

# KALENDARZE ASTRONOMICZNE

**na lata 2021 – 2030**

oraz tabele zjawisk na lata 2021 – 2040

## Piwnice

Centrum Astronomii UMK, Toruń 2020

Ponizej dla każdego roku są kalendarze numeryczne  
(po grudniu znajduje się kalendarium najważniejszych świąt  
danego roku).

Diagramy wschodów i zachodów Słońca i kilku planet dla kolejnych lat  
oraz wspomniane tabele zjawisk umieszczono po ostatnim kalendarzu.

# Kalendarz astronomiczny 2021

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżycy i paralaksy horyzontalnej Księżycy. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!

*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2021 KWIECIEŃ 4**

Dla całego roku przyjęto: TDT – UT = 70 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 10.37**, Lato **VI 21, 4.32**, Jesień **IX 22, 20.21**, Zima **XII 21, 16.59**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **28 marca do 31 października 2021 r.**

### Oznaczenia:

Dr — dzień 2021 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżycy)

$\delta$  — deklinacja (Słońca lub Księżycy)

R — odległość (Słońca lub Księżycy)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżycy

Wsch — wschód (Słońca, Księżycy lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżycy lub planety)

# STYCZEŃ 2021

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
1	1	Pią	216	18.59311	-3.36	18.4855	-22.58	0.98326	8.4908	21.53	60.358	2.3	94	800	1149.4	1539	1759	126.9	955	1047	1	
2	2	Sob	217	19.03277	-4.04	18.5319	-22.52	0.98326	9.4352	18.33	59.864	3.3	88	759	1149.8	1540	1918	220.2	1024	1043	2	
3	3	Nie	218	19.07242	-4.32	18.5743	-22.46	0.98326	10.3659	14.12	59.399	4.3	81	759	1150.3	1542	2040	311.8	1046	1039	3	
4	4	Pon	219	19.11208	-4.59	19.0207	-22.40	0.98327	11.2836	9.05	58.966	5.3	71	759	1150.7	1543	2201	401.6	1105	1035	4	
5	5	Wto	220	19.15174	-5.26	19.0630	-22.33	0.98328	12.1921	3.27	58.566	6.3	61	759	1151.2	1544	2324	450.2	1121	1031	5	
6	6	Śro	221	19.19139	-5.52	19.1053	-22.26	0.98330	13.1006	-2.25	58.209	0.1	49	758	1151.6	1545	****	538.4	1137	1028	6	
7	7	Czw	222	19.23105	-6.18	19.1516	-22.19	0.98333	14.0153	-8.13	57.913	1.1	38	758	1152.1	1547	047	627.5	1153	1024	7	
8	8	Pią	223	19.27070	-6.44	19.1938	-22.11	0.98335	14.5540	-13.40	57.701	2.1	27	757	1152.5	1548	212	718.6	1212	1020	8	
9	9	Sob	224	19.31036	-7.09	19.2359	-22.02	0.98339	15.5212	-18.22	57.605	3.1	18	756	1152.9	1550	339	812.7	1236	1016	9	
10	10	Nie	225	19.35001	-7.33	19.2820	-21.53	0.98343	16.5140	-21.60	57.653	4.1	10	756	1153.3	1551	505	910.0	1307	1012	10	
11	11	Pon	226	19.38567	-7.57	19.3241	-21.44	0.98347	17.5326	-24.14	57.868	5.1	4	755	1153.7	1553	627	1010.1	1349	1008	11	
12	12	Wto	227	19.42533	-8.20	19.3701	-21.34	0.98351	18.5602	-24.52	58.257	6.1	1	754	1154.1	1554	736	1111.2	1446	1004	12	
13	13	Śro	228	19.46498	-8.43	19.4120	-21.24	0.98356	19.5729	-23.54	58.809	0.2	0	754	1154.5	1556	830	1211.1	1556	1000	13	
14	14	Czw	229	19.50464	-9.05	19.4538	-21.13	0.98361	20.5606	-21.30	59.491	1.2	2	753	1154.8	1557	909	1307.8	1714	956	14	
15	15	Pią	230	19.54429	-9.26	19.4956	-21.02	0.98367	21.5059	-17.59	60.256	2.2	6	752	1155.2	1559	937	1400.4	1833	952	15	
16	16	Sob	231	19.58395	-9.47	19.5413	-20.51	0.98373	22.4204	-13.41	61.043	3.2	12	751	1155.5	1601	958	1448.7	1951	948	16	
17	17	Nie	232	20.02361	-10.07	19.5830	-20.39	0.98380	23.2953	-8.53	61.792	4.2	19	750	1155.9	1602	1015	1533.6	2105	944	17	
18	18	Pon	233	20.06326	-10.26	20.0246	-20.27	0.98386	0.1517	-3.51	62.444	5.2	28	749	1156.2	1604	1029	1615.9	2216	940	18	
19	19	Wto	234	20.10291	-10.44	20.0701	-20.14	0.98394	0.5915	1.14	62.950	6.2	37	748	1156.5	1606	1042	1656.9	2326	936	19	
20	20	Śro	235	20.14257	-11.02	20.1115	-20.01	0.98401	1.4244	6.12	63.274	7.2	46	746	1156.8	1608	1055	1737.6	****	932	20	
21	21	Czw	236	20.18223	-11.19	20.1528	-19.48	0.98409	2.2641	10.55	63.397	0.6	55	745	1157.1	1609	1109	1819.0	036	929	21	
22	22	Pią	237	20.22188	-11.35	20.1941	-19.34	0.98418	3.1160	15.13	63.314	1.6	65	744	1157.3	1611	1125	1902.2	145	925	22	
23	23	Sob	238	20.26154	-11.51	20.2353	-19.20	0.98427	3.5923	18.57	63.037	2.6	73	743	1157.6	1613	1145	1947.8	256	921	23	
24	24	Nie	239	20.30119	-12.05	20.2804	-19.06	0.98437	4.4922	21.57	62.594	3.6	81	741	1157.8	1615	1210	2036.4	406	917	24	
25	25	Pon	240	20.34085	-12.19	20.3214	-18.51	0.98447	5.4207	23.59	62.024	4.6	88	740	1158.1	1617	1245	2127.9	515	913	25	
26	26	Wto	241	20.38051	-12.32	20.3624	-18.36	0.98458	6.3716	24.52	61.373	5.6	94	739	1158.3	1619	1331	2221.9	617	909	26	
27	27	Śro	242	20.42016	-12.44	20.4033	-18.20	0.98470	7.3357	24.28	60.692	6.6	98	737	1158.5	1620	1430	2316.9	711	905	27	
28	28	Czw	243	20.45582	-12.55	20.4441	-18.04	0.98482	8.3060	22.41	60.032	7.6	100	736	1158.7	1622	1542	****	753	901	28	
29	29	Pią	244	20.49547	-13.06	20.4848	-17.48	0.98494	9.2716	19.37	59.435	0.7	99	734	1158.8	1624	1701	011.8	826	857	29	
30	30	Sob	245	20.53513	-13.16	20.5254	-17.32	0.98508	10.2202	15.25	58.933	1.7	97	732	1159.0	1626	1824	105.3	851	853	30	
31	31	Nie	246	20.57478	-13.24	20.5659	-17.15	0.98522	11.1510	10.21	58.543	2.7	92	731	1159.2	1628	1948	157.0	911	849	31	

Fazy Księżyca [Dm, h.mm]:      3kw 6, 10.37      Now 13, 6.00      1kw 20, 22.02      Pełn 28, 20.16

# STYCZEŃ 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.49	8.45	15.59	6.32	14.13	11.36	1.50	9.14	17.30	9.10	17.24	12.02	2.39	10.46	21.53	8.56	16.38		
	18.815	-22.96	19.355	-24.26	17.350	-22.49	1.685	11.43	20.353	-19.99	20.268	-20.16	2.308	13.36	23.324	-5.54	19.767	-22.43	6.72431	1
3	5.51	17.51	8.48	16.09	6.36	14.14	11.29	1.48	9.07	17.25	9.03	17.17	11.54	2.31	10.39	21.45	8.48	16.30		
	18.962	-22.77	19.590	-23.80	17.530	-22.72	1.739	11.78	20.385	-19.88	20.284	-20.11	2.306	13.35	23.326	-5.52	19.772	-22.42	6.85573	3
5	5.51	17.53	8.50	16.20	6.41	14.15	11.22	1.45	9.01	17.19	8.56	17.11	11.46	2.23	10.31	21.38	8.41	16.23		
	19.108	-22.56	19.825	-23.23	17.711	-22.91	1.795	12.13	20.417	-19.78	20.300	-20.06	2.305	13.34	23.329	-5.51	19.776	-22.41	6.98715	5
7	5.50	17.55	8.51	16.31	6.45	14.17	11.16	1.43	8.54	17.14	8.48	17.04	11.38	2.15	10.23	21.30	8.33	16.15		
	19.254	-22.31	20.058	-22.56	17.892	-23.04	1.853	12.49	20.449	-19.67	20.316	-20.01	2.304	13.34	23.331	-5.49	19.781	-22.40	7.11857	7
9	5.50	17.57	8.51	16.42	6.48	14.20	11.10	1.41	8.47	17.09	8.41	16.57	11.30	2.07	10.15	21.22	8.25	16.08		
	19.400	-22.03	20.287	-21.79	18.074	-23.13	1.911	12.84	20.481	-19.56	20.332	-19.96	2.304	13.34	23.334	-5.47	19.786	-22.39	7.24999	9
11	5.49	17.60	8.51	16.54	6.52	14.22	11.03	1.38	8.41	17.04	8.34	16.51	11.22	1.59	10.07	21.15	8.18	16.00		
	19.545	-21.73	20.512	-20.93	18.255	-23.18	1.971	13.20	20.513	-19.45	20.348	-19.91	2.303	13.34	23.337	-5.45	19.791	-22.39	7.38141	11
13	5.48	18.02	8.49	17.06	6.55	14.25	10.57	1.36	8.34	16.59	8.27	16.44	11.14	1.51	9.60	21.07	8.10	15.53		
	19.689	-21.40	20.732	-19.97	18.437	-23.17	2.032	13.56	20.545	-19.34	20.365	-19.86	2.303	13.34	23.340	-5.43	19.795	-22.38	7.51284	13
15	5.47	18.05	8.47	17.17	6.57	14.29	10.50	1.34	8.27	16.53	8.19	16.38	11.06	1.43	9.52	20.60	8.03	15.45		
	19.832	-21.04	20.943	-18.93	18.619	-23.12	2.094	13.91	20.577	-19.22	20.381	-19.81	2.303	13.34	23.343	-5.41	19.800	-22.37	7.64426	15
17	5.46	18.08	8.44	17.29	6.60	14.33	10.44	1.32	8.20	16.48	8.12	16.31	10.59	1.36	9.44	20.52	7.55	15.38		
	19.975	-20.65	21.143	-17.82	18.801	-23.02	2.158	14.27	20.609	-19.11	20.397	-19.75	2.303	13.34	23.346	-5.39	19.805	-22.36	7.77568	17
19	5.44	18.10	8.40	17.39	7.02	14.37	10.38	1.31	8.14	16.43	8.05	16.25	10.51	1.28	9.36	20.45	7.47	15.30		
	20.117	-20.23	21.330	-16.66	18.982	-22.87	2.222	14.63	20.642	-18.99	20.414	-19.70	2.304	13.34	23.349	-5.37	19.810	-22.35	7.90709	19
21	5.42	18.13	8.35	17.49	7.03	14.41	10.32	1.29	8.07	16.38	7.58	16.18	10.43	1.20	9.29	20.37	7.40	15.23		
	20.258	-19.80	21.498	-15.48	19.163	-22.68	2.287	14.99	20.674	-18.87	20.430	-19.65	2.304	13.35	23.353	-5.35	19.814	-22.34	8.03851	21
23	5.40	18.16	8.29	17.56	7.04	14.46	10.26	1.27	8.00	16.33	7.50	16.12	10.35	1.12	9.21	20.30	7.32	15.15		
	20.398	-19.33	21.643	-14.32	19.343	-22.44	2.353	15.34	20.706	-18.75	20.447	-19.59	2.305	13.35	23.356	-5.33	19.819	-22.33	8.16993	23
25	5.38	18.19	8.21	18.02	7.05	14.51	10.20	1.25	7.54	16.28	7.43	16.05	10.27	1.04	9.13	20.22	7.24	15.08		
	20.537	-18.85	21.758	-13.23	19.523	-22.15	2.421	15.69	20.738	-18.63	20.463	-19.54	2.306	13.36	23.360	-5.30	19.824	-22.32	8.30136	25
27	5.36	18.22	8.12	18.05	7.05	14.56	10.14	1.24	7.47	16.23	7.36	15.59	10.19	0.57	9.05	20.14	7.17	15.00		
	20.676	-18.34	21.837	-12.25	19.702	-21.82	2.489	16.04	20.771	-18.51	20.479	-19.48	2.308	13.37	23.364	-5.28	19.828	-22.31	8.43278	27
29	5.34	18.26	8.02	18.04	7.06	15.01	10.08	1.22	7.40	16.17	7.29	15.52	10.11	0.49	8.57	20.07	7.09	14.52		
	20.813	-17.80	21.874	-11.44	19.879	-21.45	2.558	16.39	20.803	-18.39	20.496	-19.43	2.309	13.38	23.367	-5.25	19.833	-22.30	8.56420	29
31	5.31	18.29	7.51	17.58	7.05	15.07	10.02	1.21	7.33	16.12	7.21	15.46	10.04	0.41	8.50	19.59	7.01	14.45		
	20.950	-17.25	21.866	-10.87	20.056	-21.03	2.628	16.74	20.835	-18.26	20.512	-19.37	2.311	13.39	23.371	-5.23	19.838	-22.30	8.69562	31

# LUTY 2021

Piwnice, CA UMK			←———— Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) —————→										..... Czas strefowy [hhmm.] .....								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
32	1	Pon	247	21.01444	-13.33	21.0104	-16.58	0.98536	12.0701	4.41	58.269	3.7	84	729	1159.3	1630	2111	247.0	928	845	1
33	2	Wto	248	21.05409	-13.40	21.0508	-16.41	0.98551	12.5818	-1.15	58.103	4.7	75	728	1159.4	1632	2235	336.1	944	841	2
34	3	Śro	249	21.09375	-13.46	21.0911	-16.23	0.98566	13.4957	-7.07	58.033	5.7	64	726	1159.5	1634	****	425.2	1000	837	3
35	4	Czw	250	21.13341	-13.52	21.1313	-16.05	0.98582	14.4253	-12.39	58.046	6.7	53	724	1159.6	1636	000	515.4	1017	833	4
36	5	Pią	251	21.17306	-13.57	21.1715	-15.47	0.98599	15.3753	-17.28	58.131	0.7	42	722	1159.7	1638	125	607.7	1039	830	5
37	6	Sob	252	21.21272	-14.01	21.2115	-15.28	0.98615	16.3520	-21.18	58.286	1.7	31	720	1159.8	1640	250	702.7	1106	826	6
38	7	Nie	253	21.25237	-14.04	21.2515	-15.10	0.98633	17.3460	-23.51	58.514	2.7	21	719	1159.8	1642	412	800.2	1144	822	7
39	8	Pon	254	21.29203	-14.07	21.2914	-14.51	0.98650	18.3553	-24.55	58.821	3.7	13	717	1159.9	1644	524	859.4	1234	818	8
40	9	Wto	255	21.33168	-14.09	21.3313	-14.31	0.98668	19.3627	-24.27	59.213	4.7	6	715	1159.9	1646	622	958.5	1337	814	9
41	10	Śro	256	21.37134	-14.10	21.3710	-14.12	0.98686	20.3506	-22.31	59.690	5.7	2	713	1159.9	1648	706	1055.5	1451	810	10
42	11	Czw	257	21.41100	-14.10	21.4107	-13.52	0.98704	21.3045	-19.23	60.243	6.7	0	711	1159.9	1650	738	1149.2	1610	806	11
43	12	Pią	258	21.45065	-14.09	21.4503	-13.32	0.98723	22.2259	-15.18	60.849	0.7	0	709	1159.9	1651	801	1239.2	1728	802	12
44	13	Sob	259	21.49031	-14.08	21.4858	-13.12	0.98742	23.1202	-10.37	61.476	1.7	3	707	1159.9	1653	819	1325.6	1845	758	13
45	14	Nie	260	21.52596	-14.06	21.5253	-12.52	0.98761	23.5833	-5.34	62.081	2.7	7	705	1159.9	1655	834	1409.3	1958	754	14
46	15	Pon	261	21.56562	-14.03	21.5647	-12.31	0.98780	0.4319	-0.24	62.620	3.7	13	703	1159.8	1657	848	1451.2	2109	750	15
47	16	Wto	262	22.00527	-13.60	22.0040	-12.10	0.98800	1.2714	4.42	63.047	4.7	21	701	1159.7	1659	900	1532.2	2220	746	16
48	17	Śro	263	22.04493	-13.56	22.0432	-11.49	0.98819	2.1112	9.33	63.322	5.7	29	659	1159.7	1701	914	1613.5	2330	742	17
49	18	Czw	264	22.08458	-13.51	22.0824	-11.28	0.98840	2.5602	14.02	63.415	6.7	38	657	1159.6	1703	928	1655.9	****	738	18
50	19	Pią	265	22.12424	-13.45	22.1215	-11.07	0.98860	3.4229	17.58	63.308	7.7	47	655	1159.5	1705	946	1740.1	040	735	19
51	20	Sob	266	22.16389	-13.39	22.1605	-10.45	0.98881	4.3110	21.13	62.998	0.7	56	653	1159.4	1707	1009	1827.0	150	731	20
52	21	Nie	267	22.20355	-13.32	22.1955	-10.23	0.98902	5.2224	23.34	62.499	1.7	66	650	1159.3	1709	1039	1916.7	259	727	21
53	22	Pon	268	22.24321	-13.24	22.2344	-10.02	0.98924	6.1608	24.52	61.841	2.7	75	648	1159.2	1711	1119	2009.0	404	723	22
54	23	Wto	269	22.28286	-13.16	22.2732	-9.40	0.98946	7.1151	24.55	61.068	3.7	83	646	1159.0	1713	1212	2103.3	501	719	23
55	24	Śro	270	22.32252	-13.07	22.3120	-9.17	0.98968	8.0836	23.39	60.237	4.7	90	644	1158.9	1715	1318	2158.2	548	715	24
56	25	Czw	271	22.36217	-12.58	22.3507	-8.55	0.98991	9.0522	21.01	59.414	5.7	96	642	1158.7	1717	1435	2252.7	624	711	25
57	26	Pią	272	22.40183	-12.48	22.3853	-8.33	0.99014	10.0117	17.08	58.662	6.7	99	639	1158.5	1719	1558	2346.0	652	707	26
58	27	Sob	273	22.44148	-12.37	22.4239	-8.10	0.99038	10.5556	12.13	58.042	0.1	100	637	1158.4	1720	1724	*****	714	703	27
59	28	Nie	274	22.48114	-12.26	22.4625	-7.47	0.99062	11.4926	6.32	57.597	1.1	98	635	1158.2	1722	1850	037.9	732	659	28

Fazy Księżyca [Dm, h.mm]:      3kw 4, 18.37      Nów 11, 20.06      1kw 19, 19.47      Pełn 27, 9.17

# LUTY 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	5.30	18.30	7.44	17.54	7.05	15.10	9.59	1.20	7.30	16.10	7.18	15.42	9.60	0.37	8.46	19.56	6.58	14.41		
	21.018	-16.97	21.843	-10.69	20.144	-20.81	2.663	16.91	20.851	-18.20	20.520	-19.35	2.312	13.39	23.373	-5.22	19.840	-22.29	8.76133	1
3	5.27	18.34	7.31	17.42	7.04	15.16	9.53	1.19	7.23	16.05	7.10	15.36	9.52	0.30	8.38	19.48	6.50	14.34		
	21.153	-16.38	21.765	-10.53	20.319	-20.33	2.734	17.25	20.883	-18.08	20.536	-19.29	2.314	13.41	23.377	-5.19	19.845	-22.28	8.89274	3
5	5.24	18.37	7.17	17.27	7.03	15.22	9.47	1.17	7.17	15.59	7.03	15.29	9.44	0.22	8.30	19.41	6.42	14.26		
	21.287	-15.78	21.648	-10.67	20.493	-19.81	2.806	17.59	20.915	-17.95	20.553	-19.23	2.317	13.42	23.381	-5.16	19.849	-22.27	9.02416	5
7	5.21	18.40	7.02	17.08	7.02	15.28	9.42	1.16	7.10	15.54	6.56	15.23	9.36	0.14	8.23	19.33	6.35	14.19		
	21.421	-15.16	21.503	-11.06	20.666	-19.25	2.878	17.92	20.947	-17.82	20.569	-19.18	2.319	13.43	23.385	-5.14	19.854	-22.27	9.15558	7
9	5.18	18.44	6.49	16.48	7.01	15.35	9.36	1.15	7.03	15.49	6.49	15.16	9.29	0.07	8.15	19.26	6.27	14.11		
	21.554	-14.52	21.348	-11.65	20.838	-18.65	2.952	18.25	20.979	-17.69	20.585	-19.12	2.322	13.45	23.389	-5.11	19.858	-22.26	9.28701	9
11	5.14	18.47	6.36	16.27	6.59	15.41	9.31	1.13	6.56	15.44	6.41	15.10	9.21	23.55	8.07	19.18	6.19	14.04		
	21.685	-13.87	21.197	-12.35	21.008	-18.02	3.026	18.57	21.011	-17.56	20.601	-19.07	2.325	13.46	23.394	-5.08	19.862	-22.25	9.41843	11
13	5.11	18.51	6.24	16.07	6.57	15.47	9.25	1.12	6.49	15.39	6.34	15.03	9.13	23.48	7.59	19.11	6.12	13.56		
	21.816	-13.20	21.065	-13.09	21.177	-17.35	3.101	18.89	21.043	-17.43	20.616	-19.01	2.328	13.48	23.398	-5.06	19.867	-22.24	9.54985	13
15	5.07	18.54	6.15	15.48	6.55	15.54	9.20	1.11	6.43	15.34	6.27	14.57	9.05	23.40	7.51	19.03	6.04	13.48		
	21.946	-12.52	20.963	-13.80	21.345	-16.65	3.177	19.20	21.074	-17.30	20.632	-18.96	2.332	13.50	23.402	-5.03	19.871	-22.24	9.68126	15
17	5.03	18.58	6.06	15.33	6.52	16.01	9.14	1.10	6.36	15.29	6.20	14.50	8.57	23.33	7.44	18.56	5.56	13.41		
	22.076	-11.82	20.894	-14.45	21.511	-15.92	3.253	19.51	21.106	-17.17	20.648	-18.90	2.335	13.52	23.407	-5.00	19.875	-22.23	9.81268	17
19	4.60	19.02	5.60	15.19	6.50	16.07	9.09	1.09	6.29	15.23	6.12	14.43	8.50	23.25	7.36	18.49	5.49	13.33		
	22.204	-11.11	20.860	-15.00	21.676	-15.16	3.330	19.81	21.137	-17.04	20.663	-18.85	2.339	13.54	23.411	-4.97	19.879	-22.22	9.94410	19
21	4.56	19.05	5.55	15.09	6.47	16.14	9.04	1.07	6.22	15.18	6.05	14.37	8.42	23.18	7.28	18.41	5.41	13.26		
	22.332	-10.39	20.859	-15.45	21.840	-14.38	3.408	20.11	21.168	-16.91	20.679	-18.79	2.343	13.56	23.416	-4.94	19.883	-22.21	10.07552	21
23	4.51	19.09	5.51	15.01	6.44	16.21	8.58	1.06	6.15	15.13	5.58	14.30	8.34	23.10	7.20	18.34	5.33	13.18		
	22.459	-9.66	20.888	-15.78	22.002	-13.56	3.486	20.40	21.199	-16.77	20.694	-18.74	2.347	13.58	23.420	-4.91	19.887	-22.21	10.20694	23
25	4.47	19.13	5.47	14.55	6.41	16.27	8.53	1.05	6.08	15.08	5.50	14.24	8.26	23.03	7.13	18.26	5.26	13.11		
	22.585	-8.92	20.943	-16.00	22.164	-12.72	3.565	20.68	21.229	-16.64	20.709	-18.69	2.352	13.60	23.425	-4.88	19.891	-22.20	10.33836	25
27	4.43	19.16	5.45	14.51	6.38	16.34	8.48	1.04	6.02	15.03	5.43	14.17	8.19	22.55	7.05	18.19	5.18	13.03		
	22.711	-8.17	21.021	-16.10	22.324	-11.86	3.644	20.95	21.260	-16.51	20.723	-18.63	2.356	13.63	23.429	-4.85	19.895	-22.20	10.46978	27

# MARZEC 2021

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →											..... Czas strefowy [hhmm.] .....									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
60	1	Pon	275	22.52079	-12.15	22.5010	-7.25	0.99086	12.4216	0.26	57.349	2.1	94	633	1158.0	1724	2017	128.8	749	655	1	
61	2	Wto	276	22.56045	-12.02	22.5354	-7.02	0.99111	13.3513	-5.43	57.298	3.1	87	630	1157.8	1726	2144	219.3	805	651	2	
62	3	Śro	277	23.00010	-11.50	22.5738	-6.39	0.99137	14.2905	-11.32	57.426	4.1	78	628	1157.6	1728	2312	310.6	822	647	3	
63	4	Czw	278	23.03576	-11.37	23.0121	-6.16	0.99162	15.2436	-16.41	57.698	5.1	68	626	1157.4	1730	****	403.4	842	643	4	
64	5	Pią	279	23.07541	-11.23	23.0505	-5.53	0.99188	16.2208	-20.49	58.077	6.1	57	623	1157.1	1732	039	458.4	908	639	5	
65	6	Sob	280	23.11507	-11.09	23.0847	-5.29	0.99214	17.2127	-23.39	58.527	0.4	46	621	1156.9	1734	203	555.5	942	636	6	
66	7	Nie	281	23.15472	-10.55	23.1230	-5.06	0.99240	18.2145	-25.02	59.017	1.4	35	619	1156.7	1735	318	654.0	1028	632	7	
67	8	Pon	282	23.19438	-10.41	23.1612	-4.43	0.99267	19.2140	-24.54	59.529	2.4	25	617	1156.4	1737	420	752.4	1127	628	8	
68	9	Wto	283	23.23404	-10.26	23.1953	-4.19	0.99294	20.1951	-23.19	60.050	3.4	16	614	1156.2	1739	507	849.2	1237	624	9	
69	10	Śro	284	23.27369	-10.10	23.2334	-3.56	0.99321	21.1516	-20.29	60.575	4.4	9	612	1155.9	1741	541	942.9	1353	620	10	
70	11	Czw	285	23.31335	-9.55	23.2715	-3.32	0.99347	22.0732	-16.40	61.100	5.4	4	609	1155.7	1743	606	1033.2	1511	616	11	
71	12	Pią	286	23.35300	-9.39	23.3056	-3.08	0.99374	22.5648	-12.08	61.618	6.4	1	607	1155.4	1745	625	1120.1	1627	612	12	
72	13	Sob	287	23.39266	-9.23	23.3436	-2.45	0.99401	23.4335	-7.10	62.119	0.0	0	605	1155.1	1747	640	1204.3	1741	608	13	
73	14	Nie	288	23.43231	-9.06	23.3816	-2.21	0.99429	0.2838	-1.59	62.583	1.0	1	602	1154.8	1748	654	1246.6	1854	604	14	
74	15	Pon	289	23.47197	-8.49	23.4156	-1.57	0.99456	1.1243	3.12	62.987	2.0	4	600	1154.6	1750	706	1327.8	2005	600	15	
75	16	Wto	290	23.51162	-8.33	23.4536	-1.34	0.99483	1.5641	8.13	63.300	3.0	9	558	1154.3	1752	719	1409.0	2115	556	16	
76	17	Śro	291	23.55128	-8.15	23.4915	-1.10	0.99510	2.4115	12.52	63.492	4.0	15	555	1154.0	1754	733	1450.9	2226	552	17	
77	18	Czw	292	23.59093	-7.58	23.5254	-0.46	0.99537	3.2708	17.01	63.533	5.0	22	553	1153.7	1756	749	1534.4	2336	548	18	
78	19	Pią	293	0.03059	-7.41	23.5634	-0.22	0.99564	4.1453	20.31	63.401	6.0	30	550	1153.4	1758	809	1619.9	****	544	19	
79	20	Sob	294	0.07024	-7.23	0.0012	0.01	0.99592	5.0451	23.10	63.080	7.0	39	548	1153.1	1759	835	1708.0	046	540	20	
80	21	Nie	295	0.10590	-7.05	0.0351	0.25	0.99619	5.5705	24.49	62.572	8.0	49	546	1152.8	1801	910	1758.5	152	537	21	
81	22	Pon	296	0.14555	-6.47	0.0730	0.49	0.99647	6.5114	25.18	61.890	0.8	58	543	1152.5	1803	957	1850.9	252	533	22	
82	23	Wto	297	0.18521	-6.29	0.1108	1.12	0.99674	7.4638	24.32	61.065	1.8	68	541	1152.2	1805	1056	1944.5	342	529	23	
83	24	Śro	298	0.22487	-6.11	0.1447	1.36	0.99702	8.4228	22.26	60.147	2.8	77	538	1151.9	1807	1208	2038.3	422	525	24	
84	25	Czw	299	0.26452	-5.53	0.1825	1.60	0.99730	9.3757	19.03	59.199	3.8	86	536	1151.6	1808	1328	2131.5	452	521	25	
85	26	Pią	300	0.30418	-5.35	0.2203	2.23	0.99758	10.3241	14.32	58.296	4.8	93	534	1151.3	1810	1452	2223.8	516	517	26	
86	27	Sob	301	0.34383	-5.16	0.2542	2.47	0.99787	11.2639	9.04	57.515	5.8	97	531	1151.0	1812	1619	2315.3	535	513	27	
87	28	Nie	302	0.38349	-4.58	0.2920	3.10	0.99815	12.2014	2.58	56.925	6.8	100	529	1150.7	1814	1747	****	552	509	28	
87	28	Nie	302	23.38250	-4.59	0.2911	3.09	0.99814	12.1760	3.14	56.945	7.8	100	629	1250.7	1914	1847	015.3	652	609	28	
88	29	Pon	303	23.42216	-4.41	0.3249	3.32	0.99843	13.1151	-3.08	56.587	0.6	99	626	1250.4	1916	2016	106.8	708	605	29	
89	30	Wto	304	23.46181	-4.23	0.3628	3.56	0.99872	14.0646	-9.22	56.494	1.6	96	624	1250.1	1917	2147	159.0	725	601	30	
90	31	Śro	305	23.50146	-4.05	0.4006	4.19	0.99901	15.0326	-15.03	56.661	2.6	90	622	1249.8	1919	2319	253.0	744	557	31	

Fazy Księżyca [Dm, h.mm]:      3kw 6, 2.30      Nów 13, 11.21      1kw 21, 15.41      Pełn 28, 20.48



# MARZEC 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST		Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)		
1	4.38	19.20	5.43	14.49	6.34	16.41	8.43	1.03	5.55	14.57	5.36	14.10	8.11	22.48	6.57	18.11	5.10	12.55			
	22.836	-7.41	21.118	-16.10	22.483	-10.98	3.724	21.22	21.290	-16.38	20.738	-18.58	2.361	13.65	23.434	-4.83	19.898	-22.19	10.60119	1	
3	4.34	19.24	5.41	14.48	6.31	16.47	8.38	1.02	5.48	14.52	5.28	14.04	8.03	22.40	6.49	18.04	5.02	12.48			
	22.961	-6.65	21.231	-15.99	22.641	-10.08	3.805	21.48	21.320	-16.24	20.753	-18.53	2.366	13.68	23.439	-4.80	19.902	-22.18	10.73261	3	
5	4.29	19.28	5.39	14.49	6.27	16.54	8.33	1.01	5.41	14.47	5.21	13.57	7.56	22.33	6.42	17.57	4.55	12.40			
	23.085	-5.88	21.359	-15.77	22.797	-9.16	3.886	21.73	21.350	-16.11	20.767	-18.47	2.371	13.70	23.443	-4.77	19.905	-22.18	10.86403	5	
7	4.24	19.32	5.38	14.52	6.23	17.01	8.28	0.59	5.34	14.42	5.14	13.50	7.48	22.26	6.34	17.49	4.47	12.32			
	23.208	-5.10	21.498	-15.46	22.954	-8.22	3.968	21.97	21.380	-15.98	20.781	-18.42	2.376	13.73	23.448	-4.74	19.909	-22.17	10.99545	7	
9	4.19	19.36	5.36	14.55	6.20	17.07	8.24	0.58	5.27	14.36	5.06	13.44	7.40	22.18	6.26	17.42	4.39	12.25			
	23.331	-4.32	21.647	-15.05	23.109	-7.27	4.050	22.21	21.409	-15.84	20.795	-18.37	2.381	13.76	23.453	-4.71	19.912	-22.17	11.12687	9	
11	4.14	19.40	5.35	15.00	6.16	17.14	8.19	0.57	5.20	14.31	4.59	13.37	7.32	22.11	6.19	17.34	4.32	12.17			
	23.454	-3.53	21.804	-14.54	23.263	-6.31	4.133	22.44	21.438	-15.71	20.808	-18.32	2.387	13.79	23.457	-4.68	19.915	-22.16	11.25829	11	
13	4.09	19.44	5.33	15.06	6.12	17.20	8.15	0.56	5.13	14.26	4.51	13.30	7.25	22.04	6.11	17.27	4.24	12.10			
	23.577	-2.74	21.968	-13.93	23.417	-5.33	4.216	22.65	21.467	-15.58	20.822	-18.27	2.393	13.82	23.462	-4.65	19.918	-22.16	11.38971	13	
15	4.04	19.48	5.32	15.12	6.08	17.27	8.10	0.55	5.06	14.20	4.44	13.23	7.17	21.56	6.03	17.19	4.16	12.02			
	23.699	-1.95	22.139	-13.24	23.570	-4.35	4.300	22.86	21.496	-15.45	20.835	-18.23	2.398	13.85	23.467	-4.62	19.921	-22.16	11.52112	15	
17	3.59	19.52	5.30	15.19	6.04	17.34	8.06	0.53	4.59	14.15	4.37	13.17	7.09	21.49	5.55	17.12	4.09	11.54			
	23.821	-1.16	22.315	-12.46	23.723	-3.36	4.384	23.06	21.524	-15.32	20.847	-18.18	2.404	13.88	23.471	-4.59	19.924	-22.15	11.65254	17	
19	3.53	19.56	5.28	15.27	5.60	17.40	8.01	0.52	4.52	14.10	4.29	13.10	7.02	21.42	5.48	17.05	4.01	11.47			
	23.943	-0.37	22.496	-11.60	23.875	-2.36	4.469	23.25	21.552	-15.19	20.860	-18.13	2.410	13.91	23.476	-4.56	19.927	-22.15	11.78396	19	
21	3.48	20.01	5.26	15.36	5.56	17.47	7.57	0.51	4.45	14.04	4.22	13.03	6.54	21.34	5.40	16.57	3.53	11.39			
	0.064	0.42	22.681	-10.65	0.027	-1.35	4.554	23.43	21.579	-15.06	20.872	-18.09	2.417	13.94	23.480	-4.53	19.929	-22.15	11.91538	21	
23	3.42	20.05	5.23	15.45	5.51	17.53	7.53	0.49	4.38	13.59	4.14	12.56	6.46	21.27	5.32	16.50	3.45	11.31			
	0.186	1.21	22.871	-9.62	0.179	-0.35	4.639	23.61	21.607	-14.93	20.884	-18.04	2.423	13.97	23.485	-4.50	19.932	-22.14	12.04680	23	
25	3.36	20.10	5.21	15.55	5.47	17.60	7.49	0.48	4.31	13.53	4.07	12.49	6.39	21.20	5.24	16.42	3.38	11.23			
	0.307	1.99	23.064	-8.50	0.331	0.66	4.725	23.77	21.633	-14.80	20.896	-18.00	2.429	14.00	23.490	-4.47	19.934	-22.14	12.17822	25	
27	3.31	20.14	5.18	16.05	5.43	18.06	7.45	0.46	4.24	13.48	3.60	12.42	6.31	21.12	5.17	16.35	3.30	11.16			
	0.428	2.78	23.262	-7.31	0.482	1.67	4.811	23.92	21.660	-14.67	20.907	-17.96	2.436	14.04	23.494	-4.44	19.936	-22.14	12.30963	27	
29	4.25	21.19	6.15	17.16	6.39	19.13	8.41	1.45	5.17	14.42	4.52	13.35	7.23	22.05	6.09	17.27	4.22	12.08			
	0.547	3.54	23.459	-6.07	0.630	2.65	4.896	24.06	21.686	-14.55	20.918	-17.92	2.443	14.07	23.499	-4.42	19.938	-22.14	12.44105	29	
31	4.19	21.24	6.13	17.28	6.35	19.19	8.38	1.43	5.10	14.37	4.45	13.28	7.16	21.58	6.01	17.20	4.14	12.00			
	0.668	4.32	23.664	-4.73	0.782	3.66	4.982	24.19	21.712	-14.42	20.929	-17.87	2.449	14.10	23.503	-4.39	19.940	-22.14	12.57247	31	

# KWIECIEŃ 2021

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
91	1	Czw	306	23.54112	-3.47	0.4345	4.42	0.99930	16.0213	-19.46	57.055	3.6	82	619	1249.5	1921	****	349.1	808	553	1	
92	2	Pią	307	23.58078	-3.29	0.4724	5.05	0.99959	17.0254	-23.11	57.623	4.6	72	617	1249.2	1923	048	447.6	839	549	2	
93	3	Sob	308	0.02043	-3.11	0.5103	5.28	0.99989	18.0432	-25.03	58.304	5.6	61	614	1248.9	1925	210	547.6	922	545	3	
94	4	Nie	309	0.06009	-2.54	0.5442	5.51	1.00018	19.0541	-25.20	59.040	6.6	50	612	1248.6	1926	317	647.4	1018	542	4	
95	5	Pon	310	0.09574	-2.37	0.5821	6.14	1.00048	20.0450	-24.05	59.781	1.0	39	610	1248.4	1928	409	745.3	1126	538	5	
96	6	Wto	311	0.13540	-2.20	1.0201	6.37	1.00077	21.0056	-21.32	60.492	2.0	29	607	1248.1	1930	446	840.0	1241	534	6	
97	7	Śro	312	0.17505	-2.03	1.0540	6.59	1.00106	21.5336	-17.57	61.148	3.0	20	605	1247.8	1932	513	930.9	1359	530	7	
98	8	Czw	313	0.21471	-1.46	1.0920	7.22	1.00136	22.4302	-13.37	61.738	4.0	13	603	1247.5	1933	533	1018.1	1515	526	8	
99	9	Pią	314	0.25436	-1.30	1.1301	7.44	1.00165	23.2949	-8.46	62.257	5.0	7	600	1247.2	1935	549	1102.4	1629	522	9	
100	10	Sob	315	0.29402	-1.14	1.1641	8.06	1.00193	0.1445	-3.38	62.704	6.0	3	558	1247.0	1937	602	1144.6	1741	518	10	
101	11	Nie	316	0.33367	-0.58	1.2022	8.28	1.00222	0.5839	1.35	63.075	7.0	0	556	1246.7	1939	614	1225.9	1852	514	11	
102	12	Pon	317	0.37333	-0.43	1.2403	8.50	1.00251	1.4219	6.41	63.367	0.3	0	553	1246.5	1941	627	1306.6	2003	510	12	
103	13	Wto	318	0.41298	-0.27	1.2744	9.12	1.00279	2.2630	11.30	63.569	1.3	2	551	1246.2	1942	640	1348.1	2113	506	13	
104	14	Śro	319	0.45264	-0.13	1.3126	9.34	1.00307	3.1153	15.53	63.667	2.3	5	549	1246.0	1944	655	1430.9	2224	502	14	
105	15	Czw	320	0.49229	0.02	1.3508	9.55	1.00335	3.5859	19.38	63.644	3.3	10	547	1245.7	1946	713	1515.6	2335	458	15	
106	16	Pią	321	0.53195	0.16	1.3851	10.16	1.00362	4.4808	22.36	63.481	4.3	16	544	1245.5	1948	736	1602.6	****	454	16	
107	17	Sob	322	0.57161	0.30	1.4233	10.37	1.00390	5.3920	24.36	63.163	5.3	23	542	1245.2	1950	807	1651.9	043	450	17	
108	18	Nie	323	1.01126	0.43	1.4617	10.58	1.00417	6.3219	25.30	62.681	6.3	32	540	1245.0	1951	848	1743.0	145	446	18	
109	19	Pon	324	1.05092	0.56	1.5000	11.19	1.00444	7.2626	25.11	62.037	7.3	41	538	1244.8	1953	942	1835.2	238	443	19	
110	20	Wto	325	1.09057	1.09	1.5344	11.40	1.00471	8.2058	23.37	61.246	0.1	51	535	1244.6	1955	1047	1927.6	321	439	20	
111	21	Śro	326	1.13023	1.21	1.5728	12.00	1.00497	9.1513	20.48	60.339	1.1	62	533	1244.4	1957	1202	2019.5	354	435	21	
112	22	Czw	327	1.16588	1.33	2.0113	12.20	1.00524	10.0848	16.50	59.367	2.1	72	531	1244.2	1959	1322	2110.6	419	431	22	
113	23	Pią	328	1.20554	1.44	2.0458	12.40	1.00551	11.0143	11.51	58.394	3.1	81	529	1244.0	2000	1446	2201.2	439	427	23	
114	24	Sob	329	1.24519	1.55	2.0844	13.00	1.00577	11.5423	6.04	57.499	4.1	89	527	1243.8	2002	1612	2251.7	456	423	24	
115	25	Nie	330	1.28485	2.06	2.1230	13.20	1.00604	12.4728	-0.12	56.764	5.1	96	525	1243.7	2004	1741	2343.1	512	419	25	
116	26	Pon	331	1.32450	2.16	2.1617	13.39	1.00630	13.4151	-6.36	56.260	6.1	99	522	1243.5	2006	1911	*****	528	415	26	
117	27	Wto	332	1.36416	2.25	2.2004	13.58	1.00657	14.3822	-12.43	56.039	0.3	100	520	1243.3	2007	2045	036.4	545	411	27	
118	28	Śro	333	1.40382	2.34	2.2351	14.17	1.00683	15.3737	-18.04	56.123	1.3	98	518	1243.2	2009	2219	132.6	607	407	28	
119	29	Czw	334	1.44347	2.43	2.2739	14.36	1.00709	16.3933	-22.11	56.494	2.3	92	516	1243.0	2011	2348	231.8	635	403	29	
120	30	Pią	335	1.48313	2.51	2.3128	14.54	1.00735	17.4314	-24.45	57.107	3.3	85	514	1242.9	2013	****	333.6	713	359	30	

Fazy Księżycyca [Dm, h.mm]:      3kw 4, 12.02      Nów 12, 4.31      1kw 20, 8.59      Pełn 27, 5.32

# KWIECIEŃ 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.16	21.26	6.11	17.34	6.33	19.23	8.36	1.42	5.07	14.34	4.41	13.25	7.12	21.54	5.57	17.16	4.10	11.56		
	0.729	4.70	23.768	-4.03	0.858	4.16	5.026	24.25	21.724	-14.36	20.934	-17.86	2.453	14.12	23.505	-4.37	19.941	-22.14	12.63818	1
3	4.10	21.31	6.08	17.46	6.29	19.29	8.32	1.40	4.59	14.28	4.33	13.18	7.04	21.47	5.49	17.09	4.03	11.49		
	0.851	5.47	23.980	-2.58	1.010	5.15	5.113	24.36	21.750	-14.24	20.945	-17.82	2.460	14.15	23.510	-4.35	19.943	-22.14	12.76960	3
5	4.04	21.36	6.05	17.59	6.24	19.36	8.29	1.39	4.52	14.22	4.26	13.11	6.57	21.40	5.42	17.01	3.55	11.41		
	0.973	6.23	0.196	-1.06	1.163	6.14	5.200	24.46	21.775	-14.12	20.955	-17.78	2.467	14.19	23.514	-4.32	19.945	-22.14	12.90102	5
7	3.57	21.41	6.02	18.13	6.20	19.42	8.25	1.37	4.45	14.17	4.18	13.04	6.49	21.33	5.34	16.54	3.47	11.33		
	1.095	6.99	0.418	0.52	1.316	7.12	5.288	24.56	21.799	-14.00	20.964	-17.74	2.474	14.22	23.519	-4.29	19.946	-22.14	13.03244	7
9	3.51	21.47	5.59	18.28	6.16	19.49	8.22	1.35	4.38	14.11	4.11	12.57	6.41	21.25	5.26	16.46	3.39	11.25		
	1.217	7.73	0.644	2.16	1.469	8.09	5.376	24.64	21.823	-13.88	20.974	-17.71	2.481	14.26	23.523	-4.26	19.948	-22.14	13.16386	9
11	3.45	21.52	5.56	18.43	6.12	19.56	8.19	1.33	4.31	14.05	4.03	12.50	6.34	21.18	5.18	16.39	3.32	11.18		
	1.339	8.47	0.877	3.86	1.623	9.04	5.464	24.71	21.847	-13.77	20.982	-17.68	2.488	14.29	23.527	-4.24	19.949	-22.14	13.29527	11
13	3.38	21.58	5.53	18.59	6.08	20.03	8.16	1.31	4.24	13.59	3.56	12.42	6.26	21.11	5.11	16.31	3.24	11.10		
	1.462	9.20	1.116	5.60	1.778	9.99	5.553	24.77	21.870	-13.65	20.991	-17.65	2.495	14.33	23.531	-4.21	19.950	-22.14	13.42669	13
15	3.31	22.04	5.50	19.15	6.05	20.09	8.13	1.29	4.17	13.54	3.48	12.35	6.18	21.04	5.03	16.24	3.16	11.02		
	1.586	9.92	1.361	7.38	1.934	10.91	5.641	24.82	21.892	-13.54	20.999	-17.62	2.503	14.36	23.535	-4.19	19.951	-22.14	13.55811	15
17	3.24	22.10	5.47	19.32	6.01	20.16	8.10	1.26	4.09	13.48	3.41	12.28	6.11	20.57	4.55	16.16	3.08	10.54		
	1.709	10.62	1.613	9.18	2.090	11.82	5.730	24.86	21.915	-13.43	21.007	-17.59	2.510	14.40	23.539	-4.16	19.952	-22.14	13.68953	17
19	3.17	22.16	5.45	19.50	5.57	20.23	8.07	1.24	4.02	13.42	3.33	12.21	6.03	20.49	4.47	16.09	3.00	10.46		
	1.833	11.32	1.871	10.98	2.248	12.71	5.819	24.88	21.936	-13.32	21.015	-17.56	2.517	14.44	23.543	-4.14	19.953	-22.15	13.82095	19
21	3.10	22.22	5.42	20.08	5.54	20.30	8.05	1.22	3.55	13.36	3.25	12.14	5.55	20.42	4.40	16.01	2.53	10.38		
	1.958	12.00	2.134	12.76	2.406	13.58	5.908	24.90	21.958	-13.22	21.022	-17.54	2.525	14.47	23.547	-4.11	19.953	-22.15	13.95237	21
23	3.03	22.29	5.40	20.27	5.50	20.36	8.02	1.19	3.48	13.30	3.18	12.06	5.48	20.35	4.32	15.54	2.45	10.31		
	2.083	12.67	2.403	14.50	2.566	14.43	5.997	24.90	21.978	-13.11	21.028	-17.51	2.532	14.51	23.551	-4.09	19.954	-22.15	14.08379	23
25	2.55	22.36	5.38	20.46	5.47	20.43	7.60	1.17	3.41	13.24	3.10	11.59	5.40	20.28	4.24	15.46	2.37	10.23		
	2.208	13.33	2.674	16.17	2.726	15.26	6.086	24.89	21.998	-13.01	21.034	-17.49	2.540	14.55	23.555	-4.07	19.954	-22.16	14.21520	25
27	2.47	22.44	5.36	21.04	5.44	20.50	7.57	1.14	3.33	13.18	3.02	11.51	5.32	20.21	4.16	15.39	2.29	10.15		
	2.334	13.97	2.945	17.75	2.888	16.06	6.175	24.87	22.018	-12.91	21.040	-17.47	2.547	14.58	23.558	-4.05	19.954	-22.16	14.34662	27
29	2.39	22.51	5.35	21.22	5.41	20.57	7.55	1.11	3.26	13.11	2.55	11.44	5.25	20.13	4.09	15.31	2.21	10.07		
	2.461	14.59	3.215	19.20	3.051	16.83	6.264	24.84	22.037	-12.82	21.046	-17.45	2.555	14.62	23.562	-4.03	19.954	-22.17	14.47804	29

# MAJ 2021

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce				Księżyc				Gal.	
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
121	1	Sob	336	1.52278	2.58	2.3517	15.12	1.00761	18.4656	-25.36	57.894	4.3	76	512	1242.8	2015	106	436.2	805	355	1	
122	2	Nie	337	1.56244	3.05	2.3907	15.30	1.00787	19.4844	-24.45	58.779	5.3	65	510	1242.7	2016	206	537.3	911	351	2	
123	3	Pon	338	2.00210	3.11	2.4257	15.48	1.00813	20.4707	-22.29	59.690	6.3	54	508	1242.6	2018	249	634.8	1027	347	3	
124	4	Wto	339	2.04175	3.17	2.4648	16.05	1.00838	21.4128	-19.03	60.568	0.6	44	506	1242.5	2020	319	728.0	1146	344	4	
125	5	Śro	340	2.08141	3.22	2.5040	16.22	1.00863	22.3159	-14.49	61.367	1.6	34	504	1242.4	2021	341	816.8	1304	340	5	
126	6	Czw	341	2.12106	3.26	2.5432	16.39	1.00888	23.1920	-10.02	62.059	2.6	25	503	1242.3	2023	358	902.0	1419	336	6	
127	7	Pią	342	2.16072	3.30	2.5824	16.56	1.00913	0.0424	-4.57	62.631	3.6	17	501	1242.2	2025	411	944.5	1531	332	7	
128	8	Sob	343	2.20037	3.34	3.0217	17.12	1.00937	0.4809	0.15	63.078	4.6	10	459	1242.2	2027	424	1025.5	1642	328	8	
129	9	Nie	344	2.24003	3.36	3.0611	17.28	1.00961	1.3129	5.23	63.405	5.6	5	457	1242.1	2028	436	1106.0	1752	324	9	
130	10	Pon	345	2.27568	3.39	3.1006	17.44	1.00984	2.1514	10.18	63.617	6.6	2	455	1242.1	2030	448	1146.9	1902	320	10	
131	11	Wto	346	2.31534	3.40	3.1400	17.59	1.01007	3.0007	14.50	63.722	7.6	0	454	1242.1	2032	502	1229.1	2013	316	11	
132	12	Śro	347	2.35499	3.41	3.1756	18.14	1.01030	3.4643	18.47	63.721	0.6	0	452	1242.1	2033	519	1313.1	2124	312	12	
133	13	Czw	348	2.39465	3.42	3.2152	18.29	1.01052	4.3524	21.59	63.615	1.6	2	450	1242.1	2035	540	1359.4	2234	308	13	
134	14	Pią	349	2.43431	3.42	3.2549	18.44	1.01074	5.2610	24.16	63.398	2.6	6	449	1242.1	2037	608	1448.1	2339	304	14	
135	15	Sob	350	2.47396	3.41	3.2946	18.58	1.01095	6.1843	25.29	63.064	3.6	11	447	1242.1	2038	645	1538.6	****	300	15	
136	16	Nie	351	2.51362	3.40	3.3344	19.12	1.01116	7.1222	25.30	62.605	4.6	18	445	1242.1	2040	734	1630.2	035	256	16	
137	17	Pon	352	2.55327	3.38	3.3742	19.25	1.01136	8.0617	24.17	62.018	5.6	26	444	1242.1	2041	835	1721.9	121	252	17	
138	18	Wto	353	2.59293	3.36	3.4141	19.39	1.01156	8.5942	21.51	61.308	6.6	36	442	1242.2	2043	946	1812.9	156	249	18	
139	19	Śro	354	3.03258	3.33	3.4540	19.51	1.01176	9.5212	18.18	60.492	7.6	46	441	1242.2	2045	1102	1902.9	223	245	19	
140	20	Czw	355	3.07224	3.29	3.4940	20.04	1.01196	10.4346	13.45	59.600	0.6	57	439	1242.3	2046	1223	1951.9	245	241	20	
141	21	Pią	356	3.11190	3.26	3.5341	20.16	1.01215	11.3446	8.24	58.680	1.6	67	438	1242.3	2048	1345	2040.5	302	237	21	
142	22	Sob	357	3.15155	3.21	3.5741	20.28	1.01233	12.2556	2.27	57.796	2.6	78	437	1242.4	2049	1509	2129.6	317	233	22	
143	23	Nie	358	3.19121	3.16	4.0143	20.40	1.01252	13.1813	-3.48	57.020	3.6	87	435	1242.5	2050	1636	2220.5	332	229	23	
144	24	Pon	359	3.23086	3.11	4.0545	20.51	1.01270	14.1239	-10.00	56.429	4.6	94	434	1242.6	2052	1807	2314.2	348	225	24	
145	25	Wto	360	3.27052	3.05	4.0947	21.01	1.01288	15.1009	-15.44	56.088	5.6	98	433	1242.7	2053	1941	*****	407	221	25	
146	26	Śro	361	3.31017	2.59	4.1350	21.12	1.01306	16.1109	-20.31	56.039	6.6	100	432	1242.8	2055	2114	011.7	430	217	26	
147	27	Czw	362	3.34583	2.52	4.1754	21.22	1.01323	17.1512	-23.52	56.293	0.9	99	431	1242.9	2056	2241	113.0	503	213	27	
148	28	Pią	363	3.38549	2.45	4.2157	21.32	1.01341	18.2046	-25.30	56.825	1.9	94	430	1243.0	2057	2353	216.9	549	209	28	
149	29	Sob	364	3.42514	2.37	4.2602	21.41	1.01358	19.2531	-25.19	57.580	2.9	88	429	1243.1	2059	****	321.0	650	205	29	
150	30	Nie	365	3.46480	2.29	4.3006	21.50	1.01374	20.2717	-23.29	58.484	3.9	79	428	1243.3	2100	045	422.6	806	201	30	
151	31	Pon	366	3.50445	2.20	4.3412	21.58	1.01391	21.2447	-20.18	59.456	4.9	70	427	1243.4	2101	121	519.6	927	157	31	

Fazy Księżyca [Dm, h.mm]:      3kw 3, 21.50      Nów 11, 21.00      1kw 19, 21.13      Pełn 26, 13.14

# MAJ 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	2.31	22.59	5.34	21.39	5.38	21.04	7.53	1.08	3.19	13.05	2.47	11.37	5.17	20.06	4.01	15.24	2.14	9.59		
	2.588	15.20	3.480	20.50	3.215	17.57	6.354	24.80	22.056	-12.73	21.051	-17.43	2.562	14.65	23.565	-4.00	19.954	-22.17	14.60946	1
3	2.22	23.08	5.33	21.55	5.35	21.10	7.51	1.05	3.11	12.59	2.39	11.29	5.10	19.59	3.53	15.16	2.06	9.51		
	2.716	15.80	3.738	21.65	3.380	18.29	6.443	24.74	22.074	-12.64	21.055	-17.42	2.570	14.69	23.568	-3.98	19.954	-22.18	14.74089	3
5	2.13	23.17	5.33	22.10	5.33	21.17	7.49	1.02	3.04	12.53	2.32	11.22	5.02	19.52	3.45	15.09	1.58	9.43		
	2.844	16.37	3.985	22.64	3.547	18.97	6.532	24.67	22.091	-12.55	21.060	-17.41	2.578	14.73	23.572	-3.96	19.953	-22.18	14.87230	5
7	2.03	23.28	5.32	22.22	5.30	21.24	7.47	0.59	2.57	12.46	2.24	11.14	4.54	19.45	3.38	15.01	1.50	9.35		
	2.973	16.93	4.221	23.45	3.714	19.61	6.621	24.60	22.108	-12.47	21.063	-17.40	2.585	14.76	23.575	-3.95	19.953	-22.19	15.00372	7
9	1.51	23.39	5.33	22.33	5.28	21.30	7.45	0.56	2.49	12.40	2.16	11.06	4.47	19.37	3.30	14.54	1.42	9.27		
	3.103	17.47	4.443	24.11	3.884	20.23	6.710	24.51	22.124	-12.39	21.067	-17.39	2.593	14.80	23.578	-3.93	19.952	-22.19	15.13514	9
11	1.39	23.53	5.33	22.41	5.27	21.37	7.43	0.52	2.42	12.33	2.09	10.59	4.39	19.30	3.22	14.46	1.34	9.19		
	3.233	17.99	4.649	24.60	4.054	20.80	6.799	24.41	22.140	-12.31	21.070	-17.38	2.600	14.83	23.581	-3.91	19.951	-22.20	15.26656	11
13	1.23	0.23	5.34	22.48	5.25	21.43	7.42	0.49	2.35	12.27	2.01	10.51	4.31	19.23	3.14	14.38	1.26	9.11		
	3.364	18.49	4.839	24.95	4.225	21.34	6.888	24.30	22.155	-12.24	21.072	-17.37	2.608	14.87	23.584	-3.89	19.950	-22.21	15.39798	13
15	*****	*****	5.34	22.52	5.24	21.49	7.40	0.45	2.27	12.20	1.53	10.43	4.24	19.16	3.06	14.31	1.19	9.03		
	3.496	18.97	5.010	25.17	4.398	21.84	6.977	24.17	22.169	-12.17	21.074	-17.37	2.615	14.90	23.586	-3.88	19.949	-22.21	15.52940	15
17	*****	*****	5.35	22.54	5.23	21.55	7.39	0.42	2.20	12.14	1.45	10.36	4.16	19.09	2.59	14.23	1.11	8.55		
	3.628	19.42	5.161	25.25	4.571	22.30	7.066	24.04	22.182	-12.10	21.076	-17.37	2.622	14.94	23.589	-3.86	19.948	-22.22	15.66082	17
19	*****	*****	5.35	22.54	5.22	22.01	7.37	0.38	2.12	12.07	1.38	10.28	4.08	19.01	2.51	14.15	1.03	8.47		
	3.761	19.86	5.292	25.22	4.746	22.72	7.154	23.89	22.195	-12.04	21.077	-17.37	2.630	14.97	23.591	-3.85	19.947	-22.23	15.79225	19
21	*****	*****	5.35	22.51	5.22	22.06	7.36	0.34	2.05	12.00	1.30	10.20	4.01	18.54	2.43	14.08	0.55	8.39		
	3.895	20.27	5.402	25.08	4.922	23.09	7.243	23.74	22.207	-11.98	21.078	-17.37	2.637	15.01	23.594	-3.83	19.946	-22.24	15.92366	21
23	*****	*****	5.34	22.46	5.22	22.11	7.35	0.30	1.57	11.53	1.22	10.12	3.53	18.47	2.35	14.00	0.47	8.31		
	4.029	20.66	5.489	24.84	5.098	23.42	7.331	23.57	22.219	-11.92	21.078	-17.37	2.644	15.04	23.596	-3.82	19.944	-22.25	16.05508	23
25	*****	*****	5.33	22.40	5.23	22.16	7.34	0.26	1.50	11.46	1.14	10.04	3.46	18.40	2.27	13.52	0.39	8.23		
	4.163	21.02	5.554	24.52	5.275	23.70	7.419	23.39	22.230	-11.87	21.078	-17.38	2.651	15.07	23.598	-3.81	19.942	-22.26	16.18650	25
27	*****	*****	5.31	22.31	5.24	22.21	7.32	0.22	1.42	11.39	1.06	9.56	3.38	18.32	2.20	13.45	0.31	8.15		
	4.298	21.37	5.595	24.12	5.453	23.94	7.507	23.21	22.240	-11.82	21.077	-17.38	2.659	15.11	23.600	-3.80	19.941	-22.26	16.31792	27
29	*****	*****	5.28	22.21	5.25	22.25	7.31	0.18	1.35	11.32	0.58	9.48	3.30	18.25	2.12	13.37	0.23	8.07		
	4.434	21.68	5.614	23.65	5.631	24.13	7.595	23.01	22.249	-11.78	21.076	-17.39	2.666	15.14	23.602	-3.79	19.939	-22.27	16.44935	29
31	*****	*****	5.24	22.08	5.26	22.29	7.30	0.14	1.27	11.25	0.50	9.40	3.23	18.18	2.04	13.29	0.15	7.59		
	4.570	21.97	5.610	23.13	5.809	24.28	7.682	22.80	22.258	-11.74	21.075	-17.41	2.673	15.17	23.604	-3.78	19.937	-22.28	16.58077	31

# CZERWIEC 2021

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
152	1	Wto	367	3.54411	2.11	4.3817	22.07	1.01407	22.1748	-16.11	60.419	5.9	59	426	1243.6	2102	146	611.7	1048	153	1
153	2	Śro	368	3.58377	2.02	4.4223	22.14	1.01423	23.0655	-11.25	61.312	0.1	49	425	1243.7	2103	205	659.1	1205	150	2
154	3	Czw	369	4.02342	1.52	4.4630	22.22	1.01438	23.5304	-6.20	62.088	1.1	39	424	1243.9	2104	220	743.2	1320	146	3
155	4	Pią	370	4.06308	1.41	4.5036	22.29	1.01453	0.3720	-1.06	62.718	2.1	30	423	1244.1	2105	233	824.9	1431	142	4
156	5	Sob	371	4.10273	1.31	4.5444	22.35	1.01467	1.2044	4.06	63.189	3.1	21	423	1244.2	2106	245	905.5	1542	138	5
157	6	Nie	372	4.14239	1.20	4.5851	22.42	1.01481	2.0414	9.05	63.500	4.1	14	422	1244.4	2107	257	946.2	1652	134	6
158	7	Pon	373	4.18204	1.09	5.0259	22.47	1.01495	2.4840	13.43	63.660	5.1	8	421	1244.6	2108	310	1027.7	1803	130	7
159	8	Wto	374	4.22170	0.57	5.0707	22.53	1.01507	3.3445	17.50	63.684	6.1	4	421	1244.8	2109	326	1111.0	1914	126	8
160	9	Śro	375	4.26135	0.45	5.1115	22.58	1.01520	4.2255	21.15	63.589	7.1	1	420	1245.0	2110	345	1156.6	2024	122	9
161	10	Czw	376	4.30101	0.33	5.1524	23.02	1.01531	5.1321	23.48	63.389	8.1	0	420	1245.2	2111	411	1244.7	2131	118	10
162	11	Pią	377	4.34067	0.21	5.1933	23.07	1.01542	6.0546	25.17	63.097	1.0	1	420	1245.4	2112	445	1334.9	2231	114	11
163	12	Sob	378	4.38032	0.09	5.2342	23.10	1.01553	6.5930	25.36	62.720	2.0	4	419	1245.6	2112	530	1426.6	2320	110	12
164	13	Nie	379	4.41598	-0.04	5.2751	23.14	1.01563	7.5336	24.40	62.261	3.0	8	419	1245.8	2113	628	1518.5	****	106	13
165	14	Pon	380	4.45564	-0.17	5.3200	23.17	1.01572	8.4710	22.31	61.724	4.0	14	419	1246.0	2113	735	1609.7	000	102	14
166	15	Wto	381	4.49529	-0.30	5.3610	23.19	1.01581	9.3933	19.15	61.110	5.0	22	419	1246.2	2114	850	1659.6	028	058	15
167	16	Śro	382	4.53495	-0.43	5.4019	23.22	1.01590	10.3035	14.60	60.426	6.0	32	419	1246.5	2114	1008	1748.0	051	054	16
168	17	Czw	383	4.57460	-0.56	5.4429	23.23	1.01598	11.2035	9.56	59.688	7.0	42	419	1246.7	2115	1128	1835.4	109	051	17
169	18	Pią	384	5.01426	-1.09	5.4838	23.25	1.01605	12.1011	4.18	58.924	0.3	53	419	1246.9	2115	1249	1922.6	124	047	18
170	19	Sob	385	5.05391	-1.22	5.5248	23.26	1.01612	13.0020	-1.42	58.173	1.3	64	419	1247.1	2116	1412	2010.8	139	043	19
171	20	Nie	386	5.09357	-1.35	5.5657	23.26	1.01619	13.5208	-7.45	57.489	2.3	75	419	1247.3	2116	1538	2101.2	153	039	20
172	21	Pon	387	5.13322	-1.48	6.0107	23.26	1.01625	14.4640	-13.32	56.933	3.3	84	419	1247.5	2116	1707	2155.1	210	035	21
173	22	Wto	388	5.17288	-2.01	6.0517	23.26	1.01631	15.4446	-18.38	56.565	4.3	92	419	1247.8	2116	1839	2253.1	230	031	22
174	23	Śro	389	5.21254	-2.14	6.0926	23.25	1.01636	16.4639	-22.35	56.436	5.3	97	420	1248.0	2116	2009	2355.2	257	027	23
175	24	Czw	390	5.25219	-2.26	6.1335	23.24	1.01641	17.5130	-24.60	56.572	6.3	100	420	1248.2	2116	2129	*****	335	023	24
176	25	Pią	391	5.29185	-2.39	6.1745	23.22	1.01646	18.5719	-25.36	56.973	0.6	99	420	1248.4	2116	2232	059.7	428	019	25
177	26	Sob	392	5.33151	-2.52	6.2154	23.21	1.01650	20.0136	-24.25	57.608	1.6	96	421	1248.6	2116	2317	203.7	539	015	26
178	27	Nie	393	5.37116	-3.04	6.2603	23.18	1.01654	21.0217	-21.40	58.420	2.6	91	421	1248.8	2116	2348	304.5	700	011	27
179	28	Pon	394	5.41082	-3.16	6.3011	23.15	1.01658	21.5828	-17.45	59.338	3.6	83	422	1249.0	2116	****	400.5	824	007	28
180	29	Wto	395	5.45047	-3.28	6.3420	23.12	1.01662	22.5015	-13.03	60.285	4.6	74	422	1249.2	2116	009	451.4	945	003	29
181	30	Śro	396	5.49013	-3.40	6.3828	23.09	1.01665	23.3825	-7.55	61.189	5.6	65	423	1249.4	2115	026	538.0	1103	2356	30

Fazy Księżyca [Dm, h.mm]:      3kw 2, 9.24      Nów 10, 12.53      1kw 18, 5.54      Pełn 24, 20.40

# CZERWIEC 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	*****	*****	5.21	22.02	5.27	22.31	7.30	0.12	1.23	11.21	0.46	9.36	3.19	18.14	2.00	13.26	0.11	7.55		
	4.638	22.11	5.601	22.85	5.899	24.33	7.726	22.69	22.262	-11.72	21.074	-17.41	2.676	15.19	23.605	-3.77	19.936	-22.29	16.64648	1
3	*****	*****	5.16	21.47	5.30	22.35	7.29	0.07	1.16	11.14	0.39	9.28	3.11	18.07	1.52	13.18	0.03	7.47		
	4.775	22.36	5.567	22.26	6.078	24.41	7.813	22.46	22.269	-11.69	21.072	-17.43	2.683	15.22	23.606	-3.76	19.934	-22.30	16.77790	3
5	*****	*****	5.10	21.32	5.32	22.38	7.28	0.03	1.08	11.07	0.31	9.20	3.04	17.60	1.44	13.10	23.52	7.39		
	4.912	22.59	5.515	21.65	6.256	24.43	7.900	22.23	22.276	-11.66	21.069	-17.44	2.690	15.25	23.608	-3.76	19.932	-22.31	16.90932	5
7	*****	*****	5.02	21.16	5.35	22.41	7.27	23.54	1.01	10.60	0.23	9.12	2.56	17.53	1.37	13.02	23.44	7.31		
	5.050	22.79	5.451	21.03	6.435	24.41	7.987	21.98	22.282	-11.64	21.067	-17.46	2.696	15.28	23.609	-3.75	19.929	-22.32	17.04074	7
9	*****	*****	4.55	20.59	5.39	22.43	7.26	23.50	0.53	10.52	0.15	9.04	2.48	17.45	1.29	12.55	23.36	7.23		
	5.188	22.96	5.378	20.43	6.614	24.34	8.073	21.73	22.287	-11.62	21.063	-17.48	2.703	15.31	23.610	-3.74	19.927	-22.33	17.17216	9
11	*****	*****	4.46	20.43	5.42	22.45	7.26	23.45	0.45	10.45	0.07	8.56	2.41	17.38	1.21	12.47	23.28	7.15		
	5.326	23.11	5.302	19.86	6.792	24.23	8.159	21.46	22.292	-11.60	21.059	-17.50	2.709	15.34	23.611	-3.74	19.924	-22.34	17.30358	11
13	*****	*****	4.37	20.27	5.47	22.46	7.25	23.40	0.38	10.37	23.55	8.47	2.33	17.31	1.13	12.39	23.20	7.07		
	5.464	23.23	5.227	19.35	6.970	24.06	8.245	21.19	22.295	-11.59	21.055	-17.52	2.715	15.37	23.612	-3.73	19.922	-22.35	17.43501	13
15	*****	*****	4.28	20.12	5.51	22.47	7.24	23.36	0.30	10.29	23.47	8.39	2.25	17.23	1.05	12.31	23.12	6.59		
	5.603	23.32	5.158	18.93	7.147	23.85	8.331	20.90	22.298	-11.59	21.051	-17.54	2.722	15.40	23.613	-3.73	19.919	-22.36	17.56643	15
17	*****	*****	4.19	19.58	5.56	22.48	7.24	23.31	0.22	10.22	23.39	8.31	2.18	17.16	0.57	12.23	23.04	6.50		
	5.741	23.39	5.101	18.60	7.323	23.59	8.417	20.61	22.300	-11.59	21.046	-17.57	2.728	15.42	23.614	-3.73	19.916	-22.38	17.69785	17
19	*****	*****	4.10	19.47	6.01	22.48	7.23	23.26	0.14	10.14	23.31	8.22	2.10	17.09	0.50	12.16	22.56	6.42		
	5.880	23.43	5.058	18.37	7.499	23.29	8.502	20.31	22.301	-11.59	21.041	-17.60	2.734	15.45	23.614	-3.73	19.913	-22.39	17.82927	19
21	*****	*****	4.01	19.36	6.06	22.48	7.22	23.21	0.06	10.06	23.23	8.14	2.02	17.01	0.42	12.08	22.48	6.34		
	6.019	23.44	5.033	18.27	7.673	22.94	8.587	20.00	22.301	-11.60	21.035	-17.63	2.739	15.48	23.615	-3.73	19.911	-22.40	17.96069	21
23	*****	*****	3.53	19.28	6.12	22.47	7.22	23.16	23.55	9.58	23.15	8.05	1.55	16.54	0.34	11.60	22.40	6.26		
	6.157	23.42	5.028	18.28	7.846	22.55	8.671	19.68	22.301	-11.61	21.029	-17.66	2.745	15.50	23.615	-3.73	19.908	-22.41	18.09211	23
25	*****	*****	3.46	19.22	6.17	22.46	7.21	23.11	23.47	9.50	23.07	7.57	1.47	16.47	0.26	11.52	22.32	6.18		
	6.296	23.37	5.044	18.40	8.019	22.11	8.756	19.35	22.299	-11.63	21.023	-17.69	2.751	15.53	23.615	-3.73	19.905	-22.42	18.22353	25
27	*****	*****	3.38	19.18	6.23	22.45	7.21	23.06	23.39	9.42	22.59	7.49	1.39	16.39	0.18	11.44	22.24	6.10		
	6.434	23.30	5.081	18.63	8.190	21.64	8.840	19.01	22.297	-11.65	21.016	-17.72	2.756	15.55	23.615	-3.73	19.902	-22.43	18.35496	27
29	*****	*****	3.32	19.16	6.29	22.44	7.20	23.00	23.31	9.34	22.51	7.40	1.31	16.32	0.10	11.36	22.16	6.02		
	6.572	23.20	5.141	18.94	8.359	21.12	8.923	18.66	22.294	-11.68	21.009	-17.75	2.761	15.57	23.615	-3.73	19.898	-22.45	18.48638	29

# LIPIEC 2021

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Czw	397	5.52578	-3.52	6.4237	23.05	1.01667	0.2402	-2.36	61.991	6.6	55	424	1249.6	2115	040	621.5	1217	2352	1
183	2	Pią	398	5.56544	-4.03	6.4644	23.00	1.01669	1.0812	2.41	62.647	0.5	45	425	1249.8	2115	052	703.1	1329	2348	2
184	3	Sob	399	6.00509	-4.14	6.5052	22.55	1.01671	1.5156	7.47	63.130	1.5	35	425	1250.0	2114	104	744.0	1440	2344	3
185	4	Nie	400	6.04475	-4.25	6.5459	22.50	1.01672	2.3612	12.32	63.430	2.5	27	426	1250.2	2114	117	825.4	1551	2340	4
186	5	Pon	401	6.08441	-4.35	6.5906	22.45	1.01673	3.2149	16.49	63.549	3.5	19	427	1250.3	2113	132	908.0	1702	2336	5
187	6	Wto	402	6.12406	-4.45	7.0313	22.39	1.01673	4.0925	20.26	63.502	4.5	12	428	1250.5	2112	150	952.8	1812	2332	6
188	7	Śro	403	6.16372	-4.55	7.0720	22.32	1.01672	4.5918	23.13	63.312	5.5	6	429	1250.7	2112	213	1040.1	1921	2328	7
189	8	Czw	404	6.20337	-5.05	7.1126	22.25	1.01671	5.5125	24.60	63.006	6.5	3	430	1250.8	2111	244	1129.7	2024	2324	8
190	9	Pią	405	6.24303	-5.14	7.1531	22.18	1.01669	6.4514	25.37	62.612	7.5	0	431	1251.0	2110	326	1221.6	2117	2320	9
191	10	Sob	406	6.28269	-5.22	7.1936	22.11	1.01667	7.3948	24.59	62.154	0.4	0	432	1251.1	2109	420	1314.0	2200	2316	10
192	11	Nie	407	6.32234	-5.31	7.2341	22.03	1.01664	8.3406	23.06	61.653	1.4	2	433	1251.3	2109	526	1406.1	2232	2312	11
193	12	Pon	408	6.36200	-5.38	7.2745	21.54	1.01660	9.2716	20.02	61.125	2.4	6	434	1251.4	2108	639	1456.9	2256	2308	12
194	13	Wto	409	6.40165	-5.45	7.3149	21.46	1.01656	10.1855	15.57	60.580	3.4	11	436	1251.5	2107	757	1546.0	2316	2304	13
195	14	Śro	410	6.44131	-5.52	7.3552	21.37	1.01651	11.0908	11.02	60.023	4.4	19	437	1251.6	2106	917	1633.6	2332	2300	14
196	15	Czw	411	6.48096	-5.58	7.3955	21.27	1.01646	11.5825	5.32	59.463	5.4	28	438	1251.7	2105	1037	1720.3	2346	2257	15
197	16	Pią	412	6.52062	-6.04	7.4357	21.17	1.01640	12.4739	-0.19	58.910	6.4	39	439	1251.8	2103	1158	1807.2	****	2253	16
198	17	Sob	413	6.56028	-6.09	7.4759	21.07	1.01634	13.3748	-6.16	58.381	7.4	50	441	1251.9	2102	1321	1855.4	000	2249	17
199	18	Nie	414	6.59593	-6.14	7.5200	20.57	1.01627	14.2960	-11.60	57.903	1.0	61	442	1252.0	2101	1446	1946.3	015	2245	18
200	19	Pon	415	7.03559	-6.18	7.5601	20.46	1.01620	15.2512	-17.11	57.513	2.0	72	443	1252.0	2100	1614	2040.7	033	2241	19
201	20	Wto	416	7.07524	-6.21	8.0001	20.35	1.01612	16.2401	-21.25	57.249	3.0	82	445	1252.1	2058	1743	2139.3	056	2237	20
202	21	Śro	417	7.11490	-6.24	8.0400	20.23	1.01604	17.2616	-24.20	57.151	4.0	90	446	1252.2	2057	1906	2241.2	128	2233	21
203	22	Czw	418	7.15455	-6.27	8.0759	20.11	1.01596	18.3041	-25.36	57.249	5.0	96	448	1252.2	2056	2016	2344.7	213	2229	22
204	23	Pią	419	7.19421	-6.28	8.1157	19.59	1.01587	19.3507	-25.06	57.555	6.0	99	449	1252.2	2054	2109	*****	314	2225	23
205	24	Sob	420	7.23387	-6.29	8.1555	19.46	1.01579	20.3719	-22.56	58.061	0.3	100	451	1252.2	2053	2145	046.9	431	2221	24
206	25	Nie	421	7.27352	-6.30	8.1952	19.33	1.01569	21.3546	-19.24	58.734	1.3	98	452	1252.2	2051	2211	145.5	555	2217	25
207	26	Pon	422	7.31318	-6.30	8.2349	19.20	1.01560	22.2957	-14.53	59.524	2.3	93	454	1252.2	2050	2230	239.4	719	2213	26
208	27	Wto	423	7.35283	-6.29	8.2745	19.07	1.01550	23.2018	-9.46	60.368	3.3	87	455	1252.2	2048	2245	328.8	841	2209	27
209	28	Śro	424	7.39249	-6.28	8.3140	18.53	1.01539	0.0739	-4.22	61.199	4.3	79	457	1252.2	2047	2258	414.5	958	2205	28
210	29	Czw	425	7.43214	-6.26	8.3535	18.39	1.01529	0.5301	1.04	61.956	5.3	70	458	1252.2	2045	2310	457.7	1112	2201	29
211	30	Pią	426	7.47180	-6.24	8.3929	18.24	1.01518	1.3727	6.19	62.587	6.3	61	500	1252.1	2043	2323	539.5	1225	2158	30
212	31	Sob	427	7.51146	-6.21	8.4322	18.09	1.01506	2.2157	11.16	63.052	7.3	51	501	1252.1	2042	2337	621.1	1336	2154	31

Fazy Księżyca [Dm, h.mm]:      3kw 1, 23.11      Now 10, 3.17      1kw 17, 12.11      Pełn 24, 4.37      3kw 31, 15.16



# LIPIEC 2021 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	****	****	3.26	19.16	6.35	22.42	7.20	22.55	23.23	9.25	22.43	7.32	1.24	16.24	0.03	11.28	22.08	5.54		
	6.710	23.08	5.222	19.33	8.527	20.56	9.007	18.31	22.291	-11.71	21.002	-17.79	2.766	15.60	23.615	-3.73	19.895	-22.46	18.61780	1
3	****	****	3.22	19.17	6.42	22.40	7.19	22.50	23.15	9.17	22.35	7.23	1.16	16.17	23.51	11.20	22.00	5.45		
	6.848	22.92	5.325	19.77	8.694	19.97	9.090	17.95	22.286	-11.74	20.994	-17.83	2.771	15.62	23.614	-3.74	19.892	-22.47	18.74921	3
5	****	****	3.18	19.20	6.48	22.38	7.19	22.45	23.07	9.09	22.27	7.14	1.08	16.09	23.43	11.13	21.52	5.37		
	6.985	22.74	5.450	20.25	8.860	19.34	9.173	17.58	22.281	-11.78	20.986	-17.86	2.776	15.64	23.614	-3.74	19.889	-22.48	18.88063	5
7	****	****	3.15	19.24	6.55	22.35	7.18	22.39	22.59	9.00	22.18	7.06	1.01	16.02	23.35	11.05	21.44	5.29		
	7.122	22.54	5.597	20.75	9.024	18.68	9.256	17.20	22.274	-11.83	20.978	-17.90	2.780	15.66	23.613	-3.75	19.886	-22.49	19.01206	7
9	****	****	3.14	19.30	7.01	22.32	7.18	22.34	22.51	8.52	22.10	6.57	0.53	15.54	23.27	10.57	21.36	5.21		
	7.259	22.30	5.766	21.25	9.186	17.98	9.338	16.82	22.268	-11.88	20.970	-17.94	2.785	15.68	23.612	-3.76	19.882	-22.51	19.14348	9
11	****	****	3.14	19.37	7.08	22.29	7.17	22.28	22.43	8.43	22.02	6.49	0.45	15.47	23.19	10.49	21.28	5.13		
	7.395	22.04	5.956	21.73	9.347	17.25	9.420	16.42	22.260	-11.93	20.961	-17.98	2.789	15.70	23.611	-3.76	19.879	-22.52	19.27491	11
13	****	****	3.15	19.45	7.14	22.26	7.17	22.23	22.35	8.34	21.54	6.40	0.37	15.39	23.11	10.41	21.20	5.05		
	7.530	21.76	6.166	22.15	9.507	16.49	9.502	16.03	22.251	-11.99	20.952	-18.02	2.793	15.71	23.610	-3.77	19.876	-22.53	19.40633	13
15	****	****	3.19	19.54	7.21	22.23	7.16	22.17	22.27	8.25	21.46	6.31	0.30	15.32	23.03	10.33	21.13	4.56		
	7.665	21.45	6.396	22.50	9.665	15.71	9.584	15.62	22.242	-12.05	20.943	-18.06	2.797	15.73	23.609	-3.78	19.872	-22.54	19.53774	15
17	****	****	3.24	20.02	7.27	22.19	7.16	22.12	22.19	8.17	21.38	6.23	0.22	15.24	22.56	10.25	21.05	4.48		
	7.800	21.12	6.644	22.74	9.821	14.89	9.665	15.21	22.232	-12.11	20.934	-18.10	2.800	15.75	23.608	-3.79	19.869	-22.56	19.66916	17
19	****	****	3.31	20.11	7.34	22.16	7.16	22.06	22.11	8.08	21.30	6.14	0.14	15.17	22.48	10.17	20.57	4.40		
	7.934	20.76	6.909	22.86	9.976	14.05	9.746	14.79	22.222	-12.18	20.924	-18.15	2.804	15.76	23.606	-3.80	19.866	-22.57	19.80058	19
21	****	****	3.40	20.20	7.40	22.12	7.15	22.01	22.03	7.59	21.21	6.05	0.06	15.09	22.40	10.09	20.49	4.32		
	8.067	20.38	7.188	22.82	10.130	13.19	9.827	14.36	22.211	-12.25	20.915	-18.19	2.807	15.78	23.605	-3.81	19.862	-22.58	19.93200	21
23	****	****	3.51	20.28	7.47	22.08	7.15	21.55	21.55	7.50	21.13	5.56	23.55	15.02	22.32	10.01	20.41	4.24		
	8.199	19.98	7.477	22.62	10.283	12.31	9.908	13.93	22.199	-12.32	20.905	-18.23	2.810	15.79	23.603	-3.83	19.859	-22.59	20.06343	23
25	****	****	4.04	20.35	7.53	22.04	7.14	21.49	21.47	7.41	21.05	5.48	23.47	14.54	22.24	9.53	20.33	4.16		
	8.331	19.56	7.773	22.24	10.434	11.40	9.988	13.49	22.186	-12.40	20.895	-18.27	2.813	15.80	23.601	-3.84	19.856	-22.60	20.19485	25
27	****	****	4.18	20.41	7.60	21.59	7.14	21.44	21.38	7.32	20.57	5.39	23.39	14.46	22.16	9.45	20.25	4.08		
	8.462	19.11	8.072	21.69	10.584	10.48	10.069	13.05	22.173	-12.48	20.886	-18.32	2.816	15.81	23.599	-3.85	19.852	-22.61	20.32627	27
29	1.15	0.04	4.33	20.45	8.06	21.55	7.14	21.38	21.30	7.22	20.49	5.30	23.31	14.39	22.08	9.37	20.17	3.59		
	8.593	18.64	8.370	20.96	10.733	9.54	10.149	12.60	22.160	-12.56	20.876	-18.36	2.818	15.82	23.597	-3.87	19.849	-22.63	20.45769	29
31	1.37	-0.07	4.49	20.49	8.12	21.51	7.13	21.32	21.22	7.13	20.41	5.21	23.24	14.31	22.00	9.28	20.09	3.51		
	8.723	18.16	8.663	20.07	10.881	8.58	10.229	12.15	22.146	-12.65	20.866	-18.40	2.820	15.83	23.595	-3.88	19.846	-22.64	20.58911	31

# SIERPIEŃ 2021

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)									Czas strefowy [hhmm.]									
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
213	1	Nie	428	7.55111	-6.17	8.4715	17.54	1.01495	3.0721	15.43	63.327	0.9	42	503	1252.0	2040	2353	703.5	1447	2150	1	
214	2	Pon	429	7.59077	-6.13	8.5108	17.39	1.01482	3.5425	19.33	63.405	1.9	33	505	1252.0	2038	****	747.6	1559	2146	2	
215	3	Wto	430	8.03042	-6.08	8.5459	17.23	1.01470	4.4336	22.36	63.294	2.9	24	506	1251.9	2036	015	833.9	1708	2142	3	
216	4	Śro	431	8.07008	-6.03	8.5851	17.07	1.01457	5.3503	24.40	63.013	3.9	16	508	1251.8	2034	042	922.8	1814	2138	4	
217	5	Czw	432	8.10573	-5.57	9.0241	16.51	1.01443	6.2828	25.38	62.595	4.9	10	510	1251.7	2033	120	1013.8	1911	2134	5	
218	6	Pią	433	8.14539	-5.50	9.0631	16.35	1.01429	7.2307	25.21	62.076	5.9	5	511	1251.6	2031	210	1106.3	1958	2130	6	
219	7	Sob	434	8.18505	-5.43	9.1021	16.18	1.01414	8.1759	23.47	61.497	6.9	1	513	1251.5	2029	312	1159.1	2033	2126	7	
220	8	Nie	435	8.22470	-5.36	9.1410	16.01	1.01399	9.1208	20.59	60.900	7.9	0	515	1251.3	2027	424	1251.1	2100	2122	8	
221	9	Pon	436	8.26436	-5.27	9.1758	15.44	1.01383	10.0457	17.04	60.317	0.8	1	516	1251.2	2025	543	1341.6	2121	2118	9	
222	10	Wto	437	8.30401	-5.18	9.2146	15.26	1.01366	10.5616	12.14	59.777	1.8	4	518	1251.1	2023	704	1430.5	2138	2114	10	
223	11	Śro	438	8.34367	-5.09	9.2533	15.08	1.01349	11.4626	6.44	59.296	2.8	9	520	1250.9	2021	825	1518.1	2153	2110	11	
224	12	Czw	439	8.38332	-4.59	9.2919	14.50	1.01332	12.3606	0.51	58.881	3.8	17	521	1250.7	2019	947	1605.4	2207	2106	12	
225	13	Pią	440	8.42298	-4.48	9.3305	14.32	1.01314	13.2610	-5.08	58.536	4.8	26	523	1250.6	2017	1110	1653.2	2222	2103	13	
226	14	Sob	441	8.46263	-4.37	9.3651	14.14	1.01296	14.1738	-10.56	58.259	5.8	36	525	1250.4	2015	1234	1742.8	2238	2059	14	
227	15	Nie	442	8.50229	-4.25	9.4035	13.55	1.01277	15.1126	-16.13	58.051	6.8	47	527	1250.2	2013	1400	1835.3	2259	2055	15	
228	16	Pon	443	8.54194	-4.13	9.4420	13.36	1.01258	16.0817	-20.38	57.919	0.8	59	528	1250.0	2011	1527	1931.2	2326	2051	16	
229	17	Wto	444	8.58160	-4.00	9.4803	13.17	1.01238	17.0814	-23.50	57.874	1.8	70	530	1249.8	2008	1651	2030.5	****	2047	17	
230	18	Śro	445	9.02126	-3.47	9.5147	12.57	1.01219	18.1032	-25.32	57.931	2.8	80	532	1249.5	2006	1804	2131.8	005	2043	18	
231	19	Czw	446	9.06091	-3.33	9.5529	12.38	1.01198	19.1334	-25.34	58.106	3.8	88	533	1249.3	2004	1902	2233.2	059	2039	19	
232	20	Pią	447	9.10057	-3.19	9.5912	12.18	1.01178	20.1523	-23.56	58.412	4.8	95	535	1249.1	2002	1943	2332.2	209	2035	20	
233	21	Sob	448	9.14022	-3.04	10.0253	11.58	1.01158	21.1419	-20.52	58.849	5.8	99	537	1248.8	2000	2012	*****	329	2031	21	
234	22	Nie	449	9.17588	-2.49	10.0635	11.38	1.01137	22.0935	-16.39	59.405	6.8	100	538	1248.6	1957	2033	027.4	453	2027	22	
235	23	Pon	450	9.21553	-2.33	10.1015	11.18	1.01116	23.0113	-11.41	60.054	0.9	99	540	1248.3	1955	2050	118.5	616	2023	23	
236	24	Wto	451	9.25519	-2.17	10.1356	10.57	1.01095	23.4948	-6.17	60.754	1.9	96	542	1248.0	1953	2103	205.9	736	2019	24	
237	25	Śro	452	9.29484	-2.00	10.1736	10.37	1.01074	0.3612	-0.45	61.458	2.9	91	544	1247.8	1951	2116	250.4	852	2015	25	
238	26	Czw	453	9.33450	-1.43	10.2115	10.16	1.01052	1.2123	4.41	62.112	3.9	84	545	1247.5	1948	2128	333.2	1007	2011	26	
239	27	Pią	454	9.37415	-1.26	10.2455	9.55	1.01030	2.0616	9.50	62.666	4.9	76	547	1247.2	1946	2141	415.4	1119	2007	27	
240	28	Sob	455	9.41381	-1.08	10.2833	9.34	1.01008	2.5141	14.31	63.077	5.9	68	549	1246.9	1944	2157	457.8	1232	2004	28	
241	29	Nie	456	9.45346	-0.50	10.3212	9.12	1.00986	3.3824	18.36	63.310	6.9	58	550	1246.6	1942	2215	541.4	1344	2000	29	
242	30	Pon	457	9.49312	-0.32	10.3550	8.51	1.00964	4.2655	21.55	63.347	0.1	49	552	1246.3	1939	2240	626.9	1454	1956	30	
243	31	Wto	458	9.53278	-0.13	10.3928	8.29	1.00941	5.1731	24.19	63.183	1.1	40	554	1246.0	1937	2313	714.7	1602	1952	31	

Fazy Księżycyca [Dm, h.mm]:      3kw 0, 15.16      Now 8, 15.50      1kw 15, 17.20      Pełn 22, 14.02      3kw 30, 9.13



# WRZESIEŃ 2021

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
244	1	Śro	459	9.57243	0.06	10.4306	8.07	1.00918	6.1006	25.39	62.829	2.1	30	556	1245.7	1935	2358	804.7	1702	1948	1	
245	2	Czw	460	10.01209	0.25	10.4643	7.46	1.00895	7.0409	25.46	62.311	3.1	22	557	1245.3	1932	0**	856.4	1753	1944	2	
246	3	Pią	461	10.05174	0.44	10.5020	7.24	1.00871	7.5851	24.37	61.668	4.1	14	559	1245.0	1930	055	949.0	1832	1940	3	
247	4	Sob	462	10.09140	1.04	10.5357	7.01	1.00847	8.5320	22.11	60.949	5.1	8	601	1244.7	1927	204	1041.4	1902	1936	4	
248	5	Nie	463	10.13105	1.24	10.5734	6.39	1.00823	9.4654	18.34	60.211	6.1	3	602	1244.3	1925	321	1132.8	1925	1932	5	
249	6	Pon	464	10.17071	1.44	11.0110	6.17	1.00798	10.3915	13.55	59.507	7.1	0	604	1244.0	1923	442	1222.9	1944	1928	6	
250	7	Wto	465	10.21036	2.05	11.0446	5.54	1.00773	11.3033	8.28	58.888	0.4	0	606	1243.7	1920	605	1311.8	1959	1924	7	
251	8	Śro	466	10.25002	2.25	11.0822	5.32	1.00747	12.2117	2.29	58.391	1.4	2	608	1243.3	1918	729	1400.2	2013	1920	8	
252	9	Czw	467	10.28567	2.46	11.1158	5.09	1.00721	13.1215	-3.41	58.038	2.4	7	609	1243.0	1916	854	1448.9	2028	1916	9	
253	10	Pią	468	10.32533	3.07	11.1533	4.47	1.00695	14.0420	-9.44	57.834	3.4	14	611	1242.6	1913	1020	1538.9	2044	1912	10	
254	11	Sob	469	10.36498	3.28	11.1909	4.24	1.00668	14.5823	-15.17	57.770	4.4	23	613	1242.3	1911	1147	1631.3	2103	1908	11	
255	12	Nie	470	10.40464	3.49	11.2244	4.01	1.00641	15.5503	-19.59	57.826	5.4	34	614	1241.9	1908	1316	1726.7	2128	1905	12	
256	13	Pon	471	10.44429	4.10	11.2620	3.38	1.00614	16.5426	-23.29	57.982	6.4	45	616	1241.6	1906	1441	1825.0	2202	1901	13	
257	14	Wto	472	10.48395	4.32	11.2955	3.15	1.00587	17.5553	-25.31	58.217	0.6	56	618	1241.2	1904	1558	1925.3	2251	1857	14	
258	15	Śro	473	10.52361	4.53	11.3330	2.52	1.00560	18.5803	-25.55	58.517	1.6	67	620	1240.9	1901	1659	2025.8	2355	1853	15	
259	16	Czw	474	10.56326	5.15	11.3705	2.29	1.00532	19.5908	-24.42	58.875	2.6	77	621	1240.5	1859	1744	2124.4	****	1849	16	
260	17	Pią	475	11.00292	5.36	11.4040	2.05	1.00504	20.5741	-22.01	59.286	3.6	86	623	1240.1	1856	1816	2219.7	111	1845	17	
261	18	Sob	476	11.04257	5.58	11.4415	1.42	1.00477	21.5253	-18.08	59.750	4.6	93	625	1239.8	1854	1838	2311.2	233	1841	18	
262	19	Nie	477	11.08223	6.19	11.4750	1.19	1.00449	22.4440	-13.24	60.262	5.6	97	626	1239.4	1851	1856	2359.1	356	1837	19	
263	20	Pon	478	11.12188	6.40	11.5125	0.56	1.00421	23.3332	-8.07	60.813	6.6	100	628	1239.1	1849	1910	*****	516	1833	20	
264	21	Wto	479	11.16154	7.02	11.5501	0.32	1.00393	0.2014	-2.35	61.384	0.4	100	630	1238.7	1847	1922	044.1	633	1829	21	
265	22	Śro	480	11.20119	7.23	11.5836	0.09	1.00366	1.0539	2.57	61.949	1.4	98	632	1238.4	1844	1934	127.4	748	1825	22	
266	23	Czw	481	11.24085	7.44	12.0211	-0.14	1.00338	1.5040	8.16	62.472	2.4	94	633	1238.0	1842	1947	209.7	902	1821	23	
267	24	Pią	482	11.28050	8.05	12.0547	-0.38	1.00310	2.3603	13.12	62.916	3.4	89	635	1237.7	1839	2001	252.1	1015	1817	24	
268	25	Sob	483	11.32016	8.26	12.0923	-1.01	1.00282	3.2230	17.33	63.243	4.4	82	637	1237.3	1837	2018	335.4	1128	1813	25	
269	26	Nie	484	11.35581	8.47	12.1258	-1.24	1.00255	4.1032	21.10	63.419	5.4	74	638	1237.0	1834	2039	420.3	1240	1810	26	
270	27	Pon	485	11.39547	9.07	12.1635	-1.48	1.00227	5.0025	23.53	63.417	6.4	66	640	1236.6	1832	2109	507.2	1349	1806	27	
271	28	Wto	486	11.43513	9.27	12.2011	-2.11	1.00199	5.5208	25.35	63.220	7.4	56	642	1236.3	1830	2148	556.1	1453	1802	28	
272	29	Śro	487	11.47478	9.47	12.2347	-2.34	1.00171	6.4516	26.06	62.827	0.3	47	644	1236.0	1827	2239	646.7	1547	1758	29	
273	30	Czw	488	11.51444	10.07	12.2724	-2.58	1.00143	7.3910	25.24	62.252	1.3	37	645	1235.6	1825	2343	738.4	1630	1754	30	

Fazy Księżyca [Dm, h.mm]:      Nów 7, 2.52      1kw 13, 22.39      Pełn 21, 1.55      3kw 29, 3.57

# WRZESIEŃ 2021 (c.d.)

Świty, zmierychy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	3.44	21.46	8.20	20.05	9.51	20.34	7.06	19.58	19.09	4.43	18.30	3.03	21.18	12.26	19.53	7.18	18.01	1.42		
	10.718	8.12	12.167	-1.96	13.167	-7.65	11.489	4.30	21.887	-14.11	20.716	-19.02	2.827	15.85	23.551	-4.18	19.801	-22.79	22.69182	1
3	3.49	21.39	8.29	19.60	9.57	20.30	7.06	19.52	19.01	4.34	18.22	2.54	21.10	12.18	19.45	7.10	17.53	1.34		
	10.839	7.39	12.324	-3.30	13.309	-8.64	11.567	3.78	21.871	-14.19	20.708	-19.05	2.825	15.85	23.547	-4.21	19.799	-22.80	22.82324	3
5	3.55	21.33	8.37	19.54	10.03	20.25	7.06	19.46	18.53	4.25	18.14	2.46	21.02	12.10	19.38	7.02	17.45	1.26		
	10.959	6.65	12.475	-4.59	13.452	-9.63	11.646	3.26	21.855	-14.27	20.701	-19.08	2.824	15.84	23.544	-4.23	19.797	-22.81	22.95466	5
7	3.60	21.27	8.45	19.48	10.09	20.20	7.05	19.40	18.44	4.16	18.06	2.37	20.54	12.02	19.30	6.54	17.38	1.18		
	11.079	5.91	12.620	-5.83	13.594	-10.60	11.724	2.74	21.840	-14.35	20.694	-19.11	2.822	15.83	23.541	-4.25	19.795	-22.81	23.08607	7
9	4.04	21.21	8.51	19.42	10.15	20.15	7.05	19.34	18.36	4.06	17.57	2.29	20.46	11.54	19.22	6.46	17.30	1.10		
	11.199	5.15	12.758	-7.01	13.738	-11.56	11.802	2.22	21.825	-14.43	20.687	-19.14	2.820	15.82	23.537	-4.27	19.793	-22.82	23.21749	9
11	4.09	21.15	8.57	19.36	10.21	20.11	7.05	19.28	18.28	3.57	17.49	2.20	20.38	11.46	19.14	6.37	17.22	1.02		
	11.319	4.40	12.888	-8.13	13.881	-12.50	11.881	1.69	21.811	-14.50	20.681	-19.16	2.817	15.81	23.534	-4.29	19.791	-22.82	23.34891	11
13	4.14	21.09	9.03	19.29	10.28	20.06	7.04	19.22	18.19	3.48	17.41	2.12	20.30	11.38	19.06	6.29	17.14	0.54		
	11.439	3.63	13.009	-9.19	14.026	-13.42	11.960	1.17	21.798	-14.57	20.675	-19.19	2.815	15.80	23.531	-4.32	19.790	-22.83	23.48033	13
15	4.18	21.03	9.07	19.23	10.34	20.01	7.04	19.16	18.11	3.39	17.33	2.04	20.23	11.29	18.58	6.21	17.06	0.46		
	11.558	2.86	13.121	-10.15	14.171	-14.33	12.038	0.64	21.784	-14.63	20.669	-19.21	2.812	15.79	23.527	-4.34	19.788	-22.84	23.61175	15
17	4.23	20.57	9.10	19.16	10.40	19.57	7.03	19.10	18.03	3.30	17.25	1.55	20.15	11.21	18.50	6.13	16.58	0.38		
	11.678	2.09	13.222	-11.03	14.316	-15.22	12.117	0.11	21.772	-14.70	20.664	-19.23	2.809	15.77	23.524	-4.36	19.787	-22.84	23.74317	17
19	4.27	20.51	9.12	19.09	10.46	19.53	7.03	19.04	17.55	3.21	17.17	1.47	20.07	11.13	18.42	6.05	16.50	0.30		
	11.797	1.32	13.309	-11.79	14.463	-16.08	12.196	-0.41	21.760	-14.76	20.659	-19.25	2.806	15.76	23.521	-4.38	19.786	-22.84	23.87459	19
21	4.31	20.46	9.12	19.02	10.52	19.48	7.03	18.58	17.47	3.12	17.09	1.39	19.59	11.05	18.34	5.57	16.42	0.22		
	11.917	0.54	13.382	-12.43	14.609	-16.93	12.275	-0.94	21.748	-14.81	20.654	-19.26	2.803	15.75	23.517	-4.40	19.785	-22.85	0.00601	21
23	4.35	20.40	9.10	18.54	10.58	19.44	7.02	18.52	17.38	3.03	17.01	1.31	19.51	10.57	18.26	5.48	16.34	0.14		
	12.036	-0.24	13.436	-12.92	14.757	-17.75	12.354	-1.47	21.738	-14.86	20.650	-19.28	2.800	15.73	23.514	-4.42	19.784	-22.85	0.13742	23
25	4.39	20.35	9.06	18.47	11.05	19.40	7.02	18.46	17.30	2.55	16.53	1.22	19.43	10.49	18.18	5.40	16.26	0.06		
	12.156	-1.02	13.470	-13.23	14.906	-18.54	12.433	-2.00	21.728	-14.91	20.646	-19.29	2.796	15.71	23.511	-4.45	19.783	-22.86	0.26884	25
27	4.43	20.29	8.59	18.39	11.11	19.36	7.02	18.41	17.22	2.46	16.45	1.14	19.35	10.41	18.10	5.32	16.19	23.54		
	12.276	-1.79	13.480	-13.35	15.055	-19.30	12.513	-2.53	21.719	-14.96	20.643	-19.31	2.792	15.70	23.507	-4.47	19.782	-22.86	0.40026	27
29	4.47	20.24	8.50	18.31	11.17	19.32	7.02	18.35	17.14	2.37	16.37	1.06	19.27	10.32	18.02	5.24	16.11	23.46		
	12.397	-2.57	13.462	-13.22	15.205	-20.04	12.593	-3.05	21.710	-15.00	20.640	-19.32	2.789	15.68	23.504	-4.49	19.782	-22.86	0.53168	29

# PAŹDZIERNIK 2021

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2459																		
274	1	Pią	489	11.55409	10.27	12.3101	-3.21	1.00115	8.3304	23.26	61.524	2.3	28	647	1235.3	1822	****	830.2	1704	1750	1
275	2	Sob	490	11.59375	10.46	12.3439	-3.44	1.00087	9.2622	20.15	60.691	3.3	19	649	1235.0	1820	056	921.4	1729	1746	2
276	3	Nie	491	12.03340	11.04	12.3817	-4.07	1.00059	10.1845	15.59	59.811	4.3	12	651	1234.7	1818	215	1011.6	1748	1742	3
277	4	Pon	492	12.07306	11.23	12.4155	-4.30	1.00031	11.1019	10.46	58.953	5.3	5	652	1234.4	1815	338	1100.9	1804	1738	4
278	5	Wto	493	12.11271	11.41	12.4533	-4.54	1.00002	12.0130	4.53	58.187	6.3	1	654	1234.1	1813	502	1149.7	1819	1734	5
279	6	Śro	494	12.15237	11.59	12.4912	-5.17	0.99974	12.5301	-1.25	57.576	7.3	0	656	1233.8	1811	627	1238.9	1833	1730	6
280	7	Czw	495	12.19202	12.16	12.5251	-5.40	0.99945	13.4545	-7.45	57.168	1.0	1	658	1233.5	1808	755	1329.5	1848	1726	7
281	8	Pią	496	12.23168	12.33	12.5631	-6.02	0.99916	14.4034	-13.43	56.984	2.0	5	700	1233.2	1806	925	1422.5	1906	1722	8
282	9	Sob	497	12.27133	12.49	13.0011	-6.25	0.99887	15.3806	-18.54	57.024	3.0	12	701	1232.9	1804	1057	1518.5	1929	1718	9
283	10	Nie	498	12.31099	13.05	13.0352	-6.48	0.99858	16.3826	-22.55	57.262	4.0	21	703	1232.7	1801	1227	1617.6	2000	1714	10
284	11	Pon	499	12.35064	13.21	13.0733	-7.11	0.99829	17.4053	-25.24	57.657	5.0	31	705	1232.4	1759	1350	1718.9	2045	1711	11
285	12	Wto	500	12.39030	13.36	13.1114	-7.33	0.99800	18.4357	-26.12	58.161	6.0	42	707	1232.1	1757	1457	1820.4	2145	1707	12
286	13	Śro	501	12.42596	13.50	13.1456	-7.56	0.99770	19.4547	-25.19	58.730	0.3	53	709	1231.9	1754	1547	1920.0	2259	1703	13
287	14	Czw	502	12.46561	14.04	13.1839	-8.18	0.99741	20.4448	-22.55	59.326	1.3	64	710	1231.7	1752	1621	2016.0	****	1659	14
288	15	Pią	503	12.50527	14.18	13.2222	-8.40	0.99712	21.4013	-19.18	59.922	2.3	74	712	1231.4	1750	1646	2108.0	019	1655	15
289	16	Sob	504	12.54492	14.31	13.2605	-9.02	0.99683	22.3159	-14.47	60.503	3.3	83	714	1231.2	1748	1704	2156.0	141	1651	16
290	17	Nie	505	12.58458	14.43	13.2950	-9.24	0.99655	23.2042	-9.40	61.060	4.3	90	716	1231.0	1745	1718	2241.1	301	1647	17
291	18	Pon	506	13.02423	14.55	13.3334	-9.46	0.99626	0.0709	-4.13	61.588	5.3	95	718	1230.8	1743	1730	2324.1	418	1643	18
292	19	Wto	507	13.06389	15.06	13.3720	-10.08	0.99598	0.5215	1.19	62.083	6.3	99	720	1230.6	1741	1742	*****	533	1639	19
293	20	Śro	508	13.10354	15.17	13.4106	-10.29	0.99570	1.3654	6.43	62.536	7.3	100	721	1230.5	1739	1754	006.2	647	1635	20
294	21	Czw	509	13.14320	15.27	13.4452	-10.51	0.99542	2.2154	11.48	62.934	0.8	99	723	1230.3	1737	1807	048.2	800	1631	21
295	22	Pią	510	13.18285	15.36	13.4839	-11.12	0.99514	3.0757	16.23	63.258	1.8	97	725	1230.1	1734	1822	131.0	913	1627	22
296	23	Sob	511	13.22251	15.45	13.5227	-11.33	0.99487	3.5532	20.17	63.486	2.8	93	727	1230.0	1732	1842	215.2	1026	1623	23
297	24	Nie	512	13.26216	15.53	13.5616	-11.54	0.99460	4.4455	23.19	63.591	3.8	87	729	1229.9	1730	1907	301.4	1137	1619	24
298	25	Pon	513	13.30182	15.60	14.0005	-12.14	0.99433	5.3602	25.21	63.547	4.8	81	731	1229.7	1728	1942	349.5	1243	1615	25
299	26	Wto	514	13.34148	16.06	14.0356	-12.35	0.99407	6.2831	26.15	63.336	5.8	73	732	1229.6	1726	2028	439.3	1341	1612	26
300	27	Śro	515	13.38113	16.12	14.0746	-12.55	0.99381	7.2140	25.57	62.944	6.8	64	734	1229.5	1724	2126	530.2	1428	1608	27
301	28	Czw	516	13.42079	16.17	14.1138	-13.15	0.99355	8.1446	24.25	62.371	7.8	54	736	1229.5	1722	2235	621.1	1505	1604	28
302	29	Pią	517	13.46044	16.21	14.1531	-13.35	0.99329	9.0712	21.43	61.633	0.6	44	738	1229.4	1720	2350	711.5	1532	1600	29
303	30	Sob	518	13.50010	16.24	14.1924	-13.55	0.99303	9.5842	17.54	60.761	1.6	34	740	1229.3	1718	****	800.9	1553	1556	30
304	31	Nie	519	13.53575	16.27	14.2318	-14.14	0.99277	10.4921	13.08	59.806	2.6	25	742	1229.3	1716	109	849.3	1610	1552	31
304	31	Nie	519	14.54074	16.27	14.2328	-14.15	0.99276	10.5127	12.55	59.765	2.6	24	642	1129.3	1616	009	749.3	1510	1452	31

Fazy Księżyca [Dm, h.mm]:      Nów 6, 13.05      1kw 13, 5.25      Pełn 20, 16.57      3kw 28, 22.05      3kw 28, 21.05

# PAŹDZIERNIK 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.51	20.19	8.37	18.22	11.23	19.28	7.01	18.29	17.06	2.29	16.29	0.58	19.19	10.24	17.54	5.16	16.03	23.38		
	12.517	-3.35	13.416	-12.82	15.355	-20.75	12.673	-3.58	21.703	-15.03	20.638	-19.33	2.784	15.66	23.501	-4.51	19.781	-22.87	0.66310	1
3	4.55	20.14	8.21	18.14	11.29	19.25	7.01	18.23	16.58	2.20	16.21	0.50	19.11	10.16	17.46	5.08	15.55	23.30		
	12.638	-4.12	13.341	-12.13	15.506	-21.42	12.753	-4.11	21.696	-15.06	20.636	-19.33	2.780	15.64	23.498	-4.53	19.781	-22.87	0.79452	3
5	4.59	20.09	8.01	18.06	11.35	19.21	7.01	18.17	16.50	2.12	16.13	0.42	19.03	10.08	17.38	4.59	15.47	23.22		
	12.759	-4.89	13.239	-11.15	15.658	-22.07	12.833	-4.63	21.690	-15.09	20.634	-19.34	2.776	15.62	23.494	-4.55	19.781	-22.87	0.92593	5
7	5.03	20.04	7.39	17.57	11.40	19.18	7.01	18.11	16.42	2.04	16.05	0.34	18.55	9.59	17.30	4.51	15.39	23.14		
	12.881	-5.66	13.117	-9.90	15.811	-22.68	12.914	-5.15	21.684	-15.11	20.633	-19.34	2.771	15.60	23.491	-4.57	19.781	-22.87	1.05735	7
9	5.06	19.59	7.15	17.50	11.46	19.15	7.00	18.05	16.34	1.56	15.58	0.26	18.47	9.51	17.22	4.43	15.31	23.07		
	13.003	-6.42	12.987	-8.46	15.963	-23.25	12.995	-5.67	21.680	-15.13	20.633	-19.35	2.767	15.58	23.488	-4.59	19.781	-22.87	1.18877	9
11	5.10	19.54	6.51	17.42	11.51	19.12	7.00	17.60	16.26	1.47	15.50	0.18	18.39	9.43	17.14	4.35	15.23	22.59		
	13.126	-7.18	12.861	-6.97	16.117	-23.79	13.076	-6.19	21.677	-15.14	20.633	-19.35	2.762	15.56	23.485	-4.61	19.781	-22.87	1.32019	11
13	5.14	19.50	6.30	17.36	11.56	19.10	6.60	17.54	16.18	1.39	15.42	0.10	18.31	9.35	17.07	4.27	15.16	22.51		
	13.249	-7.93	12.754	-5.55	16.270	-24.30	13.158	-6.71	21.674	-15.15	20.633	-19.35	2.757	15.54	23.483	-4.62	19.782	-22.87	1.45161	13
15	5.17	19.45	6.11	17.30	12.01	19.08	6.60	17.48	16.10	1.31	15.34	0.03	18.23	9.26	16.59	4.19	15.08	22.43		
	13.373	-8.67	12.680	-4.35	16.424	-24.76	13.239	-7.23	21.672	-15.15	20.634	-19.34	2.752	15.52	23.480	-4.64	19.782	-22.87	1.58303	15
17	5.21	19.41	5.56	17.25	12.06	19.05	6.60	17.42	16.02	1.23	15.26	23.51	18.15	9.18	16.51	4.11	15.00	22.35		
	13.497	-9.40	12.645	-3.48	16.577	-25.19	13.322	-7.74	21.671	-15.15	20.635	-19.34	2.747	15.49	23.477	-4.66	19.783	-22.87	1.71445	17
19	5.24	19.37	5.46	17.20	12.11	19.04	6.60	17.37	15.54	1.16	15.18	23.43	18.07	9.10	16.43	4.02	14.52	22.27		
	13.622	-10.13	12.653	-2.99	16.730	-25.58	13.404	-8.25	21.671	-15.15	20.637	-19.33	2.742	15.47	23.474	-4.68	19.784	-22.87	1.84586	19
21	5.28	19.33	5.41	17.16	12.15	19.02	6.59	17.31	15.46	1.08	15.11	23.36	17.59	9.01	16.35	3.54	14.44	22.20		
	13.748	-10.84	12.702	-2.88	16.883	-25.92	13.487	-8.75	21.672	-15.14	20.639	-19.32	2.737	15.45	23.472	-4.69	19.785	-22.87	1.97728	21
23	5.31	19.29	5.39	17.12	12.19	19.01	6.59	17.25	15.38	1.00	15.03	23.28	17.51	8.53	16.27	3.46	14.37	22.12		
	13.874	-11.55	12.789	-3.11	17.036	-26.23	13.570	-9.26	21.674	-15.13	20.641	-19.31	2.732	15.42	23.469	-4.71	19.786	-22.87	2.10870	23
25	5.35	19.25	5.41	17.08	12.22	18.59	6.59	17.20	15.30	0.52	14.55	23.20	17.43	8.45	16.19	3.38	14.29	22.04		
	14.002	-12.24	12.905	-3.65	17.187	-26.50	13.654	-9.76	21.677	-15.11	20.644	-19.30	2.727	15.40	23.467	-4.72	19.787	-22.87	2.24012	25
27	5.38	19.21	5.46	17.04	12.25	18.59	6.59	17.14	15.23	0.45	14.47	23.13	17.35	8.36	16.11	3.30	14.21	21.56		
	14.130	-12.92	13.047	-4.42	17.338	-26.72	13.738	-10.25	21.680	-15.09	20.648	-19.29	2.721	15.37	23.465	-4.74	19.788	-22.86	2.37154	27
29	5.42	19.17	5.53	17.01	12.28	18.58	6.59	17.08	15.15	0.38	14.40	23.05	17.26	8.28	16.03	3.22	14.13	21.48		
	14.258	-13.59	13.206	-5.37	17.487	-26.91	13.822	-10.74	21.684	-15.06	20.652	-19.27	2.716	15.35	23.462	-4.75	19.790	-22.86	2.50297	29
31	5.45	19.14	6.01	16.58	12.30	18.58	6.59	17.03	15.07	0.30	14.32	22.58	17.18	8.20	15.55	3.14	14.05	21.41		
	14.388	-14.24	13.380	-6.46	17.635	-27.05	13.907	-11.23	21.690	-15.03	20.656	-19.26	2.711	15.33	23.460	-4.76	19.792	-22.86	2.63438	31
31	4.45	18.14	5.01	15.58	11.30	17.58	5.59	16.03	14.07	23.26	13.32	21.58	16.18	7.20	14.55	2.14	13.05	20.41		
	14.391	-14.25	13.383	-6.48	17.638	-27.05	13.909	-11.24	21.690	-15.03	20.656	-19.26	2.710	15.33	23.460	-4.76	19.792	-22.86	2.63438	31

# LISTOPAD 2021

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Pon	520	14.58039	16.29	14.2722	-14.34	0.99251	11.4143	7.19	58.794	3.6	15	644	1129.3	1614	131	837.1	1524	1448	1
306	2	Wto	521	15.02005	16.30	14.3118	-14.53	0.99226	12.3224	1.11	57.885	4.6	8	646	1129.3	1612	255	925.4	1538	1444	2
307	3	Śro	522	15.05571	16.30	14.3515	-15.12	0.99200	13.2427	-5.12	57.122	5.6	3	648	1129.3	1610	421	1014.9	1552	1440	3
308	4	Czw	523	15.09536	16.29	14.3912	-15.31	0.99175	14.1851	-11.28	56.574	6.6	0	649	1129.3	1608	551	1107.1	1608	1436	4
309	5	Pią	524	15.13502	16.27	14.4310	-15.49	0.99150	15.1627	-17.09	56.293	0.6	0	651	1129.3	1607	724	1202.7	1628	1432	5
310	6	Sob	525	15.17467	16.25	14.4709	-16.07	0.99125	16.1735	-21.47	56.301	1.6	4	653	1129.3	1605	859	1302.4	1656	1428	6
311	7	Nie	526	15.21433	16.22	14.5109	-16.25	0.99101	17.2140	-24.55	56.583	2.6	10	655	1129.4	1603	1030	1405.3	1736	1424	7
312	8	Pon	527	15.25398	16.18	14.5509	-16.42	0.99076	18.2703	-26.17	57.097	3.6	18	657	1129.5	1601	1147	1509.5	1832	1420	8
313	9	Wto	528	15.29364	16.13	14.5911	-16.59	0.99051	19.3126	-25.48	57.781	4.6	28	659	1129.5	1600	1245	1612.2	1943	1417	9
314	10	Śro	529	15.33330	16.07	15.0313	-17.16	0.99027	20.3244	-23.40	58.566	5.6	38	701	1129.6	1558	1325	1711.1	2105	1413	10
315	11	Czw	530	15.37295	16.00	15.0716	-17.33	0.99003	21.2950	-20.13	59.387	6.6	49	703	1129.7	1556	1353	1805.2	2228	1409	11
316	12	Pią	531	15.41261	15.53	15.1120	-17.49	0.98979	22.2240	-15.48	60.189	0.9	60	704	1129.9	1555	1412	1854.6	2349	1405	12
317	13	Sob	532	15.45226	15.45	15.1525	-18.05	0.98956	23.1151	-10.46	60.934	1.9	70	706	1130.0	1553	1427	1940.3	****	1401	13
318	14	Nie	533	15.49192	15.36	15.1931	-18.20	0.98933	23.5820	-5.23	61.600	2.9	79	708	1130.2	1552	1440	2023.4	107	1357	14
319	15	Pon	534	15.53157	15.26	15.2337	-18.36	0.98910	0.4309	0.07	62.176	3.9	86	710	1130.3	1550	1451	2105.2	222	1353	15
320	16	Wto	535	15.57123	15.15	15.2744	-18.51	0.98888	1.2720	5.32	62.657	4.9	92	712	1130.5	1549	1502	2146.5	335	1349	16
321	17	Śro	536	16.01088	15.04	15.3152	-19.05	0.98866	2.1146	10.41	63.047	5.9	97	714	1130.7	1547	1515	2228.6	447	1345	17
322	18	Czw	537	16.05054	14.51	15.3601	-19.20	0.98845	2.5713	15.23	63.348	6.9	99	715	1130.9	1546	1529	2312.0	600	1341	18
323	19	Pią	538	16.09019	14.38	15.4011	-19.34	0.98824	3.4416	19.27	63.559	0.1	100	717	1131.1	1545	1547	2357.4	713	1337	19
324	20	Sob	539	16.12585	14.24	15.4422	-19.47	0.98803	4.3314	22.43	63.677	1.1	99	719	1131.3	1543	1610	*****	825	1333	20
325	21	Nie	540	16.16551	14.09	15.4833	-20.01	0.98783	5.2403	25.01	63.691	2.1	96	721	1131.6	1542	1641	045.0	934	1329	21
326	22	Pon	541	16.20516	13.54	15.5245	-20.13	0.98764	6.1618	26.12	63.589	3.1	92	722	1131.9	1541	1723	134.4	1035	1325	22
327	23	Wto	542	16.24482	13.37	15.5658	-20.26	0.98745	7.0915	26.11	63.356	4.1	86	724	1132.1	1540	1816	224.9	1126	1321	23
328	24	Śro	543	16.28448	13.20	16.0112	-20.38	0.98727	8.0202	24.58	62.978	5.1	79	726	1132.4	1539	1921	315.6	1206	1318	24
329	25	Czw	544	16.32413	13.02	16.0526	-20.50	0.98708	8.5357	22.34	62.447	6.1	70	727	1132.7	1538	2033	405.6	1235	1314	25
330	26	Pią	545	16.36379	12.43	16.0942	-21.01	0.98691	9.4437	19.07	61.766	7.1	61	729	1133.0	1537	2149	454.3	1258	1310	26
331	27	Sob	546	16.40344	12.24	16.1358	-21.12	0.98674	10.3407	14.43	60.949	8.1	51	731	1133.4	1536	2307	541.7	1315	1306	27
332	28	Nie	547	16.44310	12.03	16.1815	-21.23	0.98657	11.2252	9.32	60.029	0.9	40	732	1133.7	1535	****	628.1	1330	1302	28
333	29	Pon	548	16.48275	11.43	16.2232	-21.33	0.98640	12.1140	3.46	59.054	1.9	30	734	1134.0	1534	027	714.3	1343	1258	29
334	30	Wto	549	16.52241	11.21	16.2650	-21.43	0.98624	13.0130	-2.23	58.093	2.9	20	735	1134.4	1533	149	801.4	1356	1254	30

Fazy Księżyca [Dm, h.mm]:      Nów 4, 22.15      1kw 11, 13.46      Pełn 19, 9.57      3kw 27, 13.28



# LISTOPAD 2021 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.47	18.12	5.06	15.56	11.31	17.58	5.59	16.00	14.03	23.23	13.28	21.54	16.14	7.15	14.51	2.10	13.01	20.37		
	14.456	-14.57	13.474	-7.06	17.712	-27.11	13.952	-11.48	21.693	-15.01	20.659	-19.25	2.708	15.31	23.459	-4.77	19.792	-22.86	2.70009	1
3	4.50	18.09	5.16	15.53	11.33	17.58	5.59	15.55	13.55	23.15	13.20	21.47	16.06	7.07	14.43	2.02	12.54	20.29		
	14.587	-15.20	13.662	-8.27	17.857	-27.19	14.037	-11.96	21.699	-14.97	20.664	-19.23	2.702	15.29	23.457	-4.78	19.794	-22.85	2.83151	3
5	4.53	18.06	5.27	15.50	11.34	17.58	5.59	15.49	13.48	23.08	13.13	21.39	15.58	6.59	14.35	1.54	12.46	20.21		
	14.719	-15.81	13.856	-9.51	18.001	-27.23	14.123	-12.44	21.706	-14.93	20.669	-19.21	2.697	15.26	23.456	-4.79	19.796	-22.85	2.96293	5
7	4.56	18.03	5.38	15.47	11.35	17.59	5.59	15.44	13.40	23.01	13.05	21.32	15.50	6.50	14.27	1.46	12.38	20.14		
	14.852	-16.41	14.054	-10.77	18.142	-27.24	14.210	-12.91	21.715	-14.89	20.675	-19.18	2.691	15.24	23.454	-4.80	19.798	-22.85	3.09435	7
9	4.59	17.60	5.49	15.44	11.35	17.60	5.59	15.38	13.33	22.54	12.57	21.24	15.42	6.42	14.20	1.38	12.30	20.06		
	14.986	-16.99	14.256	-12.03	18.280	-27.20	14.297	-13.37	21.723	-14.84	20.682	-19.16	2.686	15.21	23.452	-4.81	19.801	-22.84	3.22577	9
11	5.03	17.57	6.01	15.41	11.34	18.01	5.59	15.33	13.25	22.47	12.50	21.17	15.34	6.34	14.12	1.30	12.23	19.58		
	15.121	-17.54	14.460	-13.27	18.415	-27.13	14.385	-13.83	21.733	-14.78	20.688	-19.13	2.680	15.19	23.451	-4.82	19.803	-22.84	3.35719	11
13	5.06	17.55	6.12	15.38	11.33	18.02	5.60	15.28	13.17	22.40	12.42	21.10	15.26	6.25	14.04	1.22	12.15	19.51		
	15.257	-18.08	14.666	-14.48	18.548	-27.03	14.473	-14.28	21.744	-14.72	20.696	-19.11	2.675	15.16	23.450	-4.82	19.806	-22.83	3.48861	13
15	5.09	17.52	6.24	15.36	11.32	18.03	5.60	15.23	13.10	22.33	12.35	21.03	15.18	6.17	13.56	1.14	12.07	19.43		
	15.394	-18.60	14.874	-15.65	18.676	-26.88	14.561	-14.72	21.755	-14.66	20.703	-19.08	2.670	15.14	23.448	-4.83	19.808	-22.83	3.62003	15
17	5.12	17.50	6.36	15.33	11.30	18.04	5.60	15.17	13.02	22.27	12.27	20.56	15.10	6.09	13.48	1.06	11.59	19.35		
	15.531	-19.09	15.084	-16.78	18.801	-26.71	14.650	-15.16	21.767	-14.59	20.711	-19.05	2.664	15.12	23.447	-4.84	19.811	-22.82	3.75145	17
19	5.15	17.48	6.47	15.31	11.28	18.05	5.60	15.12	12.55	22.20	12.19	20.48	15.02	6.00	13.40	0.58	11.52	19.28		
	15.670	-19.56	15.295	-17.85	18.921	-26.50	14.740	-15.59	21.780	-14.52	20.720	-19.02	2.659	15.09	23.446	-4.84	19.814	-22.82	3.88287	19
21	5.17	17.46	6.59	15.30	11.25	18.06	6.00	15.07	12.47	22.13	12.12	20.41	14.54	5.52	13.32	0.50	11.44	19.20		
	15.809	-20.01	15.508	-18.87	19.036	-26.27	14.830	-16.02	21.794	-14.45	20.728	-18.98	2.654	15.07	23.446	-4.84	19.817	-22.81	4.01429	21
23	5.20	17.45	7.10	15.28	11.21	18.07	6.00	15.02	12.40	22.07	12.04	20.34	14.46	5.44	13.24	0.42	11.36	19.12		
	15.949	-20.43	15.723	-19.83	19.146	-26.00	14.920	-16.43	21.808	-14.37	20.737	-18.95	2.649	15.05	23.445	-4.85	19.820	-22.80	4.14572	23
25	5.23	17.43	7.21	15.27	11.17	18.08	6.00	14.57	12.32	22.00	11.57	20.27	14.38	5.35	13.16	0.34	11.29	19.05		
	16.091	-20.83	15.939	-20.73	19.251	-25.71	15.012	-16.84	21.823	-14.29	20.747	-18.91	2.644	15.02	23.445	-4.85	19.823	-22.80	4.27714	25
27	5.25	17.42	7.32	15.27	11.13	18.08	6.00	14.52	12.25	21.54	11.49	20.20	14.30	5.27	13.09	0.26	11.21	18.57		
	16.233	-21.20	16.158	-21.56	19.350	-25.40	15.103	-17.24	21.838	-14.21	20.757	-18.87	2.639	15.00	23.444	-4.85	19.826	-22.79	4.40856	27
29	5.28	17.41	7.43	15.26	11.07	18.09	6.01	14.48	12.17	21.48	11.42	20.13	14.22	5.19	13.01	0.18	11.13	18.50		
	16.376	-21.55	16.378	-22.31	19.442	-25.06	15.196	-17.63	21.855	-14.12	20.767	-18.83	2.634	14.98	23.444	-4.85	19.830	-22.78	4.53998	29

# GRUDZIEŃ 2021

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →									Czas strefowy [hhmm.]									
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
335	1	Śro	550	16.56206	10.59	16.3109	-21.52	0.98609	13.5330	-8.37	57.224	3.9	12	737	1134.8	1532	315	850.7	1411	1250	1	
336	2	Czw	551	17.00172	10.36	16.3529	-22.01	0.98593	14.4849	-14.34	56.531	4.9	5	738	1135.2	1532	445	943.5	1428	1246	2	
337	3	Pią	552	17.04138	10.12	16.3949	-22.10	0.98578	15.4815	-19.45	56.086	5.9	1	740	1135.5	1531	619	1040.9	1451	1242	3	
338	4	Sob	553	17.08103	9.48	16.4410	-22.18	0.98563	16.5153	-23.41	55.940	0.1	0	741	1136.0	1531	754	1143.1	1524	1238	4	
339	5	Nie	554	17.12069	9.23	16.4831	-22.25	0.98548	17.5830	-25.55	56.109	1.1	2	742	1136.4	1530	921	1248.6	1613	1234	5	
340	6	Pon	555	17.16034	8.58	16.5253	-22.32	0.98534	19.0543	-26.13	56.571	2.1	7	744	1136.8	1530	1032	1354.7	1720	1230	6	
341	7	Wto	556	17.20000	8.32	16.5715	-22.39	0.98520	20.1044	-24.38	57.273	3.1	14	745	1137.2	1529	1122	1458.0	1841	1226	7	
342	8	Śro	557	17.23566	8.06	17.0138	-22.46	0.98507	21.1132	-21.28	58.140	4.1	23	746	1137.7	1529	1155	1556.5	2008	1222	8	
343	9	Czw	558	17.27531	7.39	17.0601	-22.51	0.98493	22.0726	-17.11	59.089	5.1	33	747	1138.1	1529	1218	1649.4	2133	1219	9	
344	10	Pią	559	17.31497	7.12	17.1025	-22.57	0.98480	22.5850	-12.10	60.045	6.1	44	749	1138.6	1528	1235	1737.6	2254	1215	10	
345	11	Sob	560	17.35462	6.44	17.1449	-23.02	0.98468	23.4643	-6.45	60.944	0.4	54	750	1139.0	1528	1248	1822.2	****	1211	11	
346	12	Nie	561	17.39428	6.16	17.1914	-23.06	0.98456	0.3216	-1.13	61.740	1.4	64	751	1139.5	1528	1300	1904.5	010	1207	12	
347	13	Pon	562	17.43394	5.48	17.2338	-23.10	0.98444	1.1636	4.15	62.406	2.4	73	752	1139.9	1528	1311	1945.9	124	1203	13	
348	14	Wto	563	17.47359	5.20	17.2803	-23.14	0.98433	2.0046	9.28	62.930	3.4	81	753	1140.4	1528	1323	2027.5	237	1159	14	
349	15	Śro	564	17.51324	4.51	17.3229	-23.17	0.98423	2.4542	14.16	63.312	4.4	88	753	1140.9	1528	1337	2110.2	349	1155	15	
350	16	Czw	565	17.55290	4.22	17.3654	-23.20	0.98413	3.3205	18.29	63.559	5.4	94	754	1141.4	1528	1353	2154.7	502	1151	16	
351	17	Pią	566	17.59256	3.53	17.4120	-23.22	0.98404	4.2024	21.58	63.684	6.4	97	755	1141.9	1529	1414	2241.4	614	1147	17	
352	18	Sob	567	18.03221	3.23	17.4546	-23.24	0.98395	5.1045	24.30	63.698	7.4	100	756	1142.4	1529	1442	2330.3	724	1143	18	
353	19	Nie	568	18.07187	2.54	17.5012	-23.25	0.98387	6.0249	25.59	63.612	0.3	100	756	1142.9	1529	1520	*****	828	1139	19	
354	20	Pon	569	18.11153	2.24	17.5438	-23.26	0.98380	6.5553	26.16	63.431	1.3	99	757	1143.3	1530	1610	020.7	923	1135	20	
355	21	Wto	570	18.15118	1.54	17.5905	-23.26	0.98373	7.4858	25.19	63.155	2.3	95	758	1143.8	1530	1712	111.7	1006	1131	21	
356	22	Śro	571	18.19084	1.25	18.0331	-23.26	0.98367	8.4111	23.12	62.780	3.3	91	758	1144.3	1531	1822	202.2	1039	1127	22	
357	23	Czw	572	18.23050	0.55	18.0757	-23.25	0.98361	9.3158	19.59	62.301	4.3	84	758	1144.8	1531	1937	251.3	1103	1124	23	
358	24	Pią	573	18.27015	0.25	18.1223	-23.24	0.98356	10.2111	15.51	61.715	5.3	76	759	1145.3	1532	2053	338.6	1122	1120	24	
359	25	Sob	574	18.30581	-0.05	18.1650	-23.23	0.98352	11.0910	10.58	61.025	6.3	67	759	1145.8	1533	2210	424.4	1137	1116	25	
360	26	Nie	575	18.34546	-0.34	18.2116	-23.21	0.98348	11.5634	5.29	60.244	7.3	57	759	1146.3	1533	2329	509.3	1150	1112	26	
361	27	Pon	576	18.38512	-1.04	18.2542	-23.18	0.98345	12.4420	-0.22	59.400	0.4	46	800	1146.8	1534	****	554.3	1203	1108	27	
362	28	Wto	577	18.42477	-1.33	18.3008	-23.15	0.98342	13.3336	-6.23	58.536	1.4	35	800	1147.3	1535	050	640.6	1216	1104	28	
363	29	Śro	578	18.46443	-2.02	18.3434	-23.12	0.98340	14.2535	-12.16	57.710	2.4	25	800	1147.8	1536	214	729.6	1231	1100	29	
364	30	Czw	579	18.50408	-2.31	18.3859	-23.08	0.98338	15.2123	-17.39	56.993	3.4	16	800	1148.3	1537	343	822.6	1250	1056	30	
365	31	Pią	580	18.54374	-3.00	18.4325	-23.04	0.98336	16.2144	-22.05	56.458	4.4	8	800	1148.8	1538	515	920.7	1316	1052	31	

Fazy Księżyca [Dm, h.mm]:      Nów 4, 8.43      1kw 11, 2.35      Pełn 19, 5.36      3kw 27, 3.24

# GRUDZIEŃ 2021 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	17.40	7.54	15.27	11.02	18.09	6.01	14.43	12.10	21.41	11.34	20.06	14.14	5.11	12.53	0.11	11.05	18.42		
	16.519	-21.87	16.600	-22.99	19.528	-24.71	15.289	-18.01	21.872	-14.02	20.778	-18.79	2.630	14.96	23.444	-4.85	19.833	-22.78	4.67139	1
3	5.33	17.39	8.04	15.28	10.56	18.09	6.01	14.38	12.03	21.35	11.27	19.59	14.06	5.02	12.45	0.03	10.58	18.34		
	16.664	-22.16	16.824	-23.60	19.606	-24.34	15.382	-18.38	21.889	-13.93	20.788	-18.75	2.625	14.94	23.444	-4.85	19.837	-22.77	4.80282	3
5	5.35	17.38	8.13	15.29	10.49	18.08	6.01	14.34	11.55	21.29	11.19	19.52	13.58	4.54	12.37	23.51	10.50	18.27		
	16.809	-22.42	17.050	-24.12	19.676	-23.95	15.476	-18.74	21.907	-13.83	20.800	-18.71	2.621	14.92	23.444	-4.85	19.841	-22.76	4.93424	5
7	5.37	17.38	8.22	15.32	10.42	18.07	6.01	14.29	11.48	21.23	11.12	19.45	13.50	4.46	12.29	23.43	10.42	18.19		
	16.954	-22.65	17.277	-24.56	19.738	-23.55	15.571	-19.10	21.926	-13.73	20.811	-18.66	2.616	14.90	23.444	-4.84	19.844	-22.75	5.06566	7
9	5.39	17.38	8.31	15.35	10.34	18.05	6.01	14.25	11.41	21.17	11.04	19.39	13.42	4.38	12.21	23.35	10.35	18.12		
	17.100	-22.86	17.506	-24.92	19.791	-23.14	15.666	-19.44	21.945	-13.62	20.823	-18.61	2.612	14.88	23.445	-4.84	19.848	-22.75	5.19709	9
11	5.41	17.38	8.39	15.39	10.26	18.03	6.01	14.20	11.33	21.11	10.57	19.32	13.34	4.29	12.13	23.28	10.27	18.04		
	17.247	-23.03	17.736	-25.18	19.835	-22.73	15.762	-19.77	21.965	-13.51	20.835	-18.57	2.608	14.86	23.445	-4.83	19.852	-22.74	5.32851	11
13	5.43	17.38	8.47	15.43	10.17	18.00	6.01	14.16	11.26	21.05	10.49	19.25	13.26	4.21	12.06	23.20	10.19	17.57		
	17.394	-23.17	17.967	-25.36	19.868	-22.31	15.858	-20.09	21.986	-13.40	20.848	-18.52	2.604	14.84	23.446	-4.83	19.856	-22.73	5.45992	13
15	5.44	17.38	8.53	15.48	10.07	17.57	6.01	14.12	11.19	20.59	10.42	19.18	13.18	4.13	11.58	23.12	10.12	17.49		
	17.541	-23.29	18.199	-25.44	19.891	-21.88	15.955	-20.40	22.007	-13.28	20.860	-18.47	2.601	14.83	23.447	-4.82	19.860	-22.72	5.59134	15
17	5.46	17.39	8.59	15.55	9.57	17.53	6.01	14.08	11.11	20.53	10.35	19.11	13.10	4.05	11.50	23.04	10.04	17.41		
	17.689	-23.37	18.432	-25.42	19.902	-21.46	16.053	-20.70	22.028	-13.16	20.873	-18.42	2.597	14.81	23.448	-4.81	19.865	-22.71	5.72276	17
19	5.47	17.40	9.04	16.02	9.46	17.48	6.01	14.04	11.04	20.47	10.27	19.05	13.02	3.57	11.42	22.56	9.56	17.34		
	17.837	-23.42	18.663	-25.30	19.902	-21.04	16.151	-20.99	22.050	-13.04	20.886	-18.36	2.594	14.80	23.449	-4.81	19.869	-22.70	5.85419	19
21	5.48	17.41	9.08	16.09	9.35	17.42	6.01	13.60	10.57	20.41	10.20	18.58	12.54	3.49	11.34	22.49	9.49	17.26		
	17.985	-23.44	18.894	-25.08	19.891	-20.63	16.249	-21.26	22.073	-12.92	20.900	-18.31	2.591	14.78	23.451	-4.80	19.873	-22.69	5.98561	21
23	5.49	17.42	9.12	16.18	9.23	17.36	6.01	13.56	10.50	20.35	10.12	18.51	12.46	3.40	11.26	22.41	9.41	17.19		
	18.133	-23.42	19.123	-24.77	19.867	-20.22	16.349	-21.52	22.095	-12.79	20.913	-18.26	2.588	14.77	23.452	-4.79	19.877	-22.68	6.11704	23
25	5.50	17.43	9.14	16.27	9.10	17.28	6.01	13.52	10.42	20.30	10.05	18.45	12.38	3.32	11.19	22.33	9.33	17.11		
	18.280	-23.38	19.349	-24.35	19.831	-19.82	16.448	-21.77	22.119	-12.66	20.927	-18.20	2.585	14.76	23.454	-4.77	19.882	-22.67	6.24845	25
27	5.50	17.44	9.15	16.36	8.57	17.20	6.01	13.49	10.35	20.24	9.58	18.38	12.30	3.24	11.11	22.26	9.26	17.04		
	18.428	-23.31	19.570	-23.83	19.785	-19.43	16.548	-22.01	22.143	-12.52	20.941	-18.14	2.583	14.75	23.456	-4.76	19.886	-22.66	6.37987	27
29	5.51	17.46	9.16	16.46	8.43	17.12	6.01	13.45	10.28	20.18	9.50	18.31	12.22	3.16	11.03	22.18	9.18	16.56		
	18.576	-23.20	19.785	-23.21	19.727	-19.05	16.649	-22.23	22.167	-12.39	20.955	-18.09	2.580	14.74	23.457	-4.75	19.891	-22.65	6.51129	29
31	5.51	17.48	9.15	16.55	8.29	17.02	6.01	13.42	10.21	20.13	9.43	18.25	12.14	3.08	10.55	22.10	9.10	16.49		
	18.724	-23.06	19.992	-22.51	19.660	-18.68	16.750	-22.44	22.191	-12.25	20.970	-18.03	2.578	14.73	23.459	-4.73	19.895	-22.65	6.64272	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2021

Nowy Rok	Pią	1 styczeń	Dzień Matki	Śro	26 maj
Najświętszej Maryi Panny Rodzicielki	Pią	1 styczeń	Trójcy Najświętszej	Nie	30 maj
Objawienia Pańskiego (Trzech Króli)	Śro	6 styczeń	Dzień Dziecka	Wto	1 czerwiec
Juliański Nowy Rok	Czw	14 styczeń	Boże Ciało	Czw	3 czerwiec
Dzień Babci	Czw	21 styczeń	Dzień Dziełczynienia	Nie	6 czerwiec
Dzień Dziadka	Pią	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	11 czerwiec
Ofiarowania Pańskiego	Wto	2 luty	Dzień Ojca	Śro	23 czerwiec
Matki Boskiej Gromnicznej	Wto	2 luty	Noc Świętojańska	Śro	23 czerwiec
Tłusty czwartek	Czw	11 luty	Św. Piotra i Pawła	Wto	29 czerwiec
Walentynki	Nie	14 luty	Wniebowzięcia N.M.P.	Nie	15 sierpień
Środa Popielcowa	Śro	17 luty	Święto Wojska Polskiego	Nie	15 sierpień
Święto UMK	Pią	19 luty	Dzień Solidarności i Wolności	Wto	31 sierpień
Dzień Kobiet	Pon	8 marzec	Dzień Programisty	Pon	13 wrzesień
Narodowy Dzień Życia	Śro	24 marzec	Dożynki – Święto Plonów	Czw	23 wrzesień
Niedziela Palmowa	Nie	28 marzec	Dzień Papieski	Nie	10 październik
Niedziela Wielkanocna	Nie	4 kwiecień	Dzień Edukacji Narodowej	Czw	14 październik
Niedziela Miłosierdzia Bożego	Nie	11 kwiecień	Dzień Papieża Jana Pawła II	Sob	16 październik
Święto Pracy	Sob	1 maj	Wszystkich Świętych	Pon	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Nie	2 maj	Zaduszki	Wto	2 listopad
Najświętsza Maryja Królowa Polski	Pon	3 maj	Święto Niepodległości	Czw	11 listopad
Święto Konstytucji 3 Maja	Pon	3 maj	Pierwsza niedziela Adwentu	Nie	28 listopad
Wniebowstąpienia Pańskiego	Czw	13 maj	Niepokalane Poczęcie N.M.P.	Śro	8 grudzień
Dzień Polskiej Niezapominajki	Sob	15 maj	Boże Narodzenie	Sob	25 grudzień
Zesłania Ducha Świętego	Nie	23 maj	Sylwester	Pią	31 grudzień

# Kalendarz astronomiczny 2022

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżycy i paralaksy horyzontalnej Księżycy. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!  
*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2022 KWIECIEŃ 17**

Dla całego roku przyjęto: TDT – UT = 70 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 16.33**, Lato **VI 21, 10.14**, Jesień **IX 23, 2.04**, Zima **XII 21, 22.48**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **27 marca do 30 października 2022 r.**

### Oznaczenia:

Dr — dzień 2022 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżycy)

$\delta$  — deklinacja (Słońca lub Księżycy)

R — odległość (Słońca lub Księżycy)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżycy

Wsch — wschód (Słońca, Księżycy lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżycy lub planety)

# STYCZEŃ 2022

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)									Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
1	1	Sob	581	18.58340	-3.29	18.4750	-22.59	0.98335	17.2622	-25.06	56.171	5.4	3	800	1149.2	1539	646	1023.7	1355	1048	1
2	2	Nie	582	19.02305	-3.57	18.5214	-22.54	0.98334	18.3340	-26.17	56.172	6.4	0	759	1149.7	1540	807	1130.0	1452	1044	2
3	3	Pon	583	19.06271	-4.25	18.5639	-22.48	0.98334	19.4051	-25.31	56.472	0.7	1	759	1150.2	1541	908	1236.0	1608	1040	3
4	4	Wto	584	19.10237	-4.52	19.0103	-22.42	0.98333	20.4510	-22.57	57.044	1.7	4	759	1150.6	1543	951	1338.8	1736	1036	4
5	5	Śro	585	19.14202	-5.19	19.0526	-22.35	0.98334	21.4455	-18.57	57.834	2.7	10	759	1151.1	1544	1019	1436.4	1905	1032	5
6	6	Czw	586	19.18168	-5.46	19.0950	-22.28	0.98334	22.3947	-13.59	58.764	3.7	18	758	1151.5	1545	1039	1528.5	2031	1028	6
7	7	Pią	587	19.22133	-6.12	19.1412	-22.21	0.98335	23.3025	-8.29	59.751	4.7	27	758	1151.9	1546	1054	1616.2	2153	1025	7
8	8	Sob	588	19.26099	-6.37	19.1834	-22.13	0.98337	0.1756	-2.48	60.718	5.7	37	757	1152.4	1548	1107	1700.6	2310	1021	8
9	9	Nie	589	19.30064	-7.03	19.2256	-22.04	0.98339	1.0330	2.49	61.598	6.7	47	757	1152.8	1549	1119	1743.2	***	1017	9
10	10	Pon	590	19.34030	-7.27	19.2717	-21.55	0.98341	1.4818	8.12	62.344	0.7	57	756	1153.2	1551	1130	1825.2	024	1013	10
11	11	Wto	591	19.37595	-7.51	19.3137	-21.46	0.98344	2.3318	13.09	62.926	1.7	66	755	1153.6	1552	1143	1907.7	137	1009	11
12	12	Śro	592	19.41561	-8.14	19.3557	-21.36	0.98348	3.1923	17.32	63.330	2.7	75	755	1154.0	1554	1158	1951.6	250	1005	12
13	13	Czw	593	19.45527	-8.37	19.4016	-21.26	0.98352	4.0709	21.12	63.558	3.7	83	754	1154.4	1555	1218	2037.5	402	1001	13
14	14	Pią	594	19.49492	-8.59	19.4435	-21.16	0.98357	4.5656	23.59	63.624	4.7	89	753	1154.7	1557	1243	2125.7	513	957	14
15	15	Sob	595	19.53458	-9.20	19.4853	-21.05	0.98362	5.4836	25.44	63.548	5.7	94	752	1155.1	1559	1318	2215.7	620	953	15
16	16	Nie	596	19.57423	-9.41	19.5310	-20.54	0.98368	6.4137	26.18	63.352	6.7	98	751	1155.4	1600	1404	2306.9	718	949	16
17	17	Pon	597	20.01389	-10.01	19.5726	-20.42	0.98374	7.3504	25.39	63.062	7.7	100	750	1155.8	1602	1503	2358.0	805	945	17
18	18	Wto	598	20.05355	-10.20	20.0142	-20.30	0.98382	8.2759	23.46	62.697	0.5	100	749	1156.1	1604	1612	*****	841	941	18
19	19	Śro	599	20.09320	-10.38	20.0557	-20.17	0.98389	9.1935	20.46	62.271	1.5	98	748	1156.4	1605	1726	048.0	908	937	19
20	20	Czw	600	20.13286	-10.56	20.1012	-20.04	0.98398	10.0931	16.46	61.796	2.5	94	747	1156.7	1607	1843	136.4	928	933	20
21	21	Pią	601	20.17251	-11.13	20.1425	-19.51	0.98407	10.5755	11.59	61.274	3.5	88	746	1157.0	1609	2000	222.9	944	930	21
22	22	Sob	602	20.21217	-11.29	20.1838	-19.38	0.98416	11.4516	6.37	60.709	4.5	81	744	1157.2	1611	2118	308.0	958	926	22
23	23	Nie	603	20.25182	-11.45	20.2250	-19.24	0.98426	12.3223	0.52	60.104	5.5	72	743	1157.5	1613	2236	352.4	1010	922	23
24	24	Pon	604	20.29148	-11.60	20.2702	-19.09	0.98437	13.2015	-5.02	59.469	6.5	62	742	1157.7	1614	2357	437.4	1022	918	24
25	25	Wto	605	20.33113	-12.14	20.3112	-18.55	0.98448	14.1001	-10.49	58.822	7.5	51	740	1158.0	1616	****	524.0	1036	914	25
26	26	Śro	606	20.37079	-12.27	20.3522	-18.39	0.98460	15.0248	-16.12	58.193	0.9	40	739	1158.2	1618	122	613.6	1053	910	26
27	27	Czw	607	20.41045	-12.40	20.3931	-18.24	0.98472	15.5931	-20.49	57.625	1.9	29	737	1158.4	1620	249	707.4	1115	906	27
28	28	Pią	608	20.45010	-12.51	20.4339	-18.08	0.98484	17.0030	-24.15	57.169	2.9	19	736	1158.6	1622	418	806.0	1146	902	28
29	29	Sob	609	20.48576	-13.02	20.4747	-17.52	0.98497	18.0500	-26.07	56.878	3.9	11	734	1158.8	1624	542	908.8	1233	858	29
30	30	Nie	610	20.52541	-13.12	20.5153	-17.36	0.98510	19.1107	-26.09	56.799	4.9	5	733	1158.9	1626	651	1013.7	1338	854	30
31	31	Pon	611	20.56507	-13.21	20.5559	-17.19	0.98524	20.1612	-24.19	56.959	5.9	1	731	1159.1	1628	742	1117.6	1500	850	31

Fazy Księżyca [Dm, h.mm]:      Nów 2, 19.34      1kw 9, 19.11      Pełn 18, 0.48      3kw 25, 14.41

# STYCZEŃ 2022 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	5.51	17.49	9.14	17.00	8.21	16.57	6.00	13.40	10.17	20.10	9.39	18.21	12.10	3.04	10.51	22.06	9.06	16.45		
	18.797	-22.98	20.091	-22.13	19.624	-18.50	16.801	-22.54	22.204	-12.18	20.977	-18.00	2.577	14.72	23.460	-4.73	19.898	-22.64	6.70843	1
3	5.51	17.50	9.12	17.09	8.07	16.47	5.60	13.37	10.10	20.04	9.32	18.15	12.02	2.56	10.43	21.59	8.59	16.37		
	18.944	-22.80	20.278	-21.31	19.545	-18.16	16.903	-22.73	22.229	-12.04	20.992	-17.94	2.575	14.72	23.463	-4.71	19.902	-22.63	6.83985	3
5	5.51	17.52	9.08	17.18	7.52	16.36	5.60	13.34	10.03	19.59	9.24	18.08	11.55	2.48	10.36	21.51	8.51	16.30		
	19.091	-22.59	20.448	-20.45	19.461	-17.84	17.005	-22.91	22.254	-11.89	21.007	-17.88	2.574	14.71	23.465	-4.70	19.907	-22.62	6.97128	5
7	5.51	17.55	9.03	17.25	7.37	16.25	5.59	13.31	9.56	19.54	9.17	18.02	11.47	2.40	10.28	21.43	8.43	16.22		
	19.237	-22.34	20.595	-19.55	19.374	-17.54	17.108	-23.07	22.280	-11.74	21.022	-17.81	2.572	14.70	23.467	-4.68	19.912	-22.61	7.10269	7
9	5.50	17.57	8.56	17.30	7.22	16.13	5.58	13.28	9.49	19.48	9.10	17.55	11.39	2.32	10.20	21.36	8.36	16.15		
	19.382	-22.07	20.713	-18.67	19.285	-17.27	17.211	-23.22	22.306	-11.59	21.037	-17.75	2.571	14.70	23.470	-4.66	19.916	-22.60	7.23411	9
11	5.49	17.59	8.48	17.32	7.07	16.02	5.58	13.26	9.41	19.43	9.02	17.49	11.31	2.24	10.12	21.28	8.28	16.07		
	19.527	-21.77	20.795	-17.83	19.198	-17.02	17.315	-23.35	22.333	-11.44	21.052	-17.69	2.570	14.70	23.473	-4.64	19.921	-22.59	7.36553	11
13	5.48	18.02	8.38	17.31	6.53	15.50	5.57	13.23	9.34	19.37	8.55	17.42	11.23	2.16	10.04	21.21	8.20	15.60		
	19.671	-21.44	20.834	-17.09	19.114	-16.80	17.419	-23.47	22.360	-11.29	21.068	-17.62	2.569	14.69	23.475	-4.63	19.926	-22.58	7.49695	13
15	5.47	18.05	8.25	17.27	6.39	15.39	5.56	13.21	9.27	19.32	8.48	17.35	11.15	2.08	9.57	21.13	8.13	15.52		
	19.815	-21.08	20.823	-16.51	19.036	-16.62	17.523	-23.57	22.387	-11.13	21.083	-17.56	2.569	14.69	23.478	-4.61	19.930	-22.57	7.62838	15
17	5.46	18.07	8.11	17.17	6.26	15.28	5.55	13.19	9.20	19.27	8.40	17.29	11.07	2.01	9.49	21.06	8.05	15.45		
	19.957	-20.70	20.760	-16.12	18.965	-16.46	17.628	-23.66	22.414	-10.97	21.099	-17.49	2.569	14.69	23.481	-4.59	19.935	-22.56	7.75980	17
19	5.44	18.10	7.56	17.04	6.14	15.17	5.54	13.16	9.13	19.21	8.33	17.22	10.59	1.53	9.41	20.58	7.57	15.37		
	20.099	-20.29	20.648	-15.94	18.904	-16.34	17.733	-23.73	22.442	-10.81	21.114	-17.43	2.569	14.69	23.485	-4.56	19.940	-22.55	7.89122	19
21	5.43	18.13	7.39	16.47	6.02	15.07	5.53	13.14	9.06	19.16	8.26	17.16	10.51	1.45	9.33	20.50	7.50	15.30		
	20.240	-19.85	20.497	-15.98	18.853	-16.25	17.838	-23.78	22.469	-10.65	21.130	-17.36	2.569	14.69	23.488	-4.54	19.945	-22.54	8.02264	21
23	5.41	18.16	7.22	16.27	5.52	14.57	5.52	13.13	8.59	19.11	8.18	17.09	10.44	1.37	9.25	20.43	7.42	15.22		
	20.381	-19.39	20.323	-16.20	18.813	-16.20	17.944	-23.82	22.497	-10.48	21.146	-17.29	2.569	14.70	23.491	-4.52	19.949	-22.53	8.15406	23
25	5.39	18.19	7.06	16.07	5.42	14.47	5.50	13.11	8.52	19.05	8.11	17.03	10.36	1.29	9.18	20.35	7.34	15.15		
	20.520	-18.91	20.148	-16.55	18.785	-16.17	18.049	-23.85	22.526	-10.32	21.162	-17.23	2.570	14.70	23.495	-4.50	19.954	-22.52	8.28548	25
27	5.36	18.22	6.51	15.47	5.33	14.38	5.49	13.09	8.44	19.00	8.04	16.56	10.28	1.21	9.10	20.28	7.27	15.07		
	20.659	-18.40	19.990	-16.97	18.768	-16.17	18.155	-23.86	22.554	-10.15	21.178	-17.16	2.571	14.71	23.498	-4.47	19.959	-22.51	8.41690	27
29	5.34	18.25	6.39	15.28	5.25	14.30	5.47	13.08	8.37	18.55	7.56	16.50	10.20	1.14	9.02	20.20	7.19	14.60		
	20.796	-17.87	19.863	-17.43	18.763	-16.20	18.261	-23.85	22.583	-9.98	21.194	-17.09	2.572	14.71	23.502	-4.45	19.963	-22.50	8.54832	29
31	5.32	18.28	6.28	15.12	5.18	14.22	5.46	13.07	8.30	18.50	7.49	16.44	10.12	1.06	8.54	20.13	7.12	14.52		
	20.933	-17.32	19.776	-17.88	18.770	-16.24	18.368	-23.83	22.611	-9.81	21.210	-17.02	2.573	14.72	23.506	-4.43	19.968	-22.49	8.67974	31

# LUTY 2022

Piwnice, CA UMK			←———— Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) —————→										..... Czas strefowy [hhmm.] .....								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
32	1	Wto	612	21.00473	-13.30	21.0004	-17.02	0.98538	21.1805	-20.51	57.362	0.2	0	730	1159.2	1630	816	1218.0	1630	846	1
33	2	Śro	613	21.04438	-13.37	21.0408	-16.45	0.98552	22.1540	-16.10	57.982	1.2	2	728	1159.4	1631	840	1313.6	1800	842	2
34	3	Czw	614	21.08404	-13.44	21.0812	-16.27	0.98566	23.0900	-10.43	58.770	2.2	6	726	1159.5	1633	858	1404.4	1926	838	3
35	4	Pią	615	21.12369	-13.50	21.1214	-16.10	0.98581	23.5851	-4.54	59.657	3.2	13	724	1159.6	1635	912	1451.5	2047	834	4
36	5	Sob	616	21.16335	-13.55	21.1616	-15.51	0.98596	0.4616	0.58	60.569	4.2	21	723	1159.7	1637	924	1536.1	2205	831	5
37	6	Nie	617	21.20300	-13.60	21.2017	-15.33	0.98611	1.3221	6.36	61.435	5.2	30	721	1159.7	1639	936	1619.4	2320	827	6
38	7	Pon	618	21.24266	-14.03	21.2417	-15.14	0.98627	2.1808	11.50	62.194	6.2	39	719	1159.8	1641	948	1702.6	****	823	7
39	8	Wto	619	21.28231	-14.06	21.2816	-14.55	0.98643	3.0431	16.29	62.798	7.2	49	717	1159.8	1643	1003	1746.5	035	819	8
40	9	Śro	620	21.32197	-14.08	21.3215	-14.36	0.98660	3.5212	20.25	63.219	0.9	58	715	1159.9	1645	1020	1832.1	148	815	9
41	10	Czw	621	21.36162	-14.09	21.3612	-14.17	0.98677	4.4135	23.28	63.442	1.9	67	713	1159.9	1647	1043	1919.6	301	811	10
42	11	Pią	622	21.40128	-14.09	21.4009	-13.57	0.98694	5.3248	25.30	63.471	2.9	76	712	1159.9	1649	1114	2009.0	409	807	11
43	12	Sob	623	21.44094	-14.09	21.4405	-13.37	0.98712	6.2528	26.24	63.323	3.9	83	710	1159.9	1651	1157	2059.8	511	803	12
44	13	Nie	624	21.48059	-14.08	21.4801	-13.17	0.98730	7.1853	26.05	63.024	4.9	90	708	1159.9	1653	1251	2151.1	602	759	13
45	14	Pon	625	21.52025	-14.06	21.5155	-12.57	0.98749	8.1211	24.31	62.609	5.9	95	706	1159.8	1655	1357	2241.9	642	755	14
46	15	Wto	626	21.55590	-14.03	21.5549	-12.36	0.98768	9.0432	21.46	62.116	6.9	98	704	1159.8	1657	1511	2331.3	711	751	15
47	16	Śro	627	21.59556	-13.60	21.5942	-12.15	0.98788	9.5527	17.57	61.579	7.9	100	701	1159.7	1659	1628	*****	733	747	16
48	17	Czw	628	22.03521	-13.55	22.0334	-11.54	0.98809	10.4452	13.15	61.030	0.8	99	659	1159.7	1701	1747	019.1	751	743	17
49	18	Pią	629	22.07487	-13.51	22.0726	-11.33	0.98829	11.3306	7.53	60.493	1.8	97	657	1159.6	1703	1906	105.3	805	739	18
50	19	Sob	630	22.11452	-13.45	22.1117	-11.12	0.98851	12.2050	2.05	59.983	2.8	92	655	1159.5	1705	2025	150.6	817	735	19
51	20	Nie	631	22.15418	-13.39	22.1508	-10.51	0.98872	13.0854	-3.54	59.509	3.8	85	653	1159.4	1707	2146	235.8	830	732	20
52	21	Pon	632	22.19383	-13.32	22.1857	-10.29	0.98895	13.5818	-9.47	59.072	4.8	76	651	1159.3	1708	2310	322.1	843	728	21
53	22	Wto	633	22.23349	-13.25	22.2246	-10.07	0.98917	14.5004	-15.17	58.675	5.8	66	649	1159.2	1710	****	410.6	858	724	22
54	23	Śro	634	22.27315	-13.17	22.2635	-9.45	0.98940	15.4502	-20.02	58.323	6.8	55	647	1159.0	1712	036	502.4	918	720	23
55	24	Czw	635	22.31280	-13.08	22.3023	-9.23	0.98963	16.4339	-23.43	58.026	0.5	44	644	1158.9	1714	203	558.1	945	716	24
56	25	Pią	636	22.35246	-12.59	22.3410	-9.01	0.98987	17.4533	-25.58	57.803	1.5	33	642	1158.7	1716	327	657.8	1024	712	25
57	26	Sob	637	22.39211	-12.49	22.3757	-8.38	0.99011	18.4923	-26.32	57.680	2.5	23	640	1158.6	1718	440	700.0	1120	708	26
58	27	Nie	638	22.43177	-12.39	22.4143	-8.16	0.99035	19.5305	-25.18	57.684	3.5	14	638	1158.4	1720	536	902.5	1234	704	27
59	28	Pon	639	22.47142	-12.28	22.4529	-7.53	0.99059	20.5439	-22.26	57.839	4.5	7	635	1158.2	1722	615	1002.9	1400	700	28

Fazy Księżyca [Dm, h.mm]:      Nów 1, 6.46      1kw 8, 14.50      Pełn 16, 17.57      3kw 23, 23.32



## LUTY 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST (0 <sup>h</sup> UT)	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	5.30	18.30	6.24	15.05	5.15	14.19	5.45	13.06	8.27	18.47	7.45	16.40	10.08	1.02	8.50	20.09	7.08	14.48		
	21.001	-17.04	19.747	-18.09	18.777	-16.27	18.421	-23.81	22.626	-9.72	21.218	-16.99	2.574	14.72	23.507	-4.41	19.970	-22.49	8.74545	1
3	5.27	18.33	6.17	14.53	5.09	14.12	5.43	13.05	8.20	18.42	7.38	16.34	10.01	0.54	8.43	20.02	7.00	14.41		
	21.137	-16.46	19.719	-18.49	18.799	-16.33	18.527	-23.76	22.655	-9.55	21.234	-16.92	2.576	14.73	23.511	-4.39	19.975	-22.48	8.87687	3
5	5.25	18.37	6.12	14.44	5.03	14.05	5.41	13.04	8.13	18.37	7.30	16.27	9.53	0.47	8.35	19.54	6.52	14.33		
	21.271	-15.86	19.729	-18.84	18.832	-16.41	18.634	-23.70	22.684	-9.38	21.250	-16.85	2.578	14.74	23.515	-4.36	19.979	-22.47	9.00829	5
7	5.21	18.40	6.09	14.36	4.58	13.60	5.39	13.03	8.05	18.32	7.23	16.21	9.45	0.39	8.27	19.47	6.45	14.26		
	21.405	-15.24	19.770	-19.12	18.874	-16.49	18.740	-23.62	22.713	-9.20	21.266	-16.78	2.580	14.75	23.519	-4.34	19.984	-22.46	9.13971	7
9	5.18	18.43	6.06	14.31	4.54	13.54	5.37	13.02	7.58	18.27	7.16	16.14	9.37	0.31	8.19	19.39	6.37	14.18		
	21.537	-14.60	19.840	-19.34	18.925	-16.58	18.847	-23.52	22.743	-9.02	21.282	-16.71	2.582	14.77	23.523	-4.31	19.988	-22.45	9.27113	9
11	5.15	18.47	6.05	14.28	4.50	13.49	5.34	13.01	7.51	18.22	7.08	16.08	9.29	0.24	8.12	19.32	6.29	14.11		
	21.669	-13.95	19.932	-19.48	18.984	-16.66	18.953	-23.41	22.772	-8.85	21.298	-16.64	2.585	14.78	23.527	-4.28	19.992	-22.44	9.40255	11
13	5.11	18.50	6.04	14.26	4.47	13.45	5.32	13.01	7.44	18.17	7.01	16.01	9.22	0.16	8.04	19.24	6.22	14.03		
	21.800	-13.28	20.044	-19.54	19.052	-16.74	19.060	-23.28	22.802	-8.67	21.313	-16.57	2.587	14.79	23.532	-4.25	19.997	-22.44	9.53397	13
15	5.08	18.54	6.04	14.26	4.44	13.41	5.29	13.01	7.37	18.11	6.54	15.55	9.14	0.09	7.56	19.17	6.14	13.56		
	21.930	-12.60	20.172	-19.53	19.126	-16.82	19.166	-23.14	22.832	-8.49	21.329	-16.50	2.590	14.81	23.536	-4.23	20.001	-22.43	9.66539	15
17	5.04	18.57	6.04	14.28	4.41	13.38	5.27	13.00	7.30	18.06	6.46	15.48	9.06	23.57	7.48	19.09	6.06	13.48		
	22.060	-11.91	20.314	-19.43	19.207	-16.88	19.272	-22.98	22.861	-8.31	21.345	-16.43	2.594	14.83	23.540	-4.20	20.005	-22.42	9.79681	17
19	5.00	19.01	6.04	14.30	4.39	13.35	5.24	13.00	7.23	18.01	6.39	15.42	8.58	23.49	7.41	19.02	5.59	13.41		
	22.188	-11.20	20.467	-19.24	19.295	-16.93	19.379	-22.80	22.891	-8.12	21.361	-16.36	2.597	14.84	23.545	-4.17	20.009	-22.41	9.92823	19
21	4.56	19.05	6.04	14.34	4.37	13.32	5.21	12.60	7.16	17.56	6.32	15.36	8.50	23.42	7.33	18.54	5.51	13.33		
	22.316	-10.48	20.629	-18.97	19.388	-16.96	19.485	-22.61	22.921	-7.94	21.376	-16.29	2.601	14.86	23.549	-4.14	20.013	-22.41	10.05964	21
23	4.52	19.08	6.04	14.38	4.35	13.30	5.18	12.60	7.09	17.51	6.24	15.29	8.43	23.34	7.25	18.47	5.43	13.25		
	22.443	-9.75	20.799	-18.61	19.486	-16.97	19.591	-22.41	22.951	-7.76	21.392	-16.22	2.605	14.88	23.554	-4.11	20.017	-22.40	10.19106	23
25	4.48	19.12	6.04	14.44	4.33	13.29	5.15	12.60	7.02	17.46	6.17	15.22	8.35	23.27	7.17	18.39	5.36	13.18		
	22.570	-9.01	20.976	-18.17	19.590	-16.96	19.696	-22.18	22.981	-7.57	21.407	-16.15	2.609	14.90	23.558	-4.08	20.021	-22.39	10.32248	25
27	4.43	19.16	6.04	14.50	4.32	13.27	5.11	13.00	6.55	17.41	6.10	15.16	8.27	23.19	7.10	18.32	5.28	13.10		
	22.695	-8.26	21.158	-17.64	19.698	-16.92	19.802	-21.95	23.011	-7.39	21.423	-16.08	2.613	14.92	23.563	-4.05	20.025	-22.38	10.45391	27

# MARZEC 2022

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
60	1	Wto	640	22.51108	-12.17	22.4914	-7.30	0.99083	21.5247	-18.12	58.159	5.5	2	633	1158.0	1724	642	1059.4	1529	656	1	
61	2	Śro	641	22.55074	-12.05	22.5259	-7.07	0.99108	22.4709	-13.00	58.640	6.5	0	631	1157.8	1726	701	1151.8	1656	652	2	
62	3	Czw	642	22.59039	-11.52	22.5643	-6.44	0.99132	23.3813	-7.15	59.261	0.7	1	629	1157.6	1728	716	1240.5	1820	648	3	
63	4	Pią	643	23.03004	-11.40	23.0027	-6.21	0.99157	0.2648	-1.16	59.983	1.7	4	626	1157.4	1729	729	1326.4	1940	644	4	
64	5	Sob	644	23.06570	-11.26	23.0410	-5.58	0.99182	1.1354	4.36	60.751	2.7	9	624	1157.2	1731	741	1410.9	2058	640	5	
65	6	Nie	645	23.10535	-11.13	23.0753	-5.35	0.99207	2.0028	10.08	61.507	3.7	15	622	1157.0	1733	753	1454.8	2215	637	6	
66	7	Pon	646	23.14501	-10.59	23.1136	-5.12	0.99232	2.4721	15.08	62.193	4.7	23	619	1156.7	1735	807	1539.1	2331	633	7	
67	8	Wto	647	23.18466	-10.44	23.1518	-4.48	0.99257	3.3515	19.24	62.755	5.7	32	617	1156.5	1737	823	1624.7	****	629	8	
68	9	Śro	648	23.22432	-10.29	23.1859	-4.25	0.99282	4.2436	22.49	63.153	6.7	41	615	1156.2	1739	843	1711.9	045	625	9	
69	10	Czw	649	23.26398	-10.14	23.2241	-4.01	0.99308	5.1532	25.13	63.358	0.0	50	612	1156.0	1741	911	1800.9	156	621	10	
70	11	Pią	650	23.30363	-9.58	23.2622	-3.38	0.99334	6.0752	26.29	63.359	1.0	59	610	1155.7	1742	948	1851.3	301	617	11	
71	12	Sob	651	23.34329	-9.43	23.3002	-3.14	0.99360	7.0100	26.33	63.160	2.0	69	608	1155.5	1744	1037	1942.3	357	613	12	
72	13	Nie	652	23.38294	-9.26	23.3343	-2.50	0.99386	7.5413	25.22	62.780	3.0	77	605	1155.2	1746	1139	2033.2	441	609	13	
73	14	Pon	653	23.42260	-9.10	23.3723	-2.27	0.99412	8.4644	22.59	62.254	4.0	85	603	1154.9	1748	1250	2123.0	513	605	14	
74	15	Wto	654	23.46226	-8.53	23.4103	-2.03	0.99439	9.3805	19.28	61.624	5.0	91	601	1154.6	1750	1407	2211.5	538	601	15	
75	16	Śro	655	23.50191	-8.36	23.4442	-1.39	0.99466	10.2808	14.59	60.940	6.0	96	558	1154.3	1752	1526	2258.6	556	557	16	
76	17	Czw	656	23.54156	-8.19	23.4821	-1.16	0.99494	11.1708	9.43	60.255	7.0	99	556	1154.1	1753	1646	2344.7	611	553	17	
77	18	Pią	657	23.58122	-8.01	23.5201	-0.52	0.99521	12.0539	3.53	59.614	0.2	100	553	1153.8	1755	1807	*****	624	549	18	
78	19	Sob	658	0.02087	-7.44	23.5539	-0.28	0.99549	12.5426	-2.14	59.059	1.2	98	551	1153.5	1757	1930	030.8	637	545	19	
79	20	Nie	659	0.06053	-7.26	23.5918	-0.05	0.99577	13.4426	-8.21	58.613	2.2	94	549	1153.2	1759	2054	117.6	649	541	20	
80	21	Pon	660	0.10018	-7.08	0.0257	0.19	0.99606	14.3635	-14.09	58.288	3.2	88	546	1152.9	1801	2222	206.4	704	538	21	
81	22	Wto	661	0.13584	-6.50	0.0636	0.43	0.99634	15.3140	-19.14	58.082	4.2	80	544	1152.6	1802	2351	258.1	722	534	22	
82	23	Śro	662	0.17549	-6.32	0.1014	1.07	0.99663	16.3004	-23.15	57.985	5.2	70	541	1152.3	1804	****	353.4	746	530	23	
83	24	Czw	663	0.21515	-6.14	0.1353	1.30	0.99692	17.3125	-25.51	57.982	6.2	59	539	1152.0	1806	118	452.3	821	526	24	
84	25	Pią	664	0.25481	-5.56	0.1731	1.54	0.99721	18.3430	-26.47	58.060	0.2	47	537	1151.7	1808	234	553.6	911	522	25	
85	26	Sob	665	0.29446	-5.38	0.2110	2.17	0.99750	19.3725	-25.59	58.211	1.2	36	534	1151.4	1810	335	655.3	1019	518	26	
86	27	Nie	666	0.33412	-5.20	0.2448	2.41	0.99779	20.3817	-23.32	58.434	2.2	26	532	1151.1	1811	417	755.2	1140	514	27	
86	27	Nie	666	23.33313	-5.21	0.2439	2.40	0.99778	20.3549	-23.40	58.423	3.2	26	632	1251.1	1912	517	855.2	1240	614	27	
87	28	Pon	667	23.37279	-5.03	0.2818	3.03	0.99807	21.3337	-19.54	58.716	4.2	17	629	1250.8	1913	547	951.5	1407	610	28	
88	29	Wto	668	23.41244	-4.45	0.3156	3.27	0.99836	22.2751	-15.04	59.087	5.2	9	627	1250.5	1915	607	1043.9	1533	606	29	
89	30	Śro	669	23.45210	-4.27	0.3535	3.50	0.99865	23.1854	-9.33	59.538	6.2	4	625	1250.2	1917	623	1132.7	1657	602	30	
90	31	Czw	670	23.49175	-4.09	0.3913	4.13	0.99894	0.0731	-3.40	60.063	7.2	1	622	1249.9	1919	636	1218.9	1818	558	31	

Fazy Księżyca [Dm, h.mm]:      Nów 2, 18.35      1kw 10, 11.45      Pełn 18, 8.18      3kw 25, 6.37

# MARZEC 2022 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.39	19.20	6.03	14.58	4.30	13.27	5.08	13.00	6.48	17.36	6.02	15.09	8.19	23.12	7.02	18.25	5.20	13.03		
	22.821	-7.50	21.345	-17.03	19.809	-16.87	19.907	-21.70	23.041	-7.20	21.438	-16.01	2.617	14.94	23.567	-4.03	20.029	-22.38	10.58533	1
3	4.34	19.23	6.02	15.05	4.29	13.26	5.05	13.01	6.40	17.31	5.55	15.03	8.12	23.05	6.54	18.17	5.13	12.55		
	22.945	-6.74	21.536	-16.33	19.925	-16.78	20.012	-21.43	23.071	-7.02	21.453	-15.95	2.622	14.96	23.572	-4.00	20.032	-22.37	10.71674	3
5	4.29	19.27	6.01	15.14	4.27	13.26	5.01	13.01	6.33	17.26	5.47	14.56	8.04	22.57	6.46	18.10	5.05	12.48		
	23.070	-5.97	21.730	-15.55	20.043	-16.67	20.117	-21.15	23.101	-6.83	21.468	-15.88	2.627	14.99	23.576	-3.97	20.036	-22.37	10.84816	5
7	4.25	19.31	5.60	15.23	4.26	13.26	4.57	13.02	6.26	17.21	5.40	14.50	7.56	22.50	6.39	18.02	4.57	12.40		
	23.193	-5.19	21.928	-14.68	20.165	-16.53	20.222	-20.85	23.131	-6.65	21.483	-15.81	2.631	15.01	23.581	-3.94	20.039	-22.36	10.97958	7
9	4.20	19.35	5.58	15.33	4.24	13.27	4.54	13.02	6.19	17.16	5.33	14.43	7.49	22.42	6.31	17.55	4.50	12.32		
	23.317	-4.41	22.128	-13.72	20.289	-16.36	20.326	-20.54	23.161	-6.46	21.497	-15.75	2.637	15.04	23.586	-3.91	20.043	-22.36	11.11099	9
11	4.15	19.39	5.57	15.43	4.23	13.28	4.50	13.03	6.12	17.11	5.25	14.37	7.41	22.35	6.23	17.47	4.42	12.25		
	23.439	-3.63	22.332	-12.69	20.415	-16.16	20.430	-20.22	23.191	-6.27	21.512	-15.68	2.642	15.06	23.590	-3.88	20.046	-22.35	11.24242	11
13	4.10	19.43	5.55	15.54	4.21	13.29	4.46	13.03	6.05	17.06	5.18	14.30	7.33	22.27	6.15	17.40	4.34	12.17		
	23.562	-2.84	22.538	-11.57	20.544	-15.94	20.533	-19.88	23.221	-6.09	21.526	-15.62	2.647	15.09	23.595	-3.85	20.049	-22.35	11.37384	13
15	4.04	19.47	5.52	16.06	4.19	13.31	4.42	13.04	5.58	17.01	5.10	14.23	7.26	22.20	6.08	17.33	4.26	12.09		
	23.684	-2.05	22.747	-10.37	20.675	-15.67	20.637	-19.54	23.251	-5.90	21.540	-15.55	2.653	15.11	23.600	-3.82	20.052	-22.34	11.50526	15
17	3.59	19.51	5.50	16.18	4.18	13.33	4.38	13.05	5.51	16.55	5.03	14.17	7.18	22.13	5.60	17.25	4.19	12.02		
	23.806	-1.26	22.958	-9.09	20.807	-15.38	20.740	-19.17	23.280	-5.72	21.554	-15.49	2.659	15.14	23.604	-3.79	20.055	-22.34	11.63667	17
19	3.54	19.56	5.47	16.30	4.16	13.35	4.33	13.05	5.44	16.50	4.56	14.10	7.10	22.05	5.52	17.18	4.11	11.54		
	23.928	-0.47	23.173	-7.73	20.941	-15.06	20.842	-18.80	23.310	-5.53	21.567	-15.43	2.665	15.17	23.609	-3.76	20.058	-22.33	11.76809	19
21	3.48	20.00	5.45	16.43	4.14	13.37	4.29	13.06	5.37	16.45	4.48	14.03	7.02	21.58	5.44	17.10	4.03	11.46		
	0.049	0.32	23.390	-6.29	21.076	-14.71	20.944	-18.41	23.340	-5.34	21.581	-15.36	2.671	15.20	23.614	-3.73	20.061	-22.33	11.89950	21
23	3.43	20.04	5.42	16.57	4.12	13.40	4.25	13.07	5.30	16.40	4.41	13.57	6.55	21.51	5.37	17.03	3.55	11.39		
	0.171	1.11	23.611	-4.77	21.212	-14.32	21.046	-18.01	23.369	-5.16	21.594	-15.30	2.677	15.23	23.618	-3.70	20.063	-22.33	12.03092	23
25	3.37	20.09	5.39	17.11	4.10	13.42	4.20	13.08	5.23	16.35	4.33	13.50	6.47	21.43	5.29	16.55	3.48	11.31		
	0.292	1.90	23.835	-3.19	21.350	-13.91	21.147	-17.60	23.399	-4.97	21.607	-15.24	2.683	15.26	23.623	-3.67	20.066	-22.33	12.16235	25
27	3.31	20.14	5.36	17.25	4.08	13.46	4.16	13.09	5.15	16.30	4.26	13.43	6.39	21.36	5.21	16.48	3.40	11.23		
	0.413	2.68	0.064	-1.53	21.488	-13.46	21.249	-17.18	23.428	-4.79	21.620	-15.19	2.689	15.29	23.627	-3.64	20.068	-22.32	12.29377	27
27	4.31	21.14	6.36	18.25	5.08	14.45	5.16	14.08	6.15	17.30	5.26	14.43	7.39	22.36	6.21	17.48	4.40	12.23		
	0.411	2.66	0.059	-1.57	21.485	-13.47	21.246	-17.19	23.427	-4.79	21.620	-15.19	2.689	15.29	23.627	-3.64	20.068	-22.32	12.29377	27
29	4.26	21.18	6.33	18.40	5.05	14.49	5.11	14.09	6.08	17.25	5.18	14.36	7.32	22.29	6.13	17.41	4.32	12.16		
	0.532	3.45	0.291	0.15	21.624	-13.00	21.347	-16.75	23.456	-4.61	21.632	-15.13	2.696	15.32	23.632	-3.61	20.070	-22.32	12.42519	29
31	4.20	21.23	6.30	18.56	5.03	14.52	5.07	14.10	6.01	17.20	5.11	14.30	7.24	22.22	6.06	17.33	4.25	12.08		
	0.654	4.22	0.528	1.93	21.763	-12.50	21.447	-16.31	23.485	-4.43	21.645	-15.07	2.702	15.35	23.636	-3.58	20.072	-22.32	12.55660	31

# KWIECIEŃ 2022

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j	astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2459																			
91	1	Pią	671	23.53141	-3.51	0.4252	4.37	0.99923	0.5439	2.17	60.645	0.1	0	620	1249.6	1920	648	1303.3	1936	554	1	
92	2	Sob	672	23.57106	-3.34	0.4631	4.60	0.99951	1.4113	8.01	61.258	1.1	1	617	1249.3	1922	659	1347.2	2054	550	2	
93	3	Nie	673	24.01072	-3.16	0.5010	5.23	0.99980	2.2803	13.18	61.866	2.1	5	615	1249.0	1924	712	1431.5	2211	546	3	
94	4	Pon	674	0.05037	-2.59	0.5349	5.46	1.00008	3.1550	17.57	62.426	3.1	10	613	1248.7	1926	726	1516.9	2327	542	4	
95	5	Wto	675	0.09003	-2.41	0.5729	6.08	1.00037	4.0501	21.47	62.894	4.1	16	610	1248.4	1928	744	1603.9	****	539	5	
96	6	Śro	676	0.12568	-2.24	1.0108	6.31	1.00065	4.5546	24.37	63.229	5.1	24	608	1248.2	1929	809	1652.5	041	535	6	
97	7	Czw	677	0.16534	-2.08	1.0448	6.54	1.00093	5.4752	26.21	63.396	6.1	33	606	1247.9	1931	842	1742.6	150	531	7	
98	8	Pią	678	0.20500	-1.51	1.0828	7.16	1.00121	6.4048	26.53	63.373	7.1	42	603	1247.6	1933	926	1833.4	250	527	8	
99	9	Sob	679	0.24465	-1.34	1.1208	7.39	1.00149	7.3348	26.10	63.148	0.1	51	601	1247.3	1935	1022	1924.1	338	523	9	
100	10	Nie	680	0.28431	-1.18	1.1548	8.01	1.00177	8.2611	24.15	62.729	1.1	61	559	1247.1	1937	1130	2013.8	415	519	10	
101	11	Pon	681	0.32396	-1.02	1.1929	8.23	1.00205	9.1726	21.11	62.136	2.1	70	556	1246.8	1938	1244	2102.3	442	515	11	
102	12	Wto	682	0.36362	-0.47	1.2310	8.45	1.00233	10.0725	17.06	61.407	3.1	79	554	1246.5	1940	1401	2149.3	502	511	12	
103	13	Sob	683	0.40327	-0.31	1.2651	9.07	1.00261	10.5622	12.09	60.594	4.1	87	552	1246.3	1942	1521	2235.5	518	507	13	
104	14	Czw	684	0.44293	-0.16	1.3033	9.28	1.00289	11.4449	6.31	59.757	5.1	93	549	1246.0	1944	1641	2321.5	531	503	14	
105	15	Pią	685	0.48258	-0.02	1.3414	9.50	1.00316	12.3333	0.25	58.961	6.1	98	547	1245.8	1946	1804	*****	543	459	15	
106	16	Sob	686	0.52224	0.13	1.3757	10.11	1.00345	13.2332	-5.52	58.271	7.1	100	545	1245.5	1947	1929	008.2	555	455	16	
107	17	Nie	687	0.56189	0.27	1.4139	10.32	1.00373	14.1544	-11.59	57.737	0.6	99	543	1245.3	1949	2058	056.9	609	451	17	
108	18	Pon	688	1.00155	0.40	1.4522	10.53	1.00401	15.1103	-17.34	57.394	1.6	96	540	1245.1	1951	2230	148.6	625	447	18	
109	19	Wto	689	1.04120	0.54	1.4906	11.14	1.00429	16.0958	-22.09	57.253	2.6	91	538	1244.9	1953	****	244.2	647	444	19	
110	20	Śro	690	1.08086	1.06	1.5249	11.35	1.00457	17.1212	-25.21	57.304	3.6	83	536	1244.6	1955	001	343.7	719	440	20	
111	21	Czw	691	1.12052	1.19	1.5634	11.55	1.00485	18.1627	-26.51	57.520	4.6	73	534	1244.4	1956	125	446.1	804	436	21	
112	22	Pią	692	1.16017	1.31	2.0018	12.15	1.00513	19.2037	-26.31	57.863	5.6	62	532	1244.2	1958	232	549.3	908	432	22	
113	23	Sob	693	1.19583	1.42	2.0403	12.36	1.00540	20.2236	-24.28	58.296	6.6	51	529	1244.0	2000	320	650.4	1027	428	23	
114	24	Nie	694	1.23548	1.53	2.0749	12.55	1.00568	21.2059	-20.59	58.785	0.9	40	527	1243.9	2002	353	747.9	1153	424	24	
115	25	Pon	695	1.27514	2.03	2.1135	13.15	1.00595	22.1525	-16.24	59.305	1.9	29	525	1243.7	2003	415	840.8	1319	420	25	
116	26	Wto	696	1.31479	2.13	2.1522	13.34	1.00623	23.0619	-11.05	59.838	2.9	20	523	1243.5	2005	432	929.8	1442	416	26	
117	27	Śro	697	1.35445	2.23	2.1909	13.54	1.00650	23.5433	-5.21	60.376	3.9	12	521	1243.4	2007	445	1015.7	1602	412	27	
118	28	Czw	698	1.39410	2.32	2.2257	14.13	1.00676	0.4107	0.32	60.912	4.9	6	519	1243.2	2009	456	1059.7	1720	408	28	
119	29	Pią	699	1.43376	2.40	2.2645	14.31	1.00702	1.2702	6.17	61.442	5.9	2	517	1243.1	2011	507	1142.9	1836	404	29	
120	30	Sob	700	1.47341	2.48	2.3033	14.50	1.00728	2.1312	11.43	61.954	6.9	0	515	1243.0	2012	519	1226.6	1953	400	30	

Fazy Księżycyca [Dm, h.mm]:      Nów 1, 8.24      1kw 9, 8.48      Pełn 16, 20.55      3kw 23, 13.56      Nów 30, 22.28

# KWIECIEŃ 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE			MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)		
1	4.17	21.25	6.28	19.04	5.01	14.54	5.04	14.11	5.58	17.17	5.07	14.26	7.20	22.18	6.02	17.29	4.21	12.04			
	0.715	4.61	0.648	2.83	21.833	-12.23	21.497	-16.08	23.500	-4.34	21.651	-15.05	2.706	15.36	23.639	-3.57	20.073	-22.32	12.62231	1	
3	4.11	21.30	6.25	19.20	4.59	14.57	4.60	14.12	5.51	17.12	4.60	14.19	7.13	22.11	5.54	17.22	4.13	11.56			
	0.836	5.38	0.891	4.67	21.973	-11.69	21.597	-15.62	23.529	-4.16	21.662	-14.99	2.713	15.40	23.643	-3.54	20.075	-22.32	12.75372	3	
5	4.04	21.36	6.22	19.38	4.56	15.01	4.55	14.13	5.43	17.07	4.52	14.12	7.05	22.03	5.46	17.15	4.05	11.48			
	0.958	6.14	1.139	6.54	22.113	-11.12	21.696	-15.16	23.557	-3.98	21.674	-14.94	2.719	15.43	23.648	-3.51	20.077	-22.32	12.88514	5	
7	3.58	21.41	6.19	19.55	4.53	15.05	4.50	14.13	5.36	17.01	4.45	14.06	6.57	21.56	5.39	17.07	3.57	11.41			
	1.080	6.90	1.389	8.41	22.254	-10.52	21.795	-14.68	23.586	-3.80	21.685	-14.89	2.726	15.46	23.652	-3.49	20.079	-22.32	13.01656	7	
9	3.52	21.46	6.15	20.13	4.50	15.09	4.45	14.14	5.29	16.56	4.37	13.59	6.50	21.49	5.31	16.60	3.50	11.33			
	1.202	7.64	1.642	10.27	22.394	-9.90	21.894	-14.19	23.614	-3.62	21.696	-14.84	2.734	15.49	23.656	-3.46	20.080	-22.32	13.14799	9	
11	3.45	21.52	6.12	20.30	4.47	15.13	4.40	14.15	5.22	16.51	4.30	13.52	6.42	21.42	5.23	16.52	3.42	11.25			
	1.325	8.38	1.895	12.08	22.535	-9.26	21.992	-13.70	23.642	-3.44	21.707	-14.79	2.741	15.53	23.661	-3.43	20.082	-22.32	13.27941	11	
13	3.39	21.57	6.09	20.48	4.44	15.17	4.35	14.16	5.15	16.46	4.22	13.45	6.34	21.35	5.15	16.45	3.34	11.17			
	1.448	9.11	2.146	13.82	22.676	-8.59	22.089	-13.19	23.670	-3.26	21.718	-14.74	2.748	15.56	23.665	-3.41	20.083	-22.32	13.41082	13	
15	3.32	22.03	6.06	21.05	4.41	15.22	4.30	14.17	5.08	16.40	4.15	13.38	6.27	21.27	5.08	16.37	3.26	11.09			
	1.571	9.83	2.393	15.46	22.817	-7.91	22.187	-12.68	23.698	-3.09	21.728	-14.69	2.755	15.59	23.669	-3.38	20.084	-22.32	13.54224	15	
17	3.25	22.09	6.03	21.21	4.38	15.26	4.25	14.18	5.01	16.35	4.07	13.31	6.19	21.20	4.60	16.30	3.18	11.02			
	1.694	10.54	2.632	16.97	22.958	-7.20	22.284	-12.16	23.725	-2.92	21.737	-14.65	2.763	15.63	23.673	-3.35	20.085	-22.33	13.67366	17	
19	3.18	22.15	5.60	21.36	4.34	15.31	4.20	14.19	4.53	16.30	3.60	13.24	6.12	21.13	4.52	16.22	3.11	10.54			
	1.818	11.24	2.862	18.34	23.099	-6.47	22.380	-11.64	23.752	-2.74	21.747	-14.61	2.770	15.66	23.677	-3.33	20.086	-22.33	13.80508	19	
21	3.11	22.22	5.57	21.49	4.31	15.35	4.15	14.20	4.46	16.25	3.52	13.17	6.04	21.06	4.44	16.15	3.03	10.46			
	1.943	11.92	3.079	19.55	23.241	-5.73	22.476	-11.11	23.779	-2.57	21.756	-14.57	2.777	15.69	23.681	-3.30	20.087	-22.33	13.93650	21	
23	3.04	22.28	5.54	22.01	4.27	15.40	4.10	14.21	4.39	16.19	3.44	13.10	5.56	20.59	4.37	16.07	2.55	10.38			
	2.068	12.59	3.281	20.59	23.382	-4.97	22.572	-10.57	23.806	-2.40	21.765	-14.53	2.785	15.73	23.685	-3.28	20.087	-22.33	14.06792	23	
25	2.56	22.35	5.51	22.10	4.24	15.45	4.05	14.22	4.32	16.14	3.37	13.02	5.49	20.51	4.29	15.60	2.47	10.30			
	2.193	13.25	3.466	21.46	23.523	-4.19	22.668	-10.02	23.833	-2.24	21.773	-14.49	2.793	15.76	23.689	-3.26	20.088	-22.34	14.19934	25	
27	2.48	22.43	5.47	22.17	4.20	15.50	3.59	14.23	4.25	16.08	3.29	12.55	5.41	20.44	4.21	15.52	2.39	10.22			
	2.319	13.89	3.633	22.16	23.665	-3.40	22.763	-9.47	23.859	-2.07	21.781	-14.45	2.800	15.80	23.692	-3.23	20.088	-22.34	14.33076	27	
29	2.40	22.50	5.44	22.22	4.17	15.55	3.54	14.24	4.18	16.03	3.22	12.48	5.33	20.37	4.13	15.45	2.32	10.15			
	2.446	14.52	3.779	22.69	23.806	-2.60	22.858	-8.92	23.885	-1.91	21.789	-14.42	2.808	15.83	23.696	-3.21	20.088	-22.35	14.46217	29	

# MAJ 2022

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
121	1	Nie	701	1.51307	2.55	2.3423	15.08	1.00754	3.0021	16.35	62.435	0.6	0	513	1242.8	2014	532	1311.0	2109	356	1
122	2	Pon	702	1.55272	3.02	2.3812	15.26	1.00779	3.4901	20.42	62.861	1.6	2	511	1242.7	2016	549	1357.3	2224	352	2
123	3	Wto	703	1.59238	3.08	2.4203	15.44	1.00804	4.3922	23.54	63.208	2.6	6	509	1242.6	2018	610	1445.4	2336	348	3
124	4	Śro	704	2.03204	3.14	2.4554	16.01	1.00829	5.3114	26.00	63.444	3.6	11	507	1242.5	2019	639	1535.2	****	345	4
125	5	Czw	705	2.07169	3.19	2.4945	16.18	1.00853	6.2403	26.56	63.542	4.6	18	505	1242.4	2021	719	1625.9	040	341	5
126	6	Pią	706	2.11135	3.24	2.5337	16.35	1.00877	7.1701	26.37	63.476	5.6	26	503	1242.4	2023	810	1716.5	134	337	6
127	7	Sob	707	2.15101	3.28	2.5730	16.52	1.00900	8.0919	25.05	63.228	6.6	35	501	1242.3	2025	913	1806.3	214	333	7
128	8	Nie	708	2.19066	3.31	3.0123	17.08	1.00923	9.0021	22.25	62.792	7.6	44	459	1242.2	2026	1024	1854.5	245	329	8
129	9	Pon	709	2.23032	3.34	3.0516	17.24	1.00946	9.4955	18.44	62.177	0.4	54	458	1242.2	2028	1139	1941.2	307	325	9
130	10	Wto	710	2.26597	3.36	3.0910	17.40	1.00969	10.3814	14.10	61.407	1.4	64	456	1242.1	2030	1257	2026.7	324	321	10
131	11	Śro	711	2.30563	3.38	3.1305	17.56	1.00992	11.2550	8.51	60.523	2.4	73	454	1242.1	2031	1415	2111.6	338	317	11
132	12	Czw	712	2.34528	3.40	3.1700	18.11	1.01014	12.1331	2.60	59.582	3.4	82	452	1242.1	2033	1535	2157.0	350	313	12
133	13	Pią	713	2.38494	3.40	3.2056	18.26	1.01036	13.0217	-3.11	58.655	4.4	90	451	1242.1	2035	1658	2244.2	402	309	13
134	14	Sob	714	2.42459	3.41	3.2452	18.40	1.01058	13.5316	-9.25	57.817	5.4	96	449	1242.1	2036	1825	2334.3	414	305	14
135	15	Nie	715	2.46425	3.40	3.2849	18.55	1.01079	14.4733	-15.20	57.143	6.4	99	447	1242.1	2038	1956	*****	429	301	15
136	16	Pon	716	2.50390	3.39	3.3247	19.09	1.01101	15.4557	-20.28	56.691	0.2	100	446	1242.1	2039	2131	028.6	448	257	16
137	17	Wto	717	2.54356	3.38	3.3645	19.22	1.01122	16.4834	-24.21	56.497	1.2	98	444	1242.1	2041	2302	127.8	515	253	17
138	18	Śro	718	2.58322	3.36	3.4044	19.35	1.01143	17.5418	-26.34	56.567	2.2	93	443	1242.2	2043	****	231.1	555	249	18
139	19	Czw	719	3.02287	3.33	3.4443	19.48	1.01164	19.0055	-26.50	56.878	3.2	85	441	1242.2	2044	020	336.6	653	246	19
140	20	Pią	720	3.06253	3.30	3.4843	20.01	1.01185	20.0541	-25.14	57.385	4.2	76	440	1242.3	2046	118	441.1	810	242	20
141	21	Sob	721	3.10218	3.26	3.5243	20.13	1.01205	21.0638	-22.01	58.029	5.2	65	438	1242.3	2047	156	541.8	936	238	21
142	22	Nie	722	3.14184	3.22	3.5644	20.25	1.01225	22.0259	-17.35	58.751	6.2	54	437	1242.4	2049	222	637.4	1105	234	22
143	23	Pon	723	3.18150	3.17	4.0045	20.37	1.01245	22.5504	-12.21	59.497	0.6	43	436	1242.5	2050	240	728.0	1230	230	23
144	24	Wto	724	3.22115	3.12	4.0447	20.48	1.01265	23.4350	-6.41	60.226	1.6	33	434	1242.6	2052	254	814.8	1351	226	24
145	25	Śro	725	3.26081	3.06	4.0849	20.59	1.01284	0.3024	-0.51	60.910	2.6	23	433	1242.7	2053	306	859.0	1509	222	25
146	26	Czw	726	3.30046	2.59	4.1252	21.09	1.01302	1.1555	4.54	61.532	3.6	15	432	1242.8	2054	317	941.9	1625	218	26
147	27	Pią	727	3.34012	2.52	4.1656	21.20	1.01320	2.0124	10.22	62.085	4.6	9	431	1242.9	2056	328	1024.6	1740	214	27
148	28	Sob	728	3.37577	2.45	4.2060	21.29	1.01338	2.4745	15.21	62.564	5.6	4	430	1243.0	2057	340	1108.3	1856	210	28
149	29	Nie	729	3.41543	2.37	4.2504	21.39	1.01355	3.3534	19.39	62.968	6.6	1	429	1243.1	2058	355	1153.4	2011	206	29
150	30	Pon	730	3.45508	2.29	4.2909	21.48	1.01372	4.2512	23.06	63.291	7.6	0	428	1243.3	2100	415	1240.7	2124	202	30
151	31	Wto	731	3.49474	2.20	4.3314	21.56	1.01388	5.1634	25.31	63.526	0.9	1	427	1243.4	2101	440	1329.8	2231	158	31

Fazy Księżyca [Dm, h.mm]:      Nów 0, 22.28      1kw 9, 2.21      Pełn 16, 6.14      3kw 22, 20.43      Nów 30, 13.30

# MAJ 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	2.32	22.58	5.41	22.25	4.13	15.59	3.49	14.24	4.10	15.57	3.14	12.41	5.26	20.30	4.06	15.37	2.24	10.07		
	2.573	15.13	3.903	23.06	23.948	-1.79	22.952	-8.36	23.911	-1.75	21.796	-14.39	2.815	15.87	23.700	-3.19	20.088	-22.35	14.59359	1
3	2.23	23.07	5.38	22.24	4.09	16.04	3.43	14.25	4.03	15.52	3.06	12.34	5.18	20.23	3.58	15.30	2.16	9.59		
	2.701	15.73	4.004	23.27	0.089	-0.96	23.047	-7.80	23.936	-1.59	21.803	-14.36	2.823	15.90	23.703	-3.17	20.088	-22.36	14.72501	3
5	2.14	23.16	5.34	22.22	4.05	16.09	3.38	14.26	3.56	15.46	2.59	12.26	5.11	20.15	3.50	15.22	2.08	9.51		
	2.829	16.31	4.082	23.32	0.231	-0.13	23.141	-7.23	23.961	-1.43	21.810	-14.33	2.831	15.93	23.706	-3.15	20.088	-22.36	14.85643	5
7	2.04	23.27	5.30	22.16	4.02	16.15	3.33	14.27	3.49	15.41	2.51	12.19	5.03	20.08	3.42	15.14	2.00	9.43		
	2.958	16.87	4.135	23.23	0.373	0.70	23.234	-6.66	23.986	-1.28	21.816	-14.31	2.838	15.97	23.710	-3.13	20.087	-22.37	14.98786	7
9	1.53	23.38	5.26	22.08	3.58	16.20	3.27	14.28	3.42	15.35	2.43	12.12	4.55	20.01	3.34	15.07	1.52	9.35		
	3.088	17.41	4.164	22.99	0.516	1.54	23.328	-6.09	0.010	-1.12	21.822	-14.28	2.846	16.00	23.713	-3.11	20.087	-22.38	15.11928	9
11	1.40	23.52	5.21	21.58	3.54	16.25	3.22	14.29	3.34	15.30	2.36	12.04	4.48	19.54	3.27	14.59	1.45	9.27		
	3.218	17.93	4.170	22.62	0.659	2.39	23.421	-5.51	0.034	-0.97	21.828	-14.26	2.854	16.04	23.716	-3.09	20.086	-22.38	15.25070	11
13	1.25	0.20	5.16	21.45	3.50	16.30	3.17	14.29	3.27	15.24	2.28	11.57	4.40	19.47	3.19	14.52	1.37	9.19		
	3.349	18.43	4.155	22.12	0.802	3.24	23.514	-4.93	0.058	-0.83	21.833	-14.24	2.861	16.07	23.719	-3.07	20.085	-22.39	15.38211	13
15	*****	*****	5.11	21.31	3.46	16.35	3.11	14.30	3.20	15.18	2.20	11.49	4.32	19.39	3.11	14.44	1.29	9.11		
	3.480	18.91	4.119	21.51	0.945	4.08	23.606	-4.35	0.081	-0.68	21.837	-14.22	2.869	16.10	23.722	-3.06	20.085	-22.40	15.51353	15
17	*****	*****	5.05	21.15	3.42	16.41	3.06	14.31	3.13	15.13	2.13	11.42	4.25	19.32	3.03	14.37	1.21	9.03		
	3.612	19.37	4.068	20.81	1.089	4.93	23.699	-3.77	0.104	-0.54	21.841	-14.21	2.876	16.14	23.725	-3.04	20.084	-22.41	15.64495	17
19	*****	*****	4.59	20.58	3.39	16.46	3.00	14.32	3.05	15.07	2.05	11.34	4.17	19.25	2.55	14.29	1.13	8.55		
	3.745	19.81	4.005	20.04	1.234	5.78	23.791	-3.19	0.127	-0.40	21.845	-14.19	2.884	16.17	23.727	-3.03	20.082	-22.41	15.77638	19
21	*****	*****	4.52	20.40	3.35	16.52	2.55	14.33	2.58	15.01	1.57	11.27	4.10	19.18	2.48	14.21	1.05	8.47		
	3.879	20.22	3.936	19.24	1.379	6.62	23.883	-2.61	0.149	-0.26	21.849	-14.18	2.892	16.20	23.730	-3.01	20.081	-22.42	15.90780	21
23	*****	*****	4.45	20.23	3.31	16.57	2.49	14.33	2.51	14.55	1.50	11.19	4.02	19.11	2.40	14.14	0.57	8.39		
	4.013	20.61	3.865	18.44	1.525	7.46	23.974	-2.03	0.171	-0.13	21.852	-14.17	2.899	16.24	23.732	-3.00	20.080	-22.43	16.03922	23
25	*****	*****	4.39	20.06	3.27	17.02	2.44	14.34	2.44	14.49	1.42	11.11	3.54	19.03	2.32	14.06	0.49	8.31		
	4.147	20.98	3.798	17.69	1.672	8.29	0.066	-1.44	0.192	0.00	21.854	-14.17	2.906	16.27	23.734	-2.98	20.078	-22.44	16.17064	25
27	*****	*****	4.32	19.50	3.24	17.08	2.38	14.35	2.36	14.43	1.34	11.04	3.47	18.56	2.24	13.58	0.42	8.23		
	4.282	21.33	3.739	17.01	1.819	9.11	0.157	-0.86	0.213	0.13	21.856	-14.16	2.914	16.30	23.737	-2.97	20.077	-22.45	16.30206	27
29	*****	*****	4.25	19.36	3.20	17.14	2.33	14.35	2.29	14.37	1.26	10.56	3.39	18.49	2.17	13.51	0.34	8.15		
	4.418	21.65	3.693	16.43	1.968	9.93	0.249	-0.28	0.234	0.26	21.858	-14.16	2.921	16.33	23.739	-2.96	20.075	-22.46	16.43348	29
31	*****	*****	4.18	19.23	3.17	17.19	2.27	14.36	2.22	14.31	1.18	10.48	3.31	18.42	2.09	13.43	0.26	8.07		
	4.554	21.94	3.661	15.98	2.117	10.73	0.340	0.30	0.254	0.38	21.859	-14.16	2.928	16.36	23.741	-2.95	20.073	-22.47	16.56490	31

# CZERWIEC 2022

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
152	1	Śro	732	3.53440	2.11	4.3720	22.05	1.01403	6.0911	26.46	63.660	1.9	3	426	1243.6	2102	516	1420.2	2328	154	1
153	2	Czw	733	3.57405	2.01	4.4126	22.13	1.01418	7.0211	26.48	63.676	2.9	8	425	1243.7	2103	603	1511.0	****	151	2
154	3	Pią	734	4.01371	1.52	4.4532	22.20	1.01432	7.5438	25.36	63.558	3.9	13	424	1243.9	2104	702	1601.0	013	147	3
155	4	Sob	735	4.05337	1.41	4.4939	22.27	1.01446	8.4546	23.16	63.288	4.9	20	424	1244.1	2105	811	1649.5	047	143	4
156	5	Nie	736	4.09302	1.31	4.5346	22.34	1.01460	9.3514	19.53	62.857	5.9	29	423	1244.2	2106	924	1736.1	111	139	5
157	6	Pon	737	4.13268	1.20	4.5754	22.40	1.01473	10.2305	15.38	62.262	6.9	38	422	1244.4	2107	1039	1821.1	130	135	6
158	7	Wto	738	4.17233	1.09	5.0201	22.46	1.01485	11.0948	10.39	61.515	7.9	48	422	1244.6	2108	1155	1904.9	144	131	7
159	8	Śro	739	4.21199	0.57	5.0609	22.52	1.01497	11.5609	5.07	60.642	0.8	58	421	1244.8	2109	1312	1948.7	157	127	8
160	9	Czw	740	4.25164	0.46	5.1018	22.57	1.01509	12.4307	-0.49	59.686	1.8	68	421	1245.0	2110	1431	2033.6	208	123	9
161	10	Pią	741	4.29130	0.34	5.1426	23.01	1.01520	13.3151	-6.55	58.708	2.8	78	420	1245.2	2111	1554	2120.9	220	119	10
162	11	Sob	742	4.33095	0.22	5.1835	23.06	1.01531	14.2336	-12.53	57.782	3.8	87	420	1245.4	2111	1721	2212.0	233	115	11
163	12	Nie	743	4.37061	0.10	5.2243	23.10	1.01542	15.1931	-18.20	56.989	4.8	94	419	1245.6	2112	1854	2308.2	249	111	12
164	13	Pon	744	4.41027	-0.03	5.2652	23.13	1.01552	16.2015	-22.49	56.405	5.8	98	419	1245.8	2113	2028	*****	311	107	13
165	14	Wto	745	4.44592	-0.15	5.3101	23.16	1.01562	17.2530	-25.49	56.088	6.8	100	419	1246.0	2113	2155	009.8	344	103	14
166	15	Śro	746	4.48558	-0.28	5.3511	23.19	1.01572	18.3325	-26.55	56.070	0.9	99	419	1246.2	2114	2304	115.8	434	059	15
167	16	Czw	747	4.52524	-0.41	5.3920	23.21	1.01582	19.4105	-25.60	56.347	1.9	94	419	1246.4	2114	2353	223.0	544	055	16
168	17	Pią	748	4.56489	-0.54	5.4330	23.23	1.01591	20.4538	-23.14	56.882	2.9	88	419	1246.6	2115	****	327.8	711	052	17
169	18	Sob	749	5.00455	-1.07	5.4739	23.24	1.01599	21.4528	-19.00	57.615	3.9	79	419	1246.9	2115	024	427.7	843	048	18
170	19	Nie	750	5.04420	-1.20	5.5149	23.25	1.01608	22.4023	-13.49	58.471	4.9	68	419	1247.1	2116	045	522.1	1012	044	19
171	20	Pon	751	5.08386	-1.33	5.5558	23.26	1.01616	23.3110	-8.06	59.377	5.9	58	419	1247.3	2116	101	611.5	1137	040	20
172	21	Wto	752	5.12351	-1.46	6.0008	23.26	1.01623	0.1859	-2.11	60.270	0.3	47	419	1247.5	2116	114	657.4	1257	036	21
173	22	Śro	753	5.16317	-1.59	6.0417	23.26	1.01630	1.0506	3.39	61.099	1.3	37	419	1247.7	2116	125	741.1	1414	032	22
174	23	Czw	754	5.20282	-2.12	6.0827	23.25	1.01637	1.5039	9.13	61.830	2.3	27	419	1247.9	2116	136	823.9	1530	028	23
175	24	Pią	755	5.24248	-2.25	6.1236	23.24	1.01643	2.3638	14.18	62.446	3.3	19	420	1248.2	2116	148	907.1	1645	024	24
176	25	Sob	756	5.28214	-2.38	6.1646	23.23	1.01648	3.2351	18.45	62.939	4.3	12	420	1248.4	2116	202	951.6	1800	020	25
177	26	Nie	757	5.32179	-2.50	6.2055	23.21	1.01653	4.1248	22.22	63.310	5.3	6	421	1248.6	2116	220	1037.9	1913	016	26
178	27	Pon	758	5.36145	-3.03	6.2504	23.19	1.01658	5.0333	25.01	63.564	6.3	3	421	1248.8	2116	244	1126.2	2023	012	27
179	28	Wto	759	5.40110	-3.15	6.2913	23.16	1.01662	5.5548	26.33	63.708	7.3	0	422	1249.0	2116	316	1216.3	2123	008	28
180	29	Śro	760	5.44076	-3.28	6.3322	23.13	1.01665	6.4846	26.52	63.744	0.3	0	422	1249.2	2116	359	1306.9	2212	004	29
181	30	Czw	761	5.48042	-3.40	6.3731	23.09	1.01667	7.4128	25.57	63.673	1.3	2	423	1249.4	2116	455	1357.3	2249	000	30

Fazy Księżyca [Dm, h.mm]:      1kw 7, 16.48      Pełn 14, 13.52      3kw 21, 5.11      Now 29, 4.52



## CZERWIEC 2022 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	*****	*****	4.14	19.17	3.15	17.22	2.25	14.36	2.18	14.28	1.15	10.44	3.28	18.38	2.05	13.39	0.22	8.03		
	4.622	22.08	3.652	15.80	2.192	11.12	0.385	0.59	0.264	0.44	21.860	-14.16	2.932	16.38	23.741	-2.94	20.072	-22.47	16.63061	1
3	*****	*****	4.08	19.08	3.12	17.28	2.19	14.37	2.11	14.22	1.07	10.36	3.20	18.31	1.57	13.31	0.14	7.55		
	4.759	22.34	3.646	15.55	2.343	11.91	0.476	1.16	0.283	0.56	21.861	-14.16	2.939	16.41	23.743	-2.93	20.070	-22.48	16.76204	3
5	*****	*****	4.01	19.00	3.08	17.34	2.14	14.38	2.03	14.16	0.59	10.28	3.12	18.24	1.49	13.24	0.06	7.47		
	4.896	22.57	3.659	15.45	2.494	12.68	0.566	1.74	0.302	0.67	21.861	-14.17	2.946	16.44	23.745	-2.92	20.068	-22.50	16.89346	5
7	*****	*****	3.55	18.54	3.05	17.39	2.08	14.38	1.56	14.10	0.51	10.21	3.05	18.16	1.41	13.16	23.54	7.39		
	5.034	22.77	3.691	15.49	2.647	13.43	0.657	2.31	0.320	0.78	21.861	-14.18	2.953	16.47	23.746	-2.92	20.066	-22.51	17.02488	7
9	*****	*****	3.49	18.51	3.02	17.45	2.03	14.39	1.49	14.04	0.43	10.13	2.57	18.09	1.34	13.08	23.46	7.31		
	5.172	22.95	3.742	15.67	2.801	14.16	0.747	2.87	0.338	0.89	21.860	-14.19	2.960	16.50	23.748	-2.91	20.064	-22.52	17.15629	9
11	*****	*****	3.44	18.49	2.59	17.51	1.57	14.39	1.41	13.57	0.35	10.05	2.49	18.02	1.26	13.00	23.38	7.23		
	5.310	23.10	3.812	15.97	2.956	14.87	0.837	3.44	0.355	0.99	21.859	-14.20	2.967	16.53	23.749	-2.90	20.061	-22.53	17.28771	11
13	*****	*****	3.38	18.49	2.56	17.57	1.52	14.40	1.34	13.51	0.28	9.57	2.42	17.54	1.18	12.53	23.30	7.14		
	5.448	23.22	3.899	16.37	3.112	15.57	0.927	4.00	0.371	1.09	21.858	-14.21	2.973	16.55	23.750	-2.90	20.059	-22.54	17.41914	13
15	*****	*****	3.34	18.50	2.54	18.02	1.46	14.40	1.26	13.45	0.20	9.48	2.34	17.47	1.10	12.45	23.22	7.06		
	5.586	23.32	4.005	16.87	3.269	16.24	1.017	4.55	0.387	1.18	21.856	-14.23	2.980	16.58	23.751	-2.89	20.056	-22.55	17.55056	15
17	*****	*****	3.29	18.54	2.51	18.08	1.41	14.41	1.19	13.38	0.12	9.40	2.27	17.40	1.02	12.37	23.15	6.58		
	5.725	23.38	4.128	17.45	3.428	16.88	1.107	5.11	0.403	1.27	21.853	-14.25	2.986	16.61	23.752	-2.89	20.054	-22.56	17.68199	17
19	*****	*****	3.26	18.58	2.49	18.14	1.35	14.41	1.12	13.32	0.04	9.32	2.19	17.33	0.54	12.29	23.07	6.50		
	5.863	23.42	4.269	18.10	3.588	17.51	1.197	5.65	0.418	1.36	21.851	-14.27	2.993	16.64	23.752	-2.89	20.051	-22.58	17.81341	19
21	*****	*****	3.23	19.05	2.47	18.19	1.30	14.42	1.04	13.25	23.52	9.24	2.11	17.25	0.47	12.21	22.59	6.42		
	6.002	23.44	4.427	18.79	3.749	18.10	1.287	6.19	0.432	1.44	21.848	-14.29	2.999	16.66	23.753	-2.89	20.048	-22.59	17.94483	21
23	*****	*****	3.20	19.12	2.45	18.25	1.24	14.42	0.57	13.18	23.44	9.16	2.04	17.18	0.39	12.14	22.51	6.34		
	6.141	23.42	4.603	19.51	3.911	18.66	1.376	6.73	0.446	1.52	21.844	-14.31	3.005	16.69	23.753	-2.88	20.045	-22.60	18.07624	23
25	*****	*****	3.19	19.21	2.43	18.31	1.19	14.43	0.49	13.12	23.36	9.08	1.56	17.11	0.31	12.06	22.43	6.26		
	6.279	23.38	4.796	20.24	4.075	19.20	1.466	7.26	0.459	1.59	21.840	-14.34	3.011	16.71	23.754	-2.88	20.042	-22.61	18.20766	25
27	*****	*****	3.19	19.31	2.42	18.36	1.13	14.43	0.42	13.05	23.28	8.59	1.48	17.03	0.23	11.58	22.35	6.18		
	6.418	23.31	5.007	20.96	4.240	19.70	1.555	7.79	0.471	1.66	21.836	-14.37	3.016	16.74	23.754	-2.89	20.039	-22.63	18.33909	27
29	*****	*****	3.19	19.42	2.40	18.41	1.08	14.43	0.34	12.58	23.20	8.51	1.41	16.56	0.15	11.50	22.27	6.09		
	6.556	23.22	5.236	21.65	4.406	20.17	1.644	8.30	0.483	1.73	21.831	-14.40	3.022	16.76	23.754	-2.89	20.036	-22.64	18.47051	29

# LIPIEC 2022

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)											Czas strefowy [hhmm.]							
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Pią	762	5.52007	-3.52	6.4139	23.06	1.01669	8.3260	23.51	63.491	2.3	5	424	1249.6	2115	601	1446.4	2316	2353	1
183	2	Sob	763	5.55573	-4.03	6.4547	23.01	1.01671	9.2248	20.43	63.192	3.3	10	424	1249.8	2115	713	1533.5	2336	2349	2
184	3	Nie	764	5.59539	-4.14	6.4955	22.57	1.01671	10.1046	16.40	62.769	4.3	16	425	1250.0	2114	827	1618.6	2351	2345	3
185	4	Pon	765	6.03504	-4.25	6.5402	22.51	1.01671	10.5712	11.54	62.217	5.3	24	426	1250.2	2114	942	1702.2	****	2341	4
186	5	Wto	766	6.07470	-4.36	6.5810	22.46	1.01671	11.4247	6.34	61.539	6.3	33	427	1250.3	2113	1057	1745.0	004	2337	5
187	6	Śro	767	6.11435	-4.46	7.0216	22.40	1.01670	12.2824	0.52	60.748	7.3	43	428	1250.5	2113	1214	1828.1	015	2333	6
188	7	Czw	768	6.15401	-4.56	7.0623	22.34	1.01669	13.1507	-5.02	59.871	0.3	53	429	1250.7	2112	1332	1912.7	026	2329	7
189	8	Pią	769	6.19366	-5.05	7.1029	22.27	1.01667	14.0410	-10.54	58.952	1.3	64	430	1250.8	2111	1455	2000.4	038	2325	8
190	9	Sob	770	6.23332	-5.14	7.1434	22.20	1.01665	14.5648	-16.24	58.047	2.3	75	431	1251.0	2111	1622	2052.4	052	2321	9
191	10	Nie	771	6.27297	-5.23	7.1839	22.12	1.01662	15.5403	-21.11	57.230	3.3	84	432	1251.1	2110	1753	2149.9	110	2317	10
192	11	Pon	772	6.31263	-5.31	7.2244	22.05	1.01659	16.5619	-24.46	56.575	4.3	92	433	1251.3	2109	1923	2252.8	137	2313	11
193	12	Wto	773	6.35229	-5.38	7.2648	21.56	1.01656	18.0243	-26.42	56.154	5.3	97	434	1251.4	2108	2042	2359.4	217	2309	12
194	13	Śro	774	6.39194	-5.46	7.3052	21.48	1.01652	19.1058	-26.38	56.014	6.3	100	435	1251.5	2107	2141	*****	317	2305	13
195	14	Czw	775	6.43160	-5.52	7.3455	21.39	1.01648	20.1757	-24.34	56.178	0.6	99	437	1251.6	2106	2221	106.5	437	2301	14
196	15	Pią	776	6.47126	-5.58	7.3858	21.29	1.01644	21.2111	-20.47	56.630	1.6	96	438	1251.7	2105	2247	210.3	610	2258	15
197	16	Sob	777	6.51091	-6.04	7.4300	21.20	1.01639	22.1935	-15.45	57.323	2.6	90	439	1251.8	2104	2306	309.0	744	2254	16
198	17	Nie	778	6.55057	-6.09	7.4702	21.10	1.01634	23.1323	-9.59	58.189	3.6	82	440	1251.9	2103	2320	402.2	914	2250	17
199	18	Pon	779	6.59022	-6.14	7.5103	20.59	1.01629	0.0333	-3.54	59.148	4.6	72	442	1252.0	2101	2332	451.1	1038	2246	18
200	19	Wto	780	7.02588	-6.18	7.5504	20.48	1.01623	0.5119	2.09	60.121	5.6	62	443	1252.0	2100	2343	536.9	1159	2242	19
201	20	Śro	781	7.06553	-6.22	7.5904	20.37	1.01616	1.3755	7.55	61.042	6.6	52	444	1252.1	2059	2355	621.0	1317	2238	20
202	21	Czw	782	7.10519	-6.25	8.0304	20.26	1.01610	2.2424	13.13	61.859	0.8	42	446	1252.2	2057	****	704.8	1433	2234	21
203	22	Pią	783	7.14484	-6.27	8.0703	20.14	1.01603	3.1140	17.52	62.537	1.8	32	447	1252.2	2056	008	749.3	1549	2230	22
204	23	Sob	784	7.18450	-6.29	8.1101	20.02	1.01595	4.0021	21.42	63.060	2.8	24	449	1252.2	2055	025	835.2	1704	2226	23
205	24	Nie	785	7.22415	-6.31	8.1459	19.49	1.01587	4.5044	24.35	63.422	3.8	16	450	1252.3	2053	047	922.9	1814	2222	24
206	25	Pon	786	7.26381	-6.32	8.1857	19.37	1.01578	5.4238	26.22	63.631	4.8	10	452	1252.3	2052	116	1012.4	1918	2218	25
207	26	Wto	787	7.30347	-6.32	8.2253	19.23	1.01569	6.3529	26.57	63.698	5.8	5	453	1252.3	2050	156	1103.0	2010	2214	26
208	27	Śro	788	7.34312	-6.31	8.2650	19.10	1.01559	7.2822	26.17	63.640	6.8	2	455	1252.3	2049	248	1153.6	2051	2210	27
209	28	Czw	789	7.38278	-6.31	8.3045	18.56	1.01549	8.2022	24.26	63.473	7.8	0	456	1252.3	2047	351	1243.4	2120	2206	28
210	29	Pią	790	7.42244	-6.29	8.3440	18.42	1.01538	9.1048	21.29	63.208	0.7	0	458	1252.2	2045	502	1331.3	2142	2202	29
211	30	Sob	791	7.46209	-6.27	8.3835	18.28	1.01526	9.5922	17.35	62.856	1.7	3	500	1252.2	2044	617	1417.2	2158	2159	30
212	31	Nie	792	7.50175	-6.24	8.4228	18.13	1.01514	10.4613	12.55	62.421	2.7	7	501	1252.1	2042	732	1501.3	2212	2155	31

Fazy Księżyca [Dm, h.mm]:      1kw 7, 4.14      Pełn 13, 20.38      3kw 20, 16.18      Nów 28, 19.55

# LIPIEC 2022 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	****	****	3.22	19.53	2.39	18.47	1.03	14.44	0.27	12.51	23.12	8.43	1.33	16.48	0.07	11.42	22.19	6.01		
	6.694	23.09	5.482	22.28	4.573	20.61	1.733	8.81	0.494	1.79	21.826	-14.43	3.028	16.78	23.754	-2.89	20.033	-22.65	18.60194	1
3	****	****	3.25	20.05	2.39	18.52	0.57	14.44	0.19	12.44	23.04	8.34	1.25	16.41	23.55	11.34	22.11	5.53		
	6.832	22.94	5.744	22.84	4.741	21.01	1.822	9.32	0.504	1.85	21.821	-14.46	3.033	16.80	23.753	-2.89	20.030	-22.66	18.73336	3
5	****	****	3.31	20.18	2.38	18.57	0.52	14.44	0.12	12.37	22.56	8.26	1.17	16.34	23.48	11.26	22.03	5.45		
	6.969	22.76	6.022	23.28	4.910	21.38	1.911	9.81	0.514	1.90	21.815	-14.50	3.038	16.82	23.753	-2.90	20.027	-22.68	18.86478	5
7	****	****	3.38	20.30	2.38	19.01	0.47	14.44	0.04	12.30	22.48	8.17	1.10	16.26	23.40	11.18	21.55	5.37		
	7.106	22.56	6.313	23.59	5.081	21.70	1.999	10.30	0.523	1.95	21.809	-14.54	3.043	16.85	23.753	-2.90	20.024	-22.69	18.99619	7
9	****	****	3.47	20.41	2.39	19.06	0.41	14.45	23.52	12.23	22.40	8.09	1.02	16.19	23.32	11.10	21.47	5.29		
	7.243	22.33	6.615	23.74	5.252	21.99	2.088	10.78	0.531	1.99	21.803	-14.58	3.048	16.87	23.752	-2.91	20.020	-22.70	19.12761	9
11	****	****	3.57	20.51	2.39	19.10	0.36	14.45	23.45	12.16	22.32	8.00	0.54	16.11	23.24	11.03	21.39	5.21		
	7.379	22.08	6.923	23.72	5.424	22.24	2.176	11.25	0.539	2.03	21.796	-14.62	3.053	16.88	23.751	-2.91	20.017	-22.71	19.25904	11
13	****	****	4.10	21.01	2.40	19.14	0.31	14.45	23.37	12.09	22.24	7.52	0.47	16.04	23.16	10.55	21.31	5.12		
	7.514	21.80	7.236	23.52	5.597	22.45	2.264	11.72	0.545	2.06	21.789	-14.66	3.057	16.90	23.750	-2.92	20.014	-22.73	19.39046	13
15	****	****	4.24	21.08	2.41	19.18	0.26	14.45	23.30	12.01	22.16	7.43	0.39	15.56	23.08	10.47	21.23	5.04		
	7.649	21.49	7.547	23.13	5.770	22.61	2.352	12.17	0.551	2.09	21.782	-14.70	3.061	16.92	23.749	-2.93	20.011	-22.74	19.52188	15
17	****	****	4.39	21.15	2.43	19.21	0.20	14.45	23.22	11.54	22.08	7.35	0.31	15.49	23.00	10.39	21.15	4.56		
	7.784	21.16	7.855	22.57	5.944	22.74	2.440	12.62	0.556	2.11	21.774	-14.74	3.066	16.94	23.748	-2.94	20.007	-22.75	19.65331	17
19	****	****	4.54	21.19	2.45	19.25	0.15	14.45	23.14	11.46	22.00	7.26	0.23	15.41	22.52	10.31	21.07	4.48		
	7.918	20.81	8.156	21.85	6.118	22.82	2.528	13.06	0.561	2.13	21.766	-14.79	3.069	16.95	23.747	-2.95	20.004	-22.77	19.78472	19
21	****	****	5.10	21.23	2.47	19.28	0.10	14.45	23.06	11.39	21.52	7.17	0.16	15.34	22.45	10.23	20.59	4.40		
	8.051	20.43	8.448	20.99	6.293	22.86	2.615	13.49	0.565	2.14	21.758	-14.83	3.073	16.97	23.746	-2.96	20.001	-22.78	19.91614	21
23	****	****	5.26	21.24	2.50	19.30	0.05	14.45	22.59	11.31	21.44	7.09	0.08	15.26	22.37	10.15	20.51	4.32		
	8.184	20.03	8.729	20.00	6.468	22.85	2.702	13.90	0.567	2.15	21.750	-14.88	3.077	16.98	23.744	-2.97	19.997	-22.79	20.04756	23
25	****	****	5.42	21.25	2.53	19.32	23.56	14.44	22.51	11.23	21.36	7.00	23.56	15.19	22.29	10.07	20.43	4.23		
	8.316	19.61	8.999	18.90	6.644	22.80	2.789	14.31	0.569	2.15	21.741	-14.93	3.080	17.00	23.742	-2.98	19.994	-22.80	20.17898	25
27	****	****	5.57	21.25	2.56	19.34	23.51	14.44	22.43	11.16	21.28	6.51	23.49	15.11	22.21	9.59	20.35	4.15		
	8.447	19.17	9.257	17.72	6.819	22.71	2.875	14.71	0.571	2.15	21.733	-14.98	3.083	17.01	23.741	-2.99	19.991	-22.81	20.31041	27
29	1.11	0.05	6.12	21.24	2.60	19.36	23.45	14.44	22.35	11.08	21.20	6.43	23.41	15.03	22.13	9.51	20.27	4.07		
	8.578	18.70	9.505	16.47	6.994	22.57	2.962	15.10	0.571	2.14	21.724	-15.03	3.086	17.02	23.739	-3.01	19.987	-22.83	20.44183	29
31	1.35	-0.06	6.27	21.22	3.04	19.37	23.40	14.43	22.28	10.60	21.12	6.34	23.33	14.56	22.05	9.42	20.19	3.59		
	8.708	18.22	9.740	15.17	7.169	22.39	3.048	15.48	0.571	2.12	21.715	-15.08	3.089	17.03	23.737	-3.02	19.984	-22.84	20.57325	31

# SIERPIEŃ 2022

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)								Czas strefowy [hhmm.]										
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce				Księżyc					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
213	1	Pon	793	7.54140	-6.21	8.4622	17.58	1.01501	11.3153	7.41	61.905	3.7	12	503	1252.1	2040	847	1544.1	2223	2151	1	
214	2	Wto	794	7.58106	-6.17	8.5014	17.43	1.01488	12.1706	2.03	61.310	4.7	20	504	1252.0	2039	1003	1626.6	2234	2147	2	
215	3	Śro	795	8.02071	-6.12	8.5406	17.27	1.01474	13.0252	-3.46	60.642	5.7	29	506	1251.9	2037	1120	1709.9	2245	2143	3	
216	4	Czw	796	8.06037	-6.07	8.5757	17.11	1.01460	13.5016	-9.33	59.914	6.7	39	508	1251.9	2035	1239	1755.3	2257	2139	4	
217	5	Pią	797	8.10002	-6.01	9.0148	16.55	1.01446	14.4027	-15.03	59.149	7.7	49	509	1251.8	2033	1402	1844.1	2313	2135	5	
218	6	Sob	798	8.13568	-5.54	9.0538	16.39	1.01430	15.3432	-19.57	58.385	1.0	61	511	1251.7	2031	1530	1937.5	2335	2131	6	
219	7	Nie	799	8.17533	-5.47	9.0927	16.22	1.01415	16.3313	-23.50	57.671	2.0	71	513	1251.5	2029	1658	2036.1	****	2127	7	
220	8	Pon	800	8.21499	-5.40	9.1316	16.05	1.01399	17.3621	-26.19	57.066	3.0	81	514	1251.4	2027	1820	2139.3	007	2123	8	
221	9	Wto	801	8.25465	-5.31	9.1705	15.48	1.01383	18.4231	-27.00	56.634	4.0	90	516	1251.3	2025	1927	2245.0	056	2119	9	
222	10	Śro	802	8.29430	-5.22	9.2052	15.30	1.01367	19.4913	-25.44	56.428	5.0	96	518	1251.1	2023	2015	2349.8	206	2115	10	
223	11	Czw	803	8.33396	-5.13	9.2439	15.13	1.01350	20.5346	-22.37	56.483	6.0	99	519	1251.0	2021	2046	*****	333	2111	11	
224	12	Pią	804	8.37361	-5.03	9.2826	14.55	1.01333	21.5427	-18.00	56.808	0.3	100	521	1250.8	2019	2108	051.1	508	2107	12	
225	13	Sob	805	8.41327	-4.52	9.3212	14.36	1.01316	22.5048	-12.23	57.380	1.3	97	523	1250.6	2017	2124	147.5	641	2103	13	
226	14	Nie	806	8.45292	-4.41	9.3557	14.18	1.01299	23.4321	-6.12	58.149	2.3	92	524	1250.4	2015	2137	239.4	811	2100	14	
227	15	Pon	807	8.49258	-4.29	9.3942	13.59	1.01281	0.3308	0.05	59.048	3.3	85	526	1250.2	2013	2149	327.7	935	2056	15	
228	16	Wto	808	8.53223	-4.17	9.4326	13.40	1.01263	1.2116	6.10	59.998	4.3	77	528	1250.0	2011	2200	413.7	1057	2052	16	
229	17	Śro	809	8.57189	-4.04	9.4710	13.21	1.01245	2.0852	11.48	60.927	5.3	67	530	1249.8	2009	2213	458.8	1216	2048	17	
230	18	Czw	810	9.01155	-3.51	9.5053	13.02	1.01227	2.5650	16.46	61.769	6.3	58	531	1249.6	2007	2229	544.0	1334	2044	18	
231	19	Pią	811	9.05120	-3.37	9.5436	12.43	1.01208	3.4551	20.55	62.476	0.2	48	533	1249.4	2005	2248	630.3	1451	2040	19	
232	20	Sob	812	9.09086	-3.23	9.5819	12.23	1.01189	4.3618	24.06	63.015	1.2	38	535	1249.1	2002	2315	718.0	1604	2036	20	
233	21	Nie	813	9.13051	-3.09	10.0201	12.03	1.01169	5.2809	26.11	63.371	2.2	29	536	1248.9	2000	2351	807.3	1711	2032	21	
234	22	Pon	814	9.17017	-2.54	10.0542	11.43	1.01149	6.2059	27.05	63.544	3.2	21	538	1248.6	1958	****	857.8	1807	2028	22	
235	23	Wto	815	9.20582	-2.38	10.0923	11.23	1.01129	7.1400	26.43	63.544	4.2	14	540	1248.4	1956	039	948.6	1852	2024	23	
236	24	Śro	816	9.24548	-2.22	10.1304	11.02	1.01108	8.0623	25.08	63.393	5.2	8	542	1248.1	1954	140	1038.8	1924	2020	24	
237	25	Czw	817	9.28514	-2.06	10.1644	10.41	1.01087	8.5723	22.25	63.117	6.2	4	543	1247.8	1951	249	1127.5	1948	2016	25	
238	26	Pią	818	9.32479	-1.49	10.2024	10.21	1.01066	9.4641	18.41	62.744	7.2	1	545	1247.6	1949	404	1214.4	2006	2012	26	
239	27	Sob	819	9.36445	-1.32	10.2403	9.60	1.01044	10.3416	14.07	62.302	0.1	0	547	1247.3	1947	520	1259.3	2020	2008	27	
240	28	Nie	820	9.40410	-1.15	10.2742	9.39	1.01021	11.2033	8.54	61.811	1.1	1	548	1247.0	1944	636	1342.9	2031	2005	28	
241	29	Pon	821	9.44376	-0.57	10.3121	9.17	1.00998	12.0612	3.16	61.290	2.1	4	550	1246.7	1942	752	1425.8	2042	2001	29	
242	30	Wto	822	9.48341	-0.38	10.3459	8.56	1.00975	12.5203	-2.37	60.750	3.1	10	552	1246.4	1940	910	1509.1	2053	1957	30	
243	31	Śro	823	9.52307	-0.20	10.3837	8.34	1.00951	13.3905	-8.28	60.198	4.1	17	553	1246.1	1937	1028	1553.8	2105	1953	31	

Fazy Księżycyca [Dm, h.mm]:      1kw 5, 13.07      Pełn 12, 3.36      3kw 19, 6.36      Nów 27, 10.17



# WRZESIEŃ 2022

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
244	1	Czw	824	9.56272	-0.01	10.4215	8.13	1.00927	14.2821	-14.04	59.640	5.1	25	555	1245.8	1935	1150	1641.1	2119	1949	1	
245	2	Pią	825	10.00238	0.18	10.4552	7.51	1.00902	15.2050	-19.05	59.084	6.1	35	557	1245.4	1933	1316	1732.2	2138	1945	2	
246	3	Sob	826	10.04203	0.38	10.4930	7.29	1.00878	16.1716	-23.11	58.546	7.1	46	559	1245.1	1930	1443	1827.8	2205	1941	3	
247	4	Nie	827	10.08169	0.57	10.5306	7.07	1.00853	17.1743	-26.00	58.049	0.7	58	600	1244.8	1928	1606	1927.7	2246	1937	4	
248	5	Pon	828	10.12134	1.17	10.5643	6.44	1.00828	18.2116	-27.12	57.625	1.7	69	602	1244.5	1926	1717	2030.6	2345	1933	5	
249	6	Wto	829	10.16100	1.38	11.0019	6.22	1.00802	19.2604	-26.34	57.315	2.7	79	604	1244.1	1923	1810	2134.0	****	1929	6	
250	7	Śro	830	10.20066	1.58	11.0355	5.60	1.00776	20.2947	-24.07	57.159	3.7	88	605	1243.8	1921	1846	2235.2	104	1925	7	
251	8	Czw	831	10.24031	2.19	11.0731	5.37	1.00751	21.3036	-20.04	57.190	4.7	94	607	1243.4	1919	1911	2332.6	234	1921	8	
252	9	Pią	832	10.27597	2.40	11.1107	5.15	1.00725	22.2746	-14.49	57.429	5.7	99	609	1243.1	1916	1928	****	408	1917	9	
253	10	Sob	833	10.31562	3.01	11.1442	4.52	1.00699	23.2126	-8.48	57.874	6.7	100	611	1242.7	1914	1942	026.0	539	1913	10	
254	11	Nie	834	10.35528	3.22	11.1818	4.29	1.00673	0.1223	-2.26	58.501	1.0	99	612	1242.4	1911	1954	115.8	706	1909	11	
255	12	Pon	835	10.39493	3.43	11.2153	4.06	1.00647	1.0136	3.53	59.264	2.0	95	614	1242.0	1909	2006	203.2	830	1906	12	
256	13	Wto	836	10.43459	4.05	11.2528	3.43	1.00621	1.5007	9.52	60.103	3.0	89	616	1241.7	1907	2018	249.4	952	1902	13	
257	14	Śro	837	10.47424	4.26	11.2903	3.20	1.00595	2.3849	15.14	60.951	4.0	82	617	1241.3	1904	2032	335.4	1113	1858	14	
258	15	Czw	838	10.51390	4.48	11.3238	2.57	1.00568	3.2824	19.49	61.744	5.0	73	619	1241.0	1902	2050	422.2	1232	1854	15	
259	16	Pią	839	10.55355	5.09	11.3613	2.34	1.00542	4.1915	23.24	62.424	6.0	64	621	1240.6	1859	2113	510.2	1349	1850	16	
260	17	Sob	840	10.59321	5.30	11.3948	2.11	1.00516	5.1123	25.53	62.948	7.0	55	623	1240.2	1857	2146	559.7	1500	1846	17	
261	18	Nie	841	11.03286	5.52	11.4324	1.48	1.00489	6.0426	27.09	63.286	0.5	45	624	1239.9	1854	2230	650.4	1601	1842	18	
262	19	Pon	842	11.07252	6.13	11.4659	1.25	1.00462	6.5741	27.10	63.425	1.5	36	626	1239.5	1852	2326	741.5	1650	1838	19	
263	20	Wto	843	11.11217	6.35	11.5034	1.01	1.00435	7.5022	25.56	63.367	2.5	27	628	1239.2	1850	****	832.1	1727	1834	20	
264	21	Śro	844	11.15183	6.56	11.5409	0.38	1.00408	8.4147	23.31	63.131	3.5	19	629	1238.8	1847	033	921.4	1753	1830	21	
265	22	Czw	845	11.19149	7.17	11.5745	0.15	1.00381	9.3134	20.03	62.743	4.5	12	631	1238.5	1845	146	1008.9	1812	1826	22	
266	23	Pią	846	11.23114	7.38	12.0120	-0.09	1.00353	10.1943	15.41	62.242	5.5	6	633	1238.1	1842	302	1054.6	1827	1822	23	
267	24	Sob	847	11.27080	7.59	12.0456	-0.32	1.00326	11.0635	10.34	61.670	6.5	2	635	1237.8	1840	419	1138.8	1839	1818	24	
268	25	Nie	848	11.31045	8.20	12.0832	-0.55	1.00298	11.5246	4.56	61.068	7.5	0	636	1237.4	1837	536	1222.4	1850	1814	25	
269	26	Pon	849	11.35011	8.40	12.1207	-1.19	1.00269	12.3904	-1.01	60.474	0.5	0	638	1237.1	1835	655	1306.0	1901	1810	26	
270	27	Wto	850	11.38576	9.01	12.1544	-1.42	1.00241	13.2626	-7.03	59.918	1.5	3	640	1236.7	1833	814	1350.9	1912	1807	27	
271	28	Śro	851	11.42542	9.21	12.1920	-2.06	1.00212	14.1549	-12.52	59.421	2.5	7	642	1236.4	1830	937	1438.1	1925	1803	28	
272	29	Czw	852	11.46507	9.41	12.2257	-2.29	1.00183	15.0810	-18.09	58.993	3.5	14	643	1236.1	1828	1103	1528.7	1943	1759	29	
273	30	Pią	853	11.50473	10.01	12.2633	-2.52	1.00154	16.0407	-22.33	58.636	4.5	22	645	1235.7	1825	1231	1623.3	2007	1755	30	

Fazy Księżyca [Dm, h.mm]:      1kw 3, 20.08      Pełn 10, 11.59      3kw 17, 23.52      Nów 25, 23.54

# WRZESIEŃ 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	3.44	21.47	8.43	19.56	4.35	19.17	22.21	14.26	20.20	8.43	19.01	4.14	21.28	12.51	19.58	7.32	18.12	1.49		
	10.704	8.21	12.262	-4.95	9.868	14.11	4.345	20.15	0.459	1.26	21.562	-15.88	3.103	17.08	23.694	-3.32	19.938	-23.00	22.67595	1
3	3.49	21.40	8.44	19.48	4.42	19.14	22.16	14.24	20.12	8.34	18.53	4.06	21.20	12.43	19.50	7.24	18.04	1.41		
	10.825	7.48	12.333	-5.72	10.029	13.31	4.419	20.36	0.446	1.17	21.553	-15.92	3.102	17.08	23.691	-3.34	19.936	-23.01	22.80737	3
5	3.54	21.34	8.42	19.40	4.48	19.11	22.12	14.22	20.03	8.24	18.45	3.57	21.12	12.35	19.42	7.16	17.56	1.33		
	10.945	6.74	12.388	-6.36	10.188	12.49	4.491	20.56	0.433	1.08	21.544	-15.96	3.101	17.07	23.687	-3.36	19.934	-23.01	22.93880	5
7	3.59	21.28	8.39	19.32	4.55	19.08	22.07	14.20	19.55	8.15	18.37	3.48	21.04	12.27	19.34	7.08	17.48	1.25		
	11.065	6.00	12.424	-6.85	10.347	11.65	4.563	20.74	0.419	0.98	21.536	-16.01	3.100	17.07	23.684	-3.38	19.932	-23.02	23.07022	7
9	4.04	21.21	8.34	19.23	5.01	19.04	22.02	14.17	19.47	8.06	18.29	3.40	20.56	12.19	19.27	6.60	17.40	1.17		
	11.185	5.24	12.440	-7.16	10.504	10.78	4.633	20.93	0.405	0.89	21.527	-16.05	3.098	17.06	23.681	-3.41	19.930	-23.03	23.20164	9
11	4.09	21.15	8.26	19.14	5.08	19.01	21.57	14.15	19.39	7.57	18.21	3.31	20.48	12.11	19.19	6.52	17.32	1.09		
	11.305	4.49	12.433	-7.26	10.661	9.89	4.702	21.10	0.390	0.79	21.519	-16.09	3.096	17.05	23.677	-3.43	19.928	-23.03	23.33305	11
13	4.13	21.09	8.16	19.05	5.14	18.57	21.52	14.12	19.31	7.47	18.13	3.23	20.40	12.03	19.11	6.43	17.24	1.01		
	11.424	3.72	12.401	-7.12	10.817	8.98	4.769	21.26	0.375	0.69	21.512	-16.12	3.094	17.04	23.674	-3.45	19.926	-23.04	23.46447	13
15	4.18	21.03	8.02	18.56	5.21	18.53	21.47	14.09	19.22	7.38	18.05	3.14	20.32	11.55	19.03	6.35	17.17	0.53		
	11.544	2.96	12.345	-6.73	10.972	8.06	4.835	21.42	0.360	0.58	21.504	-16.16	3.092	17.04	23.671	-3.47	19.925	-23.04	23.59588	15
17	4.22	20.58	7.46	18.47	5.27	18.50	21.41	14.06	19.14	7.29	17.57	3.05	20.24	11.47	18.55	6.27	17.09	0.45		
	11.663	2.18	12.264	-6.06	11.127	7.12	4.899	21.57	0.344	0.48	21.497	-16.20	3.089	17.02	23.667	-3.49	19.923	-23.05	23.72730	17
19	4.26	20.52	7.27	18.38	5.34	18.46	21.36	14.03	19.06	7.19	17.48	2.57	20.16	11.39	18.47	6.19	17.01	0.37		
	11.783	1.41	12.163	-5.12	11.281	6.17	4.961	21.71	0.329	0.37	21.490	-16.23	3.087	17.01	23.664	-3.52	19.922	-23.05	23.85873	19
21	4.31	20.46	7.06	18.30	5.41	18.42	21.31	14.00	18.58	7.10	17.40	2.49	20.08	11.31	18.39	6.11	16.53	0.29		
	11.903	0.63	12.049	-3.95	11.434	5.21	5.022	21.85	0.312	0.27	21.483	-16.26	3.084	17.00	23.661	-3.54	19.921	-23.06	23.99015	21
23	4.35	20.41	6.44	18.22	5.47	18.38	21.26	13.57	18.49	7.01	17.32	2.40	20.00	11.23	18.31	6.03	16.45	0.21		
	12.022	-0.14	11.930	-2.62	11.587	4.23	5.081	21.98	0.296	0.16	21.477	-16.29	3.081	16.99	23.657	-3.56	19.920	-23.06	0.12157	23
25	4.39	20.35	6.22	18.15	5.54	18.34	21.20	13.53	18.41	6.51	17.24	2.32	19.53	11.14	18.23	5.54	16.37	0.13		
	12.142	-0.92	11.819	-1.25	11.740	3.25	5.137	22.10	0.280	0.05	21.471	-16.32	3.078	16.98	23.654	-3.58	19.919	-23.07	0.25299	25
27	4.43	20.30	6.02	18.08	6.00	18.30	21.15	13.49	18.33	6.42	17.16	2.23	19.45	11.06	18.15	5.46	16.29	0.05		
	12.262	-1.70	11.728	0.07	11.893	2.26	5.192	22.22	0.263	-0.05	21.465	-16.34	3.074	16.96	23.650	-3.60	19.918	-23.07	0.38440	27
29	4.47	20.25	5.45	18.03	6.07	18.26	21.09	13.46	18.25	6.32	17.08	2.15	19.37	10.58	18.07	5.38	16.21	23.53		
	12.382	-2.48	11.667	1.20	12.045	1.26	5.244	22.33	0.247	-0.16	21.460	-16.37	3.071	16.95	23.647	-3.62	19.917	-23.07	0.51582	29

# PAŹDZIERNIK 2022

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
274	1	Sob	854	11.54438	10.20	12.3010	-3.15	1.00125	17.0344	-25.42	58.348	5.5	32	647	1235.4	1823	1356	1721.9	2042	1751	1	
275	2	Nie	855	11.58404	10.40	12.3348	-3.39	1.00096	18.0613	-27.16	58.128	6.5	43	649	1235.1	1821	1511	1823.4	2135	1747	2	
276	3	Pon	856	12.02369	10.58	12.3725	-4.02	1.00066	19.0950	-27.05	57.978	0.4	55	650	1234.8	1818	1609	1925.6	2247	1743	3	
277	4	Wto	857	12.06335	11.17	12.4103	-4.25	1.00037	20.1232	-25.07	57.908	1.4	66	652	1234.5	1816	1649	2026.1	****	1739	4	
278	5	Śro	858	12.10301	11.35	12.4442	-4.48	1.00008	21.1236	-21.35	57.931	2.4	76	654	1234.2	1814	1715	2123.2	012	1735	5	
279	6	Czw	859	12.14266	11.53	12.4820	-5.11	0.99979	22.0916	-16.46	58.065	3.4	85	656	1233.9	1811	1734	2216.4	143	1731	6	
280	7	Pią	860	12.18232	12.11	12.5159	-5.34	0.99949	23.0239	-11.04	58.323	4.4	93	657	1233.6	1809	1749	2306.2	312	1727	7	
281	8	Sob	861	12.22197	12.28	12.5539	-5.57	0.99920	23.5325	-4.52	58.712	5.4	97	659	1233.3	1806	1801	2353.6	439	1723	8	
282	9	Nie	862	12.26163	12.45	12.5919	-6.20	0.99892	0.4232	1.28	59.226	6.4	100	701	1233.0	1804	1812	*****	604	1719	9	
283	10	Pon	863	12.30128	13.01	13.0259	-6.43	0.99863	1.3059	7.38	59.845	0.5	100	703	1232.7	1802	1824	039.8	726	1715	10	
284	11	Wto	864	12.34093	13.17	13.0640	-7.05	0.99834	2.1941	13.19	60.533	1.5	97	705	1232.5	1759	1837	125.8	848	1712	11	
285	12	Śro	865	12.38059	13.32	13.1021	-7.28	0.99806	3.0920	18.18	61.243	2.5	93	706	1232.2	1757	1852	212.5	1009	1708	12	
286	13	Czw	866	12.42025	13.47	13.1403	-7.50	0.99778	4.0020	22.21	61.923	3.5	87	708	1232.0	1755	1913	300.5	1129	1704	13	
287	14	Pią	867	12.45590	14.01	13.1745	-8.13	0.99750	4.5244	25.18	62.521	4.5	80	710	1231.7	1753	1942	350.2	1244	1700	14	
288	15	Sob	868	12.49556	14.15	13.2128	-8.35	0.99722	5.4608	27.01	62.988	5.5	71	712	1231.5	1750	2021	441.1	1351	1656	15	
289	16	Nie	869	12.53521	14.28	13.2511	-8.57	0.99694	6.3948	27.28	63.288	6.5	62	714	1231.3	1748	2112	532.6	1446	1652	16	
290	17	Pon	870	12.57487	14.40	13.2855	-9.19	0.99666	7.3254	26.38	63.393	7.5	53	715	1231.1	1746	2215	623.7	1527	1648	17	
291	18	Wto	871	13.01453	14.52	13.3240	-9.41	0.99639	8.2440	24.36	63.293	0.7	43	717	1230.9	1744	2326	713.6	1556	1644	18	
292	19	Śro	872	13.05418	15.04	13.3625	-10.02	0.99611	9.1443	21.29	62.994	1.7	34	719	1230.7	1741	****	801.5	1618	1640	19	
293	20	Czw	873	13.09384	15.14	13.4011	-10.24	0.99584	10.0301	17.25	62.517	2.7	25	721	1230.5	1739	041	847.6	1634	1636	20	
294	21	Pią	874	13.13349	15.24	13.4358	-10.45	0.99557	10.4957	12.34	61.897	3.7	17	723	1230.3	1737	158	932.0	1647	1632	21	
295	22	Sob	875	13.17315	15.34	13.4745	-11.07	0.99529	11.3607	7.05	61.182	4.7	10	725	1230.2	1735	315	1015.6	1658	1628	22	
296	23	Nie	876	13.21280	15.42	13.5133	-11.28	0.99502	12.2222	1.10	60.428	5.7	5	726	1230.0	1733	432	1059.1	1709	1624	23	
297	24	Pon	877	13.25246	15.50	13.5521	-11.49	0.99475	13.0940	-4.57	59.692	6.7	1	728	1229.9	1731	552	1143.7	1719	1620	24	
298	25	Wto	878	13.29211	15.57	13.5911	-12.09	0.99448	13.5901	-10.59	59.030	7.7	0	730	1229.8	1729	715	1230.7	1732	1616	25	
299	26	Śro	879	13.33177	16.04	14.0301	-12.30	0.99420	14.5126	-16.38	58.484	1.0	1	732	1229.7	1726	842	1321.0	1747	1613	26	
300	27	Czw	880	13.37142	16.10	14.0652	-12.50	0.99393	15.4739	-21.28	58.084	2.0	5	734	1229.6	1724	1012	1415.6	1809	1609	27	
301	28	Pią	881	13.41108	16.15	14.1043	-13.10	0.99366	16.4746	-25.05	57.840	3.0	11	736	1229.5	1722	1141	1514.5	1841	1605	28	
302	29	Sob	882	13.45074	16.19	14.1435	-13.30	0.99339	17.5058	-27.08	57.746	4.0	19	738	1229.4	1720	1303	1616.6	1928	1601	29	
303	30	Nie	883	13.49039	16.22	14.1828	-13.50	0.99312	18.5524	-27.23	57.782	5.0	29	740	1229.4	1718	1407	1719.7	2035	1557	30	
303	30	Nie	883	14.49138	16.23	14.1838	-13.51	0.99311	18.5805	-27.21	57.786	6.0	30	640	1129.4	1618	1307	1619.7	1935	1457	30	
304	31	Pon	884	14.53103	16.25	14.2232	-14.10	0.99284	20.0122	-25.42	57.935	7.0	41	641	1129.3	1616	1352	1721.1	2058	1453	31	

Fazy Księżyca [Dm, h.mm]:      1kw 3, 2.14      Pełn 9, 22.55      3kw 17, 19.15      Nów 25, 12.49



# PAŹDZIERNIK 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.51	20.19	5.31	17.58	6.13	18.22	21.04	13.42	18.16	6.23	17.00	2.07	19.29	10.50	17.59	5.30	16.13	23.46		
	12.503	-3.26	11.643	2.06	12.197	0.26	5.294	22.44	0.231	-0.27	21.455	-16.39	3.067	16.93	23.644	-3.65	19.917	-23.07	0.64724	1
3	4.55	20.14	5.21	17.54	6.20	18.18	20.58	13.37	18.08	6.14	16.52	1.58	19.21	10.42	17.51	5.22	16.06	23.38		
	12.624	-4.03	11.659	2.59	12.350	-0.74	5.341	22.55	0.215	-0.37	21.451	-16.41	3.063	16.91	23.641	-3.67	19.916	-23.08	0.77866	3
5	4.59	20.09	5.15	17.51	6.27	18.14	20.52	13.33	17.60	6.04	16.44	1.50	19.13	10.34	17.43	5.13	15.58	23.30		
	12.745	-4.80	11.715	2.77	12.502	-1.75	5.386	22.65	0.198	-0.47	21.446	-16.43	3.059	16.90	23.638	-3.69	19.916	-23.08	0.91008	5
7	5.02	20.04	5.14	17.47	6.33	18.09	20.46	13.28	17.51	5.55	16.36	1.42	19.05	10.25	17.35	5.05	15.50	23.22		
	12.866	-5.57	11.808	2.62	12.655	-2.75	5.428	22.75	0.183	-0.57	21.443	-16.44	3.055	16.88	23.634	-3.71	19.916	-23.08	1.04150	7
9	5.06	19.60	5.16	17.44	6.40	18.05	20.39	13.24	17.43	5.45	16.28	1.34	18.57	10.17	17.27	4.57	15.42	23.14		
	12.988	-6.33	11.931	2.16	12.807	-3.75	5.468	22.84	0.167	-0.67	21.440	-16.46	3.050	16.86	23.631	-3.73	19.916	-23.08	1.17291	9
11	5.10	19.55	5.21	17.42	6.46	18.01	20.33	13.19	17.35	5.36	16.20	1.26	18.49	10.09	17.19	4.49	15.34	23.06		
	13.111	-7.09	12.080	1.43	12.961	-4.75	5.504	22.94	0.152	-0.77	21.437	-16.47	3.046	16.84	23.628	-3.75	19.916	-23.08	1.30433	11
13	5.13	19.50	5.28	17.39	6.53	17.57	20.26	13.13	17.27	5.27	16.12	1.18	18.41	10.01	17.11	4.41	15.26	22.58		
	13.234	-7.84	12.247	0.49	13.114	-5.74	5.538	23.03	0.137	-0.86	21.434	-16.48	3.041	16.82	23.625	-3.76	19.916	-23.08	1.43575	13
15	5.17	19.46	5.37	17.36	6.60	17.53	20.20	13.08	17.18	5.18	16.04	1.10	18.33	9.52	17.03	4.33	15.18	22.50		
	13.358	-8.58	12.429	-0.62	13.269	-6.72	5.568	23.12	0.122	-0.95	21.432	-16.48	3.036	16.80	23.622	-3.78	19.917	-23.08	1.56717	15
17	5.20	19.42	5.47	17.33	7.06	17.50	20.13	13.03	17.10	5.09	15.56	1.02	18.24	9.44	16.56	4.25	15.11	22.43		
	13.482	-9.31	12.621	-1.85	13.424	-7.69	5.595	23.21	0.108	-1.04	21.431	-16.49	3.032	16.78	23.620	-3.80	19.917	-23.08	1.69859	17
19	5.24	19.37	5.58	17.30	7.13	17.46	20.06	12.57	17.02	4.59	15.49	0.54	18.16	9.36	16.48	4.16	15.03	22.35		
	13.607	-10.04	12.819	-3.16	13.579	-8.66	5.619	23.30	0.095	-1.12	21.430	-16.49	3.027	16.76	23.617	-3.82	19.918	-23.08	1.83001	19
21	5.27	19.33	6.10	17.27	7.20	17.42	19.58	12.51	16.54	4.50	15.41	0.46	18.08	9.27	16.40	4.08	14.55	22.27		
	13.733	-10.76	13.022	-4.53	13.736	-9.61	5.639	23.39	0.081	-1.20	21.429	-16.49	3.021	16.74	23.614	-3.83	19.919	-23.08	1.96143	21
23	5.31	19.29	6.22	17.24	7.27	17.38	19.51	12.45	16.45	4.41	15.33	0.38	18.00	9.19	16.32	4.00	14.47	22.19		
	13.859	-11.46	13.227	-5.93	13.893	-10.54	5.655	23.48	0.069	-1.28	21.429	-16.49	3.016	16.72	23.611	-3.85	19.920	-23.07	2.09285	23
25	5.34	19.25	6.34	17.21	7.34	17.35	19.43	12.38	16.37	4.32	15.25	0.30	17.52	9.11	16.24	3.52	14.39	22.11		
	13.986	-12.16	13.433	-7.33	14.051	-11.46	5.667	23.57	0.057	-1.35	21.429	-16.49	3.011	16.70	23.609	-3.87	19.921	-23.07	2.22426	25
27	5.38	19.21	6.46	17.18	7.40	17.31	19.35	12.32	16.29	4.23	15.17	0.22	17.44	9.02	16.16	3.44	14.31	22.04		
	14.114	-12.84	13.641	-8.73	14.211	-12.36	5.675	23.66	0.045	-1.42	21.430	-16.48	3.006	16.68	23.607	-3.88	19.922	-23.07	2.35568	27
29	5.41	19.18	6.58	17.14	7.47	17.28	19.26	12.25	16.21	4.15	15.09	0.15	17.36	8.54	16.08	3.36	14.24	21.56		
	14.243	-13.51	13.849	-10.11	14.371	-13.24	5.680	23.76	0.035	-1.48	21.431	-16.48	3.000	16.65	23.604	-3.90	19.923	-23.07	2.48711	29
31	4.44	18.14	6.11	16.11	6.55	16.25	18.18	11.18	15.13	3.06	14.01	23.03	16.28	7.46	15.00	2.28	13.16	20.48		
	14.376	-14.17	14.061	-11.49	14.536	-14.12	5.680	23.85	0.025	-1.54	21.433	-16.47	2.995	16.63	23.602	-3.91	19.925	-23.06	2.61853	31

# LISTOPAD 2022

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Wto	885	14.57069	16.27	14.2627	-14.30	0.99258	21.0141	-22.26	58.166	0.2	52	643	1129.3	1614	1422	1818.8	2227	1449	1
306	2	Śro	886	15.01034	16.28	14.3022	-14.49	0.99231	21.5813	-17.53	58.462	1.2	63	645	1129.3	1613	1442	1912.2	2356	1445	2
307	3	Czw	887	15.04600	16.29	14.3418	-15.08	0.99205	22.5108	-12.27	58.812	2.2	74	647	1129.3	1611	1457	2001.9	****	1441	3
308	4	Pią	888	15.08565	16.28	14.3815	-15.26	0.99179	23.4113	-6.28	59.211	3.2	83	649	1129.3	1609	1509	2048.7	122	1437	4
309	5	Sob	889	15.12531	16.27	14.4213	-15.44	0.99153	0.2931	-0.15	59.659	4.2	90	651	1129.3	1607	1520	2134.1	245	1433	5
310	6	Nie	890	15.16496	16.25	14.4611	-16.03	0.99128	1.1704	5.52	60.153	5.2	96	653	1129.3	1605	1531	2219.0	406	1429	6
311	7	Pon	891	15.20462	16.22	14.5011	-16.20	0.99103	2.0454	11.40	60.687	6.2	99	655	1129.4	1603	1543	2304.7	526	1425	7
312	8	Wto	892	15.24428	16.19	14.5411	-16.38	0.99079	2.5348	16.51	61.249	7.2	100	657	1129.4	1602	1557	2351.9	647	1421	8
313	9	Śro	893	15.28393	16.14	14.5812	-16.55	0.99055	3.4415	21.13	61.813	1.0	99	658	1129.5	1600	1616	*****	807	1417	9
314	10	Czw	894	15.32359	16.09	15.0214	-17.12	0.99031	4.3624	24.32	62.351	2.0	96	700	1129.6	1558	1640	040.9	925	1414	10
315	11	Pią	895	15.36324	16.02	15.0617	-17.29	0.99008	5.2952	26.39	62.824	3.0	91	702	1129.7	1557	1715	131.6	1036	1410	11
316	12	Sob	896	15.40290	15.55	15.1021	-17.45	0.98985	6.2353	27.29	63.194	4.0	85	704	1129.8	1555	1801	223.4	1137	1406	12
317	13	Nie	897	15.44255	15.47	15.1425	-18.01	0.98963	7.1727	27.02	63.424	5.0	78	706	1130.0	1553	1900	315.1	1224	1402	13
318	14	Pon	898	15.48221	15.38	15.1831	-18.17	0.98941	8.0939	25.20	63.483	6.0	69	708	1130.1	1552	2009	405.6	1258	1358	14
319	15	Wto	899	15.52187	15.29	15.2237	-18.32	0.98919	8.5957	22.32	63.350	7.0	60	710	1130.3	1550	2122	454.2	1322	1354	15
320	16	Śro	900	15.56152	15.18	15.2644	-18.47	0.98898	9.4814	18.47	63.017	8.0	51	711	1130.4	1549	2237	540.5	1340	1350	16
321	17	Czw	901	16.00118	15.07	15.3052	-19.02	0.98877	10.3451	14.13	62.492	0.9	41	713	1130.6	1548	2352	624.9	1354	1346	17
322	18	Pią	902	16.04083	14.55	15.3501	-19.16	0.98856	11.2025	9.01	61.798	1.9	32	715	1130.8	1546	****	707.9	1405	1342	18
323	19	Sob	903	16.08049	14.41	15.3910	-19.30	0.98836	12.0549	3.19	60.977	2.9	23	717	1131.1	1545	108	750.5	1416	1338	19
324	20	Nie	904	16.12014	14.27	15.4321	-19.44	0.98816	12.5204	-2.41	60.085	3.9	15	718	1131.3	1544	225	833.9	1426	1334	20
325	21	Pon	905	16.15580	14.13	15.4732	-19.57	0.98796	13.4018	-8.45	59.190	4.9	8	720	1131.5	1542	346	919.3	1437	1330	21
326	22	Wto	906	16.19545	13.57	15.5144	-20.10	0.98777	14.3140	-14.37	58.366	5.9	3	722	1131.8	1541	511	1008.0	1451	1326	22
327	23	Śro	907	16.23511	13.41	15.5557	-20.23	0.98757	15.2712	-19.51	57.680	6.9	0	724	1132.1	1540	640	1101.2	1510	1322	23
328	24	Czw	908	16.27477	13.24	16.0011	-20.35	0.98738	16.2720	-24.02	57.190	0.5	0	725	1132.4	1539	813	1159.6	1537	1319	24
329	25	Pią	909	16.31442	13.06	16.0426	-20.47	0.98719	17.3133	-26.41	56.929	1.5	3	727	1132.7	1538	942	1302.5	1619	1315	25
330	26	Sob	910	16.35408	12.47	16.0841	-20.59	0.98700	18.3758	-27.28	56.903	2.5	9	729	1133.0	1537	1057	1407.9	1720	1311	26
331	27	Nie	911	16.39374	12.28	16.1257	-21.10	0.98682	19.4351	-26.18	57.095	3.5	17	730	1133.3	1536	1150	1512.3	1841	1307	27
332	28	Pon	912	16.43339	12.07	16.1713	-21.20	0.98664	20.4642	-23.21	57.465	4.5	26	732	1133.6	1535	1225	1613.1	2011	1303	28
333	29	Wto	913	16.47305	11.47	16.2131	-21.31	0.98646	21.4514	-19.00	57.964	5.5	37	733	1134.0	1534	1249	1708.9	2142	1259	29
334	30	Śro	914	16.51270	11.25	16.2549	-21.40	0.98629	22.3924	-13.41	58.542	6.5	48	735	1134.3	1533	1305	1759.9	2309	1255	30

Fazy Księżyca [Dm, h.mm]:      1kw 1, 7.37      Pełn 8, 12.02      3kw 16, 14.27      Nów 23, 23.57      1kw 30, 15.36

# LISTOPAD 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.46	18.13	6.17	16.10	6.58	16.23	18.13	11.14	15.09	3.01	13.58	22.59	16.24	7.42	14.56	2.24	13.12	20.44		
	14.441	-14.50	14.165	-12.16	14.617	-14.54	5.678	23.89	0.020	-1.56	21.434	-16.46	2.992	16.62	23.601	-3.92	19.926	-23.06	2.68424	1
3	4.49	18.09	6.29	16.07	7.05	16.20	18.04	11.06	15.00	2.53	13.50	22.52	16.16	7.33	14.48	2.16	13.04	20.37		
	14.572	-15.13	14.373	-13.45	14.781	-15.37	5.672	23.99	0.011	-1.61	21.436	-16.45	2.987	16.60	23.599	-3.93	19.927	-23.06	2.81566	3
5	4.53	18.06	6.41	16.04	7.12	16.17	17.55	10.59	14.52	2.44	13.42	22.44	16.08	7.25	14.40	2.08	12.56	20.29		
	14.704	-15.74	14.582	-14.70	14.946	-16.16	5.661	24.08	0.003	-1.66	21.439	-16.43	2.981	16.57	23.597	-3.94	19.929	-23.05	2.94708	5
7	4.56	18.03	6.53	16.02	7.19	16.14	17.46	10.51	14.44	2.36	13.34	22.36	16.00	7.17	14.32	1.60	12.49	20.21		
	14.836	-16.34	14.791	-15.90	15.112	-16.93	5.646	24.17	23.995	-1.70	21.442	-16.42	2.976	16.55	23.595	-3.95	19.931	-23.05	3.07849	7
9	4.59	18.00	7.05	15.59	7.25	16.12	17.36	10.42	14.36	2.27	13.26	22.29	15.52	7.08	14.24	1.52	12.41	20.13		
	14.970	-16.92	15.002	-17.05	15.279	-17.67	5.627	24.26	23.989	-1.73	21.446	-16.40	2.970	16.53	23.593	-3.96	19.933	-23.04	3.20991	9
11	5.02	17.57	7.17	15.57	7.32	16.10	17.26	10.34	14.28	2.19	13.19	22.21	15.44	6.60	14.17	1.44	12.33	20.06		
	15.105	-17.48	15.213	-18.14	15.448	-18.38	5.604	24.35	23.983	-1.76	21.450	-16.38	2.965	16.50	23.592	-3.97	19.936	-23.04	3.34134	11
13	5.05	17.55	7.28	15.55	7.39	16.07	17.16	10.25	14.20	2.11	13.11	22.14	15.36	6.52	14.09	1.36	12.25	19.58		
	15.240	-18.02	15.425	-19.17	15.618	-19.06	5.576	24.43	23.978	-1.79	21.454	-16.35	2.959	16.48	23.590	-3.98	19.938	-23.03	3.47276	13
15	5.08	17.53	7.39	15.54	7.46	16.06	17.05	10.16	14.12	2.02	13.03	22.06	15.28	6.43	14.01	1.28	12.18	19.50		
	15.377	-18.53	15.638	-20.13	15.790	-19.70	5.544	24.52	23.973	-1.80	21.459	-16.33	2.954	16.46	23.589	-3.99	19.940	-23.03	3.60418	15
17	5.11	17.50	7.51	15.52	7.52	16.04	16.54	10.07	14.04	1.54	12.55	21.59	15.20	6.35	13.53	1.20	12.10	19.43		
	15.514	-19.03	15.852	-21.03	15.962	-20.30	5.508	24.60	23.970	-1.82	21.464	-16.30	2.948	16.43	23.588	-3.99	19.943	-23.02	3.73560	17
19	5.14	17.48	8.02	15.52	7.59	16.03	16.44	9.57	13.56	1.46	12.48	21.52	15.12	6.27	13.45	1.12	12.02	19.35		
	15.653	-19.51	16.069	-21.86	16.137	-20.87	5.469	24.67	23.967	-1.82	21.470	-16.27	2.943	16.41	23.587	-4.00	19.946	-23.02	3.86702	19
21	5.17	17.46	8.12	15.51	8.05	16.02	16.33	9.47	13.48	1.38	12.40	21.44	15.04	6.18	13.37	1.04	11.54	19.27		
	15.792	-19.96	16.286	-22.62	16.312	-21.39	5.426	24.74	23.966	-1.82	21.476	-16.24	2.937	16.39	23.586	-4.00	19.948	-23.01	3.99844	21
23	5.20	17.45	8.23	15.51	8.11	16.01	16.21	9.37	13.40	1.30	12.32	21.37	14.56	6.10	13.29	0.56	11.47	19.20		
	15.933	-20.38	16.505	-23.30	16.489	-21.88	5.379	24.80	23.965	-1.82	21.483	-16.20	2.932	16.37	23.585	-4.01	19.951	-23.00	4.12986	23
25	5.23	17.43	8.32	15.52	8.17	16.00	16.10	9.27	13.32	1.23	12.25	21.30	14.48	6.02	13.21	0.48	11.39	19.12		
	16.074	-20.78	16.725	-23.91	16.667	-22.32	5.330	24.86	23.965	-1.81	21.490	-16.17	2.927	16.34	23.584	-4.01	19.954	-22.99	4.26128	25
27	5.25	17.42	8.42	15.53	8.23	16.00	15.59	9.16	13.24	1.15	12.17	21.23	14.40	5.53	13.13	0.40	11.31	19.05		
	16.216	-21.16	16.947	-24.43	16.846	-22.72	5.278	24.90	23.966	-1.79	21.497	-16.13	2.922	16.32	23.584	-4.01	19.958	-22.99	4.39271	27
29	5.28	17.41	8.51	15.55	8.28	16.01	15.47	9.05	13.16	1.07	12.09	21.16	14.32	5.45	13.05	0.32	11.23	18.57		
	16.359	-21.51	17.169	-24.87	17.026	-23.08	5.224	24.94	23.967	-1.77	21.505	-16.09	2.916	16.30	23.583	-4.01	19.961	-22.98	4.52413	29

# GRUDZIEŃ 2022

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2459																					
335	1	Czw	915	16.55236	11.03	16.3007	-21.50	0.98612	23.3001	-7.48	59.156	0.8	59	736	1134.7	1533	1318	1847.4	****	1251	1
336	2	Pią	916	16.59201	10.40	16.3427	-21.59	0.98595	0.1812	-1.41	59.774	1.8	70	738	1135.1	1532	1329	1932.5	032	1247	2
337	3	Sob	917	17.03167	10.17	16.3847	-22.08	0.98579	1.0511	4.24	60.374	2.8	79	739	1135.5	1531	1340	2016.7	153	1243	3
338	4	Nie	918	17.07133	9.53	16.4307	-22.16	0.98564	1.5205	10.12	60.947	3.8	87	741	1135.9	1531	1351	2101.2	312	1239	4
339	5	Pon	919	17.11098	9.29	16.4728	-22.23	0.98549	2.3951	15.29	61.487	4.8	93	742	1136.3	1530	1404	2147.0	431	1235	5
340	6	Wto	920	17.15063	9.04	16.5150	-22.31	0.98534	3.2910	20.01	61.990	5.8	97	743	1136.7	1530	1420	2234.7	550	1231	6
341	7	Śro	921	17.19029	8.38	16.5612	-22.38	0.98520	4.2022	23.37	62.452	6.8	100	745	1137.1	1529	1442	2324.4	708	1227	7
342	8	Czw	922	17.22595	8.12	17.0034	-22.44	0.98507	5.1315	26.06	62.863	0.3	100	746	1137.5	1529	1513	*****	822	1223	8
343	9	Pią	923	17.26561	7.46	17.0457	-22.50	0.98494	6.0709	27.19	63.208	1.3	98	747	1138.0	1529	1555	015.8	927	1220	9
344	10	Sob	924	17.30526	7.19	17.0921	-22.56	0.98482	7.0101	27.14	63.466	2.3	95	748	1138.4	1528	1650	107.6	1019	1216	10
345	11	Nie	925	17.34492	6.52	17.1345	-23.01	0.98470	7.5346	25.53	63.611	3.3	90	749	1138.9	1528	1755	158.8	1058	1212	11
346	12	Pon	926	17.38457	6.24	17.1809	-23.05	0.98459	8.4437	23.24	63.620	4.3	84	750	1139.4	1528	1906	248.2	1125	1208	12
347	13	Wto	927	17.42423	5.56	17.2233	-23.10	0.98449	9.3314	19.56	63.468	5.3	77	751	1139.8	1528	2020	335.2	1145	1204	13
348	14	Śro	928	17.46388	5.27	17.2658	-23.13	0.98439	10.1948	15.39	63.140	6.3	68	752	1140.3	1528	2134	419.8	1200	1200	14
349	15	Czw	929	17.50354	4.59	17.3124	-23.17	0.98429	11.0451	10.43	62.628	7.3	59	753	1140.8	1528	2248	502.5	1212	1156	15
350	16	Pią	930	17.54320	4.30	17.3549	-23.19	0.98420	11.4913	5.18	61.942	0.1	49	754	1141.3	1528	****	544.2	1222	1152	16
351	17	Sob	931	17.58285	4.00	17.4015	-23.22	0.98412	12.3353	-0.28	61.107	1.1	39	755	1141.7	1529	003	625.9	1232	1148	17
352	18	Nie	932	18.02251	3.31	17.4441	-23.23	0.98404	13.1960	-6.23	60.164	2.1	29	756	1142.2	1529	119	708.9	1243	1144	18
353	19	Pon	933	18.06216	3.01	17.4907	-23.25	0.98396	14.0849	-12.13	59.174	3.1	20	756	1142.7	1529	240	754.6	1255	1140	19
354	20	Wto	934	18.10182	2.32	17.5333	-23.26	0.98389	15.0135	-17.40	58.212	4.1	12	757	1143.2	1530	405	844.4	1311	1136	20
355	21	Śro	935	18.14147	2.02	17.5760	-23.26	0.98382	15.5917	-22.19	57.360	5.1	6	757	1143.7	1530	536	939.6	1333	1132	21
356	22	Czw	936	18.18113	1.32	18.0226	-23.26	0.98376	17.0207	-25.42	56.699	6.1	1	758	1144.2	1531	708	1040.6	1406	1128	22
357	23	Pią	937	18.22079	1.02	18.0653	-23.26	0.98370	18.0856	-27.19	56.291	0.0	0	758	1144.7	1531	832	1146.3	1459	1124	23
358	24	Sob	938	18.26044	0.32	18.1119	-23.25	0.98364	19.1707	-26.55	56.173	1.0	2	759	1145.2	1532	938	1253.5	1613	1121	24
359	25	Nie	939	18.30010	0.02	18.1546	-23.23	0.98359	20.2332	-24.31	56.347	2.0	6	759	1145.7	1532	1022	1358.5	1743	1117	25
360	26	Pon	940	18.33576	-0.28	18.2012	-23.21	0.98354	21.2552	-20.27	56.783	3.0	13	759	1146.2	1533	1051	1458.9	1919	1113	26
361	27	Wto	941	18.37541	-0.57	18.2438	-23.19	0.98349	22.2320	-15.12	57.424	4.0	22	800	1146.7	1534	1111	1553.7	2051	1109	27
362	28	Śro	942	18.41507	-1.27	18.2904	-23.16	0.98345	23.1625	-9.15	58.199	5.0	33	800	1147.2	1535	1125	1643.8	2218	1105	28
363	29	Czw	943	18.45472	-1.56	18.3330	-23.13	0.98341	0.0612	-3.02	59.038	6.0	43	800	1147.7	1536	1137	1730.6	2341	1101	29
364	30	Pią	944	18.49438	-2.25	18.3756	-23.09	0.98338	0.5360	3.10	59.878	0.4	54	800	1148.2	1537	1148	1815.6	****	1057	30
365	31	Sob	945	18.53403	-2.54	18.4221	-23.05	0.98335	1.4103	9.03	60.674	1.4	65	800	1148.6	1538	1159	1860.0	101	1053	31

Fazy Księżyca [Dm, h.mm]: 1kw 0, 15.36 Pełn 8, 5.08 3kw 16, 9.56 Nów 23, 11.17 1kw 30, 2.20

# GRUDZIEŃ 2022 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	17.40	8.59	15.58	8.34	16.01	15.36	8.54	13.09	0.60	12.02	21.09	14.24	5.37	12.58	0.24	11.16	18.49		
	16.502	-21.83	17.392	-25.22	17.206	-23.39	5.169	24.97	23.970	-1.75	21.513	-16.05	2.911	16.28	23.583	-4.01	19.964	-22.97	4.65555	1
3	5.33	17.39	9.07	16.01	8.39	16.02	15.25	8.43	13.01	0.52	11.54	21.01	14.16	5.28	12.50	0.16	11.08	18.42		
	16.646	-22.13	17.616	-25.48	17.388	-23.65	5.112	24.99	23.973	-1.72	21.522	-16.01	2.907	16.26	23.583	-4.01	19.968	-22.96	4.78697	3
5	5.35	17.38	9.14	16.05	8.43	16.04	15.13	8.32	12.53	0.45	11.47	20.54	14.08	5.20	12.42	0.09	11.00	18.34		
	16.791	-22.39	17.838	-25.65	17.570	-23.86	5.055	25.00	23.977	-1.68	21.531	-15.96	2.902	16.24	23.583	-4.01	19.971	-22.95	4.91838	5
7	5.37	17.38	9.20	16.10	8.48	16.05	15.02	8.21	12.45	0.37	11.39	20.47	13.60	5.12	12.34	23.57	10.52	18.27		
	16.937	-22.63	18.059	-25.73	17.753	-24.02	4.998	25.00	23.982	-1.63	21.540	-15.92	2.897	16.22	23.583	-4.01	19.975	-22.95	5.04981	7
9	5.39	17.38	9.25	16.16	8.52	16.08	14.51	8.10	12.37	0.30	11.31	20.40	13.51	5.04	12.26	23.49	10.45	18.19		
	17.083	-22.84	18.278	-25.70	17.936	-24.14	4.942	24.99	23.988	-1.59	21.550	-15.87	2.893	16.20	23.583	-4.01	19.979	-22.94	5.18123	9
11	5.41	17.38	9.29	16.22	8.55	16.10	14.40	7.58	12.30	0.23	11.24	20.33	13.43	4.55	12.18	23.41	10.37	18.11		
	17.229	-23.01	18.494	-25.59	18.119	-24.21	4.886	24.98	23.995	-1.53	21.560	-15.82	2.888	16.18	23.584	-4.00	19.983	-22.93	5.31265	11
13	5.42	17.38	9.32	16.28	8.59	16.13	14.29	7.47	12.22	0.16	11.16	20.26	13.35	4.47	12.10	23.33	10.29	18.04		
	17.376	-23.16	18.703	-25.37	18.303	-24.22	4.832	24.96	0.002	-1.48	21.570	-15.77	2.884	16.16	23.584	-4.00	19.986	-22.92	5.44408	13
15	5.44	17.38	9.33	16.35	9.01	16.17	14.18	7.36	12.14	0.09	11.09	20.20	13.27	4.39	12.03	23.26	10.22	17.56		
	17.523	-23.28	18.905	-25.06	18.486	-24.19	4.779	24.93	0.011	-1.41	21.581	-15.71	2.880	16.15	23.585	-3.99	19.990	-22.91	5.57550	15
17	5.46	17.39	9.34	16.42	9.04	16.20	14.07	7.25	12.07	0.02	11.01	20.13	13.19	4.31	11.55	23.18	10.14	17.49		
	17.671	-23.36	19.097	-24.66	18.669	-24.10	4.729	24.89	0.020	-1.34	21.592	-15.66	2.876	16.13	23.586	-3.99	19.995	-22.90	5.70691	17
19	5.47	17.40	9.33	16.48	9.06	16.24	13.57	7.13	11.59	23.51	10.54	20.06	13.11	4.23	11.47	23.10	10.06	17.41		
	17.819	-23.41	19.274	-24.18	18.852	-23.97	4.681	24.85	0.029	-1.27	21.603	-15.60	2.872	16.12	23.587	-3.98	19.999	-22.89	5.83833	19
21	5.48	17.40	9.30	16.54	9.08	16.29	13.47	7.03	11.51	23.44	10.46	19.59	13.04	4.14	11.39	23.02	9.59	17.34		
	17.967	-23.44	19.432	-23.63	19.035	-23.79	4.637	24.81	0.040	-1.19	21.614	-15.54	2.869	16.10	23.588	-3.97	20.003	-22.88	5.96976	21
23	5.49	17.42	9.26	16.59	9.09	16.34	13.37	6.52	11.44	23.37	10.39	19.52	12.56	4.06	11.31	22.55	9.51	17.26		
	18.115	-23.43	19.566	-23.03	19.217	-23.56	4.595	24.77	0.051	-1.11	21.626	-15.49	2.865	16.09	23.589	-3.96	20.007	-22.87	6.10118	23
25	5.50	17.43	9.19	17.02	9.10	16.39	13.27	6.41	11.36	23.31	10.31	19.45	12.48	3.58	11.23	22.47	9.43	17.19		
	18.263	-23.39	19.669	-22.40	19.398	-23.28	4.557	24.73	0.063	-1.02	21.638	-15.42	2.862	16.07	23.591	-3.95	20.011	-22.86	6.23261	25
27	5.50	17.44	9.11	17.02	9.10	16.44	13.18	6.31	11.28	23.24	10.24	19.39	12.40	3.50	11.16	22.39	9.36	17.11		
	18.411	-23.32	19.732	-21.76	19.578	-22.95	4.523	24.68	0.076	-0.93	21.651	-15.36	2.859	16.06	23.592	-3.94	20.016	-22.85	6.36403	27
29	5.51	17.46	8.60	16.59	9.10	16.50	13.08	6.21	11.21	23.18	10.16	19.32	12.32	3.42	11.08	22.31	9.28	17.04		
	18.558	-23.21	19.749	-21.16	19.757	-22.58	4.493	24.64	0.089	-0.84	21.663	-15.30	2.856	16.05	23.594	-3.93	20.020	-22.84	6.49545	29
31	5.51	17.47	8.46	16.53	9.10	16.56	12.59	6.11	11.13	23.11	10.09	19.25	12.24	3.34	10.60	22.24	9.20	16.56		
	18.706	-23.08	19.713	-20.63	19.935	-22.16	4.466	24.60	0.103	-0.74	21.676	-15.23	2.854	16.04	23.596	-3.91	20.025	-22.83	6.62686	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2022

Nowy Rok	Sob	1 styczeń	Dzień Dziecka	Śro	1 czerwiec
Najświętszej Maryi Panny Rodzicielki	Sob	1 styczeń	Zesłania Ducha Świętego	Nie	5 czerwiec
Objawienia Pańskiego (Trzech Króli)	Czw	6 styczeń	Dzień Dziękczynienia	Nie	5 czerwiec
Juliański Nowy Rok	Pią	14 styczeń	Trójcy Najświętszej	Nie	12 czerwiec
Dzień Babci	Pią	21 styczeń	Boże Ciało	Czw	16 czerwiec
Dzień Dziadka	Sob	22 styczeń	Dzień Ojca	Czw	23 czerwiec
Ofiarowania Pańskiego	Śro	2 luty	Noc Świętojańska	Czw	23 czerwiec
Matki Boskiej Gromnicznej	Śro	2 luty	Najświętszego Serca Pana Jezusa	Pią	24 czerwiec
Walentynki	Pon	14 luty	Św. Piotra i Pawła	Śro	29 czerwiec
Święto UMK	Sob	19 luty	Wniebowzięcia N.M.P.	Pon	15 sierpień
Tłusty czwartek	Czw	24 luty	Święto Wojska Polskiego	Pon	15 sierpień
Środa Popielcowa	Śro	2 marzec	Dzień Solidarności i Wolności	Śro	31 sierpień
Dzień Kobiet	Wto	8 marzec	Dzień Programisty	Wto	13 wrzesień
Narodowy Dzień Życia	Czw	24 marzec	Dożynki – Święto Plonów	Pią	23 wrzesień
Niedziela Palmowa	Nie	10 kwiecień	Dzień Edukacji Narodowej	Pią	14 październik
Niedziela Wielkanocna	Nie	17 kwiecień	Dzień Papieski	Nie	16 październik
Niedziela Miłosierdzia Bożego	Nie	24 kwiecień	Dzień Papieża Jana Pawła II	Nie	16 październik
Święto Pracy	Nie	1 maj	Wszystkich Świętych	Wto	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Pon	2 maj	Zaduszki	Śro	2 listopad
Najświętsza Maryja Królowa Polski	Wto	3 maj	Święto Niepodległości	Pią	11 listopad
Święto Konstytucji 3 Maja	Wto	3 maj	Pierwsza niedziela Adwentu	Nie	27 listopad
Dzień Polskiej Niezapominajki	Nie	15 maj	Niepokalane Poczęcie N.M.P.	Czw	8 grudzień
Wniebowstąpienia Pańskiego	Czw	26 maj	Boże Narodzenie	Nie	25 grudzień
Dzień Matki	Czw	26 maj	Sylwester	Sob	31 grudzień

# Kalendarz astronomiczny 2023

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2", Księżyc 10", Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!  
(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)

Data Wielkanocy: **2023 KWIECIEŃ 9**

Dla całego roku przyjęto: TDT – UT = 71 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 22.24**, Lato **VI 21, 15.58**, Jesień **IX 23, 7.50**, Zima **XII 22, 4.27**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **26 marca do 29 października 2023 r.**

### Oznaczenia:

Dr — dzień 2023 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2023

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
1	1	Nie	946	18.57369	-3.22	18.4646	-23.00	0.98333	2.2826	14.26	61.392	2.4	74	800	1149.1	1539	1211	1945.1	220	1049	1	
2	2	Pon	947	19.01334	-3.50	18.5111	-22.55	0.98331	3.1701	19.07	62.018	3.4	82	800	1149.6	1540	1227	2031.7	339	1045	2	
3	3	Wto	948	19.05300	-4.18	18.5535	-22.49	0.98330	4.0718	22.54	62.543	4.4	89	759	1150.0	1541	1246	2120.3	457	1041	3	
4	4	Śro	949	19.09266	-4.46	18.5959	-22.43	0.98329	4.5921	25.37	62.969	5.4	94	759	1150.5	1542	1314	2210.8	611	1037	4	
5	5	Czw	950	19.13231	-5.12	19.0422	-22.37	0.98330	5.5241	27.07	63.300	6.4	98	759	1151.0	1543	1352	2302.2	719	1033	5	
6	6	Pią	951	19.17197	-5.39	19.0845	-22.30	0.98330	6.4627	27.21	63.537	7.4	100	758	1151.4	1545	1442	2353.6	815	1029	6	
7	7	Sob	952	19.21163	-6.05	19.1308	-22.22	0.98332	7.3930	26.18	63.682	0.5	100	758	1151.8	1546	1544	*****	858	1026	7	
8	8	Nie	953	19.25128	-6.31	19.1730	-22.15	0.98334	8.3055	24.04	63.727	1.5	98	757	1152.3	1547	1655	043.7	928	1022	8	
9	9	Pon	954	19.29094	-6.56	19.2152	-22.06	0.98337	9.2008	20.49	63.663	2.5	95	757	1152.7	1549	1808	131.5	950	1018	9	
10	10	Wto	955	19.33060	-7.20	19.2613	-21.58	0.98340	10.0708	16.42	63.476	3.5	89	756	1153.1	1550	1922	216.9	1006	1014	10	
11	11	Śro	956	19.37025	-7.44	19.3033	-21.48	0.98344	10.5215	11.56	63.153	4.5	83	755	1153.5	1552	2035	260.0	1019	1010	11	
12	12	Czw	957	19.40590	-8.07	19.3453	-21.39	0.98349	11.3611	6.40	62.684	5.5	75	755	1153.9	1553	2149	341.5	1030	1006	12	
13	13	Pią	958	19.44556	-8.30	19.3913	-21.29	0.98354	12.1950	1.05	62.065	6.5	66	754	1154.3	1555	2302	422.3	1039	1002	13	
14	14	Sob	959	19.48521	-8.52	19.4331	-21.18	0.98359	13.0415	-4.39	61.304	7.5	56	753	1154.6	1557	****	503.6	1049	958	14	
15	15	Nie	960	19.52487	-9.14	19.4749	-21.08	0.98365	13.5036	-10.22	60.425	0.4	46	752	1155.0	1558	019	546.6	1100	954	15	
16	16	Pon	961	19.56453	-9.35	19.5207	-20.56	0.98372	14.4009	-15.49	59.468	1.4	36	751	1155.3	1600	139	632.7	1113	950	16	
17	17	Wto	962	20.00418	-9.55	19.5624	-20.45	0.98379	15.3404	-20.40	58.492	2.4	26	750	1155.7	1602	304	723.4	1131	946	17	
18	18	Śro	963	20.04384	-10.15	20.0040	-20.33	0.98387	16.3308	-24.30	57.570	3.4	16	749	1156.0	1603	433	819.8	1157	942	18	
19	19	Czw	964	20.08349	-10.34	20.0455	-20.20	0.98394	17.3711	-26.53	56.786	4.4	9	748	1156.3	1605	601	921.8	1238	938	19	
20	20	Pią	965	20.12315	-10.52	20.0910	-20.08	0.98403	18.4436	-27.24	56.219	5.4	3	747	1156.6	1607	716	1028.0	1341	934	20	
21	21	Sob	966	20.16281	-11.09	20.1324	-19.54	0.98411	19.5230	-25.51	55.932	6.4	0	746	1156.9	1609	812	1135.1	1505	931	21	
22	22	Nie	967	20.20246	-11.26	20.1737	-19.41	0.98420	20.5757	-22.23	55.959	0.6	1	745	1157.2	1610	848	1239.2	1641	927	22	
23	23	Pon	968	20.24212	-11.42	20.2149	-19.27	0.98429	21.5908	-17.25	56.296	1.6	4	743	1157.4	1612	913	1338.6	1819	923	23	
24	24	Wto	969	20.28177	-11.57	20.2601	-19.13	0.98439	22.5545	-11.27	56.904	2.6	10	742	1157.7	1614	930	1432.8	1952	919	24	
25	25	Śro	970	20.32143	-12.11	20.3012	-18.58	0.98449	23.4830	-5.01	57.717	3.6	18	741	1157.9	1616	943	1522.9	2120	915	25	
26	26	Czw	971	20.36108	-12.24	20.3422	-18.43	0.98459	0.3833	1.28	58.652	4.6	27	739	1158.2	1618	955	1610.2	2244	911	26	
27	27	Pią	972	20.40074	-12.37	20.3831	-18.28	0.98470	1.2709	7.40	59.629	5.6	38	738	1158.4	1620	1006	1656.2	****	907	27	
28	28	Sob	973	20.44040	-12.49	20.4240	-18.12	0.98481	2.1529	13.20	60.576	6.6	48	736	1158.6	1621	1018	1742.1	006	903	28	
29	29	Nie	974	20.48005	-12.60	20.4647	-17.56	0.98493	3.0428	18.16	61.437	0.8	58	735	1158.7	1623	1032	1828.8	127	859	29	
30	30	Pon	975	20.51571	-13.10	20.5054	-17.40	0.98505	3.5443	22.17	62.175	1.8	68	733	1158.9	1625	1050	1917.1	246	855	30	
31	31	Wto	976	20.55536	-13.19	20.5460	-17.23	0.98517	4.4628	25.15	62.770	2.8	77	732	1159.1	1627	1115	2007.1	402	851	31	

Fazy Księżyca [Dm, h.mm]: Pełn 7, 0.08    3kw 15, 3.10    Nów 21, 21.53    1kw 28, 16.19



# STYCZEŃ 2023 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		Merkury		Wenus		Mars		Jowisz		Saturn		Uran		Neptun		Pluton		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.48	8.38	16.48	9.10	16.59	12.55	6.07	11.10	23.08	10.05	19.22	12.20	3.30	10.56	22.20	9.16	16.52		
	18.779	-23.00	19.674	-20.40	20.024	-21.93	4.454	24.58	0.110	-0.68	21.683	-15.20	2.852	16.03	23.597	-3.91	20.027	-22.82	6.69257	1
3	5.51	17.50	8.21	16.36	9.09	17.05	12.46	5.57	11.02	23.01	9.57	19.15	12.12	3.22	10.48	22.12	9.09	16.45		
	18.926	-22.82	19.556	-20.02	20.200	-21.45	4.434	24.55	0.125	-0.58	21.696	-15.13	2.850	16.02	23.599	-3.89	20.031	-22.81	6.82400	3
5	5.51	17.52	8.01	16.20	9.08	17.11	12.37	5.48	10.54	22.55	9.50	19.09	12.04	3.14	10.40	22.05	9.01	16.37		
	19.073	-22.61	19.395	-19.75	20.375	-20.92	4.418	24.52	0.141	-0.47	21.709	-15.07	2.848	16.02	23.601	-3.88	20.036	-22.80	6.95542	5
7	5.51	17.54	7.41	16.02	9.06	17.17	12.29	5.39	10.47	22.49	9.42	19.02	11.56	3.06	10.33	21.57	8.53	16.30		
	19.219	-22.37	19.207	-19.60	20.548	-20.35	4.405	24.50	0.157	-0.35	21.723	-15.00	2.846	16.01	23.603	-3.86	20.041	-22.79	7.08684	7
9	5.50	17.57	7.21	15.43	9.05	17.24	12.21	5.31	10.39	22.43	9.35	18.55	11.48	2.58	10.25	21.49	8.46	16.22		
	19.364	-22.11	19.017	-19.55	20.721	-19.74	4.397	24.48	0.174	-0.23	21.737	-14.93	2.844	16.00	23.606	-3.85	20.045	-22.78	7.21827	9
11	5.49	17.59	7.04	15.25	9.03	17.31	12.13	5.23	10.32	22.36	9.27	18.49	11.40	2.50	10.17	21.42	8.38	16.15		
	19.509	-21.81	18.848	-19.59	20.891	-19.10	4.393	24.47	0.192	-0.11	21.751	-14.86	2.843	16.00	23.608	-3.83	20.050	-22.77	7.34969	11
13	5.48	18.02	6.49	15.09	9.01	17.37	12.05	5.15	10.25	22.30	9.20	18.42	11.32	2.42	10.09	21.34	8.30	16.07		
	19.653	-21.48	18.715	-19.71	21.061	-18.42	4.392	24.46	0.210	0.01	21.765	-14.79	2.842	15.99	23.611	-3.81	20.054	-22.76	7.48110	13
15	5.47	18.04	6.37	14.54	8.58	17.44	11.57	5.07	10.17	22.24	9.13	18.36	11.24	2.34	10.01	21.27	8.23	15.60		
	19.797	-21.13	18.626	-19.89	21.229	-17.70	4.395	24.46	0.228	0.14	21.779	-14.71	2.841	15.99	23.614	-3.79	20.059	-22.75	7.61252	15
17	5.46	18.07	6.28	14.42	8.55	17.51	11.49	4.59	10.10	22.18	9.05	18.29	11.16	2.26	9.53	21.19	8.15	15.52		
	19.940	-20.75	18.582	-20.13	21.395	-16.95	4.401	24.47	0.247	0.27	21.793	-14.64	2.840	15.99	23.617	-3.77	20.064	-22.74	7.74395	17
19	5.44	18.10	6.22	14.32	8.53	17.58	11.42	4.52	10.02	22.12	8.58	18.23	11.08	2.18	9.46	21.11	8.07	15.45		
	20.082	-20.34	18.582	-20.39	21.560	-16.17	4.411	24.48	0.267	0.41	21.808	-14.56	2.840	15.98	23.620	-3.75	20.069	-22.73	7.87537	19
21	5.43	18.13	6.18	14.25	8.50	18.05	11.35	4.45	9.55	22.06	8.50	18.16	11.01	2.10	9.38	21.04	7.60	15.37		
	20.223	-19.91	18.618	-20.67	21.723	-15.36	4.425	24.50	0.287	0.55	21.823	-14.49	2.839	15.98	23.623	-3.73	20.073	-22.72	8.00679	21
23	5.41	18.16	6.16	14.19	8.46	18.12	11.28	4.39	9.48	22.00	8.43	18.09	10.53	2.02	9.30	20.56	7.52	15.30		
	20.364	-19.45	18.686	-20.94	21.885	-14.53	4.442	24.52	0.308	0.69	21.838	-14.41	2.839	15.98	23.626	-3.71	20.078	-22.71	8.13821	23
25	5.39	18.19	6.16	14.15	8.43	18.19	11.21	4.32	9.40	21.55	8.35	18.03	10.45	1.54	9.22	20.49	7.44	15.22		
	20.503	-18.97	18.780	-21.19	22.046	-13.66	4.462	24.55	0.329	0.83	21.853	-14.33	2.839	15.99	23.629	-3.69	20.082	-22.70	8.26963	25
27	5.37	18.22	6.16	14.13	8.39	18.25	11.14	4.26	9.33	21.49	8.28	17.56	10.37	1.46	9.15	20.41	7.37	15.15		
	20.642	-18.46	18.896	-21.40	22.205	-12.77	4.485	24.58	0.351	0.98	21.868	-14.26	2.840	15.99	23.633	-3.66	20.087	-22.69	8.40105	27
29	5.34	18.25	6.17	14.12	8.36	18.32	11.08	4.20	9.25	21.43	8.21	17.50	10.29	1.39	9.07	20.34	7.29	15.07		
	20.780	-17.94	19.029	-21.56	22.363	-11.86	4.511	24.62	0.373	1.13	21.883	-14.18	2.840	15.99	23.636	-3.64	20.092	-22.68	8.53247	29
31	5.32	18.28	6.19	14.12	8.32	18.39	11.01	4.14	9.18	21.37	8.13	17.44	10.21	1.31	8.59	20.26	7.21	14.60		
	20.917	-17.39	19.177	-21.66	22.520	-10.93	4.540	24.66	0.395	1.28	21.898	-14.10	2.841	16.00	23.640	-3.62	20.096	-22.66	8.66389	31

# LUTY 2023

Piwnice, CA UMK			←———— Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) —————→										..... Czas strefowy [hhmm.] .....									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
32	1	Śro	977	20.59502	-13.28	20.5905	-17.06	0.98530	5.3928	27.01	63.216	3.8	84	730	1159.2	1629	1149	2058.2	512	847	1	
33	2	Czw	978	21.03468	-13.35	21.0309	-16.49	0.98544	6.3302	27.31	63.516	4.8	90	728	1159.3	1631	1236	2149.5	612	843	2	
34	3	Pią	979	21.07433	-13.42	21.0712	-16.32	0.98558	7.2610	26.44	63.683	5.8	95	727	1159.5	1633	1335	2239.9	658	839	3	
35	4	Sob	980	21.11399	-13.48	21.1115	-16.14	0.98573	8.1757	24.45	63.729	6.8	98	725	1159.6	1635	1443	2328.5	732	835	4	
36	5	Nie	981	21.15364	-13.54	21.1517	-15.56	0.98588	9.0745	21.41	63.668	7.8	100	723	1159.6	1637	1557	*****	756	832	5	
37	6	Pon	982	21.19330	-13.58	21.1918	-15.38	0.98604	9.5522	17.43	63.508	0.7	100	721	1159.7	1639	1711	014.7	813	828	6	
38	7	Wto	983	21.23295	-14.02	21.2318	-15.19	0.98620	10.4102	13.02	63.254	1.7	97	720	1159.8	1641	1825	058.6	827	824	7	
39	8	Śro	984	21.27261	-14.04	21.2717	-15.00	0.98637	11.2515	7.49	62.906	2.7	93	718	1159.8	1643	1939	140.7	838	820	8	
40	9	Czw	985	21.31226	-14.06	21.3116	-14.41	0.98655	12.0850	2.16	62.461	3.7	88	716	1159.9	1645	2052	221.6	848	816	9	
41	10	Pią	986	21.35192	-14.08	21.3514	-14.22	0.98673	12.5239	-3.27	61.916	4.7	81	714	1159.9	1647	2207	302.4	857	812	10	
42	11	Sob	987	21.39157	-14.08	21.3911	-14.02	0.98691	13.3747	-9.09	61.271	5.7	72	712	1159.9	1649	2324	344.2	907	808	11	
43	12	Nie	988	21.43123	-14.08	21.4307	-13.42	0.98710	14.2520	-14.35	60.534	6.7	63	710	1159.9	1650	****	428.2	919	804	12	
44	13	Pon	989	21.47088	-14.07	21.4702	-13.22	0.98729	15.1625	-19.30	59.726	7.7	52	708	1159.9	1652	046	515.6	934	800	13	
45	14	Wto	990	21.51054	-14.05	21.5057	-13.02	0.98749	16.1154	-23.34	58.880	0.8	41	706	1159.8	1654	211	607.8	955	756	14	
46	15	Śro	991	21.55020	-14.03	21.5451	-12.41	0.98769	17.1207	-26.24	58.048	1.8	31	704	1159.8	1656	337	705.2	1028	752	15	
47	16	Czw	992	21.58585	-13.60	21.5845	-12.21	0.98789	18.1617	-27.37	57.292	2.8	21	702	1159.7	1658	456	807.4	1117	748	16	
48	17	Pią	993	22.02551	-13.56	22.0238	-11.60	0.98810	19.2227	-26.55	56.685	3.8	12	700	1159.7	1700	559	912.3	1229	744	17	
49	18	Sob	994	22.06516	-13.51	22.0630	-11.39	0.98830	20.2758	-24.17	56.294	4.8	5	658	1159.6	1702	643	1016.8	1359	740	18	
50	19	Nie	995	22.10482	-13.46	22.1021	-11.17	0.98851	21.3041	-19.55	56.172	5.8	1	656	1159.5	1704	712	1118.3	1537	736	19	
51	20	Pon	996	22.14448	-13.40	22.1412	-10.56	0.98873	22.2934	-14.16	56.343	0.2	0	654	1159.4	1706	732	1215.4	1714	733	20	
52	21	Wto	997	22.18413	-13.34	22.1802	-10.34	0.98894	23.2445	-7.50	56.800	1.2	2	651	1159.3	1708	747	1308.4	1847	729	21	
53	22	Śro	998	22.22379	-13.27	22.2151	-10.12	0.98916	0.1704	-1.07	57.499	2.2	7	649	1159.2	1710	800	1358.4	2016	725	22	
54	23	Czw	999	22.26344	-13.19	22.2540	-9.50	0.98937	1.0739	5.28	58.374	3.2	14	647	1159.1	1712	811	1446.4	2142	721	23	
55	24	Pią	000	22.30310	-13.10	22.2928	-9.28	0.98959	1.5735	11.35	59.344	4.2	22	645	1158.9	1714	823	1533.9	2306	717	24	
56	25	Sob	001	22.34275	-13.01	22.3316	-9.06	0.98982	2.4748	16.59	60.329	5.2	31	643	1158.8	1716	836	1621.9	****	713	25	
57	26	Nie	002	22.38241	-12.52	22.3702	-8.44	0.99004	3.3858	21.26	61.255	6.2	41	641	1158.6	1718	853	1710.9	029	709	26	
58	27	Pon	003	22.42206	-12.41	22.4049	-8.21	0.99027	4.3121	24.46	62.066	0.1	51	638	1158.4	1719	915	1801.4	149	705	27	
59	28	Wto	004	22.46172	-12.31	22.4435	-7.59	0.99050	5.2447	26.53	62.723	1.1	61	636	1158.3	1721	946	1852.8	303	701	28	

Fazy Księżyca [Dm, h.mm]: Pełn 5, 19.28    3kw 13, 17.01    Now 20, 8.06    1kw 27, 9.06

# LUTY 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.31	18.30	6.20	14.12	8.30	18.42	10.58	4.12	9.15	21.35	8.09	17.40	10.17	1.27	8.55	20.22	7.18	14.56		
	20.985	-17.11	19.256	-21.69	22.598	-10.46	4.556	24.68	0.407	1.36	21.906	-14.06	2.842	16.00	23.642	-3.60	20.099	-22.66	8.72960	1
3	5.28	18.33	6.22	14.14	8.26	18.49	10.52	4.06	9.07	21.29	8.02	17.34	10.10	1.19	8.47	20.15	7.10	14.48		
	21.120	-16.53	19.420	-21.69	22.753	-9.50	4.588	24.73	0.430	1.51	21.922	-13.98	2.843	16.01	23.646	-3.58	20.103	-22.65	8.86103	3
5	5.25	18.36	6.24	14.18	8.22	18.56	10.46	4.01	8.60	21.23	7.55	17.27	10.02	1.11	8.40	20.07	7.02	14.41		
	21.255	-15.93	19.594	-21.62	22.907	-8.53	4.624	24.78	0.454	1.67	21.937	-13.90	2.844	16.01	23.649	-3.55	20.108	-22.64	8.99245	5
7	5.22	18.40	6.26	14.22	8.18	19.03	10.39	3.55	8.53	21.18	7.47	17.21	9.54	1.04	8.32	19.60	6.55	14.33		
	21.388	-15.32	19.776	-21.47	23.060	-7.54	4.662	24.83	0.478	1.83	21.953	-13.82	2.846	16.02	23.653	-3.53	20.112	-22.63	9.12387	7
9	5.19	18.43	6.28	14.26	8.14	19.09	10.34	3.50	8.45	21.12	7.40	17.14	9.46	0.56	8.24	19.52	6.47	14.26		
	21.521	-14.68	19.964	-21.25	23.212	-6.54	4.702	24.88	0.502	2.00	21.968	-13.74	2.848	16.03	23.657	-3.50	20.117	-22.62	9.25528	9
11	5.15	18.46	6.29	14.32	8.09	19.16	10.28	3.46	8.38	21.07	7.32	17.08	9.38	0.48	8.16	19.45	6.39	14.18		
	21.653	-14.03	20.156	-20.94	23.364	-5.52	4.744	24.94	0.527	2.16	21.984	-13.66	2.850	16.04	23.661	-3.47	20.121	-22.61	9.38670	11
13	5.12	18.50	6.31	14.39	8.05	19.23	10.22	3.41	8.31	21.01	7.25	17.02	9.31	0.41	8.09	19.37	6.32	14.11		
	21.784	-13.37	20.354	-20.55	23.514	-4.50	4.788	24.99	0.552	2.33	21.999	-13.57	2.852	16.05	23.665	-3.45	20.125	-22.60	9.51812	13
15	5.08	18.53	6.32	14.46	8.01	19.29	10.17	3.36	8.24	20.56	7.18	16.55	9.23	0.33	8.01	19.30	6.24	14.03		
	21.914	-12.69	20.554	-20.08	23.664	-3.47	4.835	25.05	0.577	2.49	22.015	-13.49	2.855	16.07	23.670	-3.42	20.130	-22.59	9.64954	15
17	5.04	18.57	6.32	14.54	7.56	19.36	10.11	3.32	8.16	20.50	7.10	16.49	9.15	0.26	7.53	19.22	6.16	13.56		
	22.044	-11.99	20.758	-19.52	23.814	-2.43	4.883	25.10	0.603	2.66	22.030	-13.41	2.858	16.08	23.674	-3.39	20.134	-22.59	9.78096	17
19	5.01	19.01	6.32	15.03	7.52	19.43	10.06	3.27	8.09	20.45	7.03	16.42	9.07	0.18	7.45	19.15	6.09	13.48		
	22.172	-11.29	20.965	-18.87	23.963	-1.39	4.933	25.16	0.629	2.84	22.046	-13.33	2.861	16.09	23.678	-3.36	20.138	-22.58	9.91238	19
21	4.57	19.04	6.32	15.13	7.47	19.49	10.01	3.23	8.02	20.40	6.55	16.36	8.59	0.10	7.37	19.08	6.01	13.41		
	22.300	-10.57	21.174	-18.14	0.111	-0.34	4.985	25.21	0.655	3.01	22.062	-13.25	2.864	16.11	23.682	-3.34	20.142	-22.57	10.04380	21
23	4.52	19.08	6.32	15.23	7.43	19.56	9.55	3.19	7.55	20.34	6.48	16.29	8.52	0.03	7.30	19.00	5.53	13.33		
	22.428	-9.84	21.385	-17.33	0.260	0.70	5.039	25.26	0.682	3.18	22.077	-13.17	2.868	16.12	23.687	-3.31	20.146	-22.56	10.17522	23
25	4.48	19.12	6.31	15.33	7.38	20.02	9.50	3.15	7.48	20.29	6.41	16.23	8.44	23.51	7.22	18.53	5.46	13.25		
	22.554	-9.10	21.598	-16.42	0.408	1.75	5.094	25.31	0.708	3.36	22.093	-13.08	2.871	16.14	23.691	-3.28	20.150	-22.55	10.30663	25
27	4.44	19.15	6.30	15.44	7.34	20.09	9.46	3.11	7.40	20.24	6.33	16.16	8.36	23.44	7.14	18.45	5.38	13.18		
	22.680	-8.35	21.812	-15.43	0.556	2.79	5.151	25.36	0.736	3.53	22.108	-13.00	2.875	16.16	23.696	-3.25	20.154	-22.55	10.43805	27

# MARZEC 2023

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →										Czas strefowy [hhmm.]										
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
60	1	Śro	005	22.50137	-12.19	22.4820	-7.36	0.99073	6.1840	27.43	63.205	2.1	70	634	1158.1	1723	1029	1944.5	407	657	1	
61	2	Czw	006	22.54103	-12.08	22.5205	-7.13	0.99097	7.1208	27.14	63.505	3.1	78	632	1157.9	1725	1124	2035.4	458	653	2	
62	3	Pią	007	22.58069	-11.55	22.5549	-6.50	0.99121	8.0420	25.31	63.631	4.1	86	629	1157.7	1727	1231	2124.7	536	649	3	
63	4	Sob	008	23.02034	-11.42	22.5933	-6.27	0.99145	8.5439	22.42	63.602	5.1	92	627	1157.5	1729	1343	2211.6	602	645	4	
64	5	Nie	009	23.05600	-11.29	23.0316	-6.04	0.99170	9.4250	18.54	63.439	6.1	96	625	1157.2	1731	1458	2256.3	621	641	5	
65	6	Pon	010	23.09565	-11.15	23.0659	-5.41	0.99195	10.2904	14.20	63.167	7.1	99	622	1157.0	1733	1613	2339.1	635	638	6	
66	7	Wto	011	23.13531	-11.01	23.1041	-5.17	0.99220	11.1350	9.09	62.811	8.1	100	620	1156.8	1735	1727	*****	647	634	7	
67	8	Śro	012	23.17496	-10.47	23.1423	-4.54	0.99246	11.5749	3.35	62.389	0.9	99	618	1156.5	1736	1841	020.6	656	630	8	
68	9	Czw	013	23.21461	-10.32	23.1805	-4.31	0.99272	12.4151	-2.12	61.915	1.9	96	615	1156.3	1738	1956	101.7	706	626	9	
69	10	Pią	014	23.25427	-10.17	23.2146	-4.07	0.99299	13.2652	-7.60	61.399	2.9	92	613	1156.0	1740	2114	143.4	715	622	10	
70	11	Sob	015	23.29393	-10.01	23.2527	-3.44	0.99326	14.1353	-13.33	60.846	3.9	85	611	1155.8	1742	2234	226.8	726	618	11	
71	12	Nie	016	23.33358	-9.45	23.2908	-3.20	0.99353	15.0353	-18.37	60.259	4.9	77	608	1155.5	1744	2358	313.1	740	614	12	
72	13	Pon	017	23.37324	-9.29	23.3248	-2.56	0.99380	15.5740	-22.54	59.645	5.9	68	606	1155.2	1746	****	403.2	758	610	13	
73	14	Wto	018	23.41289	-9.13	23.3628	-2.33	0.99408	16.5533	-26.01	59.018	6.9	57	603	1155.0	1747	123	457.9	826	606	14	
74	15	Śro	019	23.45255	-8.56	23.4008	-2.09	0.99435	17.5705	-27.39	58.402	0.4	46	601	1154.7	1749	244	556.9	907	602	15	
75	16	Czw	020	23.49220	-8.39	23.4348	-1.45	0.99463	19.0047	-27.33	57.832	1.4	35	559	1154.4	1751	351	658.9	1008	558	16	
76	17	Pią	021	23.53186	-8.22	23.4727	-1.22	0.99491	20.0432	-25.36	57.354	2.4	24	556	1154.1	1753	440	801.4	1129	554	17	
77	18	Sob	022	23.57152	-8.05	23.5107	-0.58	0.99519	21.0623	-21.56	57.017	3.4	15	554	1153.8	1755	513	902.2	1302	550	18	
78	19	Nie	023	0.01117	-7.47	23.5446	-0.34	0.99547	22.0511	-16.51	56.869	4.4	7	552	1153.5	1757	536	959.6	1437	546	19	
79	20	Pon	024	0.05083	-7.30	23.5825	-0.10	0.99575	23.0047	-10.46	56.945	5.4	2	549	1153.2	1758	552	1053.4	1611	542	20	
80	21	Wto	025	0.09048	-7.12	0.0204	0.13	0.99603	23.5347	-4.07	57.258	6.4	0	547	1153.0	1800	605	1144.2	1742	539	21	
81	22	Śro	026	0.13014	-6.54	0.0543	0.37	0.99631	0.4508	2.39	57.793	0.7	1	544	1152.7	1802	616	1233.2	1910	535	22	
82	23	Czw	027	0.16579	-6.37	0.0921	1.01	0.99659	1.3551	9.08	58.513	1.7	4	542	1152.4	1804	628	1321.6	2037	531	23	
83	24	Pią	028	0.20545	-6.19	0.1260	1.24	0.99687	2.2654	15.01	59.358	2.7	9	540	1152.1	1806	640	1410.3	2203	527	24	
84	25	Sob	029	0.24510	-6.01	0.1638	1.48	0.99715	3.1855	20.00	60.257	3.7	17	537	1151.8	1807	656	1500.2	2327	523	25	
85	26	Nie	030	0.28476	-5.43	0.2017	2.12	0.99743	4.1212	23.53	61.139	4.7	25	535	1151.5	1809	715	1551.5	****	519	26	
85	26	Nie	030	23.28377	-5.43	0.2008	2.11	0.99742	4.0957	23.45	61.103	5.7	25	635	1251.5	1909	815	1651.5	027	619	26	
86	27	Pon	031	23.32343	-5.25	0.2346	2.34	0.99770	5.0417	26.25	61.906	6.7	34	632	1251.2	1911	843	1743.9	146	615	27	
87	28	Wto	032	23.36308	-5.07	0.2725	2.58	0.99798	5.5907	27.45	62.576	7.7	43	630	1250.9	1913	921	1836.6	257	611	28	
88	29	Śro	033	23.40274	-4.49	0.3103	3.21	0.99825	6.5333	27.43	63.074	0.3	53	628	1250.6	1915	1012	1928.6	354	607	29	
89	30	Czw	034	23.44239	-4.31	0.3442	3.44	0.99853	7.4638	26.24	63.378	1.3	62	625	1250.3	1916	1116	2018.8	437	603	30	
90	31	Pią	035	23.48205	-4.13	0.3820	4.08	0.99881	8.3744	23.55	63.485	2.3	71	623	1250.0	1918	1227	2106.7	507	559	31	

Fazy Księżyca [Dm, h.mm]: Pełn 7, 13.40 3kw 15, 3.08 Nów 21, 18.23 1kw 29, 4.32

# MARZEC 2023 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	4.39	19.19	6.28	15.56	7.29	20.15	9.41	3.07	7.33	20.18	6.26	16.10	8.28	23.36	7.06	18.38	5.30	13.10		
	22.806	-7.60	22.029	-14.35	0.704	3.83	5.209	25.40	0.763	3.71	22.124	-12.92	2.879	16.18	23.700	-3.22	20.158	-22.54	10.56948	1
3	4.35	19.23	6.27	16.08	7.24	20.22	9.36	3.03	7.26	20.13	6.18	16.03	8.21	23.29	6.59	18.30	5.22	13.03		
	22.930	-6.83	22.247	-13.18	0.852	4.87	5.269	25.44	0.791	3.89	22.139	-12.84	2.883	16.20	23.705	-3.19	20.161	-22.53	10.70090	3
5	4.30	19.27	6.25	16.20	7.20	20.29	9.32	2.59	7.19	20.08	6.11	15.57	8.13	23.21	6.51	18.23	5.15	12.55		
	23.054	-6.06	22.467	-11.93	1.000	5.89	5.330	25.48	0.818	4.07	22.154	-12.76	2.888	16.22	23.709	-3.16	20.165	-22.53	10.83232	5
7	4.25	19.31	6.23	16.33	7.15	20.35	9.27	2.55	7.12	20.03	6.03	15.50	8.05	23.14	6.43	18.16	5.07	12.47		
	23.178	-5.29	22.689	-10.59	1.148	6.91	5.392	25.51	0.846	4.25	22.169	-12.68	2.892	16.24	23.714	-3.13	20.169	-22.52	10.96373	7
9	4.20	19.35	6.20	16.47	7.11	20.42	9.23	2.51	7.05	19.57	5.56	15.44	7.58	23.06	6.35	18.08	4.59	12.40		
	23.301	-4.51	22.913	-9.17	1.297	7.92	5.455	25.54	0.875	4.43	22.184	-12.60	2.897	16.26	23.719	-3.10	20.172	-22.51	11.09515	9
11	4.15	19.39	6.18	17.01	7.06	20.48	9.19	2.47	6.57	19.52	5.49	15.37	7.50	22.59	6.28	18.01	4.52	12.32		
	23.424	-3.73	23.139	-7.67	1.446	8.92	5.520	25.57	0.903	4.61	22.199	-12.52	2.902	16.28	23.723	-3.07	20.175	-22.51	11.22657	11
13	4.10	19.43	6.15	17.15	7.02	20.55	9.15	2.44	6.50	19.47	5.41	15.31	7.42	22.52	6.20	17.53	4.44	12.25		
	23.547	-2.94	23.367	-6.08	1.596	9.91	5.585	25.59	0.932	4.80	22.214	-12.44	2.907	16.30	23.728	-3.04	20.179	-22.50	11.35799	13
15	4.05	19.47	6.12	17.30	6.57	21.02	9.11	2.40	6.43	19.42	5.34	15.24	7.34	22.44	6.12	17.46	4.36	12.17		
	23.669	-2.15	23.598	-4.42	1.746	10.88	5.652	25.60	0.960	4.98	22.229	-12.36	2.913	16.33	23.733	-3.01	20.182	-22.50	11.48941	15
17	3.60	19.51	6.09	17.46	6.53	21.08	9.07	2.36	6.36	19.37	5.26	15.18	7.27	22.37	6.05	17.38	4.29	12.09		
	23.791	-1.36	23.831	-2.70	1.897	11.83	5.720	25.61	0.989	5.16	22.243	-12.29	2.918	16.35	23.737	-2.98	20.185	-22.49	11.62083	17
19	3.54	19.55	6.05	18.01	6.49	21.15	9.03	2.32	6.29	19.32	5.19	15.11	7.19	22.29	5.57	17.31	4.21	12.02		
	23.913	-0.57	0.067	-0.91	2.049	12.76	5.788	25.61	1.019	5.35	22.258	-12.21	2.924	16.38	23.742	-2.95	20.188	-22.49	11.75225	19
21	3.49	19.60	6.02	18.17	6.45	21.22	8.59	2.29	6.22	19.27	5.11	15.05	7.11	22.22	5.49	17.24	4.13	11.54		
	0.034	0.22	0.304	0.93	2.201	13.68	5.858	25.61	1.048	5.53	22.272	-12.13	2.930	16.40	23.747	-2.92	20.190	-22.49	11.88366	21
23	3.43	20.04	5.58	18.34	6.40	21.28	8.56	2.25	6.15	19.21	5.04	14.58	7.04	22.15	5.41	17.16	4.05	11.46		
	0.156	1.01	0.543	2.81	2.354	14.57	5.928	25.60	1.077	5.71	22.286	-12.06	2.936	16.43	23.751	-2.89	20.193	-22.48	12.01508	23
25	3.38	20.08	5.55	18.50	6.36	21.35	8.52	2.21	6.08	19.16	4.56	14.52	6.56	22.07	5.34	17.09	3.58	11.39		
	0.277	1.80	0.781	4.70	2.508	15.45	5.999	25.58	1.107	5.90	22.300	-11.98	2.942	16.46	23.756	-2.86	20.196	-22.48	12.14650	25
27	4.32	21.13	6.51	20.06	7.32	22.42	9.49	3.17	7.00	20.11	5.49	15.45	7.48	23.00	6.26	18.01	4.50	12.31		
	0.396	2.57	1.014	6.54	2.660	16.28	6.069	25.55	1.136	6.08	22.314	-11.91	2.948	16.48	23.760	-2.83	20.198	-22.48	12.27792	27
29	4.26	21.18	6.47	20.23	7.29	22.48	9.46	3.13	6.53	20.06	5.42	15.38	7.41	22.53	6.18	17.54	4.42	12.23		
	0.518	3.35	1.248	8.39	2.815	17.10	6.142	25.52	1.165	6.26	22.328	-11.84	2.954	16.51	23.765	-2.80	20.200	-22.48	12.40934	29
31	4.20	21.22	6.42	20.38	7.25	22.55	9.42	3.10	6.46	20.01	5.34	15.32	7.33	22.46	6.10	17.46	4.34	12.15		
	0.639	4.13	1.475	10.17	2.972	17.89	6.215	25.48	1.195	6.44	22.341	-11.77	2.961	16.54	23.770	-2.78	20.203	-22.48	12.54076	31

# KWIECIEŃ 2023

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT) →							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
91	1	Sob	036	23.52171	-3.55	0.4159	4.31	0.99910	9.2636	20.25	63.405	3.3	79	620	1249.7	1920	1341	2152.2	528	555	1	
92	2	Nie	037	23.56136	-3.37	0.4538	4.54	0.99938	10.1323	16.04	63.158	4.3	87	618	1249.4	1922	1456	2235.5	543	551	2	
93	3	Pon	038	24.00101	-3.20	0.4917	5.17	0.99966	10.5834	11.03	62.778	5.3	93	616	1249.1	1924	1611	2317.4	555	547	3	
94	4	Wto	039	0.04067	-3.02	0.5256	5.40	0.99995	11.4251	5.33	62.299	6.3	97	613	1248.8	1925	1726	2358.8	605	543	4	
95	5	Śro	040	0.08032	-2.45	0.5635	6.03	1.00023	12.2705	-0.16	61.761	7.3	99	611	1248.5	1927	1841	*****	615	540	5	
96	6	Czw	041	0.11598	-2.28	1.0014	6.26	1.00052	13.1212	-6.11	61.197	0.2	100	609	1248.2	1929	1959	040.6	624	536	6	
97	7	Pią	042	0.15563	-2.11	1.0354	6.48	1.00081	13.5909	-11.57	60.637	1.2	98	606	1247.9	1931	2120	124.0	634	532	7	
98	8	Sob	043	0.19529	-1.54	1.0733	7.11	1.00110	14.4856	-17.18	60.102	2.2	95	604	1247.6	1933	2244	209.9	647	528	8	
99	9	Nie	044	0.23495	-1.37	1.1113	7.33	1.00139	15.4218	-21.54	59.605	3.2	89	602	1247.4	1934	****	259.5	704	524	9	
100	10	Pon	045	0.27460	-1.21	1.1454	7.55	1.00168	16.3934	-25.25	59.152	4.2	81	559	1247.1	1936	011	353.4	728	520	10	
101	11	Wto	046	0.31426	-1.05	1.1834	8.18	1.00197	17.4019	-27.30	58.746	5.2	72	557	1246.8	1938	134	451.4	804	516	11	
102	12	Śro	047	0.35391	-0.49	1.2215	8.39	1.00226	18.4309	-27.53	58.389	6.2	61	555	1246.6	1940	246	552.4	859	512	12	
103	13	Czw	048	0.39357	-0.34	1.2556	9.01	1.00255	19.4603	-26.28	58.089	0.0	50	552	1246.3	1942	340	654.1	1013	508	13	
104	14	Pią	049	0.43322	-0.19	1.2938	9.23	1.00284	20.4707	-23.22	57.860	1.0	38	550	1246.1	1943	417	754.1	1141	504	14	
105	15	Sob	050	0.47288	-0.04	1.3320	9.45	1.00313	21.4514	-18.50	57.722	2.0	27	548	1245.8	1945	441	850.9	1313	500	15	
106	16	Nie	051	0.51254	0.10	1.3702	10.06	1.00341	22.4011	-13.13	57.699	3.0	18	545	1245.6	1947	459	944.1	1445	456	16	
107	17	Pon	052	0.55219	0.24	1.4045	10.27	1.00370	23.3232	-6.54	57.815	4.0	10	543	1245.3	1949	512	1034.4	1614	452	17	
108	18	Wto	053	0.59185	0.38	1.4428	10.48	1.00398	0.2314	-0.16	58.086	5.0	4	541	1245.1	1951	523	1122.8	1741	448	18	
109	19	Śro	054	1.03150	0.51	1.4811	11.09	1.00426	1.1319	6.19	58.514	6.0	1	539	1244.9	1952	534	1210.4	1907	445	19	
110	20	Czw	055	1.07115	1.03	1.5155	11.30	1.00453	2.0348	12.29	59.085	0.2	0	536	1244.7	1954	546	1258.5	2033	441	20	
111	21	Pią	056	1.11081	1.16	1.5539	11.50	1.00481	2.5527	17.56	59.768	1.2	2	534	1244.5	1956	600	1348.0	2159	437	21	
112	22	Sob	057	1.15047	1.28	1.5924	12.11	1.00508	3.4842	22.23	60.515	2.2	6	532	1244.3	1958	617	1439.2	2323	433	22	
113	23	Nie	058	1.19012	1.39	2.0309	12.31	1.00535	4.4328	25.37	61.271	3.2	12	530	1244.1	1959	640	1532.1	****	429	23	
114	24	Pon	059	1.22578	1.50	2.0655	12.51	1.00561	5.3907	27.29	61.978	4.2	19	528	1243.9	2001	714	1625.8	039	425	24	
115	25	Wto	060	1.26543	2.00	2.1041	13.10	1.00588	6.3439	27.57	62.582	5.2	27	526	1243.7	2003	800	1719.1	144	421	25	
116	26	Śro	061	1.30509	2.10	2.1427	13.30	1.00614	7.2855	27.03	63.038	6.2	36	524	1243.6	2005	900	1810.7	234	417	26	
117	27	Czw	062	1.34475	2.20	2.1814	13.49	1.00639	8.2105	24.55	63.312	7.2	45	521	1243.4	2007	1009	1859.9	308	413	27	
118	28	Pią	063	1.38440	2.29	2.2202	14.08	1.00665	9.1046	21.43	63.386	0.5	55	519	1243.3	2008	1123	1946.3	333	409	28	
119	29	Sob	064	1.42406	2.38	2.2550	14.27	1.00690	9.5804	17.38	63.258	1.5	64	517	1243.1	2010	1238	2030.3	350	405	29	
120	30	Nie	065	1.46371	2.46	2.2938	14.45	1.00716	10.4329	12.51	62.941	2.5	73	515	1243.0	2012	1352	2112.4	403	401	30	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 6.34 3kw 13, 11.11 Nów 20, 6.12 1kw 27, 23.20

# KWIECIEŃ 2023 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE			MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm	
1	4.17	21.25	6.40	20.46	7.23	22.58	9.41	3.08	6.43	19.58	5.30	15.28	7.29	22.42	6.06	17.43	4.31	12.12			
	0.700	4.52	1.586	11.02	3.051	18.28	6.252	25.46	1.210	6.54	22.348	-11.73	2.964	16.55	23.772	-2.76	20.204	-22.47	12.60647	1	
3	4.11	21.30	6.36	21.00	7.20	23.05	9.38	3.04	6.36	19.53	5.23	15.22	7.22	22.35	5.59	17.35	4.23	12.04			
	0.821	5.28	1.799	12.64	3.209	19.03	6.326	25.41	1.240	6.72	22.361	-11.66	2.971	16.58	23.776	-2.73	20.206	-22.47	12.73789	3	
5	4.05	21.35	6.31	21.13	7.16	23.11	9.35	2.60	6.29	19.48	5.15	15.15	7.14	22.27	5.51	17.28	4.15	11.56			
	0.943	6.05	1.998	14.12	3.367	19.75	6.400	25.35	1.270	6.90	22.374	-11.59	2.977	16.61	23.781	-2.70	20.208	-22.47	12.86930	5	
7	3.59	21.40	6.26	21.24	7.13	23.18	9.32	2.56	6.22	19.43	5.08	15.08	7.06	22.20	5.43	17.20	4.07	11.48			
	1.065	6.80	2.180	15.43	3.527	20.43	6.475	25.28	1.300	7.08	22.386	-11.53	2.984	16.64	23.785	-2.68	20.209	-22.47	13.00072	7	
9	3.53	21.45	6.20	21.33	7.10	23.24	9.29	2.52	6.14	19.38	5.00	15.01	6.59	22.13	5.35	17.13	3.59	11.41			
	1.187	7.55	2.343	16.57	3.688	21.08	6.551	25.21	1.330	7.26	22.399	-11.46	2.991	16.67	23.790	-2.65	20.211	-22.47	13.13214	9	
11	3.46	21.51	6.15	21.40	7.08	23.31	9.27	2.48	6.07	19.33	4.53	14.55	6.51	22.06	5.28	17.05	3.52	11.33			
	1.310	8.29	2.484	17.52	3.849	21.70	6.627	25.12	1.360	7.45	22.411	-11.40	2.998	16.70	23.794	-2.62	20.213	-22.47	13.26356	11	
13	3.40	21.56	6.09	21.44	7.05	23.37	9.24	2.44	6.00	19.28	4.45	14.48	6.43	21.58	5.20	16.58	3.44	11.25			
	1.432	9.02	2.602	18.27	4.011	22.28	6.703	25.03	1.390	7.63	22.423	-11.33	3.005	16.73	23.798	-2.59	20.214	-22.48	13.39498	13	
15	3.33	22.02	6.03	21.46	7.03	23.43	9.22	2.40	5.53	19.23	4.38	14.41	6.36	21.51	5.12	16.50	3.36	11.17			
	1.555	9.74	2.695	18.81	4.174	22.82	6.780	24.93	1.420	7.81	22.435	-11.27	3.013	16.76	23.802	-2.57	20.215	-22.48	13.52640	15	
17	3.26	22.08	5.57	21.44	7.01	23.49	9.20	2.36	5.46	19.18	4.30	14.34	6.28	21.44	5.04	16.43	3.28	11.09			
	1.679	10.45	2.763	19.15	4.338	23.33	6.857	24.82	1.450	7.98	22.446	-11.21	3.020	16.79	23.807	-2.54	20.216	-22.48	13.65782	17	
19	3.19	22.14	5.51	21.39	6.59	23.54	9.17	2.31	5.39	19.13	4.23	14.27	6.20	21.37	4.57	16.36	3.21	11.02			
	1.803	11.15	2.804	19.28	4.502	23.79	6.935	24.70	1.480	8.16	22.457	-11.15	3.027	16.83	23.811	-2.52	20.217	-22.48	13.78923	19	
21	3.12	22.21	5.44	21.32	6.58	0.04	9.15	2.27	5.32	19.08	4.15	14.20	6.13	21.29	4.49	16.28	3.13	10.54			
	1.928	11.84	2.819	19.21	4.667	24.21	7.013	24.58	1.510	8.34	22.468	-11.10	3.035	16.86	23.815	-2.49	20.218	-22.48	13.92065	21	
23	3.05	22.28	5.38	21.22	6.57	0.09	9.13	2.23	5.25	19.03	4.08	14.14	6.05	21.22	4.41	16.21	3.05	10.46			
	2.053	12.51	2.810	18.93	4.832	24.59	7.091	24.44	1.541	8.52	22.479	-11.04	3.042	16.89	23.819	-2.47	20.219	-22.49	14.05207	23	
25	2.57	22.34	5.31	21.09	6.56	0.14	9.11	2.18	5.18	18.58	4.00	14.07	5.58	21.15	4.33	16.13	2.57	10.38			
	2.178	13.17	2.779	18.46	4.997	24.93	7.169	24.29	1.571	8.69	22.489	-10.99	3.050	16.92	23.823	-2.44	20.219	-22.49	14.18349	25	
27	2.49	22.42	5.25	20.54	6.55	0.18	9.09	2.14	5.11	18.52	3.53	13.60	5.50	21.08	4.26	16.06	2.49	10.30			
	2.304	13.82	2.731	17.82	5.162	25.23	7.248	24.14	1.601	8.86	22.499	-10.93	3.057	16.95	23.826	-2.42	20.220	-22.50	14.31492	27	
29	2.41	22.49	5.18	20.37	6.55	0.22	9.07	2.09	5.04	18.47	3.45	13.53	5.42	21.01	4.18	15.58	2.42	10.22			
	2.430	14.45	2.668	17.04	5.328	25.48	7.327	23.98	1.631	9.04	22.509	-10.88	3.065	16.99	23.830	-2.40	20.220	-22.50	14.44634	29	

# MAJ 2023

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
121	1	Pon	066	1.50337	2.53	2.3327	15.04	1.00741	11.2745	7.30	62.462	3.5	81	513	1242.9	2014	1507	2153.7	414	357	1
122	2	Wto	067	1.54302	3.00	2.3717	15.22	1.00766	12.1146	1.47	61.861	4.5	88	511	1242.7	2015	1622	2235.1	423	353	2
123	3	Śro	068	1.58268	3.07	2.4107	15.39	1.00791	12.5631	-4.08	61.184	5.5	94	509	1242.6	2017	1738	2317.8	432	349	3
124	4	Czw	069	2.02233	3.13	2.4457	15.57	1.00816	13.4303	-10.01	60.484	6.5	98	507	1242.5	2019	1858	*****	442	346	4
125	5	Pią	070	2.06199	3.18	2.4848	16.14	1.00840	14.3226	-15.37	59.810	7.5	100	505	1242.4	2021	2023	003.1	454	342	5
126	6	Sob	071	2.10164	3.23	2.5240	16.31	1.00865	15.2535	-20.36	59.207	0.7	99	503	1242.4	2022	2151	052.0	509	338	6
127	7	Nie	072	2.14130	3.28	2.5632	16.48	1.00889	16.2256	-24.33	58.707	1.7	97	502	1242.3	2024	2318	145.4	530	334	7
128	8	Pon	073	2.18096	3.31	3.0025	17.04	1.00914	17.2410	-27.06	58.327	2.7	91	500	1242.2	2026	****	243.5	603	330	8
129	9	Wto	074	2.22061	3.34	3.0418	17.20	1.00938	18.2751	-27.57	58.073	3.7	84	458	1242.2	2028	037	345.1	652	326	9
130	10	Śro	075	2.26027	3.37	3.0812	17.36	1.00962	19.3145	-26.56	57.938	4.7	74	456	1242.1	2029	138	447.9	801	322	10
131	11	Czw	076	2.29592	3.39	3.1207	17.52	1.00985	20.3340	-24.11	57.909	5.7	64	454	1242.1	2031	220	549.1	926	318	11
132	12	Pią	077	2.33558	3.40	3.1602	18.07	1.01009	21.3214	-19.58	57.971	6.7	52	453	1242.1	2033	247	646.8	1058	314	12
133	13	Sob	078	2.37524	3.41	3.1958	18.22	1.01032	22.2710	-14.38	58.113	0.8	41	451	1242.1	2034	306	740.4	1229	310	13
134	14	Nie	079	2.41489	3.41	3.2354	18.37	1.01055	23.1903	-8.34	58.330	1.8	30	449	1242.1	2036	320	830.4	1357	306	14
135	15	Pon	080	2.45455	3.41	3.2751	18.51	1.01077	0.0854	-2.08	58.620	2.8	20	448	1242.1	2037	332	918.1	1522	302	15
136	16	Wto	081	2.49420	3.40	3.3149	19.05	1.01099	0.5751	4.19	58.986	3.8	12	446	1242.1	2039	342	1004.6	1646	258	16
137	17	Śro	082	2.53386	3.38	3.3547	19.19	1.01121	1.4702	10.31	59.428	4.8	6	445	1242.1	2041	353	1051.2	1810	254	17
138	18	Czw	083	2.57351	3.36	3.3946	19.32	1.01142	2.3723	16.08	59.942	5.8	2	443	1242.1	2042	406	1139.1	1935	250	18
139	19	Pią	084	3.01317	3.34	3.4345	19.45	1.01163	3.2932	20.55	60.515	6.8	0	442	1242.2	2044	421	1229.0	2059	247	19
140	20	Sob	085	3.05282	3.30	3.4745	19.58	1.01183	4.2336	24.34	61.123	0.8	1	440	1242.2	2045	442	1321.0	2219	243	20
141	21	Nie	086	3.09248	3.27	3.5145	20.10	1.01203	5.1909	26.56	61.733	1.8	3	439	1242.3	2047	511	1414.6	2330	239	21
142	22	Pon	087	3.13214	3.22	3.5546	20.22	1.01222	6.1510	27.53	62.306	2.8	8	437	1242.4	2048	551	1508.6	****	235	22
143	23	Wto	088	3.17179	3.18	3.5947	20.34	1.01241	7.1023	27.26	62.797	3.8	14	436	1242.5	2050	646	1601.5	026	231	23
144	24	Śro	089	3.21145	3.12	4.0349	20.45	1.01260	8.0340	25.41	63.168	4.8	21	435	1242.5	2051	752	1652.2	107	227	24
145	25	Czw	090	3.25110	3.06	4.0751	20.56	1.01278	8.5422	22.49	63.381	5.8	29	434	1242.6	2053	905	1739.8	135	223	25
146	26	Pią	091	3.29076	3.00	4.1154	21.07	1.01295	9.4223	19.00	63.410	6.8	38	432	1242.7	2054	1020	1824.6	155	219	26
147	27	Sob	092	3.33042	2.53	4.1557	21.17	1.01312	10.2807	14.28	63.241	7.8	48	431	1242.9	2055	1134	1907.1	210	215	27
148	28	Nie	093	3.37007	2.46	4.2001	21.27	1.01329	11.1216	9.20	62.875	0.8	57	430	1243.0	2057	1248	1948.2	221	211	28
149	29	Pon	094	3.40573	2.39	4.2405	21.37	1.01345	11.5546	3.48	62.329	1.8	67	429	1243.1	2058	1401	2028.8	231	207	29
150	30	Wto	095	3.44538	2.31	4.2810	21.46	1.01361	12.3938	-1.59	61.635	2.8	76	428	1243.2	2059	1516	2110.3	240	203	30
151	31	Śro	096	3.48504	2.22	4.3215	21.54	1.01377	13.2458	-7.51	60.839	3.8	84	427	1243.4	2100	1634	2153.9	249	159	31

Fazy Księżyca [Dm, h.mm]: Pełn 5, 19.34    3kw 12, 16.28    Now 19, 17.53    1kw 27, 17.22



# MAJ 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	2.33	22.57	5.12	20.19	6.55	0.26	9.06	2.05	4.57	18.42	3.38	13.46	5.35	20.53	4.10	15.50	2.34	10.14		
	2.558	15.06	2.598	16.15	5.493	25.69	7.406	23.81	1.660	9.21	22.518	-10.84	3.073	17.02	23.834	-2.37	20.220	-22.51	14.57775	1
3	2.24	23.06	5.06	20.01	6.56	0.30	9.04	2.00	4.50	18.37	3.30	13.39	5.27	20.46	4.02	15.43	2.26	10.06		
	2.685	15.66	2.525	15.21	5.657	25.85	7.485	23.62	1.690	9.38	22.527	-10.79	3.081	17.05	23.837	-2.35	20.220	-22.51	14.70917	3
5	2.15	23.15	4.59	19.44	6.57	0.33	9.02	1.56	4.43	18.32	3.22	13.31	5.20	20.39	3.55	15.35	2.18	9.59		
	2.813	16.24	2.456	14.27	5.821	25.97	7.564	23.43	1.720	9.55	22.536	-10.75	3.088	17.08	23.841	-2.33	20.220	-22.52	14.84059	5
7	2.05	23.25	4.53	19.27	6.58	0.35	9.01	1.51	4.36	18.27	3.15	13.24	5.12	20.32	3.47	15.28	2.10	9.51		
	2.942	16.80	2.394	13.36	5.985	26.05	7.643	23.24	1.750	9.71	22.544	-10.70	3.096	17.11	23.844	-2.31	20.220	-22.52	14.97201	7
9	1.54	23.36	4.47	19.11	6.60	0.37	8.59	1.46	4.29	18.22	3.07	13.17	5.04	20.25	3.39	15.20	2.02	9.43		
	3.072	17.34	2.346	12.55	6.147	26.08	7.723	23.03	1.779	9.88	22.552	-10.66	3.104	17.15	23.848	-2.29	20.220	-22.53	15.10343	9
11	1.42	23.50	4.41	18.57	7.02	0.39	8.58	1.42	4.22	18.17	2.60	13.10	4.57	20.17	3.31	15.13	1.55	9.35		
	3.202	17.87	2.312	11.86	6.309	26.07	7.802	22.81	1.809	10.04	22.560	-10.63	3.112	17.18	23.851	-2.27	20.219	-22.54	15.23485	11
13	1.27	0.16	4.36	18.45	7.04	0.40	8.57	1.37	4.15	18.11	2.52	13.03	4.49	20.10	3.23	15.05	1.47	9.27		
	3.333	18.37	2.295	11.31	6.469	26.02	7.882	22.58	1.838	10.20	22.567	-10.59	3.119	17.21	23.854	-2.25	20.219	-22.54	15.36627	13
15	1.09	1.15	4.30	18.35	7.06	0.41	8.55	1.32	4.08	18.06	2.44	12.56	4.42	20.03	3.16	14.58	1.39	9.19		
	3.464	18.85	2.297	10.93	6.628	25.92	7.961	22.35	1.867	10.37	22.575	-10.56	3.127	17.24	23.857	-2.23	20.218	-22.55	15.49769	15
17	****	****	4.25	18.27	7.09	0.42	8.54	1.27	4.01	18.01	2.37	12.48	4.34	19.56	3.08	14.50	1.31	9.11		
	3.596	19.32	2.316	10.70	6.786	25.79	8.041	22.11	1.896	10.52	22.581	-10.52	3.135	17.27	23.860	-2.22	20.217	-22.56	15.62911	17
19	****	****	4.20	18.21	7.12	0.41	8.53	1.22	3.54	17.56	2.29	12.41	4.26	19.49	3.00	14.42	1.23	9.03		
	3.729	19.76	2.353	10.64	6.942	25.61	8.121	21.85	1.925	10.68	22.587	-10.50	3.143	17.30	23.863	-2.20	20.216	-22.57	15.76053	19
21	****	****	4.14	18.17	7.15	0.41	8.52	1.17	3.47	17.50	2.21	12.34	4.19	19.41	2.52	14.35	1.15	8.55		
	3.862	20.17	2.408	10.73	7.095	25.39	8.200	21.59	1.954	10.84	22.593	-10.47	3.150	17.33	23.865	-2.18	20.215	-22.58	15.89195	21
23	****	****	4.09	18.15	7.19	0.40	8.50	1.12	3.40	17.45	2.14	12.26	4.11	19.34	2.45	14.27	1.07	8.47		
	3.996	20.57	2.479	10.96	7.247	25.14	8.280	21.32	1.983	10.99	22.599	-10.44	3.158	17.37	23.868	-2.17	20.214	-22.59	16.02338	23
25	****	****	4.05	18.14	7.22	0.39	8.49	1.07	3.33	17.40	2.06	12.19	4.04	19.27	2.37	14.19	0.60	8.39		
	4.131	20.94	2.566	11.33	7.397	24.85	8.359	21.04	2.011	11.14	22.604	-10.42	3.166	17.40	23.870	-2.15	20.212	-22.59	16.15480	25
27	****	****	4.00	18.15	7.26	0.37	8.48	1.02	3.26	17.35	1.58	12.11	3.56	19.20	2.29	14.12	0.52	8.31		
	4.266	21.29	2.669	11.82	7.544	24.52	8.439	20.76	2.039	11.29	22.609	-10.40	3.173	17.43	23.873	-2.14	20.211	-22.60	16.28622	27
29	****	****	3.56	18.18	7.30	0.35	8.47	0.56	3.18	17.29	1.51	12.04	3.48	19.13	2.21	14.04	0.44	8.23		
	4.402	21.61	2.786	12.42	7.689	24.16	8.518	20.46	2.067	11.44	22.613	-10.38	3.181	17.46	23.875	-2.13	20.209	-22.61	16.41764	29
31	****	****	3.52	18.22	7.34	0.32	8.46	0.51	3.11	17.24	1.43	11.56	3.41	19.05	2.13	13.56	0.36	8.15		
	4.538	21.91	2.917	13.12	7.831	23.76	8.598	20.16	2.095	11.58	22.617	-10.37	3.188	17.49	23.877	-2.12	20.208	-22.63	16.54906	31

# CZERWIEC 2023

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
152	1	Czw	097	3.52469	2.13	4.3620	22.03	1.01392	14.1259	-13.34	59.999	4.8	91	426	1243.5	2102	1756	2241.0	300	155	1
153	2	Pią	098	3.56435	2.04	4.4026	22.11	1.01408	15.0445	-18.48	59.180	5.8	96	425	1243.7	2103	1923	2332.7	313	152	2
154	3	Sob	099	4.00400	1.54	4.4432	22.18	1.01423	16.0107	-23.13	58.446	6.8	99	424	1243.8	2104	2052	*****	332	148	3
155	4	Nie	100	4.04366	1.44	4.4839	22.26	1.01437	17.0209	-26.21	57.854	0.3	100	424	1244.0	2105	2217	029.7	359	144	4
156	5	Pon	101	4.08332	1.34	4.5246	22.32	1.01451	18.0645	-27.48	57.443	1.3	98	423	1244.2	2106	2328	131.5	442	140	5
157	6	Wto	102	4.12297	1.23	4.5653	22.39	1.01465	19.1234	-27.21	57.234	2.3	93	422	1244.4	2107	****	235.9	545	136	6
158	7	Śro	103	4.16263	1.12	5.0101	22.45	1.01479	20.1654	-24.60	57.224	3.3	86	422	1244.5	2108	018	339.9	708	132	7
159	8	Czw	104	4.20229	1.01	5.0508	22.50	1.01493	21.1747	-21.01	57.392	4.3	76	421	1244.7	2109	051	440.5	841	128	8
160	9	Pią	105	4.24194	0.50	5.0917	22.56	1.01506	22.1429	-15.49	57.703	5.3	66	421	1244.9	2110	113	536.5	1014	124	9
161	10	Sob	106	4.28160	0.38	5.1325	23.00	1.01518	23.0725	-9.51	58.119	6.3	55	420	1245.1	2110	128	628.2	1144	120	10
162	11	Nie	107	4.32125	0.26	5.1734	23.05	1.01531	23.5736	-3.29	58.604	0.6	43	420	1245.3	2111	140	716.5	1310	116	11
163	12	Pon	108	4.36091	0.13	5.2142	23.09	1.01542	0.4617	2.56	59.129	1.6	32	419	1245.5	2112	151	802.8	1433	112	12
164	13	Wto	109	4.40056	0.01	5.2552	23.12	1.01554	1.3441	9.07	59.674	2.6	23	419	1245.7	2113	202	848.7	1556	108	13
165	14	Śro	110	4.44022	-0.12	5.3001	23.16	1.01564	2.2352	14.48	60.225	3.6	14	419	1245.9	2113	213	935.3	1719	104	14
166	15	Czw	111	4.47587	-0.25	5.3410	23.18	1.01575	3.1440	19.43	60.775	4.6	8	419	1246.2	2114	227	1023.5	1842	100	15
167	16	Pią	112	4.51553	-0.38	5.3820	23.21	1.01584	4.0728	23.38	61.317	5.6	3	419	1246.4	2114	246	1114.0	2002	056	16
168	17	Sob	113	4.55519	-0.51	5.4229	23.23	1.01593	5.0205	26.20	61.842	6.6	1	419	1246.6	2115	311	1206.5	2116	053	17
169	18	Nie	114	4.59484	-1.04	5.4639	23.24	1.01602	5.5744	27.41	62.337	0.2	0	419	1246.8	2115	347	1300.1	2218	049	18
170	19	Pon	115	5.03450	-1.17	5.5049	23.25	1.01610	6.5311	27.39	62.781	1.2	1	419	1247.0	2115	436	1353.5	2304	045	19
171	20	Wto	116	5.07416	-1.30	5.5458	23.26	1.01617	7.4709	26.15	63.150	2.2	5	419	1247.3	2116	539	1445.1	2337	041	20
172	21	Śro	117	5.11381	-1.43	5.5908	23.26	1.01624	8.3843	23.41	63.416	3.2	10	419	1247.5	2116	650	1533.9	****	037	21
173	22	Czw	118	5.15347	-1.57	6.0318	23.26	1.01630	9.2732	20.07	63.549	4.2	16	419	1247.7	2116	804	1619.8	000	033	22
174	23	Pią	119	5.19312	-2.10	6.0728	23.26	1.01636	10.1346	15.47	63.524	5.2	23	419	1247.9	2116	919	1702.9	016	029	23
175	24	Sob	120	5.23278	-2.23	6.1137	23.25	1.01641	10.5801	10.51	63.321	6.2	32	420	1248.1	2116	1032	1744.0	028	025	24
176	25	Nie	121	5.27243	-2.35	6.1546	23.23	1.01645	11.4107	5.29	62.932	7.2	41	420	1248.3	2116	1144	1824.1	038	021	25
177	26	Pon	122	5.31209	-2.48	6.1956	23.22	1.01649	12.2404	-0.09	62.361	0.1	51	421	1248.5	2116	1257	1904.3	047	017	26
178	27	Wto	123	5.35175	-3.01	6.2405	23.19	1.01653	13.0757	-5.53	61.628	1.1	61	421	1248.8	2116	1412	1946.0	056	013	27
179	28	Śro	124	5.39140	-3.13	6.2814	23.17	1.01656	13.5358	-11.34	60.769	2.1	70	422	1249.0	2116	1530	2030.4	106	009	28
180	29	Czw	125	5.43106	-3.25	6.3222	23.14	1.01659	14.4321	-16.55	59.836	3.1	80	422	1249.2	2116	1653	2119.0	117	005	29
181	30	Pią	126	5.47071	-3.37	6.3631	23.10	1.01661	15.3712	-21.37	58.896	4.1	88	423	1249.4	2116	1821	2212.9	133	001	30

Fazy Księżyca [Dm, h.mm]: Pełn 4, 5.42 3kw 10, 21.31 Nów 18, 6.37 1kw 26, 9.50

## CZERWIEC 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	****	****	3.50	18.25	7.35	0.31	8.46	0.48	3.08	17.21	1.39	11.52	3.37	19.02	2.09	13.53	0.32	8.11		
	4.606	22.05	2.987	13.50	7.901	23.55	8.637	20.00	2.109	11.66	22.619	-10.36	3.192	17.50	23.878	-2.11	20.207	-22.63	16.61477	1
3	****	****	3.46	18.31	7.39	0.28	8.45	0.43	3.01	17.16	1.31	11.45	3.29	18.55	2.02	13.45	0.24	8.03		
	4.742	22.31	3.139	14.31	8.038	23.11	8.717	19.69	2.136	11.80	22.622	-10.35	3.199	17.53	23.880	-2.10	20.205	-22.64	16.74619	3
5	****	****	3.43	18.38	7.43	0.24	8.44	0.38	2.54	17.10	1.23	11.37	3.22	18.47	1.54	13.37	0.16	7.55		
	4.879	22.54	3.304	15.19	8.173	22.64	8.796	19.36	2.164	11.94	22.625	-10.34	3.207	17.56	23.881	-2.09	20.203	-22.65	16.87761	5
7	****	****	3.40	18.47	7.47	0.20	8.43	0.32	2.47	17.05	1.16	11.30	3.14	18.40	1.46	13.29	0.08	7.47		
	5.017	22.75	3.483	16.11	8.304	22.15	8.875	19.03	2.190	12.07	22.627	-10.33	3.214	17.59	23.883	-2.08	20.201	-22.66	17.00904	7
9	****	****	3.37	18.57	7.51	0.16	8.42	0.27	2.40	16.59	1.08	11.22	3.06	18.33	1.38	13.22	23.56	7.38		
	5.155	22.93	3.677	17.08	8.432	21.63	8.954	18.69	2.217	12.21	22.630	-10.33	3.221	17.62	23.885	-2.07	20.199	-22.68	17.14046	9
11	****	****	3.35	19.08	7.54	0.12	8.42	0.21	2.33	16.54	1.00	11.14	2.59	18.26	1.30	13.14	23.49	7.30		
	5.293	23.08	3.884	18.06	8.557	21.08	9.033	18.34	2.243	12.34	22.631	-10.33	3.228	17.64	23.886	-2.07	20.196	-22.69	17.27188	11
13	****	****	3.34	19.20	7.57	0.07	8.41	0.16	2.26	16.48	0.52	11.06	2.51	18.18	1.23	13.06	23.41	7.22		
	5.431	23.21	4.107	19.04	8.678	20.52	9.111	17.99	2.270	12.47	22.633	-10.33	3.235	17.67	23.887	-2.06	20.194	-22.70	17.40330	13
15	****	****	3.34	19.33	8.01	0.02	8.40	0.10	2.18	16.43	0.45	10.58	2.44	18.11	1.15	12.58	23.33	7.14		
	5.569	23.31	4.345	20.01	8.795	19.94	9.190	17.63	2.295	12.60	22.633	-10.33	3.242	17.70	23.888	-2.05	20.192	-22.71	17.53472	15
17	****	****	3.35	19.47	8.04	23.53	8.39	0.05	2.11	16.37	0.37	10.51	2.36	18.04	1.07	12.51	23.25	7.06		
	5.708	23.38	4.598	20.94	8.908	19.34	9.269	17.26	2.321	12.73	22.634	-10.34	3.249	17.72	23.889	-2.05	20.189	-22.72	17.66614	17
19	****	****	3.36	20.01	8.07	23.48	8.38	23.55	2.04	16.32	0.29	10.43	2.28	17.56	0.59	12.43	23.17	6.58		
	5.847	23.42	4.866	21.82	9.017	18.72	9.347	16.88	2.346	12.85	22.634	-10.34	3.255	17.75	23.890	-2.05	20.186	-22.74	17.79757	19
21	****	****	3.40	20.16	8.09	23.42	8.38	23.50	1.57	16.26	0.21	10.35	2.21	17.49	0.51	12.35	23.09	6.50		
	5.986	23.44	5.148	22.60	9.121	18.09	9.425	16.50	2.371	12.97	22.634	-10.35	3.262	17.78	23.891	-2.04	20.184	-22.75	17.92899	21
23	****	****	3.44	20.31	8.11	23.36	8.37	23.44	1.50	16.20	0.13	10.27	2.13	17.42	0.43	12.27	23.01	6.42		
	6.124	23.43	5.443	23.27	9.221	17.46	9.504	16.11	2.395	13.09	22.633	-10.37	3.268	17.80	23.892	-2.04	20.181	-22.76	18.06041	23
25	****	****	3.50	20.46	8.13	23.29	8.36	23.38	1.43	16.14	0.05	10.19	2.05	17.34	0.36	12.19	22.53	6.34		
	6.263	23.39	5.750	23.81	9.316	16.81	9.582	15.71	2.419	13.20	22.631	-10.38	3.275	17.83	23.892	-2.04	20.178	-22.77	18.19183	25
27	****	****	3.58	20.60	8.15	23.23	8.36	23.33	1.36	16.09	23.54	10.11	1.58	17.27	0.28	12.12	22.45	6.25		
	6.401	23.32	6.064	24.18	9.406	16.16	9.660	15.30	2.443	13.31	22.630	-10.40	3.281	17.85	23.892	-2.04	20.175	-22.79	18.32325	27
29	****	****	4.08	21.12	8.16	23.16	8.35	23.27	1.29	16.03	23.46	10.03	1.50	17.20	0.20	12.04	22.37	6.17		
	6.540	23.23	6.383	24.37	9.491	15.51	9.737	14.89	2.466	13.42	22.628	-10.42	3.287	17.87	23.893	-2.04	20.172	-22.80	18.45467	29

# LIPIEC 2023

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Sob	127	5.51037	-3.49	6.4039	23.07	1.01663	16.3609	-25.17	58.025	5.1	94	423	1249.6	2115	1949	2312.5	156	2354	1
183	2	Nie	128	5.55003	-4.00	6.4447	23.02	1.01665	17.3948	-27.26	57.296	6.1	98	424	1249.8	2115	2108	*****	230	2350	2
184	3	Pon	129	5.58568	-4.11	6.4855	22.58	1.01666	18.4621	-27.43	56.774	7.1	100	425	1249.9	2114	2209	016.7	324	2346	3
185	4	Wto	130	6.02534	-4.22	6.5302	22.53	1.01667	19.5259	-25.60	56.502	0.9	99	426	1250.1	2114	2249	122.6	441	2342	4
186	5	Śro	131	6.06499	-4.33	6.5709	22.47	1.01668	20.5659	-22.25	56.496	1.9	94	427	1250.3	2113	2316	226.7	614	2338	5
187	6	Czw	132	6.10465	-4.43	7.0116	22.41	1.01668	21.5650	-17.24	56.742	2.9	88	428	1250.5	2113	2334	326.7	751	2334	6
188	7	Pią	133	6.14431	-4.53	7.0522	22.35	1.01668	22.5225	-11.25	57.200	3.9	79	428	1250.6	2112	2347	421.7	925	2330	7
189	8	Sob	134	6.18396	-5.02	7.0928	22.29	1.01668	23.4432	-4.56	57.814	4.9	68	429	1250.8	2111	2359	512.6	1055	2326	8
190	9	Nie	135	6.22362	-5.11	7.1334	22.22	1.01667	0.3424	1.37	58.524	5.9	57	431	1250.9	2111	000	600.5	1221	2322	9
191	10	Pon	136	6.26327	-5.20	7.1739	22.14	1.01665	1.2318	7.57	59.275	0.3	46	432	1251.1	2110	009	647.0	1344	2318	10
192	11	Wto	137	6.30293	-5.28	7.2144	22.07	1.01664	2.1225	13.46	60.020	1.3	36	433	1251.2	2109	021	733.5	1507	2314	11
193	12	Śro	138	6.34258	-5.36	7.2549	21.58	1.01661	3.0240	18.50	60.727	2.3	26	434	1251.3	2108	034	821.1	1630	2310	12
194	13	Czw	139	6.38224	-5.43	7.2953	21.50	1.01658	3.5437	22.56	61.375	3.3	17	435	1251.5	2107	051	910.5	1751	2306	13
195	14	Pią	140	6.42190	-5.50	7.3356	21.41	1.01655	4.4821	25.53	61.954	4.3	11	436	1251.6	2106	113	1001.9	1907	2302	14
196	15	Sob	141	6.46155	-5.57	7.3759	21.32	1.01651	5.4319	27.32	62.459	5.3	5	437	1251.7	2105	145	1054.8	2012	2259	15
197	16	Nie	142	6.50121	-6.03	7.4202	21.22	1.01647	6.3830	27.48	62.886	6.3	2	439	1251.8	2104	230	1147.9	2102	2255	16
198	17	Pon	143	6.54086	-6.08	7.4604	21.12	1.01641	7.3239	26.43	63.233	7.3	0	440	1251.9	2103	329	1239.9	2139	2251	17
199	18	Wto	144	6.58052	-6.13	7.5005	21.02	1.01636	8.2443	24.25	63.493	0.6	0	441	1252.0	2102	437	1329.6	2204	2247	18
200	19	Śro	145	7.02018	-6.18	7.5406	20.51	1.01629	9.1411	21.04	63.653	1.6	2	443	1252.0	2100	551	1416.3	2222	2243	19
201	20	Czw	146	7.05583	-6.22	7.5807	20.40	1.01622	10.0060	16.54	63.699	2.6	6	444	1252.1	2059	706	1500.2	2235	2239	20
202	21	Pią	147	7.09549	-6.25	8.0206	20.29	1.01615	10.4535	12.05	63.614	3.6	12	446	1252.2	2058	819	1541.8	2246	2235	21
203	22	Sob	148	7.13514	-6.28	8.0606	20.17	1.01607	11.2840	6.50	63.383	4.6	18	447	1252.2	2056	932	1621.8	2255	2231	22
204	23	Nie	149	7.17480	-6.30	8.1004	20.05	1.01598	12.1107	1.18	62.991	5.6	26	448	1252.2	2055	1043	1701.4	2303	2227	23
205	24	Pon	150	7.21445	-6.31	8.1402	19.52	1.01589	12.5356	-4.22	62.436	6.6	35	450	1252.3	2054	1156	1741.6	2312	2223	24
206	25	Wto	151	7.25411	-6.32	8.1760	19.40	1.01579	13.3815	-9.58	61.725	7.6	45	451	1252.3	2052	1311	1823.8	2323	2219	25
207	26	Śro	152	7.29376	-6.33	8.2157	19.27	1.01569	14.2515	-15.19	60.880	0.5	55	453	1252.3	2051	1430	1909.2	2336	2215	26
208	27	Czw	153	7.33342	-6.32	8.2553	19.13	1.01558	15.1605	-20.10	59.939	1.5	65	454	1252.3	2049	1554	1959.2	2354	2211	27
209	28	Pią	154	7.37308	-6.31	8.2949	18.59	1.01547	16.1142	-24.09	58.958	2.5	75	456	1252.3	2047	1720	2054.7	****	2207	28
210	29	Sob	155	7.41273	-6.30	8.3344	18.45	1.01536	17.1222	-26.53	58.009	3.5	84	458	1252.2	2046	1843	2155.7	022	2203	29
211	30	Nie	156	7.45239	-6.28	8.3738	18.31	1.01525	18.1709	-27.56	57.170	4.5	92	459	1252.2	2044	1953	2300.5	105	2200	30
212	31	Pon	157	7.49204	-6.25	8.4132	18.17	1.01513	19.2352	-27.02	56.521	5.5	97	501	1252.2	2042	2043	*****	210	2156	31

Fazy Księżyca [Dm, h.mm]: Pełn 3, 13.39    3kw 10, 3.48    Nów 17, 20.32    1kw 26, 0.07

# LIPIEC 2023 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	****	****	4.19	21.24	8.17	23.09	8.34	23.21	1.22	15.57	23.38	9.54	1.42	17.12	0.12	11.56	22.29	6.09		
	6.678	23.11	6.703	24.38	9.570	14.86	9.815	14.48	2.489	13.53	22.625	-10.44	3.293	17.89	23.893	-2.04	20.169	-22.81	18.58609	1
3	****	****	4.32	21.33	8.18	23.01	8.34	23.15	1.14	15.51	23.30	9.46	1.35	17.05	0.04	11.48	22.21	6.01		
	6.815	22.96	7.021	24.20	9.643	14.21	9.893	14.06	2.511	13.63	22.623	-10.47	3.299	17.92	23.893	-2.04	20.166	-22.83	18.71752	3
5	****	****	4.45	21.41	8.18	22.54	8.33	23.10	1.07	15.45	23.22	9.38	1.27	16.58	23.52	11.40	22.13	5.53		
	6.953	22.79	7.332	23.85	9.710	13.57	9.970	13.63	2.533	13.73	22.619	-10.49	3.304	17.94	23.892	-2.05	20.163	-22.84	18.84894	5
7	****	****	4.60	21.47	8.17	22.46	8.32	23.04	1.00	15.39	23.14	9.30	1.19	16.50	23.45	11.32	22.05	5.45		
	7.090	22.59	7.635	23.32	9.770	12.94	10.048	13.19	2.554	13.83	22.616	-10.52	3.310	17.96	23.892	-2.05	20.160	-22.85	18.98036	7
9	****	****	5.15	21.52	8.16	22.37	8.32	22.58	0.53	15.33	23.06	9.22	1.12	16.43	23.37	11.24	21.57	5.37		
	7.226	22.36	7.927	22.65	9.824	12.31	10.125	12.75	2.575	13.93	22.612	-10.55	3.315	17.98	23.892	-2.06	20.157	-22.87	19.11178	9
11	****	****	5.30	21.55	8.15	22.29	8.31	22.52	0.46	15.27	22.58	9.13	1.04	16.35	23.29	11.16	21.49	5.28		
	7.362	22.11	8.207	21.85	9.869	11.71	10.202	12.31	2.596	14.02	22.607	-10.59	3.320	18.00	23.891	-2.06	20.154	-22.88	19.24320	11
13	****	****	5.44	21.56	8.12	22.20	8.31	22.46	0.39	15.21	22.50	9.05	0.56	16.28	23.21	11.08	21.41	5.20		
	7.498	21.83	8.476	20.94	9.907	11.12	10.279	11.86	2.616	14.11	22.603	-10.62	3.325	18.02	23.890	-2.07	20.150	-22.89	19.37462	13
15	****	****	5.59	21.57	8.10	22.10	8.30	22.40	0.31	15.15	22.42	8.57	0.49	16.21	23.13	11.00	21.34	5.12		
	7.633	21.53	8.732	19.93	9.937	10.56	10.357	11.40	2.635	14.19	22.598	-10.66	3.330	18.03	23.889	-2.07	20.147	-22.91	19.50604	15
17	****	****	6.13	21.56	8.06	22.01	8.29	22.34	0.24	15.08	22.34	8.48	0.41	16.13	23.05	10.53	21.26	5.04		
	7.768	21.20	8.975	18.84	9.958	10.02	10.434	10.94	2.654	14.28	22.592	-10.70	3.335	18.05	23.888	-2.08	20.144	-22.92	19.63747	17
19	****	****	6.27	21.54	8.02	21.51	8.29	22.28	0.17	15.02	22.26	8.40	0.33	16.06	22.57	10.45	21.18	4.56		
	7.902	20.85	9.207	17.70	9.971	9.52	10.511	10.47	2.672	14.36	22.586	-10.74	3.339	18.07	23.887	-2.09	20.140	-22.93	19.76889	19
21	****	****	6.40	21.52	7.57	21.40	8.28	22.22	0.10	14.56	22.18	8.31	0.26	15.58	22.49	10.37	21.10	4.48		
	8.035	20.48	9.426	16.51	9.973	9.04	10.588	10.00	2.690	14.43	22.580	-10.78	3.343	18.08	23.886	-2.10	20.137	-22.95	19.90031	21
23	****	****	6.52	21.49	7.51	21.30	8.28	22.16	0.02	14.49	22.11	8.23	0.18	15.51	22.42	10.29	21.02	4.39		
	8.168	20.08	9.634	15.28	9.966	8.61	10.664	9.53	2.707	14.51	22.574	-10.82	3.347	18.10	23.885	-2.11	20.134	-22.96	20.03172	23
25	****	****	7.04	21.45	7.44	21.19	8.27	22.10	23.51	14.43	22.02	8.14	0.10	15.43	22.34	10.21	20.54	4.31		
	8.300	19.66	9.831	14.03	9.949	8.23	10.741	9.05	2.724	14.58	22.567	-10.87	3.351	18.11	23.883	-2.12	20.131	-22.97	20.16314	25
27	****	****	7.14	21.41	7.37	21.07	8.26	22.05	23.44	14.36	21.54	8.06	0.02	15.35	22.26	10.13	20.46	4.23		
	8.431	19.22	10.017	12.76	9.922	7.89	10.818	8.56	2.739	14.64	22.560	-10.92	3.355	18.13	23.882	-2.13	20.127	-22.98	20.29457	27
29	1.06	0.05	7.25	21.36	7.28	20.56	8.26	21.59	23.36	14.30	21.46	7.57	23.51	15.28	22.18	10.04	20.38	4.15		
	8.562	18.76	10.193	11.49	9.885	7.61	10.895	8.07	2.755	14.70	22.553	-10.97	3.358	18.14	23.880	-2.15	20.124	-23.00	20.42599	29
31	1.33	-0.05	7.34	21.31	7.19	20.44	8.25	21.53	23.29	14.23	21.38	7.48	23.43	15.20	22.10	9.56	20.30	4.07		
	8.692	18.28	10.359	10.23	9.838	7.38	10.972	7.58	2.769	14.76	22.545	-11.02	3.362	18.15	23.878	-2.16	20.121	-23.01	20.55741	31

# SIERPIEŃ 2023

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
213	1	Wto	158	7.53170	-6.21	8.4525	18.02	1.01500	20.2941	-24.09	56.127	6.5	100	502	1252.1	2041	2115	006.1	337	2152	1	
214	2	Śro	159	7.57136	-6.17	8.4917	17.46	1.01488	21.3221	-19.32	56.026	0.6	99	504	1252.0	2039	2137	109.1	515	2148	2	
215	3	Czw	160	8.01101	-6.13	8.5309	17.31	1.01475	22.3060	-13.41	56.226	1.6	96	506	1252.0	2037	2153	207.9	654	2144	3	
216	4	Pią	161	8.05067	-6.07	8.5701	17.15	1.01462	23.2554	-7.06	56.699	2.6	90	507	1251.9	2035	2205	302.2	829	2140	4	
217	5	Sob	162	8.09032	-6.02	9.0051	16.59	1.01448	0.1802	-0.17	57.389	3.6	81	509	1251.8	2034	2216	352.9	959	2136	5	
218	6	Nie	163	8.12598	-5.55	9.0442	16.43	1.01434	1.0838	6.22	58.224	4.6	71	511	1251.7	2032	2227	441.5	1127	2132	6	
219	7	Pon	164	8.16563	-5.48	9.0831	16.26	1.01420	1.5853	12.31	59.130	5.6	61	512	1251.6	2030	2240	529.4	1253	2128	7	
220	8	Wto	165	8.20529	-5.41	9.1220	16.09	1.01406	2.4946	17.54	60.038	6.6	50	514	1251.4	2028	2255	617.7	1417	2124	8	
221	9	Śro	166	8.24494	-5.33	9.1609	15.52	1.01391	3.4157	22.17	60.893	1.0	40	516	1251.3	2026	2316	707.2	1540	2120	9	
222	10	Czw	167	8.28460	-5.24	9.1956	15.35	1.01376	4.3537	25.31	61.658	2.0	30	517	1251.1	2024	2345	758.4	1659	2116	10	
223	11	Pią	168	8.32425	-5.15	9.2344	15.17	1.01360	5.3024	27.26	62.309	3.0	21	519	1251.0	2022	****	851.0	1807	2112	11	
224	12	Sob	169	8.36391	-5.05	9.2731	14.59	1.01344	6.2528	27.59	62.836	4.0	14	521	1250.8	2020	026	944.0	1902	2108	12	
225	13	Nie	170	8.40357	-4.55	9.3117	14.41	1.01327	7.1942	27.11	63.239	5.0	8	522	1250.7	2018	120	1036.3	1942	2104	13	
226	14	Pon	171	8.44322	-4.44	9.3502	14.23	1.01310	8.1206	25.08	63.522	6.0	4	524	1250.5	2016	227	1126.5	2010	2101	14	
227	15	Wto	172	8.48288	-4.32	9.3848	14.04	1.01292	9.0202	21.59	63.692	7.0	1	526	1250.3	2014	339	1214.1	2029	2057	15	
228	16	Śro	173	8.52254	-4.20	9.4232	13.45	1.01274	9.4923	17.57	63.754	0.0	0	527	1250.1	2012	454	1258.7	2043	2053	16	
229	17	Czw	174	8.56219	-4.08	9.4616	13.26	1.01256	10.3427	13.15	63.709	1.0	1	529	1249.9	2009	609	1340.9	2054	2049	17	
230	18	Pią	175	9.00185	-3.55	9.4960	13.07	1.01236	11.1748	8.02	63.555	2.0	4	531	1249.7	2007	721	1421.3	2104	2045	18	
231	19	Sob	176	9.04150	-3.41	9.5343	12.47	1.01217	12.0015	2.32	63.287	3.0	8	533	1249.4	2005	833	1500.8	2112	2041	19	
232	20	Nie	177	9.08115	-3.27	9.5725	12.28	1.01197	12.4242	-3.07	62.898	4.0	14	534	1249.2	2003	945	1540.5	2121	2037	20	
233	21	Pon	178	9.12081	-3.13	10.0108	12.08	1.01176	13.2608	-8.44	62.382	5.0	21	536	1249.0	2001	1059	1621.4	2130	2033	21	
234	22	Wto	179	9.16047	-2.58	10.0449	11.48	1.01155	14.1137	-14.06	61.739	6.0	30	538	1248.7	1959	1215	1704.7	2141	2029	22	
235	23	Śro	180	9.20012	-2.42	10.0830	11.27	1.01134	15.0014	-19.02	60.979	7.0	40	539	1248.5	1956	1336	1751.7	2157	2025	23	
236	24	Czw	181	9.23578	-2.27	10.1211	11.07	1.01112	15.5255	-23.12	60.124	0.0	50	541	1248.2	1954	1459	1843.5	2219	2021	24	
237	25	Pią	182	9.27543	-2.10	10.1551	10.46	1.01090	16.5012	-26.18	59.211	1.0	61	543	1247.9	1952	1622	1940.3	2253	2017	25	
238	26	Sob	183	9.31509	-1.54	10.1931	10.26	1.01067	17.5147	-27.56	58.295	2.0	71	545	1247.6	1950	1737	2041.7	2346	2013	26	
239	27	Nie	184	9.35474	-1.36	10.2310	10.05	1.01045	18.5614	-27.48	57.443	3.0	81	546	1247.4	1947	1834	2145.4	****	2009	27	
240	28	Pon	185	9.39440	-1.19	10.2649	9.44	1.01022	20.0118	-25.44	56.732	4.0	90	548	1247.1	1945	1913	2248.7	102	2006	28	
241	29	Wto	186	9.43406	-1.01	10.3028	9.22	1.00999	21.0440	-21.50	56.236	5.0	96	550	1246.8	1943	1939	2349.2	234	2002	29	
242	30	Śro	187	9.47371	-0.43	10.3406	9.01	1.00976	22.0456	-16.27	56.011	6.0	99	551	1246.5	1940	1956	****	413	1958	30	
243	31	Czw	188	9.51337	-0.24	10.3744	8.40	1.00953	23.0150	-10.01	56.088	0.3	100	553	1246.1	1938	2010	045.9	552	1954	31	

Fazy Księżycyca [Dm, h.mm]: Pełn 1, 20.32    3kw 8, 12.28    Nów 16, 11.38    1kw 24, 11.57    Pełn 31, 3.36

# SIERPIEŃ 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)		
1	1.41	23.57	7.38	21.28	7.14	20.38	8.25	21.50	23.25	14.20	21.34	7.44	23.39	15.16	22.06	9.52	20.26	4.03			
	8.757	18.03	10.438	9.61	9.811	7.29	11.010	7.33	2.776	14.79	22.541	-11.04	3.363	18.16	23.877	-2.17	20.119	-23.02	20.623	12	1
3	1.55	23.44	7.46	21.22	7.03	20.25	8.25	21.44	23.18	14.13	21.26	7.35	23.31	15.09	21.58	9.44	20.18	3.55			
	8.886	17.51	10.588	8.37	9.750	7.15	11.087	6.84	2.790	14.85	22.534	-11.09	3.366	18.17	23.875	-2.18	20.116	-23.03	20.754	54	3
5	2.07	23.33	7.53	21.16	6.51	20.13	8.24	21.38	23.11	14.06	21.18	7.27	23.24	15.01	21.50	9.36	20.10	3.47			
	9.014	16.98	10.727	7.17	9.682	7.08	11.164	6.34	2.803	14.90	22.525	-11.15	3.369	18.18	23.873	-2.20	20.113	-23.04	20.885	96	5
7	2.17	23.23	7.60	21.09	6.39	20.01	8.23	21.32	23.03	13.60	21.10	7.18	23.16	14.54	21.42	9.28	20.02	3.38			
	9.142	16.43	10.856	6.00	9.608	7.06	11.240	5.83	2.815	14.95	22.517	-11.20	3.371	18.19	23.871	-2.21	20.109	-23.05	21.017	38	7
9	2.26	23.14	8.05	21.03	6.26	19.48	8.23	21.26	22.56	13.53	21.02	7.09	23.08	14.46	21.34	9.20	19.54	3.30			
	9.269	15.87	10.973	4.89	9.528	7.11	11.317	5.33	2.826	14.99	22.508	-11.26	3.374	18.20	23.869	-2.23	20.106	-23.06	21.148	80	9
11	2.35	23.05	8.09	20.55	6.13	19.36	8.22	21.19	22.48	13.46	20.54	7.01	23.00	14.38	21.26	9.12	19.46	3.22			
	9.395	15.28	11.078	3.83	9.446	7.21	11.394	4.82	2.837	15.03	22.500	-11.31	3.376	18.20	23.866	-2.24	20.103	-23.07	21.280	22	11
13	2.43	22.56	8.12	20.48	5.59	19.24	8.22	21.13	22.41	13.39	20.46	6.52	22.52	14.31	21.18	9.04	19.38	3.14			
	9.521	14.68	11.171	2.84	9.362	7.36	11.471	4.30	2.847	15.07	22.491	-11.37	3.378	18.21	23.864	-2.26	20.100	-23.08	21.411	64	13
15	2.50	22.48	8.13	20.40	5.45	19.12	8.21	21.07	22.33	13.32	20.38	6.43	22.45	14.23	21.11	8.56	19.30	3.06			
	9.647	14.06	11.249	1.94	9.280	7.56	11.548	3.79	2.856	15.10	22.482	-11.42	3.379	18.22	23.861	-2.28	20.097	-23.10	21.543	06	15
17	2.57	22.40	8.14	20.31	5.31	19.01	8.21	21.01	22.26	13.24	20.30	6.35	22.37	14.15	21.03	8.48	19.22	2.58			
	9.771	13.43	11.313	1.15	9.200	7.80	11.625	3.27	2.864	15.13	22.472	-11.48	3.381	18.22	23.859	-2.30	20.094	-23.11	21.674	48	17
19	3.04	22.33	8.12	20.23	5.17	18.50	8.21	20.55	22.18	13.17	20.22	6.26	22.29	14.07	20.55	8.40	19.14	2.50			
	9.895	12.79	11.359	0.47	9.126	8.07	11.703	2.75	2.871	15.16	22.463	-11.54	3.382	18.22	23.856	-2.32	20.091	-23.12	21.805	90	19
21	3.11	22.25	8.09	20.14	5.04	18.40	8.20	20.49	22.10	13.10	20.14	6.17	22.21	13.59	20.47	8.31	19.06	2.42			
	10.019	12.13	11.387	-0.06	9.057	8.36	11.780	2.23	2.878	15.18	22.454	-11.60	3.383	18.23	23.853	-2.34	20.088	-23.13	21.937	31	21
23	3.17	22.18	8.03	20.04	4.51	18.30	8.20	20.43	22.03	13.02	20.06	6.08	22.13	13.52	20.39	8.23	18.58	2.33			
	10.142	11.46	11.395	-0.43	8.997	8.67	11.858	1.71	2.884	15.20	22.444	-11.65	3.384	18.23	23.850	-2.36	20.086	-23.14	22.068	73	23
25	3.23	22.11	7.56	19.55	4.38	18.21	8.19	20.37	21.55	12.55	19.57	5.60	22.05	13.44	20.31	8.15	18.50	2.25			
	10.264	10.77	11.382	-0.61	8.946	8.98	11.935	1.18	2.889	15.21	22.435	-11.71	3.384	18.23	23.847	-2.38	20.083	-23.15	22.200	16	25
27	3.29	22.04	7.45	19.45	4.26	18.12	8.19	20.31	21.47	12.47	19.49	5.51	21.58	13.36	20.23	8.07	18.42	2.17			
	10.386	10.08	11.347	-0.57	8.904	9.30	12.013	0.66	2.893	15.22	22.425	-11.77	3.384	18.23	23.844	-2.40	20.080	-23.15	22.331	58	27
29	3.35	21.57	7.33	19.35	4.14	18.04	8.18	20.25	21.40	12.40	19.41	5.42	21.50	13.28	20.15	7.59	18.34	2.09			
	10.508	9.37	11.289	-0.31	8.873	9.61	12.091	0.13	2.896	15.23	22.416	-11.83	3.385	18.23	23.841	-2.42	20.078	-23.16	22.463	00	29
31	3.40	21.51	7.18	19.25	4.04	17.57	8.18	20.19	21.32	12.32	19.33	5.33	21.42	13.20	20.07	7.51	18.26	2.01			
	10.629	8.66	11.211	0.19	8.853	9.90	12.169	-0.40	2.899	15.24	22.406	-11.88	3.384	18.23	23.838	-2.44	20.075	-23.17	22.594	42	31

# WRZESIEŃ 2023

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j	astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2460																			
244	1	Pią	189	9.55302	-0.05	10.4122	8.18	1.00929	23.5559	-3.04	56.464	1.3	97	555	1245.8	1936	2022	139.1	726	1950	1	
245	2	Sob	190	9.59268	0.14	10.4459	7.56	1.00906	0.4825	3.56	57.100	2.3	92	556	1245.5	1933	2033	229.9	858	1946	2	
246	3	Nie	191	10.03233	0.34	10.4836	7.34	1.00882	1.4014	10.32	57.932	3.3	84	558	1245.2	1931	2045	319.6	1028	1942	3	
247	4	Pon	192	10.07199	0.54	10.5213	7.12	1.00858	2.3227	16.25	58.879	4.3	75	600	1244.9	1929	2059	409.3	1156	1938	4	
248	5	Wto	193	10.11164	1.14	10.5549	6.50	1.00834	3.2543	21.17	59.863	5.3	66	602	1244.5	1926	2118	460.0	1323	1934	5	
249	6	Śro	194	10.15130	1.34	10.5926	6.28	1.00810	4.2017	24.57	60.810	6.3	55	603	1244.2	1924	2144	552.0	1446	1930	6	
250	7	Czw	195	10.19095	1.54	11.0302	6.05	1.00785	5.1549	27.16	61.664	0.5	45	605	1243.8	1922	2221	645.4	1600	1926	7	
251	8	Pią	196	10.23061	2.15	11.0638	5.43	1.00761	6.1132	28.10	62.385	1.5	35	607	1243.5	1919	2312	739.1	1700	1922	8	
252	9	Sob	197	10.27026	2.35	11.1014	5.20	1.00736	7.0623	27.40	62.951	2.5	26	608	1243.2	1917	****	832.1	1744	1918	9	
253	10	Nie	198	10.30592	2.56	11.1349	4.58	1.00711	7.5921	25.53	63.354	3.5	18	610	1242.8	1914	016	923.2	1815	1914	10	
254	11	Pon	199	10.34558	3.17	11.1725	4.35	1.00685	8.4951	22.58	63.599	4.5	12	612	1242.5	1912	127	1011.5	1837	1910	11	
255	12	Wto	200	10.38523	3.38	11.2100	4.12	1.00659	9.3745	19.06	63.697	5.5	6	614	1242.1	1910	242	1057.0	1852	1907	12	
256	13	Śro	201	10.42489	3.60	11.2436	3.49	1.00633	10.2317	14.31	63.665	6.5	2	615	1241.8	1907	357	1139.8	1904	1903	13	
257	14	Czw	202	10.46454	4.21	11.2811	3.26	1.00607	11.0703	9.22	63.521	7.5	0	617	1241.4	1905	510	1221.0	1913	1859	14	
258	15	Pią	203	10.50420	4.42	11.3146	3.03	1.00580	11.4947	3.51	63.279	0.3	0	619	1241.0	1902	623	1300.7	1922	1855	15	
259	16	Sob	204	10.54385	5.04	11.3522	2.40	1.00553	12.3220	-1.50	62.951	1.3	2	620	1240.7	1900	735	1340.4	1930	1851	16	
260	17	Nie	205	10.58351	5.25	11.3857	2.17	1.00526	13.1536	-7.32	62.541	2.3	5	622	1240.3	1857	849	1421.0	1939	1847	17	
261	18	Pon	206	11.02316	5.46	11.4232	1.53	1.00498	14.0034	-13.01	62.053	3.3	10	624	1240.0	1855	1005	1503.5	1949	1843	18	
262	19	Wto	207	11.06282	6.08	11.4607	1.30	1.00470	14.4812	-18.04	61.489	4.3	17	626	1239.6	1853	1124	1549.0	2003	1839	19	
263	20	Śro	208	11.10247	6.29	11.4942	1.07	1.00442	15.3920	-22.26	60.851	5.3	25	627	1239.3	1850	1246	1638.5	2022	1835	20	
264	21	Czw	209	11.14213	6.50	11.5318	0.44	1.00414	16.3430	-25.47	60.148	6.3	35	629	1238.9	1848	1408	1732.6	2051	1831	21	
265	22	Pią	210	11.18178	7.12	11.5653	0.20	1.00385	17.3333	-27.48	59.400	7.3	46	631	1238.6	1845	1525	1830.8	2135	1827	22	
266	23	Sob	211	11.22144	7.33	12.0028	-0.03	1.00357	18.3527	-28.12	58.637	0.6	57	632	1238.2	1843	1627	1931.8	2239	1823	23	
267	24	Nie	212	11.26110	7.54	12.0404	-0.26	1.00328	19.3827	-26.49	57.905	1.6	68	634	1237.9	1840	1711	2033.2	****	1819	24	
268	25	Pon	213	11.30075	8.15	12.0739	-0.50	1.00299	20.4032	-23.39	57.261	2.6	78	636	1237.5	1838	1740	2133.0	003	1815	25	
269	26	Wto	214	11.34041	8.35	12.1115	-1.13	1.00271	21.4018	-18.55	56.767	3.6	87	638	1237.2	1836	1801	2229.8	137	1811	26	
270	27	Śro	215	11.38006	8.56	12.1451	-1.36	1.00242	22.3717	-12.58	56.481	4.6	94	639	1236.8	1833	1815	2323.6	314	1808	27	
271	28	Czw	216	11.41572	9.17	12.1827	-1.60	1.00213	23.3150	-6.14	56.448	5.6	99	641	1236.5	1831	1827	*****	449	1804	28	
272	29	Pią	217	11.45537	9.37	12.2204	-2.23	1.00184	0.2449	0.49	56.687	0.0	100	643	1236.1	1828	1839	015.1	622	1800	29	
273	30	Sob	218	11.49503	9.57	12.2540	-2.46	1.00156	1.1717	7.45	57.185	1.0	99	645	1235.8	1826	1850	105.4	753	1756	30	

Fazy Księżyca [Dm, h.mm]:      3kw 7, 0.21      Now 15, 3.40      1kw 22, 21.32      Pełn 29, 11.57



# WRZESIEŃ 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	3.43	21.47	7.09	19.20	3.59	17.53	8.18	20.16	21.28	12.28	19.29	5.29	21.38	13.16	20.03	7.47	18.22	1.57		
	10.689	8.30	11.165	0.53	8.847	10.05	12.208	-0.66	2.899	15.24	22.401	-11.91	3.384	18.23	23.837	-2.45	20.074	-23.18	22.66012	1
3	3.48	21.41	6.51	19.11	3.49	17.47	8.17	20.10	21.20	12.20	19.21	5.20	21.30	13.08	19.55	7.38	18.15	1.49		
	10.810	7.57	11.063	1.37	8.843	10.32	12.287	-1.19	2.901	15.23	22.392	-11.97	3.384	18.23	23.834	-2.47	20.072	-23.18	22.79154	3
5	3.53	21.35	6.31	19.02	3.40	17.41	8.17	20.04	21.13	12.12	19.13	5.11	21.22	13.01	19.47	7.30	18.07	1.41		
	10.930	6.83	10.954	2.39	8.850	10.56	12.365	-1.72	2.901	15.23	22.382	-12.02	3.383	18.23	23.830	-2.49	20.070	-23.19	22.92296	5
7	3.58	21.28	6.10	18.54	3.32	17.35	8.17	19.58	21.05	12.05	19.05	5.03	21.14	12.53	19.39	7.22	17.59	1.33		
	11.051	6.09	10.846	3.52	8.867	10.78	12.444	-2.25	2.900	15.22	22.373	-12.08	3.382	18.22	23.827	-2.51	20.068	-23.20	23.05438	7
9	4.03	21.22	5.51	18.46	3.25	17.30	8.16	19.53	20.57	11.56	18.57	4.54	21.06	12.45	19.31	7.14	17.51	1.25		
	11.170	5.34	10.749	4.69	8.894	10.98	12.523	-2.78	2.898	15.21	22.364	-12.13	3.381	18.22	23.824	-2.53	20.066	-23.20	23.18580	9
11	4.08	21.16	5.32	18.40	3.18	17.25	8.16	19.47	20.49	11.48	18.49	4.45	20.58	12.37	19.23	7.06	17.43	1.17		
	11.290	4.58	10.674	5.80	8.930	11.14	12.603	-3.31	2.896	15.19	22.355	-12.18	3.380	18.21	23.820	-2.56	20.064	-23.21	23.31722	11
13	4.13	21.10	5.16	18.35	3.12	17.21	8.16	19.41	20.41	11.40	18.40	4.37	20.51	12.29	19.15	6.58	17.35	1.09		
	11.410	3.82	10.628	6.78	8.975	11.26	12.682	-3.84	2.893	15.17	22.346	-12.23	3.378	18.21	23.817	-2.58	20.062	-23.22	23.44864	13
15	4.17	21.04	5.03	18.30	3.07	17.17	8.16	19.35	20.33	11.32	18.32	4.28	20.43	12.21	19.08	6.49	17.27	1.01		
	11.530	3.05	10.617	7.54	9.028	11.36	12.762	-4.36	2.888	15.14	22.337	-12.28	3.376	18.20	23.814	-2.60	20.060	-23.22	23.58005	15
17	4.22	20.58	4.54	18.27	3.02	17.13	8.15	19.29	20.25	11.24	18.24	4.19	20.35	12.13	18.60	6.41	17.19	0.53		
	11.649	2.28	10.644	8.05	9.088	11.42	12.843	-4.89	2.883	15.11	22.328	-12.33	3.374	18.19	23.810	-2.62	20.059	-23.23	23.71147	17
19	4.26	20.53	4.49	18.24	2.58	17.09	8.15	19.23	20.17	11.15	18.16	4.11	20.27	12.05	18.52	6.33	17.11	0.45		
	11.769	1.50	10.709	8.28	9.156	11.44	12.923	-5.42	2.877	15.08	22.320	-12.38	3.372	18.18	23.807	-2.65	20.057	-23.23	23.84289	19
21	4.30	20.47	4.48	18.22	2.55	17.06	8.15	19.17	20.09	11.07	18.08	4.02	20.19	11.56	18.44	6.25	17.03	0.37		
	11.888	0.73	10.809	8.21	9.230	11.42	13.004	-5.94	2.870	15.05	22.312	-12.43	3.369	18.17	23.804	-2.67	20.056	-23.24	23.97431	21
23	4.34	20.41	4.50	18.20	2.52	17.02	8.15	19.11	20.01	10.58	17.60	3.53	20.11	11.48	18.36	6.17	16.55	0.29		
	12.008	-0.05	10.940	7.86	9.310	11.37	13.085	-6.46	2.863	15.01	22.304	-12.47	3.367	18.16	23.800	-2.69	20.055	-23.24	0.10573	23
25	4.38	20.36	4.55	18.18	2.50	16.59	8.15	19.06	19.53	10.49	17.52	3.45	20.03	11.40	18.28	6.08	16.47	0.21		
	12.128	-0.83	11.098	7.25	9.396	11.29	13.167	-6.99	2.854	14.97	22.296	-12.51	3.364	18.15	23.797	-2.71	20.053	-23.24	0.23715	25
27	4.43	20.31	5.02	18.16	2.48	16.56	8.15	18.60	19.45	10.41	17.44	3.36	19.55	11.32	18.20	6.00	16.39	0.13		
	12.248	-1.61	11.276	6.40	9.487	11.16	13.249	-7.50	2.845	14.92	22.288	-12.55	3.361	18.14	23.794	-2.73	20.053	-23.25	0.36857	27
29	4.47	20.25	5.11	18.14	2.47	16.53	8.14	18.54	19.36	10.32	17.36	3.28	19.47	11.24	18.12	5.52	16.32	0.05		
	12.368	-2.39	11.469	5.36	9.582	11.00	13.331	-8.02	2.835	14.87	22.281	-12.59	3.357	18.13	23.790	-2.76	20.052	-23.25	0.49999	29

# PAŹDZIERNIK 2023

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
274	1	Nie	219	11.53468	10.16	12.2917	-3.10	1.00127	2.1014	14.08	57.901	2.0	94	646	1235.5	1824	1903	155.8	924	1752	1	
275	2	Pon	220	11.57434	10.36	12.3254	-3.33	1.00099	3.0423	19.36	58.770	3.0	88	648	1235.2	1821	1920	247.2	1055	1748	2	
276	3	Wto	221	12.01399	10.55	12.3632	-3.56	1.00071	4.0001	23.53	59.718	4.0	80	650	1234.8	1819	1943	340.3	1223	1744	3	
277	4	Śro	222	12.05365	11.14	12.4010	-4.19	1.00043	4.5650	26.46	60.665	5.0	71	652	1234.5	1816	2016	434.8	1344	1740	4	
278	5	Czw	223	12.09330	11.32	12.4348	-4.42	1.00014	5.5358	28.10	61.543	6.0	61	653	1234.2	1814	2102	530.1	1452	1736	5	
279	6	Pią	224	12.13296	11.50	12.4726	-5.05	0.99986	6.5012	28.05	62.297	7.0	52	655	1233.9	1812	2202	624.7	1543	1732	6	
280	7	Sob	225	12.17262	12.07	12.5105	-5.28	0.99958	7.4427	26.38	62.889	0.8	42	657	1233.6	1809	2313	717.4	1619	1728	7	
281	8	Nie	226	12.21227	12.25	12.5445	-5.51	0.99930	8.3600	23.59	63.298	1.8	33	659	1233.3	1807	****	807.2	1643	1724	8	
282	9	Pon	227	12.25193	12.41	12.5825	-6.14	0.99902	9.2442	20.21	63.519	2.8	24	700	1233.1	1805	027	853.8	1700	1720	9	
283	10	Wto	228	12.29158	12.58	13.0205	-6.37	0.99874	10.1050	15.55	63.560	3.8	16	702	1232.8	1802	142	937.5	1713	1716	10	
284	11	Śro	229	12.33124	13.13	13.0546	-6.60	0.99845	10.5460	10.54	63.441	4.8	10	704	1232.5	1800	257	1019.0	1723	1713	11	
285	12	Czw	230	12.37089	13.29	13.0927	-7.22	0.99817	11.3759	5.27	63.189	5.8	5	706	1232.3	1758	410	1059.2	1731	1709	12	
286	13	Pią	231	12.41055	13.43	13.1309	-7.45	0.99789	12.2040	-0.16	62.833	6.8	2	708	1232.0	1755	522	1138.9	1739	1705	13	
287	14	Sob	232	12.45020	13.58	13.1651	-8.07	0.99760	13.0359	-6.02	62.403	7.8	0	709	1231.8	1753	636	1219.6	1748	1701	14	
288	15	Nie	233	12.48586	14.11	13.2034	-8.29	0.99732	13.4852	-11.40	61.923	0.7	0	711	1231.6	1751	752	1301.7	1758	1657	15	
289	16	Pon	234	12.52551	14.24	13.2417	-8.52	0.99703	14.3618	-16.56	61.414	1.7	3	713	1231.3	1749	911	1346.8	1810	1653	16	
290	17	Wto	235	12.56517	14.37	13.2801	-9.14	0.99674	15.2703	-21.32	60.888	2.7	7	715	1231.1	1746	1033	1435.5	1828	1649	17	
291	18	Śro	236	13.00482	14.49	13.3146	-9.36	0.99646	16.2136	-25.10	60.354	3.7	13	717	1230.9	1744	1157	1528.5	1853	1645	18	
292	19	Czw	237	13.04448	15.00	13.3531	-9.57	0.99617	17.1948	-27.31	59.814	4.7	22	719	1230.7	1742	1316	1625.4	1931	1641	19	
293	20	Pią	238	13.08414	15.11	13.3917	-10.19	0.99589	18.2040	-28.19	59.276	5.7	31	720	1230.6	1740	1422	1725.1	2029	1637	20	
294	21	Sob	239	13.12379	15.21	13.4303	-10.40	0.99560	19.2228	-27.23	58.749	6.7	42	722	1230.4	1738	1511	1825.3	2145	1633	21	
295	22	Nie	240	13.16345	15.31	13.4650	-11.02	0.99531	20.2322	-24.45	58.252	0.3	53	724	1230.2	1735	1544	1924.0	2314	1629	22	
296	23	Pon	241	13.20310	15.40	13.5038	-11.23	0.99503	21.2201	-20.35	57.812	1.3	64	726	1230.1	1733	1606	2019.9	****	1625	23	
297	24	Wto	242	13.24276	15.48	13.5426	-11.44	0.99475	22.1756	-15.10	57.466	2.3	75	728	1229.9	1731	1622	2112.8	047	1621	24	
298	25	Śro	243	13.28241	15.55	13.5815	-12.04	0.99447	23.1128	-8.52	57.254	3.3	85	730	1229.8	1729	1634	2203.4	219	1617	25	
299	26	Czw	244	13.32207	16.02	14.0205	-12.25	0.99420	0.0327	-2.04	57.215	4.3	92	732	1229.7	1727	1645	2252.7	350	1614	26	
300	27	Pią	245	13.36172	16.08	14.0556	-12.45	0.99392	0.5459	4.51	57.375	5.3	97	733	1229.6	1725	1656	2342.1	520	1610	27	
301	28	Sob	246	13.40138	16.14	14.0947	-13.06	0.99365	1.4707	11.27	57.742	6.3	100	735	1229.5	1723	1708	*****	650	1606	28	
302	29	Nie	247	13.44103	16.18	14.1339	-13.26	0.99338	2.4044	17.22	58.302	0.6	100	737	1229.4	1721	1723	032.6	821	1602	29	
302	29	Nie	247	14.44202	16.18	14.1349	-13.26	0.99337	2.4300	17.36	58.329	1.6	100	637	1129.4	1621	1623	*****	721	1502	29	
303	30	Pon	248	14.48167	16.22	14.1741	-13.46	0.99311	3.3840	22.25	59.050	2.6	97	639	1129.4	1619	1643	025.2	851	1458	30	
304	31	Wto	249	14.52133	16.25	14.2135	-14.06	0.99285	4.3607	25.54	59.869	3.6	92	641	1129.3	1617	1711	120.0	1018	1454	31	

Fazy Księżycyca [Dm, h.mm]:      3kw 6, 15.48      Nów 14, 19.55      1kw 22, 5.29      Pełn 28, 22.24

# PAŹDZIERNIK 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.50	20.20	5.22	18.12	2.46	16.50	8.14	18.48	19.28	10.23	17.28	3.19	19.39	11.16	18.04	5.44	16.24	23.53		
	12.488	-3.16	11.672	4.16	9.682	10.81	13.414	-8.53	2.824	14.82	22.274	-12.63	3.354	18.12	23.787	-2.78	20.051	-23.25	0.63140	1
3	4.54	20.15	5.34	18.10	2.46	16.47	8.14	18.43	19.20	10.14	17.20	3.11	19.31	11.08	17.56	5.36	16.16	23.45		
	12.609	-3.94	11.882	2.84	9.785	10.57	13.498	-9.05	2.812	14.76	22.268	-12.67	3.350	18.10	23.784	-2.80	20.050	-23.26	0.76282	3
5	4.58	20.10	5.46	18.07	2.46	16.44	8.14	18.37	19.12	10.05	17.12	3.02	19.23	10.59	17.48	5.28	16.08	23.37		
	12.730	-4.71	12.095	1.44	9.892	10.30	13.581	-9.55	2.800	14.70	22.261	-12.70	3.347	18.09	23.780	-2.82	20.050	-23.26	0.89424	5
7	5.02	20.05	5.59	18.04	2.46	16.41	8.14	18.31	19.04	9.56	17.04	2.54	19.15	10.51	17.40	5.19	16.00	23.29		
	12.851	-5.47	12.309	-0.02	10.002	10.00	13.665	-10.06	2.787	14.64	22.255	-12.73	3.343	18.07	23.777	-2.84	20.050	-23.26	1.02566	7
9	5.06	20.00	6.12	18.01	2.47	16.38	8.14	18.26	18.55	9.47	16.56	2.46	19.07	10.43	17.32	5.11	15.52	23.22		
	12.974	-6.24	12.524	-1.51	10.116	9.65	13.750	-10.56	2.774	14.58	22.250	-12.76	3.339	18.06	23.774	-2.86	20.050	-23.26	1.15709	9
11	5.09	19.56	6.25	17.58	2.49	16.35	8.14	18.20	18.47	9.38	16.47	2.37	18.59	10.35	17.24	5.03	15.44	23.14		
	13.096	-7.00	12.737	-3.02	10.232	9.28	13.835	-11.05	2.759	14.51	22.245	-12.78	3.334	18.04	23.771	-2.88	20.049	-23.26	1.28850	11
13	5.13	19.51	6.38	17.55	2.50	16.32	8.14	18.14	18.39	9.29	16.39	2.29	18.51	10.27	17.16	4.55	15.36	23.06		
	13.219	-7.75	12.950	-4.52	10.350	8.87	13.921	-11.55	2.745	14.44	22.240	-12.81	3.330	18.02	23.768	-2.90	20.050	-23.26	1.41992	13
15	5.16	19.46	6.50	17.52	2.52	16.28	8.14	18.09	18.30	9.20	16.31	2.21	18.43	10.18	17.08	4.47	15.29	22.58		
	13.343	-8.49	13.161	-6.02	10.471	8.43	14.007	-12.03	2.729	14.37	22.235	-12.83	3.325	18.01	23.765	-2.92	20.050	-23.26	1.55133	15
17	5.20	19.42	7.03	17.48	2.54	16.25	8.15	18.04	18.22	9.10	16.23	2.12	18.35	10.10	17.00	4.39	15.21	22.50		
	13.467	-9.23	13.370	-7.49	10.593	7.96	14.093	-12.52	2.714	14.30	22.231	-12.85	3.321	17.99	23.762	-2.94	20.050	-23.26	1.68275	17
19	5.24	19.38	7.16	17.45	2.56	16.22	8.15	17.58	18.14	9.01	16.15	2.04	18.27	10.02	16.52	4.31	15.13	22.42		
	13.592	-9.95	13.578	-8.94	10.717	7.46	14.181	-12.99	2.697	14.22	22.228	-12.87	3.316	17.97	23.759	-2.95	20.051	-23.26	1.81418	19
21	5.27	19.34	7.28	17.42	2.59	16.19	8.15	17.53	18.05	8.52	16.08	1.56	18.19	9.54	16.45	4.22	15.05	22.35		
	13.718	-10.67	13.785	-10.34	10.843	6.93	14.268	-13.47	2.681	14.14	22.224	-12.88	3.311	17.95	23.756	-2.97	20.051	-23.25	1.94560	21
23	5.31	19.30	7.40	17.38	3.02	16.16	8.15	17.47	17.57	8.42	15.60	1.48	18.11	9.45	16.37	4.14	14.57	22.27		
	13.844	-11.38	13.991	-11.71	10.970	6.37	14.357	-13.93	2.664	14.07	22.221	-12.90	3.306	17.93	23.754	-2.99	20.052	-23.25	2.07702	23
25	5.34	19.26	7.52	17.35	3.05	16.12	8.15	17.42	17.48	8.33	15.52	1.40	18.03	9.37	16.29	4.06	14.49	22.19		
	13.971	-12.07	14.197	-13.04	11.099	5.78	14.445	-14.39	2.647	13.99	22.219	-12.90	3.301	17.91	23.751	-3.00	20.053	-23.25	2.20844	25
27	5.37	19.22	8.04	17.32	3.08	16.09	8.15	17.37	17.40	8.24	15.44	1.32	17.55	9.29	16.21	3.58	14.42	22.11		
	14.099	-12.76	14.402	-14.31	11.229	5.17	14.535	-14.84	2.629	13.91	22.217	-12.91	3.296	17.89	23.749	-3.02	20.054	-23.25	2.33985	27
29	5.41	19.18	8.16	17.29	3.11	16.05	8.16	17.32	17.31	8.14	15.36	1.24	17.47	9.20	16.13	3.50	14.34	22.03		
	14.227	-13.43	14.607	-15.54	11.360	4.54	14.625	-15.29	2.612	13.82	22.215	-12.92	3.290	17.87	23.746	-3.04	20.055	-23.24	2.47127	29
29	4.41	18.18	7.17	16.29	2.12	15.05	7.16	16.32	16.31	7.14	14.36	0.24	16.47	8.20	15.13	2.50	13.34	21.03		
	14.230	-13.44	14.612	-15.56	11.363	4.52	14.627	-15.30	2.611	13.82	22.215	-12.92	3.290	17.87	23.746	-3.04	20.055	-23.24	2.47127	29
31	4.44	18.15	7.28	16.26	2.15	15.02	7.16	16.27	16.23	7.05	14.28	0.16	16.39	8.12	15.05	2.42	13.26	20.56		
	14.360	-14.10	14.817	-16.73	11.495	3.87	14.717	-15.74	2.594	13.74	22.214	-12.92	3.285	17.85	23.744	-3.05	20.057	-23.24	2.60269	31

# LISTOPAD 2023

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Śro	250	14.56099	16.27	14.2529	-14.25	0.99259	5.3428	27.51	60.719	4.6	85	643	1129.3	1615	1752	216.3	1135	1450	1
306	2	Czw	251	15.00064	16.29	14.2924	-14.44	0.99234	6.3221	28.15	61.534	5.6	77	645	1129.3	1613	1847	312.7	1235	1446	2
307	3	Pią	252	15.04030	16.29	14.3320	-15.03	0.99208	7.2821	27.11	62.252	6.6	68	647	1129.3	1611	1955	407.5	1318	1442	3
308	4	Sob	253	15.07596	16.29	14.3717	-15.22	0.99184	8.2128	24.50	62.825	7.6	59	649	1129.3	1609	2110	459.5	1347	1438	4
309	5	Nie	254	15.11561	16.28	14.4115	-15.40	0.99159	9.1122	21.26	63.218	0.1	49	650	1129.3	1607	2225	547.9	1406	1434	5
310	6	Pon	255	15.15527	16.26	14.4513	-15.58	0.99135	9.5818	17.12	63.411	1.1	40	652	1129.3	1606	2340	632.9	1420	1430	6
311	7	Wto	256	15.19492	16.23	14.4913	-16.16	0.99111	10.4253	12.19	63.402	2.1	31	654	1129.4	1604	****	715.2	1431	1426	7
312	8	Śro	257	15.23458	16.20	14.5313	-16.34	0.99087	11.2600	6.59	63.204	3.1	22	656	1129.4	1602	053	755.7	1440	1422	8
313	9	Czw	258	15.27423	16.15	14.5714	-16.51	0.99063	12.0835	1.21	62.843	4.1	15	658	1129.5	1600	206	835.4	1448	1418	9
314	10	Pią	259	15.31389	16.10	15.0116	-17.08	0.99040	12.5139	-4.25	62.357	5.1	9	700	1129.6	1559	319	915.5	1457	1415	10
315	11	Sob	260	15.35354	16.04	15.0518	-17.25	0.99017	13.3614	-10.08	61.787	6.1	4	702	1129.7	1557	434	957.1	1506	1411	11
316	12	Nie	261	15.39320	15.57	15.0922	-17.41	0.98994	14.2321	-15.34	61.178	7.1	1	704	1129.8	1555	552	1041.4	1518	1407	12
317	13	Pon	262	15.43285	15.49	15.1327	-17.57	0.98971	15.1356	-20.26	60.572	0.1	0	705	1129.9	1554	715	1129.4	1533	1403	13
318	14	Wto	263	15.47251	15.40	15.1732	-18.13	0.98948	16.0832	-24.23	60.002	1.1	1	707	1130.1	1552	840	1222.0	1556	1359	14
319	15	Śro	264	15.51217	15.30	15.2138	-18.28	0.98925	17.0705	-27.06	59.494	2.1	5	709	1130.2	1551	1003	1318.8	1630	1355	15
320	16	Czw	265	15.55182	15.20	15.2545	-18.44	0.98903	18.0832	-28.14	59.060	3.1	11	711	1130.4	1549	1115	1418.9	1722	1351	16
321	17	Pią	266	15.59148	15.08	15.2953	-18.58	0.98881	19.1060	-27.37	58.703	4.1	18	713	1130.6	1548	1210	1519.9	1834	1347	17
322	18	Sob	267	16.03113	14.56	15.3402	-19.13	0.98859	20.1222	-25.16	58.421	5.1	28	715	1130.8	1547	1247	1619.3	2000	1343	18
323	19	Nie	268	16.07079	14.43	15.3811	-19.27	0.98837	21.1107	-21.23	58.208	6.1	39	716	1131.0	1545	1312	1715.6	2131	1339	19
324	20	Pon	269	16.11045	14.30	15.4221	-19.41	0.98816	22.0641	-16.16	58.063	0.0	50	718	1131.3	1544	1329	1808.4	2302	1335	20
325	21	Wto	270	16.15010	14.15	15.4632	-19.54	0.98795	22.5924	-10.16	57.989	1.0	61	720	1131.5	1543	1342	1858.2	****	1331	21
326	22	Śro	271	16.18576	13.60	15.5044	-20.07	0.98774	23.5012	-3.45	57.997	2.0	72	722	1131.7	1541	1353	1946.2	031	1327	22
327	23	Czw	272	16.22541	13.44	15.5457	-20.20	0.98754	0.4012	2.57	58.102	3.0	82	723	1132.0	1540	1403	2033.8	158	1323	23
328	24	Pią	273	16.26507	13.27	15.5910	-20.32	0.98734	1.3038	9.29	58.320	4.0	90	725	1132.3	1539	1414	2122.3	325	1320	24
329	25	Sob	274	16.30472	13.09	16.0324	-20.44	0.98715	2.2231	15.30	58.660	5.0	96	727	1132.6	1538	1428	2212.8	453	1316	25
330	26	Nie	275	16.34438	12.51	16.0739	-20.56	0.98696	3.1635	20.39	59.124	6.0	99	728	1132.9	1537	1445	2305.9	622	1312	26
331	27	Pon	276	16.38404	12.32	16.1155	-21.07	0.98678	4.1302	24.38	59.698	0.1	100	730	1133.2	1536	1509	****	750	1308	27
332	28	Wto	277	16.42369	12.12	16.1611	-21.18	0.98661	5.1116	27.12	60.353	1.1	99	731	1133.5	1535	1543	001.4	912	1304	28
333	29	Śro	278	16.46335	11.52	16.2028	-21.28	0.98643	6.0958	28.11	61.049	2.1	95	733	1133.9	1534	1633	058.3	1020	1300	29
334	30	Czw	279	16.50300	11.30	16.2446	-21.38	0.98627	7.0729	27.38	61.734	3.1	90	735	1134.2	1534	1737	154.7	1111	1256	30

Fazy Księżyca [Dm, h.mm]:      3kw 5, 9.37      Nów 13, 10.27      1kw 20, 11.50      Pełn 27, 10.16

# LISTOPAD 2023 (c.d.)

Świty, zmierychy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.46	18.13	7.34	16.25	2.17	15.00	7.16	16.24	16.19	7.00	14.24	0.12	16.35	8.08	15.01	2.38	13.22	20.52		
	14.425	-14.42	14.920	-17.30	11.562	3.53	14.763	-15.96	2.585	13.70	22.214	-12.92	3.282	17.84	23.743	-3.06	20.057	-23.24	2.66840	1
3	4.49	18.10	7.45	16.23	2.21	14.57	7.16	16.19	16.10	6.51	14.16	0.04	16.27	7.60	14.53	2.30	13.14	20.44		
	14.556	-15.05	15.126	-18.38	11.696	2.84	14.854	-16.38	2.567	13.62	22.213	-12.92	3.277	17.82	23.740	-3.07	20.059	-23.23	2.79983	3
5	4.52	18.06	7.57	16.20	2.25	14.53	7.17	16.14	16.02	6.41	14.08	23.52	16.18	7.51	14.45	2.22	13.06	20.36		
	14.687	-15.67	15.332	-19.40	11.831	2.13	14.947	-16.80	2.549	13.54	22.213	-12.92	3.271	17.80	23.738	-3.08	20.061	-23.23	2.93125	5
7	4.55	18.03	8.08	16.18	2.29	14.49	7.17	16.09	15.54	6.32	14.00	23.45	16.10	7.43	14.37	2.14	12.59	20.29		
	14.820	-16.27	15.540	-20.36	11.967	1.41	15.039	-17.21	2.532	13.45	22.214	-12.91	3.266	17.78	23.736	-3.09	20.062	-23.22	3.06267	7
9	4.59	18.01	8.18	16.17	2.33	14.46	7.17	16.04	15.45	6.22	13.52	23.37	16.02	7.34	14.29	2.06	12.51	20.21		
	14.954	-16.85	15.748	-21.26	12.104	0.67	15.133	-17.62	2.514	13.37	22.215	-12.90	3.260	17.76	23.734	-3.11	20.064	-23.22	3.19408	9
11	5.02	17.58	8.29	16.16	2.38	14.42	7.18	15.60	15.37	6.13	13.44	23.29	15.54	7.26	14.21	1.58	12.43	20.13		
	15.088	-17.41	15.957	-22.08	12.241	-0.09	15.227	-18.01	2.497	13.29	22.216	-12.89	3.254	17.74	23.733	-3.12	20.066	-23.21	3.32550	11
13	5.05	17.55	8.39	16.15	2.42	14.39	7.18	15.55	15.28	6.04	13.37	23.21	15.46	7.18	14.13	1.50	12.35	20.06		
	15.224	-17.95	16.167	-22.83	12.380	-0.86	15.322	-18.40	2.479	13.22	22.218	-12.88	3.249	17.72	23.731	-3.12	20.069	-23.21	3.45692	13
15	5.08	17.53	8.49	16.14	2.47	14.35	7.18	15.50	15.20	5.54	13.29	23.14	15.38	7.09	14.06	1.42	12.28	19.58		
	15.361	-18.47	16.377	-23.51	12.519	-1.64	15.417	-18.77	2.463	13.14	22.220	-12.86	3.243	17.69	23.730	-3.13	20.071	-23.20	3.58834	15
17	5.11	17.51	8.58	16.15	2.51	14.31	7.18	15.46	15.11	5.45	13.21	23.06	15.30	7.01	13.58	1.34	12.20	19.50		
	15.498	-18.97	16.587	-24.10	12.659	-2.43	15.513	-19.14	2.446	13.06	22.222	-12.84	3.237	17.67	23.728	-3.14	20.073	-23.19	3.71977	17
19	5.14	17.49	9.07	16.15	2.56	14.28	7.19	15.41	15.03	5.36	13.13	22.59	15.22	6.53	13.50	1.26	12.12	19.43		
	15.636	-19.45	16.797	-24.62	12.800	-3.22	15.610	-19.49	2.430	12.99	22.225	-12.82	3.232	17.65	23.727	-3.15	20.076	-23.19	3.85119	19
21	5.17	17.47	9.15	16.16	3.01	14.24	7.19	15.37	14.55	5.27	13.05	22.51	15.14	6.44	13.42	1.18	12.04	19.35		
	15.776	-19.90	17.005	-25.05	12.942	-4.03	15.707	-19.83	2.414	12.92	22.229	-12.80	3.226	17.63	23.726	-3.15	20.079	-23.18	3.98261	21
23	5.20	17.45	9.22	16.18	3.06	14.20	7.19	15.33	14.46	5.17	12.58	22.44	15.06	6.36	13.34	1.10	11.57	19.27		
	15.916	-20.33	17.212	-25.39	13.085	-4.83	15.805	-20.17	2.399	12.85	22.233	-12.77	3.221	17.61	23.725	-3.16	20.081	-23.17	4.11403	23
25	5.22	17.43	9.29	16.20	3.11	14.17	7.19	15.29	14.38	5.08	12.50	22.36	14.58	6.28	13.26	1.02	11.49	19.20		
	16.057	-20.74	17.415	-25.64	13.229	-5.64	15.903	-20.49	2.384	12.79	22.237	-12.74	3.215	17.59	23.724	-3.16	20.084	-23.16	4.24545	25
27	5.25	17.42	9.34	16.23	3.16	14.13	7.20	15.25	14.30	4.59	12.42	22.29	14.50	6.19	13.18	0.54	11.41	19.12		
	16.199	-21.12	17.613	-25.80	13.374	-6.45	16.003	-20.80	2.370	12.72	22.242	-12.71	3.210	17.57	23.723	-3.17	20.087	-23.16	4.37687	27
29	5.27	17.41	9.38	16.26	3.22	14.10	7.20	15.21	14.21	4.50	12.34	22.21	14.42	6.11	13.10	0.46	11.33	19.04		
	16.341	-21.47	17.805	-25.87	13.520	-7.26	16.102	-21.09	2.357	12.66	22.247	-12.68	3.205	17.55	23.723	-3.17	20.091	-23.15	4.50829	29

# GRUDZIEŃ 2023

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										→ Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2460																					
335	1	Pią	280	16.54266	11.09	16.2905	-21.48	0.98611	8.0224	25.42	62.356	4.1	83	736	1134.6	1533	1850	248.9	1146	1252	1
336	2	Sob	281	16.58232	10.46	16.3324	-21.57	0.98595	8.5400	22.36	62.865	5.1	75	738	1135.0	1532	2006	339.5	1210	1248	2
337	3	Nie	282	17.02197	10.23	16.3743	-22.06	0.98580	9.4215	18.35	63.218	6.1	67	739	1135.4	1531	2122	426.3	1226	1244	3
338	4	Pon	283	17.06163	9.59	16.4204	-22.14	0.98566	10.2740	13.54	63.385	7.1	57	740	1135.8	1531	2236	509.9	1238	1240	4
339	5	Wto	284	17.10128	9.35	16.4625	-22.22	0.98552	11.1104	8.43	63.348	0.2	48	742	1136.2	1530	2348	550.9	1248	1236	5
340	6	Śro	285	17.14094	9.10	16.5046	-22.29	0.98538	11.5327	3.13	63.106	1.2	39	743	1136.6	1530	****	630.6	1256	1232	6
341	7	Czw	286	17.18059	8.44	16.5508	-22.36	0.98525	12.3552	-2.28	62.675	2.2	30	744	1137.0	1529	100	710.0	1304	1228	7
342	8	Pią	287	17.22025	8.18	16.5931	-22.43	0.98512	13.1926	-8.09	62.084	3.2	21	746	1137.4	1529	213	750.4	1313	1224	8
343	9	Sob	288	17.25590	7.52	17.0354	-22.49	0.98500	14.0517	-13.40	61.380	4.2	14	747	1137.9	1529	329	833.1	1324	1221	9
344	10	Nie	289	17.29556	7.25	17.0818	-22.54	0.98488	14.5431	-18.45	60.615	5.2	7	748	1138.3	1528	450	919.4	1337	1217	10
345	11	Pon	290	17.33522	6.57	17.1242	-22.60	0.98476	15.4801	-23.05	59.851	6.2	3	749	1138.8	1528	614	1010.2	1357	1213	11
346	12	Wto	291	17.37487	6.29	17.1706	-23.04	0.98464	16.4604	-26.17	59.145	7.2	0	750	1139.3	1528	740	1106.2	1426	1209	12
347	13	Śro	292	17.41453	6.01	17.2131	-23.09	0.98453	17.4759	-27.58	58.549	0.5	0	751	1139.7	1528	859	1206.5	1512	1205	13
348	14	Czw	293	17.45419	5.33	17.2556	-23.12	0.98442	18.5156	-27.53	58.100	1.5	3	752	1140.2	1528	1003	1309.2	1618	1201	14
349	15	Pią	294	17.49384	5.04	17.3021	-23.16	0.98432	19.5526	-25.57	57.813	2.5	8	753	1140.7	1528	1047	1411.2	1743	1157	15
350	16	Sob	295	17.53350	4.35	17.3447	-23.19	0.98422	20.5623	-22.20	57.689	3.5	15	754	1141.2	1528	1116	1510.1	1915	1153	16
351	17	Nie	296	17.57315	4.05	17.3913	-23.21	0.98412	21.5342	-17.22	57.712	4.5	25	755	1141.7	1529	1136	1604.9	2048	1149	17
352	18	Pon	297	18.01281	3.36	17.4339	-23.23	0.98403	22.4730	-11.28	57.855	5.5	35	755	1142.1	1529	1150	1655.9	2218	1145	18
353	19	Wto	298	18.05247	3.06	17.4805	-23.25	0.98394	23.3837	-5.03	58.090	6.5	46	756	1142.6	1529	1201	1744.2	2345	1141	19
354	20	Śro	299	18.09212	2.37	17.5231	-23.26	0.98386	0.2814	1.34	58.395	0.7	58	757	1143.1	1529	1211	1831.2	****	1137	20
355	21	Czw	300	18.13177	2.07	17.5657	-23.26	0.98378	1.1737	8.02	58.750	1.7	68	757	1143.6	1530	1222	1918.3	110	1133	21
356	22	Pią	301	18.17143	1.37	18.0124	-23.26	0.98371	2.0758	14.03	59.149	2.7	78	758	1144.1	1530	1234	2006.8	236	1129	22
357	23	Sob	302	18.21109	1.08	18.0550	-23.26	0.98364	3.0011	19.20	59.586	3.7	86	758	1144.6	1531	1249	2057.7	402	1125	23
358	24	Nie	303	18.25074	0.38	18.1016	-23.25	0.98358	3.5447	23.35	60.062	4.7	93	759	1145.1	1532	1310	2151.2	529	1122	24
359	25	Pon	304	18.29040	0.08	18.1442	-23.24	0.98352	4.5135	26.31	60.574	5.7	97	759	1145.6	1532	1340	2246.8	652	1118	25
360	26	Wto	305	18.33006	-0.22	18.1909	-23.22	0.98347	5.4939	27.59	61.113	6.7	100	759	1146.1	1533	1422	2343.1	806	1114	26
361	27	Śro	306	18.36571	-0.51	18.2335	-23.20	0.98343	6.4726	27.55	61.662	0.4	100	800	1146.6	1534	1521	*****	903	1110	27
362	28	Czw	307	18.40537	-1.20	18.2801	-23.17	0.98339	7.4322	26.24	62.195	1.4	98	800	1147.1	1535	1631	038.2	944	1106	28
363	29	Pią	308	18.44502	-1.50	18.3226	-23.14	0.98336	8.3620	23.38	62.681	2.4	94	800	1147.6	1535	1748	130.5	1011	1102	29
364	30	Sob	309	18.48468	-2.19	18.3652	-23.10	0.98334	9.2554	19.51	63.081	3.4	89	800	1148.1	1536	1904	219.2	1030	1058	30
365	31	Nie	310	18.52434	-2.47	18.4117	-23.06	0.98332	10.1222	15.19	63.359	4.4	82	800	1148.5	1537	2019	304.2	1044	1054	31

Fazy Księżyca [Dm, h.mm]:      3kw 5, 6.49      Now 13, 0.32      1kw 19, 19.39      Pełn 27, 1.33

# GRUDZIEŃ 2023 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	17.40	9.41	16.29	3.27	14.06	7.20	15.17	14.13	4.41	12.27	22.14	14.34	6.03	13.02	0.38	11.26	18.57		
	16.485	-21.79	17.987	-25.84	13.667	-8.07	16.203	-21.38	2.344	12.61	22.253	-12.64	3.199	17.53	23.722	-3.17	20.094	-23.14	4.63972	1
3	5.32	17.39	9.42	16.33	3.33	14.03	7.20	15.13	14.05	4.32	12.19	22.07	14.26	5.55	12.54	0.30	11.18	18.49		
	16.629	-22.09	18.156	-25.72	13.815	-8.87	16.304	-21.65	2.332	12.55	22.259	-12.60	3.194	17.51	23.722	-3.17	20.097	-23.13	4.77114	3
5	5.35	17.38	9.42	16.36	3.38	13.59	7.20	15.09	13.56	4.24	12.11	21.60	14.18	5.46	12.47	0.22	11.10	18.42		
	16.774	-22.36	18.308	-25.51	13.964	-9.67	16.406	-21.91	2.320	12.51	22.265	-12.56	3.189	17.49	23.722	-3.17	20.101	-23.12	4.90256	5
7	5.37	17.38	9.39	16.38	3.44	13.56	7.20	15.06	13.48	4.15	12.03	21.52	14.10	5.38	12.39	0.15	11.02	18.34		
	16.919	-22.60	18.437	-25.21	14.114	-10.45	16.508	-22.16	2.309	12.46	22.272	-12.52	3.184	17.47	23.722	-3.17	20.104	-23.11	5.03398	7
9	5.39	17.38	9.34	16.39	3.49	13.53	7.20	15.02	13.40	4.06	11.56	21.45	14.02	5.30	12.31	0.07	10.55	18.26		
	17.065	-22.81	18.537	-24.84	14.266	-11.23	16.611	-22.39	2.300	12.42	22.279	-12.48	3.179	17.45	23.722	-3.17	20.108	-23.10	5.16539	9
11	5.41	17.38	9.27	16.38	3.55	13.50	7.20	14.59	13.32	3.57	11.48	21.38	13.54	5.21	12.23	23.55	10.47	18.19		
	17.212	-22.99	18.600	-24.40	14.418	-12.00	16.714	-22.60	2.290	12.38	22.287	-12.43	3.174	17.43	23.722	-3.17	20.111	-23.09	5.29682	11
13	5.42	17.38	9.16	16.35	4.01	13.47	7.20	14.56	13.24	3.49	11.40	21.31	13.46	5.13	12.15	23.47	10.39	18.11		
	17.359	-23.14	18.619	-23.91	14.573	-12.75	16.818	-22.81	2.282	12.35	22.295	-12.38	3.170	17.41	23.723	-3.16	20.115	-23.08	5.42824	13
15	5.44	17.38	9.02	16.30	4.06	13.44	7.20	14.53	13.15	3.40	11.33	21.24	13.38	5.05	12.07	23.39	10.32	18.04		
	17.506	-23.26	18.585	-23.37	14.728	-13.49	16.923	-23.00	2.274	12.32	22.303	-12.33	3.165	17.40	23.723	-3.16	20.119	-23.07	5.55967	15
17	5.45	17.39	8.45	16.21	4.12	13.41	7.19	14.50	13.07	3.32	11.25	21.17	13.30	4.57	11.59	23.31	10.24	17.56		
	17.653	-23.35	18.496	-22.81	14.884	-14.21	17.028	-23.17	2.268	12.30	22.312	-12.28	3.161	17.38	23.724	-3.15	20.123	-23.06	5.69109	17
19	5.47	17.40	8.24	16.09	4.18	13.38	7.19	14.47	12.59	3.24	11.18	21.10	13.21	4.48	11.52	23.24	10.16	17.49		
	17.801	-23.41	18.356	-22.23	15.042	-14.91	17.133	-23.33	2.262	12.28	22.321	-12.23	3.157	17.36	23.725	-3.14	20.127	-23.05	5.82251	19
21	5.48	17.40	8.01	15.54	4.24	13.36	7.19	14.45	12.51	3.15	11.10	21.03	13.13	4.40	11.44	23.16	10.08	17.41		
	17.949	-23.44	18.176	-21.65	15.202	-15.59	17.239	-23.47	2.257	12.26	22.330	-12.17	3.153	17.35	23.726	-3.14	20.131	-23.04	5.95393	21
23	5.49	17.41	7.38	15.38	4.29	13.34	7.18	14.42	12.43	3.07	11.02	20.56	13.05	4.32	11.36	23.08	10.01	17.34		
	18.097	-23.43	17.980	-21.12	15.362	-16.25	17.346	-23.60	2.253	12.25	22.340	-12.11	3.149	17.33	23.727	-3.13	20.135	-23.03	6.08535	23
25	5.50	17.43	7.16	15.22	4.35	13.32	7.17	14.40	12.35	2.59	10.55	20.49	12.57	4.24	11.28	23.00	9.53	17.26		
	18.245	-23.40	17.792	-20.66	15.524	-16.89	17.452	-23.71	2.250	12.25	22.350	-12.05	3.145	17.32	23.728	-3.12	20.139	-23.02	6.21677	25
27	5.50	17.44	6.56	15.08	4.41	13.30	7.17	14.38	12.27	2.51	10.47	20.42	12.50	4.16	11.20	22.53	9.45	17.18		
	18.393	-23.33	17.636	-20.33	15.688	-17.50	17.560	-23.81	2.247	12.25	22.360	-11.99	3.142	17.31	23.729	-3.11	20.144	-23.01	6.34819	27
29	5.51	17.46	6.40	14.54	4.47	13.28	7.16	14.36	12.19	2.43	10.39	20.35	12.42	4.08	11.12	22.45	9.38	17.11		
	18.541	-23.23	17.524	-20.16	15.852	-18.08	17.667	-23.89	2.246	12.25	22.371	-11.93	3.139	17.29	23.731	-3.10	20.148	-23.00	6.47962	29
31	5.51	17.47	6.29	14.43	4.52	13.26	7.15	14.34	12.11	2.35	10.32	20.28	12.34	3.59	11.05	22.37	9.30	17.03		
	18.688	-23.10	17.461	-20.14	16.018	-18.63	17.775	-23.95	2.245	12.26	22.382	-11.86	3.136	17.28	23.733	-3.09	20.152	-22.99	6.61104	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2023

Nowy Rok	Nie	1 styczeń	Zesłania Ducha Świętego	Nie	28 maj
Najświętszej Maryi Panny Rodzicielki	Nie	1 styczeń	Dzień Dziecka	Czw	1 czerwiec
Objawienia Pańskiego (Trzech Króli)	Pią	6 styczeń	Trójcy Najświętszej	Nie	4 czerwiec
Juliański Nowy Rok	Sob	14 styczeń	Dzień Dziękczynienia	Nie	4 czerwiec
Dzień Babci	Sob	21 styczeń	Boże Ciało	Czw	8 czerwiec
Dzień Dziadka	Nie	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	16 czerwiec
Ofiarowania Pańskiego	Czw	2 luty	Dzień Ojca	Pią	23 czerwiec
Matki Boskiej Gromnicznej	Czw	2 luty	Noc Świętojańska	Pią	23 czerwiec
Walentynki	Wto	14 luty	Św. Piotra i Pawła	Czw	29 czerwiec
Tłusty czwartek	Czw	16 luty	Wniebowzięcia N.M.P.	Wto	15 sierpień
Święto UMK	Nie	19 luty	Święto Wojska Polskiego	Wto	15 sierpień
Środa Popielcowa	Śro	22 luty	Dzień Solidarności i Wolności	Czw	31 sierpień
Dzień Kobiet	Śro	8 marzec	Dzień Programisty	Śro	13 wrzesień
Narodowy Dzień Życia	Pią	24 marzec	Dożynki – Święto Plonów	Sob	23 wrzesień
Niedziela Palmowa	Nie	2 kwiecień	Dzień Edukacji Narodowej	Sob	14 październik
Niedziela Wielkanocna	Nie	9 kwiecień	Dzień Papieski	Nie	15 październik
Niedziela Miłosierdzia Bożego	Nie	16 kwiecień	Dzień Papieża Jana Pawła II	Pon	16 październik
Święto Pracy	Pon	1 maj	Wszystkich Świętych	Śro	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Wto	2 maj	Zaduszki	Czw	2 listopad
Najświętsza Maryja Królowa Polski	Śro	3 maj	Święto Niepodległości	Sob	11 listopad
Święto Konstytucji 3 Maja	Śro	3 maj	Pierwsza niedziela Adwentu	Nie	3 grudzień
Dzień Polskiej Niezapominajki	Pon	15 maj	Niepokalane Poczęcie N.M.P.	Pią	8 grudzień
Wniebowstąpienia Pańskiego	Czw	18 maj	Boże Narodzenie	Pon	25 grudzień
Dzień Matki	Pią	26 maj	Sylwester	Nie	31 grudzień



# Kalendarz astronomiczny 2024

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!  
*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2024 MARZEC 31**

Dla całego roku przyjęto: TDT – UT = 71 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 4.06**, Lato **VI 20, 21.51**, Jesień **IX 22, 13.44**, Zima **XII 21, 10.20**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **31 marca do 27 października 2024 r.**

### Oznaczenia:

Dr — dzień 2024 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2024

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2460																		
1	1	Pon	311	18.56399	-3.16	18.4542	-23.01	0.98331	10.5621	10.16	63.481	5.4	74	800	1149.0	1538	2132	346.2	1054	1050	1
2	2	Wto	312	19.00365	-3.44	18.5007	-22.56	0.98331	11.3848	4.51	63.421	6.4	66	800	1149.5	1540	2243	426.2	1103	1046	2
3	3	Śro	313	19.04330	-4.12	18.5431	-22.51	0.98331	12.2042	-0.44	63.165	7.4	57	759	1149.9	1541	2355	505.2	1111	1042	3
4	4	Czw	314	19.08296	-4.40	18.5856	-22.45	0.98331	13.0309	-6.21	62.711	0.3	47	759	1150.4	1542	****	544.5	1120	1038	4
5	5	Pią	315	19.12261	-5.07	19.0319	-22.38	0.98332	13.4719	-11.51	62.077	1.3	37	759	1150.9	1543	108	625.4	1129	1034	5
6	6	Sob	316	19.16227	-5.33	19.0743	-22.32	0.98334	14.3421	-17.00	61.296	2.3	28	758	1151.3	1544	225	709.0	1141	1030	6
7	7	Nie	317	19.20193	-5.60	19.1205	-22.24	0.98336	15.2522	-21.35	60.416	3.3	19	758	1151.7	1546	346	756.8	1157	1027	7
8	8	Pon	318	19.24158	-6.26	19.1628	-22.17	0.98338	16.2104	-25.13	59.502	4.3	12	757	1152.2	1547	511	849.7	1221	1023	8
9	9	Wto	319	19.28124	-6.51	19.2050	-22.08	0.98341	17.2129	-27.32	58.627	5.3	6	757	1152.6	1549	634	948.0	1258	1019	9
10	10	Śro	320	19.32089	-7.16	19.2511	-21.60	0.98344	18.2523	-28.09	57.863	6.3	1	756	1153.0	1550	746	1050.3	1355	1015	10
11	11	Czw	321	19.36055	-7.40	19.2932	-21.51	0.98347	19.3028	-26.52	57.278	7.3	0	756	1153.4	1552	840	1154.2	1514	1011	11
12	12	Pią	322	19.40021	-8.04	19.3352	-21.41	0.98351	20.3409	-23.43	56.916	1.0	1	755	1153.8	1553	916	1256.4	1647	1007	12
13	13	Sob	323	19.43586	-8.27	19.3812	-21.31	0.98355	21.3435	-18.60	56.798	2.0	5	754	1154.2	1555	939	1355.0	1824	1003	13
14	14	Nie	324	19.47552	-8.49	19.4231	-21.21	0.98360	22.3114	-13.08	56.916	3.0	12	753	1154.6	1556	956	1449.3	1959	959	14
15	15	Pon	325	19.51517	-9.11	19.4649	-21.10	0.98365	23.2435	-6.35	57.239	4.0	21	752	1154.9	1558	1008	1540.1	2130	955	15
16	16	Wto	326	19.55483	-9.32	19.5107	-20.59	0.98370	0.1542	0.12	57.718	5.0	31	752	1155.3	1559	1019	1628.6	2257	951	16
17	17	Śro	327	19.59448	-9.52	19.5524	-20.48	0.98376	1.0550	6.50	58.299	6.0	42	751	1155.6	1601	1030	1716.3	****	947	17
18	18	Czw	328	20.03414	-10.12	19.5940	-20.36	0.98382	1.5613	13.01	58.933	0.3	53	749	1155.9	1603	1041	1804.5	024	943	18
19	19	Pią	329	20.07380	-10.31	20.0355	-20.23	0.98389	2.4752	18.27	59.579	1.3	64	748	1156.3	1605	1055	1854.3	150	939	19
20	20	Sob	330	20.11345	-10.49	20.0810	-20.11	0.98396	3.4127	22.53	60.209	2.3	74	747	1156.6	1606	1113	1946.4	316	935	20
21	21	Nie	331	20.15311	-11.07	20.1224	-19.58	0.98404	4.3702	26.04	60.807	3.3	82	746	1156.9	1608	1140	2040.6	440	931	21
22	22	Pon	332	20.19276	-11.23	20.1637	-19.44	0.98413	5.3403	27.51	61.364	4.3	90	745	1157.1	1610	1217	2136.0	556	928	22
23	23	Wto	333	20.23242	-11.39	20.2050	-19.30	0.98422	6.3114	28.09	61.878	5.3	95	744	1157.4	1612	1310	2230.9	658	924	23
24	24	Śro	334	20.27208	-11.54	20.2502	-19.16	0.98431	7.2711	26.59	62.346	6.3	98	742	1157.7	1614	1417	2323.7	743	920	24
25	25	Czw	335	20.31173	-12.09	20.2912	-19.02	0.98441	8.2039	24.32	62.761	7.3	100	741	1157.9	1615	1531	*****	814	916	25
26	26	Pią	336	20.35139	-12.22	20.3322	-18.47	0.98452	9.1101	20.59	63.115	0.7	100	740	1158.1	1617	1648	013.5	836	912	26
27	27	Sob	337	20.39104	-12.35	20.3732	-18.32	0.98464	9.5817	16.37	63.390	1.7	97	738	1158.3	1619	1804	059.7	850	908	27
28	28	Nie	338	20.43070	-12.47	20.4140	-18.16	0.98476	10.4256	11.40	63.566	2.7	93	737	1158.5	1621	1918	142.7	902	904	28
29	29	Pon	339	20.47035	-12.58	20.4548	-18.00	0.98488	11.2543	6.18	63.619	3.7	88	735	1158.7	1623	2030	223.3	911	900	29
30	30	Wto	340	20.51001	-13.08	20.4955	-17.44	0.98501	12.0732	0.45	63.526	4.7	81	734	1158.9	1625	2141	302.5	919	856	30
31	31	Śro	341	20.54566	-13.18	20.5401	-17.27	0.98515	12.4923	-4.51	63.267	5.7	73	732	1159.0	1627	2252	341.3	927	852	31

Fazy Księżyca [Dm, h.mm]:      3kw 4, 4.30      Nów 11, 12.57      1kw 18, 4.53      Pełn 25, 18.54

# STYCZEŃ 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm])  
 oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet  
 w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.48	6.24	14.38	4.55	13.26	7.15	14.33	12.07	2.31	10.28	20.25	12.30	3.55	11.01	22.33	9.26	16.60		
	18.762	-23.02	17.447	-20.18	16.102	-18.89	17.829	-23.97	2.246	12.26	22.387	-11.83	3.134	17.28	23.733	-3.08	20.155	-22.98	6.67675	1
3	5.51	17.50	6.18	14.29	5.01	13.25	7.13	14.31	11.59	2.24	10.21	20.18	12.22	3.47	10.53	22.26	9.18	16.52		
	18.909	-22.85	17.453	-20.35	16.270	-19.40	17.937	-24.01	2.246	12.28	22.399	-11.76	3.131	17.26	23.735	-3.07	20.159	-22.97	6.80817	3
5	5.51	17.52	6.15	14.22	5.06	13.24	7.12	14.30	11.51	2.16	10.13	20.11	12.14	3.39	10.45	22.18	9.11	16.45		
	19.055	-22.64	17.498	-20.62	16.439	-19.87	18.046	-24.03	2.248	12.30	22.411	-11.69	3.129	17.25	23.737	-3.05	20.164	-22.96	6.93959	5
7	5.51	17.54	6.14	14.17	5.11	13.23	7.11	14.28	11.44	2.09	10.05	20.05	12.06	3.31	10.37	22.10	9.03	16.37		
	19.202	-22.40	17.576	-20.93	16.610	-20.30	18.155	-24.04	2.251	12.32	22.422	-11.62	3.126	17.25	23.739	-3.04	20.168	-22.95	7.07101	7
9	5.50	17.56	6.14	14.12	5.17	13.23	7.09	14.27	11.36	2.01	9.58	19.58	11.58	3.23	10.29	22.03	8.55	16.30		
	19.347	-22.14	17.680	-21.28	16.782	-20.70	18.264	-24.02	2.254	12.35	22.435	-11.55	3.124	17.24	23.742	-3.02	20.173	-22.93	7.20243	9
11	5.49	17.59	6.17	14.10	5.22	13.23	7.08	14.26	11.28	1.54	9.50	19.51	11.50	3.15	10.22	21.55	8.48	16.22		
	19.492	-21.84	17.806	-21.64	16.954	-21.06	18.373	-23.99	2.259	12.38	22.447	-11.47	3.122	17.23	23.744	-3.00	20.177	-22.92	7.33386	11
13	5.48	18.01	6.20	14.08	5.26	13.23	7.06	14.25	11.20	1.46	9.43	19.45	11.42	3.07	10.14	21.48	8.40	16.15		
	19.637	-21.52	17.950	-21.97	17.128	-21.39	18.482	-23.94	2.264	12.42	22.460	-11.40	3.120	17.22	23.747	-2.99	20.182	-22.91	7.46528	13
15	5.47	18.04	6.23	14.07	5.31	13.24	7.04	14.24	11.12	1.39	9.35	19.38	11.34	2.59	10.06	21.40	8.32	16.07		
	19.780	-21.17	18.107	-22.28	17.303	-21.67	18.592	-23.88	2.270	12.46	22.473	-11.32	3.119	17.22	23.749	-2.97	20.186	-22.90	7.59670	15
17	5.46	18.07	6.28	14.08	5.35	13.24	7.02	14.24	11.05	1.32	9.28	19.31	11.26	2.51	9.58	21.32	8.25	15.60		
	19.923	-20.79	18.277	-22.54	17.478	-21.91	18.701	-23.80	2.277	12.51	22.486	-11.24	3.118	17.22	23.752	-2.95	20.191	-22.89	7.72812	17
19	5.45	18.09	6.32	14.09	5.39	13.26	7.00	14.23	10.57	1.25	9.20	19.25	11.18	2.43	9.50	21.25	8.17	15.52		
	20.065	-20.39	18.455	-22.74	17.654	-22.11	18.811	-23.70	2.285	12.56	22.499	-11.17	3.117	17.21	23.755	-2.93	20.196	-22.88	7.85954	19
21	5.43	18.12	6.36	14.11	5.43	13.27	6.58	14.23	10.49	1.18	9.13	19.18	11.10	2.35	9.43	21.17	8.09	15.45		
	20.207	-19.96	18.642	-22.88	17.831	-22.27	18.920	-23.58	2.293	12.62	22.513	-11.09	3.116	17.21	23.758	-2.91	20.200	-22.87	7.99096	21
23	5.41	18.15	6.41	14.14	5.47	13.29	6.56	14.22	10.42	1.11	9.05	19.11	11.02	2.27	9.35	21.10	8.02	15.37		
	20.347	-19.51	18.836	-22.96	18.008	-22.39	19.030	-23.45	2.303	12.67	22.526	-11.00	3.115	17.21	23.761	-2.89	20.205	-22.85	8.12238	23
25	5.39	18.18	6.45	14.18	5.50	13.31	6.53	14.22	10.34	1.04	8.58	19.05	11.05	2.19	9.27	21.02	7.54	15.30		
	20.487	-19.03	19.035	-22.96	18.186	-22.46	19.139	-23.30	2.313	12.74	22.540	-10.92	3.115	17.21	23.764	-2.87	20.210	-22.84	8.25380	25
27	5.37	18.21	6.48	14.23	5.53	13.34	6.51	14.22	10.26	0.57	8.50	18.58	10.47	2.12	9.19	20.55	7.46	15.22		
	20.625	-18.53	19.238	-22.88	18.364	-22.48	19.249	-23.13	2.324	12.80	22.554	-10.84	3.115	17.21	23.767	-2.85	20.214	-22.83	8.38523	27
29	5.35	18.24	6.52	14.29	5.56	13.37	6.48	14.22	10.19	0.50	8.43	18.52	10.39	2.04	9.11	20.47	7.39	15.15		
	20.763	-18.00	19.446	-22.72	18.542	-22.46	19.358	-22.94	2.336	12.87	22.568	-10.76	3.115	17.21	23.771	-2.82	20.219	-22.82	8.51664	29
31	5.32	18.28	6.55	14.36	5.58	13.40	6.45	14.22	10.11	0.44	8.35	18.45	10.31	1.56	9.04	20.39	7.31	15.07		
	20.900	-17.46	19.656	-22.48	18.720	-22.40	19.467	-22.74	2.348	12.94	22.583	-10.67	3.115	17.21	23.774	-2.80	20.223	-22.81	8.64806	31

# LUTY 2024

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
32	1	Czw	2460	342	20.58532	-13.26	20.5806	-17.11	0.98529	13.3219	-10.21	62.831	6.7	65	730	1159.2	1629	****	420.9	936	848	1
33	2	Pią	343	21.02497	-13.34	21.0210	-16.53	0.98544	14.1725	-15.33	62.219	7.7	55	729	1159.3	1631	006	502.4	946	844	2	
34	3	Sob	344	21.06463	-13.41	21.0614	-16.36	0.98559	15.0548	-20.14	61.448	0.5	45	727	1159.4	1632	124	547.2	959	840	3	
35	4	Nie	345	21.10429	-13.48	21.1017	-16.18	0.98575	15.5821	-24.09	60.550	1.5	35	725	1159.5	1634	245	636.3	1018	836	4	
36	5	Pon	346	21.14394	-13.53	21.1419	-16.00	0.98591	16.5533	-26.57	59.577	2.5	25	724	1159.6	1636	408	730.6	1047	833	5	
37	6	Wto	347	21.18360	-13.58	21.1820	-15.42	0.98607	17.5656	-28.16	58.596	3.5	16	722	1159.7	1638	525	829.8	1133	829	6	
38	7	Śro	348	21.22326	-14.02	21.2221	-15.23	0.98623	19.0060	-27.47	57.687	4.5	9	720	1159.8	1640	627	932.3	1241	825	7	
39	8	Czw	349	21.26291	-14.05	21.2621	-15.05	0.98640	20.0523	-25.25	56.933	5.5	3	718	1159.8	1642	711	1035.4	1408	821	8	
40	9	Pią	350	21.30257	-14.07	21.3020	-14.45	0.98657	21.0753	-21.16	56.407	6.5	0	716	1159.9	1644	740	1136.7	1546	817	9	
41	10	Sob	351	21.34222	-14.09	21.3418	-14.26	0.98675	22.0715	-15.40	56.159	0.5	0	714	1159.9	1646	759	1234.2	1725	813	10	
42	11	Nie	352	21.38188	-14.10	21.3815	-14.07	0.98692	23.0324	-9.07	56.209	1.5	3	712	1159.9	1648	814	1328.2	1901	809	11	
43	12	Pon	353	21.42153	-14.10	21.4212	-13.47	0.98710	23.5700	-2.05	56.541	2.5	9	711	1159.9	1650	826	1419.5	2033	805	12	
44	13	Wto	354	21.46119	-14.09	21.4607	-13.27	0.98728	0.4912	4.55	57.109	3.5	17	709	1159.9	1652	836	1509.3	2204	801	13	
45	14	Śro	355	21.50084	-14.08	21.5002	-13.07	0.98747	1.4108	11.31	57.847	4.5	27	707	1159.9	1654	848	1559.0	2334	757	14	
46	15	Czw	356	21.54050	-14.05	21.5357	-12.46	0.98766	2.3351	17.21	58.681	5.5	37	705	1159.8	1656	901	1649.8	****	753	15	
47	16	Pią	357	21.58015	-14.02	21.5750	-12.25	0.98785	3.2802	22.09	59.544	6.5	48	703	1159.8	1658	918	1742.2	102	749	16	
48	17	Sob	358	22.01581	-13.59	22.0143	-12.05	0.98804	4.2351	25.41	60.378	0.8	59	700	1159.7	1700	941	1836.4	229	745	17	
49	18	Nie	359	22.05547	-13.54	22.0535	-11.44	0.98824	5.2050	27.47	61.145	1.8	69	658	1159.6	1702	1015	1931.7	349	741	18	
50	19	Pon	360	22.09512	-13.49	22.0927	-11.22	0.98844	6.1757	28.23	61.818	2.8	78	656	1159.6	1704	1103	2026.6	455	737	19	
51	20	Wto	361	22.13478	-13.43	22.1317	-11.01	0.98865	7.1354	27.32	62.387	3.8	85	654	1159.5	1706	1206	2119.8	545	734	20	
52	21	Śro	362	22.17443	-13.37	22.1707	-10.39	0.98886	8.0733	25.21	62.850	4.8	92	652	1159.4	1708	1318	2210.0	619	730	21	
53	22	Czw	363	22.21409	-13.29	22.2057	-10.18	0.98907	8.5816	22.03	63.210	5.8	96	650	1159.2	1709	1435	2256.9	642	726	22	
54	23	Pią	364	22.25374	-13.22	22.2445	-9.56	0.98929	9.4559	17.51	63.470	6.8	99	648	1159.1	1711	1551	2340.7	658	722	23	
55	24	Sob	365	22.29340	-13.13	22.2834	-9.34	0.98952	10.3105	12.60	63.635	7.8	100	645	1159.0	1713	1705	*****	710	718	24	
56	25	Nie	366	22.33305	-13.04	22.3221	-9.11	0.98975	11.1412	7.42	63.702	0.9	99	643	1158.8	1715	1818	022.0	720	714	25	
57	26	Pon	367	22.37271	-12.55	22.3608	-8.49	0.98998	11.5611	2.08	63.666	1.9	97	641	1158.7	1717	1929	101.5	728	710	26	
58	27	Wto	368	22.41236	-12.44	22.3954	-8.27	0.99022	12.3755	-3.30	63.517	2.9	93	639	1158.5	1719	2041	140.3	736	706	27	
59	28	Śro	369	22.45202	-12.34	22.4340	-8.04	0.99046	13.2021	-9.03	63.242	3.9	87	637	1158.3	1721	2154	219.4	744	702	28	
60	29	Czw	370	22.49167	-12.22	22.4726	-7.41	0.99070	14.0427	-14.20	62.831	4.9	80	634	1158.1	1723	2309	259.9	753	658	29	

Fazy Księżyca [Dm, h.mm]:      3kw 3, 0.18      Now 10, 23.59      1kw 16, 16.01      Pełn 24, 13.30

## LUTY 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	5.31	18.29	6.56	14.39	5.59	13.42	6.44	14.22	10.08	0.40	8.32	18.42	10.27	1.52	8.60	20.36	7.27	15.03		
	20.968	-17.18	19.763	-22.33	18.809	-22.35	19.522	-22.64	2.355	12.98	22.590	-10.63	3.116	17.21	23.776	-2.79	20.226	-22.80	8.71377	1
3	5.28	18.33	6.58	14.47	6.01	13.46	6.41	14.23	10.00	0.34	8.24	18.35	10.19	1.44	8.52	20.28	7.20	14.56		
	21.104	-16.60	19.977	-21.96	18.986	-22.22	19.630	-22.41	2.368	13.06	22.604	-10.54	3.116	17.22	23.780	-2.76	20.230	-22.79	8.84519	3
5	5.25	18.36	7.00	14.55	6.02	13.50	6.38	14.23	9.53	0.27	8.17	18.29	10.11	1.36	8.44	20.21	7.12	14.48		
	21.239	-16.00	20.194	-21.50	19.164	-22.05	19.739	-22.17	2.383	13.14	22.619	-10.46	3.117	17.22	23.783	-2.74	20.235	-22.78	8.97661	5
7	5.22	18.39	7.02	15.04	6.04	13.54	6.34	14.24	9.45	0.21	8.09	18.22	10.03	1.29	8.36	20.13	7.04	14.41		
	21.372	-15.39	20.413	-20.95	19.341	-21.83	19.848	-21.91	2.398	13.22	22.634	-10.37	3.119	17.23	23.787	-2.71	20.239	-22.77	9.10804	7
9	5.19	18.43	7.02	15.14	6.04	13.58	6.31	14.24	9.38	0.14	8.02	18.16	9.56	1.21	8.29	20.06	6.56	14.33		
	21.505	-14.76	20.633	-20.32	19.517	-21.57	19.956	-21.63	2.414	13.31	22.649	-10.28	3.120	17.23	23.791	-2.69	20.244	-22.76	9.23946	9
11	5.16	18.46	7.03	15.24	6.05	14.03	6.28	14.25	9.30	0.08	7.54	18.10	9.48	1.13	8.21	19.58	6.49	14.26		
	21.637	-14.11	20.855	-19.59	19.693	-21.26	20.064	-21.34	2.430	13.40	22.664	-10.19	3.122	17.24	23.795	-2.66	20.248	-22.75	9.37088	11
13	5.12	18.50	7.03	15.35	6.05	14.08	6.24	14.26	9.23	0.02	7.47	18.03	9.40	1.06	8.13	19.51	6.41	14.18		
	21.769	-13.45	21.077	-18.78	19.868	-20.92	20.171	-21.04	2.447	13.49	22.679	-10.10	3.123	17.25	23.799	-2.63	20.252	-22.74	9.50229	13
15	5.09	18.53	7.03	15.47	6.05	14.14	6.20	14.26	9.16	23.52	7.39	17.57	9.32	0.58	8.05	19.43	6.33	14.11		
	21.899	-12.77	21.301	-17.86	20.043	-20.53	20.278	-20.72	2.465	13.59	22.694	-10.01	3.126	17.26	23.803	-2.61	20.257	-22.73	9.63371	15
17	5.05	18.57	7.02	15.59	6.05	14.19	6.17	14.27	9.08	23.45	7.32	17.50	9.24	0.50	7.58	19.36	6.26	14.03		
	22.029	-12.08	21.526	-16.86	20.216	-20.10	20.385	-20.38	2.483	13.69	22.709	-9.92	3.128	17.27	23.807	-2.58	20.261	-22.72	9.76513	17
19	5.01	19.00	7.01	16.11	6.04	14.25	6.13	14.28	9.01	23.39	7.24	17.44	9.17	0.43	7.50	19.28	6.18	13.56		
	22.157	-11.37	21.752	-15.77	20.388	-19.63	20.492	-20.03	2.502	13.79	22.724	-9.83	3.131	17.28	23.812	-2.55	20.265	-22.72	9.89655	19
21	4.57	19.04	6.59	16.24	6.03	14.30	6.09	14.29	8.54	23.33	7.17	17.37	9.09	0.35	7.42	19.21	6.10	13.48		
	22.285	-10.66	21.979	-14.58	20.559	-19.13	20.598	-19.67	2.522	13.89	22.739	-9.74	3.133	17.29	23.816	-2.52	20.269	-22.71	10.02797	21
23	4.53	19.07	6.57	16.37	6.02	14.36	6.05	14.30	8.46	23.27	7.09	17.31	9.01	0.27	7.34	19.13	6.03	13.40		
	22.413	-9.93	22.206	-13.30	20.730	-18.58	20.704	-19.29	2.542	14.00	22.755	-9.65	3.136	17.31	23.820	-2.50	20.273	-22.70	10.15940	23
25	4.49	19.11	6.55	16.51	6.00	14.42	6.01	14.31	8.39	23.21	7.02	17.24	8.53	0.20	7.27	19.06	5.55	13.33		
	22.539	-9.19	22.435	-11.93	20.899	-18.00	20.809	-18.89	2.563	14.10	22.770	-9.56	3.140	17.32	23.825	-2.47	20.277	-22.69	10.29081	25
27	4.44	19.15	6.53	17.05	5.58	14.48	5.56	14.32	8.32	23.15	6.54	17.18	8.46	0.12	7.19	18.58	5.47	13.25		
	22.665	-8.44	22.665	-10.48	21.067	-17.39	20.914	-18.49	2.584	14.21	22.785	-9.47	3.143	17.33	23.829	-2.44	20.281	-22.68	10.42223	27
29	4.40	19.19	6.50	17.20	5.56	14.55	5.52	14.33	8.24	23.09	6.47	17.11	8.38	0.05	7.11	18.51	5.40	13.18		
	22.790	-7.69	22.895	-8.94	21.233	-16.74	21.019	-18.07	2.606	14.32	22.801	-9.38	3.147	17.35	23.833	-2.41	20.285	-22.67	10.55364	29

# MARZEC 2024

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →										..... Czas strefowy [hhmm.] .....										
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
61	1	Pią	371	22.53133	-12.11	22.5110	-7.18	0.99095	14.5112	-19.09	62.276	5.9	71	632	1157.9	1725	****	342.9	805	654	1	
62	2	Sob	372	22.57099	-11.58	22.5455	-6.56	0.99120	15.4127	-23.15	61.582	6.9	62	630	1157.7	1727	028	429.4	821	650	2	
63	3	Nie	373	23.01064	-11.46	22.5839	-6.33	0.99145	16.3546	-26.22	60.763	7.9	52	627	1157.5	1728	149	520.3	844	646	3	
64	4	Pon	374	23.05030	-11.33	23.0222	-6.09	0.99171	17.3403	-28.10	59.851	0.8	41	625	1157.3	1730	307	615.7	921	642	4	
65	5	Wto	375	23.08595	-11.19	23.0605	-5.46	0.99197	18.3522	-28.22	58.894	1.8	31	623	1157.1	1732	414	714.9	1016	638	5	
66	6	Śro	376	23.12561	-11.05	23.0948	-5.23	0.99223	19.3759	-26.48	57.959	2.8	21	621	1156.8	1734	505	816.0	1133	635	6	
67	7	Czw	377	23.16526	-10.51	23.1330	-4.60	0.99249	20.3959	-23.26	57.124	3.8	12	618	1156.6	1736	539	916.6	1305	631	7	
68	8	Pią	378	23.20492	-10.36	23.1712	-4.36	0.99275	21.3953	-18.29	56.469	4.8	6	616	1156.4	1738	602	1015.1	1442	627	8	
69	9	Sob	379	23.24458	-10.21	23.2053	-4.13	0.99301	22.3713	-12.18	56.065	5.8	1	614	1156.1	1740	618	1110.7	1620	623	9	
70	10	Nie	380	23.28423	-10.06	23.2435	-3.49	0.99328	23.3218	-5.20	55.960	0.1	0	611	1155.8	1742	631	1203.8	1756	619	10	
71	11	Pon	381	23.32388	-9.50	23.2816	-3.26	0.99354	0.2602	1.55	56.166	1.1	2	609	1155.6	1743	642	1255.3	1930	615	11	
72	12	Wto	382	23.36354	-9.34	23.3156	-3.02	0.99381	1.1928	8.59	56.661	2.1	6	606	1155.3	1745	653	1346.6	2103	611	12	
73	13	Śro	383	23.40319	-9.18	23.3536	-2.38	0.99407	2.1338	15.24	57.391	3.1	13	604	1155.0	1747	706	1438.8	2237	607	13	
74	14	Czw	384	23.44285	-9.01	23.3916	-2.15	0.99434	3.0914	20.48	58.278	4.1	22	602	1154.8	1749	721	1532.6	****	603	14	
75	15	Pią	385	23.48251	-8.45	23.4256	-1.51	0.99460	4.0626	24.54	59.242	5.1	32	559	1154.5	1751	742	1628.1	009	559	15	
76	16	Sob	386	23.52216	-8.28	23.4636	-1.27	0.99487	5.0447	27.30	60.206	6.1	43	557	1154.2	1753	812	1724.8	135	555	16	
77	17	Nie	387	23.56182	-8.10	23.5015	-1.03	0.99514	6.0310	28.31	61.106	0.3	53	555	1153.9	1754	856	1821.1	248	551	17	
78	18	Pon	388	24.00147	-7.53	23.5354	-0.40	0.99541	7.0013	28.00	61.897	1.3	63	552	1153.6	1756	955	1915.6	345	547	18	
79	19	Wto	389	0.04113	-7.35	23.5733	-0.16	0.99568	7.5446	26.06	62.551	2.3	72	550	1153.3	1758	1106	2007.0	423	543	19	
80	20	Śro	390	0.08078	-7.18	0.0112	0.08	0.99596	8.4612	23.02	63.054	3.3	80	547	1153.0	1800	1222	2054.9	449	540	20	
81	21	Czw	391	0.12044	-6.60	0.0450	0.31	0.99623	9.3427	19.02	63.406	4.3	87	545	1152.7	1802	1339	2139.4	507	536	21	
82	22	Pią	392	0.16009	-6.42	0.0829	0.55	0.99651	10.1956	14.19	63.617	5.3	93	543	1152.4	1803	1454	2221.2	520	532	22	
83	23	Sob	393	0.19575	-6.24	0.1207	1.19	0.99679	11.0320	9.06	63.699	6.3	97	540	1152.1	1805	1607	2301.0	530	528	23	
84	24	Nie	394	0.23540	-6.05	0.1546	1.42	0.99707	11.4529	3.35	63.666	7.3	99	538	1151.8	1807	1718	2340.0	538	524	24	
85	25	Pon	395	0.27506	-5.47	0.1924	2.06	0.99735	12.2716	-2.06	63.531	0.2	100	535	1151.5	1809	1830	*****	546	520	25	
86	26	Wto	396	0.31471	-5.29	0.2303	2.30	0.99764	13.0934	-7.43	63.300	1.2	99	533	1151.2	1811	1943	019.0	553	516	26	
87	27	Śro	397	0.35437	-5.11	0.2641	2.53	0.99793	13.5321	-13.08	62.979	2.2	96	531	1150.9	1812	2058	059.2	602	512	27	
88	28	Czw	398	0.39402	-4.53	0.3019	3.16	0.99822	14.3928	-18.06	62.565	3.2	91	528	1150.6	1814	2216	141.4	613	508	28	
89	29	Pią	399	0.43368	-4.34	0.3358	3.40	0.99851	15.2843	-22.24	62.057	4.2	85	526	1150.3	1816	2336	226.7	627	504	29	
90	30	Sob	400	0.47334	-4.16	0.3736	4.03	0.99880	16.2134	-25.46	61.456	5.2	77	523	1150.0	1818	****	315.8	647	500	30	
91	31	Nie	401	0.51299	-3.59	0.4115	4.26	0.99909	17.1760	-27.54	60.765	6.2	68	521	1149.7	1820	055	409.0	718	456	31	
91	31	Nie	401	23.51200	-3.59	0.4106	4.25	0.99908	17.1535	-27.51	60.795	6.1	68	621	1249.7	1920	155	509.0	818	556	31	

Fazy Księżyca [Dm, h.mm]:      3kw 3, 16.24      Nów 10, 10.00      1kw 17, 5.11      Pełn 25, 8.00      Pełn 25, 9.00

# MARZEC 2024 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE			MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm	
1	4.38	19.21	6.49	17.27	5.55	14.58	5.50	14.34	8.21	23.06	6.43	17.08	8.34	23.57	7.07	18.47	5.36	13.14			
	22.853	-7.31	23.011	-8.13	21.316	-16.41	21.071	-17.86	2.617	14.38	22.808	-9.33	3.149	17.36	23.836	-2.39	20.287	-22.67	10.61935	1	
3	4.33	19.24	6.46	17.42	5.53	15.04	5.45	14.35	8.14	23.01	6.36	17.02	8.26	23.49	6.59	18.40	5.28	13.06			
	22.977	-6.54	23.242	-6.47	21.481	-15.72	21.175	-17.42	2.640	14.49	22.823	-9.24	3.153	17.38	23.840	-2.36	20.291	-22.66	10.75077	3	
5	4.28	19.28	6.42	17.57	5.51	15.10	5.41	14.36	8.06	22.55	6.28	16.55	8.19	23.42	6.52	18.32	5.20	12.59			
	23.101	-5.77	23.474	-4.74	21.645	-14.99	21.279	-16.97	2.663	14.61	22.839	-9.15	3.157	17.39	23.845	-2.34	20.294	-22.66	10.88220	5	
7	4.23	19.32	6.39	18.13	5.48	15.17	5.36	14.37	7.59	22.49	6.21	16.49	8.11	23.34	6.44	18.25	5.13	12.51			
	23.225	-4.99	23.705	-2.96	21.808	-14.24	21.382	-16.51	2.686	14.72	22.854	-9.06	3.161	17.41	23.849	-2.31	20.298	-22.65	11.01362	7	
9	4.18	19.36	6.35	18.28	5.45	15.23	5.32	14.39	7.52	22.43	6.13	16.42	8.03	23.27	6.36	18.18	5.05	12.44			
	23.348	-4.21	23.934	-1.13	21.969	-13.47	21.484	-16.04	2.710	14.84	22.869	-8.97	3.166	17.43	23.854	-2.28	20.301	-22.64	11.14504	9	
11	4.13	19.40	6.31	18.44	5.42	15.29	5.27	14.40	7.45	22.38	6.06	16.36	7.55	23.20	6.28	18.10	4.57	12.36			
	23.471	-3.43	0.159	0.71	22.129	-12.67	21.587	-15.55	2.735	14.96	22.884	-8.88	3.170	17.45	23.859	-2.25	20.305	-22.64	11.27645	11	
13	4.08	19.44	6.26	18.59	5.39	15.36	5.22	14.41	7.38	22.32	5.59	16.30	7.48	23.12	6.21	18.03	4.50	12.28			
	23.593	-2.64	0.379	2.56	22.289	-11.84	21.689	-15.06	2.760	15.08	22.900	-8.79	3.175	17.47	23.863	-2.22	20.308	-22.63	11.40787	13	
15	4.03	19.48	6.21	19.13	5.36	15.42	5.17	14.42	7.31	22.27	5.51	16.23	7.40	23.05	6.13	17.55	4.42	12.21			
	23.716	-1.85	0.591	4.36	22.447	-11.00	21.790	-14.56	2.785	15.20	22.915	-8.70	3.181	17.49	23.868	-2.19	20.311	-22.63	11.53929	15	
17	3.58	19.53	6.16	19.27	5.33	15.49	5.12	14.43	7.24	22.21	5.44	16.17	7.32	22.57	6.05	17.48	4.34	12.13			
	23.837	-1.06	0.791	6.09	22.604	-10.13	21.891	-14.05	2.811	15.32	22.930	-8.62	3.186	17.51	23.872	-2.16	20.314	-22.62	11.67071	17	
19	3.52	19.57	6.10	19.39	5.29	15.55	5.08	14.45	7.17	22.15	5.36	16.10	7.25	22.50	5.57	17.40	4.26	12.05			
	23.959	-0.27	0.976	7.70	22.761	-9.25	21.992	-13.52	2.837	15.45	22.945	-8.53	3.191	17.53	23.877	-2.13	20.317	-22.62	11.80213	19	
21	3.47	20.01	6.04	19.49	5.26	16.02	5.03	14.46	7.10	22.10	5.29	16.04	7.17	22.43	5.50	17.33	4.19	11.58			
	0.081	0.52	1.142	9.18	22.916	-8.35	22.092	-12.99	2.863	15.57	22.959	-8.44	3.197	17.56	23.882	-2.10	20.320	-22.62	11.93355	21	
23	3.41	20.06	5.58	19.57	5.22	16.08	4.58	14.47	7.03	22.04	5.21	15.57	7.09	22.35	5.42	17.26	4.11	11.50			
	0.202	1.31	1.287	10.47	23.071	-7.43	22.192	-12.45	2.890	15.69	22.974	-8.35	3.203	17.58	23.886	-2.07	20.323	-22.61	12.06497	23	
25	3.36	20.10	5.51	20.03	5.18	16.14	4.53	14.48	6.56	21.59	5.14	15.51	7.02	22.28	5.34	17.18	4.03	11.42			
	0.323	2.10	1.406	11.57	23.225	-6.50	22.291	-11.91	2.917	15.82	22.989	-8.27	3.209	17.61	23.891	-2.04	20.325	-22.61	12.19638	25	
27	3.30	20.15	5.43	20.06	5.15	16.21	4.47	14.50	6.49	21.54	5.06	15.44	6.54	22.20	5.27	17.11	3.56	11.35			
	0.445	2.88	1.498	12.43	23.378	-5.56	22.390	-11.35	2.945	15.94	23.003	-8.18	3.215	17.63	23.896	-2.01	20.328	-22.61	12.32780	27	
29	3.24	20.19	5.36	20.05	5.11	16.27	4.42	14.51	6.42	21.48	4.59	15.38	6.46	22.13	5.19	17.03	3.48	11.27			
	0.566	3.66	1.562	13.06	23.531	-4.61	22.488	-10.79	2.973	16.07	23.017	-8.10	3.221	17.65	23.900	-1.98	20.330	-22.60	12.45922	29	
31	3.18	20.24	5.28	20.02	5.07	16.34	4.37	14.52	6.35	21.43	4.51	15.31	6.39	22.06	5.11	16.56	3.40	11.19			
	0.687	4.44	1.596	13.43	23.683	-3.65	22.587	-10.22	3.001	16.19	23.032	-8.01	3.227	17.68	23.905	-1.95	20.332	-22.60	12.59064	31	
31	4.18	21.24	6.28	21.02	6.07	17.33	5.37	15.52	7.35	22.43	5.51	16.31	7.39	23.06	6.11	17.56	4.40	12.19			
	0.685	4.42	1.596	13.43	23.680	-3.67	22.585	-10.24	3.001	16.19	23.031	-8.01	3.227	17.68	23.905	-1.95	20.332	-22.60	12.59064	31	

# KWIECIEŃ 2024

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
92	1	Pon	402	23.55166	-3.41	0.4445	4.48	0.99937	18.1443	-28.34	60.033	7.1	58	619	1249.4	1921	305	605.7	905	552	1	
93	2	Wto	403	23.59132	-3.24	0.4823	5.12	0.99967	19.1518	-27.39	59.221	0.3	47	616	1249.1	1923	400	704.5	1012	548	2	
94	3	Śro	404	0.03097	-3.06	0.5203	5.34	0.99996	20.1538	-25.02	58.402	1.3	36	614	1248.9	1925	439	803.3	1136	544	3	
95	4	Czw	405	0.07063	-2.49	0.5542	5.57	1.00025	21.1425	-20.51	57.632	2.3	25	611	1248.6	1927	505	900.6	1308	541	4	
96	5	Pią	406	0.11028	-2.32	0.5921	6.20	1.00054	22.1102	-15.20	56.977	3.3	16	609	1248.3	1929	523	955.6	1443	537	5	
97	6	Sob	407	0.14594	-2.15	1.0301	6.43	1.00083	23.0540	-8.49	56.506	4.3	8	607	1248.0	1930	536	1048.2	1618	533	6	
98	7	Nie	408	0.18559	-1.58	1.0641	7.05	1.00112	23.5906	-1.45	56.278	5.3	3	604	1247.7	1932	548	1139.5	1751	529	7	
99	8	Pon	409	0.22525	-1.42	1.1021	7.28	1.00141	0.5222	5.28	56.328	6.3	0	602	1247.4	1934	559	1230.6	1925	525	8	
100	9	Wto	410	0.26490	-1.25	1.1401	7.50	1.00169	1.4631	12.19	56.662	0.7	1	600	1247.2	1936	610	1322.7	2100	521	9	
101	10	Śro	411	0.30456	-1.10	1.1742	8.12	1.00198	2.4226	18.23	57.254	1.7	4	557	1246.9	1938	624	1416.8	2235	517	10	
102	11	Czw	412	0.34421	-0.54	1.2122	8.34	1.00226	3.4028	23.16	58.048	2.7	10	555	1246.6	1939	642	1513.2	****	513	11	
103	12	Pią	413	0.38387	-0.38	1.2504	8.56	1.00254	4.4015	26.38	58.970	3.7	17	553	1246.4	1941	709	1611.5	008	509	12	
104	13	Sob	414	0.42353	-0.23	1.2845	9.18	1.00282	5.4037	28.20	59.941	4.7	26	551	1246.1	1943	748	1710.1	130	505	13	
105	14	Nie	415	0.46318	-0.09	1.3227	9.39	1.00309	6.3955	28.23	60.883	5.7	36	548	1245.9	1945	842	1807.2	236	501	14	
106	15	Pon	416	0.50284	0.06	1.3609	10.01	1.00337	7.3640	26.55	61.736	6.7	46	546	1245.7	1947	951	1901.0	323	457	15	
107	16	Wto	417	0.54249	0.20	1.3952	10.22	1.00364	8.2957	24.10	62.450	0.6	56	544	1245.4	1948	1107	1950.9	354	453	16	
108	17	Śro	418	0.58215	0.34	1.4334	10.43	1.00391	9.1936	20.24	62.999	1.6	66	541	1245.2	1950	1225	2036.8	414	449	17	
109	18	Czw	419	1.02180	0.47	1.4718	11.04	1.00418	10.0601	15.52	63.368	2.6	74	539	1245.0	1952	1341	2119.5	428	445	18	
110	19	Pią	420	1.06146	0.60	1.5101	11.25	1.00445	10.4959	10.47	63.560	3.6	82	537	1244.7	1954	1454	2159.9	439	442	19	
111	20	Sob	421	1.10111	1.13	1.5445	11.45	1.00472	11.3223	5.20	63.588	4.6	89	535	1244.5	1955	1606	2239.0	448	438	20	
112	21	Nie	422	1.14077	1.25	1.5830	12.06	1.00499	12.1411	-0.19	63.472	5.6	94	533	1244.3	1957	1717	2317.9	456	434	21	
113	22	Pon	423	1.18042	1.36	2.0214	12.26	1.00526	12.5620	-5.59	63.236	6.6	98	530	1244.1	1959	1830	2357.7	503	430	22	
114	23	Wto	424	1.22008	1.48	2.0560	12.46	1.00553	13.3948	-11.30	62.905	7.6	100	528	1244.0	2001	1945	*****	512	426	23	
115	24	Śro	425	1.25573	1.58	2.0945	13.05	1.00580	14.2530	-16.40	62.501	0.4	100	526	1243.8	2003	2103	039.5	522	422	24	
116	25	Czw	426	1.29539	2.09	2.1332	13.25	1.00607	15.1414	-21.14	62.041	1.4	98	524	1243.6	2004	2223	124.2	535	418	25	
117	26	Pią	427	1.33505	2.19	2.1718	13.44	1.00633	16.0630	-24.54	61.538	2.4	94	522	1243.4	2006	2343	212.5	553	414	26	
118	27	Sob	428	1.37470	2.28	2.2106	14.03	1.00660	17.0218	-27.25	60.998	3.4	89	520	1243.3	2008	****	304.9	620	410	27	
119	28	Nie	429	1.41436	2.37	2.2454	14.22	1.00687	18.0053	-28.30	60.427	4.4	81	518	1243.1	2010	057	400.8	702	406	28	
120	29	Pon	430	1.45401	2.45	2.2842	14.41	1.00713	19.0049	-27.58	59.831	5.4	72	516	1243.0	2011	157	458.8	803	402	29	
121	30	Wto	431	1.49367	2.52	2.3231	14.59	1.00740	20.0024	-25.48	59.220	6.4	62	514	1242.9	2013	240	556.9	920	358	30	

Fazy Księżycyca [Dm, h.mm]:      3kw 2, 5.15      Nów 8, 20.21      1kw 15, 21.13      Pełn 24, 1.49



# KWIECIEŃ 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.15	21.27	6.24	20.59	6.05	17.36	5.34	15.52	7.31	22.40	5.48	16.28	7.35	23.02	6.07	17.52	4.36	12.15		
	0.746	4.81	1.602	13.52	23.756	-3.19	22.634	-9.95	3.015	16.25	23.038	-7.97	3.230	17.69	23.907	-1.93	20.333	-22.60	12.65635	1
3	4.09	21.32	6.15	20.50	6.01	17.43	5.29	15.54	7.24	22.35	5.40	16.21	7.27	22.55	5.59	17.45	4.28	12.08		
	0.867	5.57	1.595	13.50	23.907	-2.22	22.731	-9.37	3.044	16.38	23.052	-7.89	3.237	17.72	23.912	-1.91	20.335	-22.60	12.78777	3
5	4.03	21.37	6.07	20.39	5.57	17.49	5.24	15.55	7.17	22.29	5.33	16.14	7.20	22.48	5.52	17.37	4.21	11.60		
	0.989	6.34	1.561	13.22	0.059	-1.24	22.829	-8.79	3.072	16.50	23.066	-7.81	3.244	17.75	23.916	-1.88	20.337	-22.60	12.91919	5
7	3.57	21.42	5.59	20.25	5.53	17.56	5.19	15.56	7.10	22.24	5.25	16.08	7.12	22.40	5.44	17.30	4.13	11.52		
	1.111	7.09	1.506	12.70	0.210	-0.26	22.926	-8.20	3.102	16.63	23.080	-7.73	3.250	17.77	23.920	-1.85	20.339	-22.60	13.05060	7
9	3.50	21.47	5.51	20.08	5.49	18.02	5.13	15.57	7.04	22.19	5.18	16.01	7.04	22.33	5.36	17.22	4.05	11.44		
	1.234	7.83	1.436	11.98	0.361	0.72	23.023	-7.61	3.131	16.75	23.093	-7.65	3.257	17.80	23.925	-1.82	20.341	-22.60	13.18202	9
11	3.44	21.53	5.44	19.50	5.45	18.08	5.08	15.58	6.57	22.13	5.10	15.55	6.57	22.26	5.28	17.15	3.57	11.37		
	1.356	8.57	1.355	11.09	0.512	1.70	23.119	-7.02	3.161	16.88	23.107	-7.57	3.264	17.83	23.929	-1.79	20.342	-22.60	13.31344	11
13	3.37	21.59	5.37	19.32	5.41	18.15	5.03	15.60	6.50	22.08	5.03	15.48	6.49	22.19	5.21	17.07	3.50	11.29		
	1.479	9.30	1.273	10.09	0.664	2.67	23.215	-6.42	3.191	17.00	23.120	-7.50	3.271	17.86	23.934	-1.77	20.344	-22.60	13.44486	13
15	3.30	22.05	5.30	19.13	5.37	18.21	4.57	16.01	6.43	22.03	4.55	15.41	6.41	22.11	5.13	16.60	3.42	11.21		
	1.603	10.01	1.194	9.06	0.815	3.65	23.311	-5.81	3.221	17.12	23.133	-7.42	3.279	17.88	23.938	-1.74	20.345	-22.60	13.57628	15
17	3.23	22.11	5.23	18.56	5.33	18.28	4.52	16.02	6.36	21.58	4.48	15.35	6.34	22.04	5.05	16.53	3.34	11.13		
	1.726	10.72	1.125	8.04	0.967	4.62	23.407	-5.21	3.252	17.25	23.145	-7.35	3.286	17.91	23.942	-1.71	20.346	-22.61	13.70770	17
19	3.16	22.17	5.18	18.39	5.29	18.34	4.46	16.03	6.29	21.52	4.40	15.28	6.26	21.57	4.57	16.45	3.26	11.05		
	1.850	11.41	1.070	7.10	1.118	5.59	23.502	-4.60	3.282	17.37	23.158	-7.28	3.293	17.94	23.946	-1.69	20.347	-22.61	13.83912	19
21	3.09	22.23	5.12	18.25	5.25	18.41	4.41	16.04	6.22	21.47	4.33	15.21	6.19	21.50	4.50	16.38	3.19	10.58		
	1.975	12.10	1.032	6.27	1.271	6.54	23.597	-3.99	3.313	17.49	23.170	-7.20	3.301	17.97	23.950	-1.66	20.348	-22.61	13.97054	21
23	3.02	22.30	5.07	18.12	5.21	18.47	4.35	16.05	6.16	21.42	4.25	15.14	6.11	21.42	4.42	16.30	3.11	10.50		
	2.100	12.76	1.013	5.60	1.424	7.49	23.692	-3.38	3.344	17.61	23.182	-7.13	3.308	18.00	23.954	-1.64	20.349	-22.62	14.10195	23
25	2.54	22.37	5.02	18.02	5.17	18.54	4.30	16.06	6.09	21.37	4.18	15.08	6.03	21.35	4.34	16.23	3.03	10.42		
	2.225	13.42	1.014	5.09	1.577	8.43	23.787	-2.76	3.375	17.73	23.194	-7.07	3.316	18.03	23.958	-1.61	20.350	-22.62	14.23337	25
27	2.46	22.45	4.57	17.53	5.13	19.00	4.25	16.07	6.02	21.32	4.10	15.01	5.56	21.28	4.26	16.15	2.55	10.34		
	2.352	14.06	1.034	4.76	1.731	9.35	23.881	-2.15	3.407	17.85	23.206	-7.00	3.324	18.06	23.962	-1.59	20.350	-22.62	14.36479	27
29	2.38	22.52	4.52	17.47	5.09	19.07	4.19	16.08	5.55	21.26	4.03	14.54	5.48	21.21	4.19	16.08	2.47	10.26		
	2.478	14.68	1.073	4.59	1.886	10.27	23.976	-1.54	3.438	17.97	23.217	-6.94	3.331	18.09	23.966	-1.56	20.351	-22.63	14.49622	29

# MAJ 2024

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
122	1	Śro	432	1.53333	2.60	2.3620	15.17	1.00766	20.5816	-22.06	58.615	7.4	51	512	1242.8	2015	309	653.5	1048	354	1
123	2	Czw	433	1.57298	3.06	2.4010	15.35	1.00791	21.5349	-17.05	58.044	0.9	39	510	1242.6	2017	329	747.5	1220	350	2
124	3	Pią	434	2.01264	3.12	2.4401	15.53	1.00817	22.4712	-11.04	57.548	1.9	28	508	1242.5	2018	343	839.0	1351	347	3
125	4	Sob	435	2.05229	3.18	2.4752	16.10	1.00842	23.3913	-4.23	57.173	2.9	18	506	1242.5	2020	355	928.9	1521	343	4
126	5	Nie	436	2.09195	3.23	2.5143	16.27	1.00867	0.3054	2.37	56.966	3.9	10	504	1242.4	2022	405	1018.2	1652	339	5
127	6	Pon	437	2.13160	3.27	2.5536	16.44	1.00892	1.2326	9.30	56.966	4.9	4	502	1242.3	2024	416	1108.4	1824	335	6
128	7	Wto	438	2.17126	3.31	2.5929	17.00	1.00916	2.1754	15.52	57.193	5.9	1	500	1242.2	2025	429	1200.7	1958	331	7
129	8	Śro	439	2.21091	3.34	3.0322	17.17	1.00940	3.1458	21.17	57.644	0.3	0	458	1242.2	2027	444	1256.0	2133	327	8
130	9	Czw	440	2.25057	3.36	3.0716	17.33	1.00963	4.1437	25.20	58.290	1.3	2	457	1242.1	2029	507	1354.1	2302	323	9
131	10	Pią	441	2.29022	3.38	3.1110	17.48	1.00986	5.1555	27.46	59.081	2.3	7	455	1242.1	2030	539	1453.9	****	319	10
132	11	Sob	442	2.32588	3.40	3.1506	18.04	1.01008	6.1708	28.28	59.950	3.3	13	453	1242.1	2032	628	1553.3	019	315	11
133	12	Nie	443	2.36554	3.41	3.1901	18.19	1.01030	7.1618	27.31	60.827	4.3	21	451	1242.1	2034	732	1650.2	115	311	12
134	13	Pon	444	2.40519	3.41	3.2258	18.33	1.01052	8.1201	25.07	61.647	5.3	30	450	1242.1	2035	848	1742.9	153	307	13
135	14	Wto	445	2.44485	3.41	3.2654	18.48	1.01073	9.0344	21.36	62.351	6.3	40	448	1242.1	2037	1007	1831.3	218	303	14
136	15	Śro	446	2.48451	3.40	3.3052	19.02	1.01094	9.5142	17.14	62.898	7.3	49	447	1242.1	2039	1124	1915.7	235	259	15
137	16	Czw	447	2.52416	3.39	3.3450	19.16	1.01115	10.3640	12.16	63.261	0.9	59	445	1242.1	2040	1239	1957.1	247	255	16
138	17	Pią	448	2.56382	3.37	3.3848	19.29	1.01135	11.1933	6.54	63.428	1.9	68	443	1242.1	2042	1352	2036.6	256	251	17
139	18	Sob	449	3.00347	3.34	3.4247	19.42	1.01155	12.0127	1.19	63.406	2.9	76	442	1242.2	2043	1503	2115.5	304	248	18
140	19	Nie	450	3.04313	3.31	3.4646	19.55	1.01175	12.4322	-4.20	63.211	3.9	84	440	1242.2	2045	1615	2154.8	312	244	19
141	20	Pon	451	3.08278	3.28	3.5046	20.07	1.01195	13.2622	-9.54	62.872	4.9	90	439	1242.3	2046	1729	2235.8	320	240	20
142	21	Wto	452	3.12244	3.24	3.5447	20.20	1.01214	14.1129	-15.12	62.422	5.9	95	438	1242.3	2048	1846	2319.5	330	236	21
143	22	Śro	453	3.16209	3.19	3.5848	20.31	1.01233	14.5937	-19.58	61.900	6.9	99	436	1242.4	2049	2006	****	342	232	22
144	23	Czw	454	3.20175	3.14	4.0250	20.43	1.01252	15.5126	-23.57	61.340	7.9	100	435	1242.5	2051	2128	007.0	358	228	23
145	24	Pią	455	3.24141	3.09	4.0652	20.54	1.01270	16.4705	-26.49	60.775	0.8	99	434	1242.6	2052	2245	058.7	423	224	24
146	25	Sob	456	3.28106	3.03	4.1054	21.04	1.01289	17.4555	-28.16	60.229	1.8	96	433	1242.7	2054	2351	154.4	500	220	25
147	26	Nie	457	3.32072	2.56	4.1457	21.15	1.01307	18.4628	-28.07	59.718	2.8	91	431	1242.8	2055	****	252.8	555	216	26
148	27	Pon	458	3.36037	2.49	4.1901	21.25	1.01325	19.4648	-26.18	59.251	3.8	84	430	1242.9	2056	040	351.8	709	212	27
149	28	Wto	459	3.40003	2.42	4.2305	21.34	1.01342	20.4516	-22.54	58.833	4.8	75	429	1243.1	2058	113	449.2	835	208	28
150	29	Śro	460	3.43569	2.34	4.2709	21.43	1.01360	21.4101	-18.11	58.467	5.8	65	428	1243.2	2059	135	543.8	1005	204	29
151	30	Czw	461	3.47534	2.25	4.3114	21.52	1.01377	22.3408	-12.27	58.157	6.8	53	427	1243.3	2100	150	635.4	1135	200	30
152	31	Pią	462	3.51500	2.17	4.3520	22.01	1.01393	23.2518	-6.03	57.916	0.7	42	426	1243.5	2101	203	724.6	1304	156	31

Fazy Księżyca [Dm, h.mm]:      3kw 1, 13.27      Nów 8, 5.22      1kw 15, 13.48      Pełn 23, 15.53      3kw 30, 19.13

# MAJ 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	2.30	23.01	4.47	17.42	5.06	19.13	4.14	16.09	5.49	21.21	3.55	14.47	5.41	21.14	4.11	16.00	2.40	10.18		
	2.606	15.29	1.128	4.60	2.042	11.16	0.070	-0.92	3.470	18.09	23.228	-6.87	3.339	18.12	23.970	-1.54	20.351	-22.63	14.62764	1
3	2.21	23.09	4.43	17.39	5.02	19.20	4.08	16.10	5.42	21.16	3.47	14.40	5.33	21.06	4.03	15.53	2.32	10.10		
	2.734	15.88	1.200	4.75	2.199	12.04	0.164	-0.31	3.502	18.21	23.239	-6.81	3.347	18.15	23.973	-1.52	20.351	-22.64	14.75906	3
5	2.11	23.19	4.39	17.38	4.59	19.26	4.03	16.11	5.35	21.11	3.40	14.33	5.25	20.59	3.55	15.45	2.24	10.02		
	2.862	16.45	1.287	5.06	2.356	12.90	0.258	0.30	3.534	18.33	23.249	-6.75	3.355	18.18	23.977	-1.50	20.351	-22.64	14.89047	5
7	2.01	23.29	4.34	17.39	4.55	19.33	3.57	16.12	5.28	21.06	3.32	14.26	5.18	20.52	3.48	15.37	2.16	9.55		
	2.991	17.01	1.388	5.50	2.515	13.74	0.352	0.92	3.566	18.44	23.259	-6.70	3.362	18.21	23.980	-1.48	20.351	-22.65	15.02189	7
9	1.50	23.41	4.30	17.41	4.52	19.40	3.52	16.13	5.22	21.00	3.25	14.19	5.10	20.45	3.40	15.30	2.08	9.47		
	3.121	17.54	1.501	6.06	2.675	14.55	0.446	1.53	3.598	18.55	23.269	-6.64	3.370	18.23	23.984	-1.46	20.351	-22.66	15.15331	9
11	1.37	23.56	4.26	17.44	4.49	19.46	3.46	16.14	5.15	20.55	3.17	14.12	5.03	20.38	3.32	15.22	2.00	9.39		
	3.252	18.06	1.627	6.74	2.836	15.35	0.540	2.13	3.630	18.67	23.279	-6.59	3.378	18.26	23.987	-1.44	20.350	-22.67	15.28474	11
13	1.20	0.27	4.22	17.49	4.46	19.53	3.41	16.15	5.08	20.50	3.10	14.05	4.55	20.30	3.24	15.15	1.53	9.31		
	3.383	18.56	1.764	7.52	2.998	16.12	0.633	2.74	3.662	18.78	23.288	-6.54	3.386	18.29	23.990	-1.42	20.350	-22.67	15.41616	13
15	*****	*****	4.19	17.55	4.43	19.60	3.35	16.16	5.02	20.45	3.02	13.58	4.47	20.23	3.16	15.07	1.45	9.23		
	3.514	19.03	1.913	8.39	3.161	16.86	0.727	3.34	3.695	18.89	23.297	-6.49	3.394	18.32	23.993	-1.40	20.349	-22.68	15.54758	15
17	*****	*****	4.15	18.02	4.40	20.06	3.30	16.17	4.55	20.40	2.54	13.51	4.40	20.16	3.09	14.60	1.37	9.15		
	3.647	19.49	2.072	9.34	3.325	17.57	0.821	3.94	3.727	19.00	23.306	-6.44	3.402	18.35	23.996	-1.38	20.348	-22.69	15.67900	17
19	*****	*****	4.11	18.10	4.38	20.13	3.24	16.18	4.48	20.35	2.47	13.44	4.32	20.09	3.01	14.52	1.29	9.07		
	3.780	19.92	2.241	10.36	3.491	18.25	0.914	4.54	3.759	19.10	23.314	-6.40	3.410	18.38	23.999	-1.36	20.347	-22.70	15.81042	19
21	*****	*****	4.08	18.19	4.36	20.19	3.19	16.19	4.42	20.29	2.39	13.37	4.25	20.02	2.53	14.44	1.21	8.59		
	3.913	20.33	2.422	11.45	3.658	18.90	1.008	5.13	3.792	19.21	23.322	-6.35	3.418	18.41	0.002	-1.35	20.346	-22.71	15.94184	21
23	*****	*****	4.05	18.29	4.34	20.26	3.13	16.20	4.35	20.24	2.32	13.30	4.17	19.54	2.45	14.37	1.13	8.51		
	4.047	20.71	2.613	12.58	3.826	19.52	1.101	5.72	3.824	19.31	23.330	-6.31	3.425	18.44	0.004	-1.33	20.345	-22.72	16.07326	23
25	*****	*****	4.02	18.40	4.32	20.32	3.08	16.21	4.28	20.19	2.24	13.22	4.10	19.47	2.38	14.29	1.05	8.43		
	4.182	21.07	2.816	13.76	3.995	20.10	1.195	6.30	3.857	19.41	23.337	-6.27	3.433	18.47	0.007	-1.32	20.344	-22.73	16.20468	25
27	*****	*****	4.00	18.53	4.30	20.38	3.02	16.22	4.22	20.14	2.16	13.15	4.02	19.40	2.30	14.21	0.58	8.35		
	4.317	21.41	3.031	14.97	4.166	20.64	1.289	6.87	3.889	19.52	23.344	-6.24	3.441	18.50	0.009	-1.30	20.342	-22.74	16.33611	27
29	*****	*****	3.58	19.06	4.29	20.44	2.57	16.23	4.15	20.08	2.09	13.08	3.54	19.33	2.22	14.14	0.50	8.27		
	4.453	21.72	3.258	16.19	4.337	21.15	1.382	7.45	3.922	19.62	23.351	-6.21	3.449	18.53	0.012	-1.29	20.341	-22.75	16.46753	29
31	*****	*****	3.57	19.20	4.28	20.50	2.52	16.24	4.09	20.03	2.01	13.01	3.47	19.25	2.14	14.06	0.42	8.19		
	4.589	22.01	3.499	17.41	4.510	21.62	1.476	8.01	3.954	19.71	23.357	-6.17	3.456	18.55	0.014	-1.28	20.339	-22.76	16.59895	31

# CZERWIEC 2024

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
153	1	Sob	463	3.55465	2.07	4.3926	22.09	1.01409	0.1537	0.42	57.761	1.7	31	425	1243.6	2102	213	812.6	1431	152	1
154	2	Nie	464	3.59431	1.58	4.4332	22.17	1.01425	1.0619	7.27	57.714	2.7	21	425	1243.8	2104	223	900.8	1600	149	2
155	3	Pon	465	4.03396	1.48	4.4738	22.24	1.01440	1.5837	13.49	57.797	3.7	12	424	1244.0	2105	235	950.6	1730	145	3
156	4	Wto	466	4.07362	1.37	4.5145	22.31	1.01454	2.5328	19.27	58.028	4.7	6	423	1244.1	2106	249	1043.1	1902	141	4
157	5	Śro	467	4.11327	1.26	4.5553	22.37	1.01468	3.5117	23.57	58.413	5.7	2	422	1244.3	2107	307	1139.0	2034	137	5
158	6	Czw	468	4.15293	1.15	5.0000	22.43	1.01482	4.5138	26.58	58.942	6.7	0	422	1244.5	2108	335	1237.7	2156	133	6
159	7	Pią	469	4.19259	1.04	5.0408	22.49	1.01495	5.5306	28.19	59.589	0.9	1	421	1244.7	2109	416	1337.6	2302	129	7
160	8	Sob	470	4.23224	0.52	5.0816	22.54	1.01507	6.5339	27.56	60.313	1.9	4	421	1244.9	2109	514	1436.3	2348	125	8
161	9	Nie	471	4.27190	0.40	5.1225	22.59	1.01519	7.5125	26.01	61.060	2.9	9	420	1245.1	2110	626	1531.7	****	121	9
162	10	Pon	472	4.31156	0.28	5.1634	23.04	1.01530	8.4519	22.48	61.775	3.9	16	420	1245.3	2111	745	1622.8	019	117	10
163	11	Wto	473	4.35121	0.16	5.2042	23.08	1.01541	9.3511	18.38	62.404	4.9	24	420	1245.5	2112	905	1709.4	039	113	11
164	12	Śro	474	4.39087	0.04	5.2451	23.12	1.01551	10.2132	13.47	62.898	5.9	33	419	1245.7	2112	1022	1752.4	053	109	12
165	13	Czw	475	4.43052	-0.09	5.2901	23.15	1.01561	11.0518	8.30	63.221	6.9	42	419	1245.9	2113	1136	1832.8	103	105	13
166	14	Pią	476	4.47018	-0.22	5.3310	23.18	1.01570	11.4730	2.58	63.352	0.2	52	419	1246.1	2114	1248	1911.8	112	101	14
167	15	Sob	477	4.50583	-0.35	5.3719	23.20	1.01579	12.2915	-2.40	63.282	1.2	61	419	1246.3	2114	1359	1950.7	120	057	15
168	16	Nie	478	4.54549	-0.48	5.4129	23.22	1.01587	13.1139	-8.15	63.020	2.2	70	419	1246.5	2115	1511	2030.7	128	054	16
169	17	Pon	479	4.58514	-1.00	5.4538	23.24	1.01595	13.5547	-13.36	62.588	3.2	79	419	1246.8	2115	1626	2113.1	137	050	17
170	18	Wto	480	5.02480	-1.13	5.4948	23.25	1.01602	14.4243	-18.32	62.023	4.2	86	419	1247.0	2115	1745	2158.9	148	046	18
171	19	Śro	481	5.06446	-1.26	5.5357	23.26	1.01610	15.3320	-22.46	61.367	5.2	92	419	1247.2	2116	1907	2249.0	202	042	19
172	20	Czw	482	5.10411	-1.39	5.5807	23.26	1.01616	16.2804	-26.01	60.673	6.2	97	419	1247.4	2116	2027	2343.7	223	038	20
173	21	Pią	483	5.14377	-1.52	6.0217	23.26	1.01623	17.2639	-27.57	59.989	7.2	100	419	1247.6	2116	2139	*****	255	034	21
174	22	Sob	484	5.18343	-2.05	6.0626	23.26	1.01629	18.2750	-28.17	59.363	0.4	100	419	1247.8	2116	2235	042.2	344	030	22
175	23	Nie	485	5.22308	-2.18	6.1035	23.25	1.01635	19.2935	-26.52	58.830	1.4	98	420	1248.1	2116	2314	142.4	453	026	23
176	24	Pon	486	5.26274	-2.31	6.1445	23.24	1.01641	20.2952	-23.47	58.414	2.4	93	420	1248.3	2116	2339	241.9	618	022	24
177	25	Wto	487	5.30239	-2.44	6.1854	23.22	1.01646	21.2721	-19.15	58.124	3.4	86	420	1248.5	2116	2357	338.7	750	018	25
178	26	Śro	488	5.34205	-2.56	6.2303	23.20	1.01651	22.2146	-13.38	57.956	4.4	77	421	1248.7	2116	****	432.1	922	014	26
179	27	Czw	489	5.38171	-3.09	6.2712	23.17	1.01655	23.1336	-7.18	57.899	5.4	67	421	1248.9	2116	010	522.3	1051	010	27
180	28	Pią	490	5.42136	-3.21	6.3121	23.15	1.01659	0.0356	-0.37	57.939	6.4	56	422	1249.1	2116	021	610.6	1219	006	28
181	29	Sob	491	5.46102	-3.33	6.3529	23.11	1.01663	0.5358	6.05	58.063	0.5	44	423	1249.3	2116	031	658.1	1346	002	29
182	30	Nie	492	5.50067	-3.45	6.3938	23.08	1.01666	1.4457	12.28	58.264	1.5	33	423	1249.5	2115	042	746.5	1514	2355	30

Fazy Księżyca [Dm, h.mm]:      Now 6, 14.38      1kw 14, 7.18      Pełn 22, 3.08      3kw 28, 23.53

## CZERWIEC 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	*****	*****	3.56	19.28	4.28	20.53	2.49	16.24	4.05	20.01	1.57	12.57	3.43	19.22	2.10	14.02	0.38	8.15		
	4.657	22.15	3.624	18.02	4.597	21.84	1.523	8.29	3.970	19.76	23.360	-6.16	3.460	18.57	0.015	-1.27	20.338	-22.76	16.66465	1
3	*****	*****	3.56	19.44	4.27	20.59	2.44	16.25	3.59	19.55	1.50	12.50	3.35	19.15	2.02	13.55	0.30	8.07		
	4.794	22.40	3.884	19.21	4.772	22.25	1.617	8.85	4.003	19.86	23.365	-6.13	3.468	18.59	0.017	-1.26	20.337	-22.77	16.79607	3
5	*****	*****	3.57	20.00	4.27	21.04	2.38	16.26	3.52	19.50	1.42	12.42	3.28	19.07	1.55	13.47	0.22	7.59		
	4.931	22.62	4.157	20.35	4.947	22.62	1.711	9.40	4.035	19.95	23.371	-6.11	3.475	18.62	0.019	-1.25	20.335	-22.79	16.92749	5
7	*****	*****	3.58	20.17	4.27	21.09	2.33	16.27	3.46	19.45	1.34	12.35	3.20	19.00	1.47	13.39	0.14	7.50		
	5.069	22.82	4.444	21.42	5.123	22.94	1.804	9.94	4.067	20.04	23.376	-6.09	3.483	18.65	0.020	-1.24	20.333	-22.80	17.05892	7
9	*****	*****	4.01	20.34	4.28	21.14	2.28	16.27	3.39	19.39	1.26	12.27	3.13	18.53	1.39	13.31	0.06	7.42		
	5.207	22.99	4.742	22.38	5.300	23.22	1.899	10.48	4.100	20.13	23.380	-6.07	3.490	18.68	0.022	-1.23	20.331	-22.81	17.19034	9
11	*****	*****	4.05	20.51	4.29	21.19	2.22	16.28	3.32	19.34	1.19	12.20	3.05	18.46	1.31	13.24	23.54	7.34		
	5.345	23.13	5.050	23.22	5.478	23.45	1.993	11.01	4.132	20.22	23.384	-6.05	3.498	18.70	0.024	-1.22	20.328	-22.82	17.32177	11
13	*****	*****	4.11	21.08	4.30	21.23	2.17	16.29	3.26	19.29	1.11	12.12	2.57	18.38	1.23	13.16	23.47	7.26		
	5.484	23.25	5.366	23.91	5.656	23.64	2.087	11.53	4.164	20.31	23.388	-6.03	3.505	18.73	0.025	-1.22	20.326	-22.83	17.45319	13
15	*****	*****	4.18	21.23	4.32	21.27	2.12	16.30	3.19	19.23	1.03	12.05	2.50	18.31	1.16	13.08	23.39	7.18		
	5.622	23.34	5.686	24.42	5.835	23.78	2.181	12.04	4.196	20.39	23.391	-6.02	3.512	18.75	0.026	-1.21	20.324	-22.85	17.58461	15
17	*****	*****	4.26	21.37	4.34	21.31	2.07	16.30	3.13	19.18	0.56	11.57	2.42	18.24	1.08	13.00	23.31	7.10		
	5.761	23.40	6.007	24.75	6.014	23.88	2.275	12.54	4.227	20.47	23.394	-6.01	3.519	18.78	0.027	-1.21	20.321	-22.86	17.71602	17
19	*****	*****	4.36	21.50	4.37	21.34	2.02	16.31	3.06	19.13	0.48	11.49	2.35	18.17	0.60	12.53	23.23	7.02		
	5.899	23.43	6.324	24.90	6.193	23.93	2.370	13.03	4.259	20.56	23.397	-6.00	3.526	18.80	0.028	-1.20	20.319	-22.87	17.84745	19
21	*****	*****	4.48	22.00	4.39	21.37	1.57	16.32	2.60	19.07	0.40	11.42	2.27	18.09	0.52	12.45	23.15	6.54		
	6.038	23.44	6.636	24.86	6.373	23.93	2.464	13.52	4.290	20.63	23.399	-6.00	3.533	18.83	0.029	-1.20	20.316	-22.89	17.97887	21
23	*****	*****	4.60	22.09	4.43	21.39	1.52	16.32	2.53	19.02	0.32	11.34	2.19	18.02	0.44	12.37	23.07	6.46		
	6.177	23.42	6.940	24.64	6.552	23.88	2.559	13.99	4.322	20.71	23.401	-6.00	3.540	18.85	0.030	-1.19	20.314	-22.90	18.11030	23
25	*****	*****	5.12	22.15	4.46	21.41	1.47	16.33	2.47	18.56	0.24	11.26	2.12	17.55	0.36	12.29	22.59	6.38		
	6.315	23.37	7.232	24.27	6.731	23.79	2.654	14.46	4.353	20.79	23.402	-6.00	3.546	18.87	0.030	-1.19	20.311	-22.91	18.24172	25
27	*****	*****	5.26	22.20	4.50	21.43	1.42	16.34	2.40	18.51	0.17	11.18	2.04	17.47	0.29	12.21	22.51	6.29		
	6.453	23.29	7.513	23.75	6.910	23.65	2.749	14.91	4.384	20.86	23.403	-6.00	3.553	18.90	0.031	-1.19	20.308	-22.93	18.37314	27
29	*****	*****	5.39	22.23	4.54	21.44	1.37	16.34	2.34	18.45	0.09	11.10	1.56	17.40	0.21	12.14	22.43	6.21		
	6.592	23.19	7.781	23.10	7.088	23.46	2.844	15.36	4.415	20.93	23.403	-6.01	3.559	18.92	0.031	-1.19	20.305	-22.94	18.50456	29

# LIPIEC 2024

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
183	1	Pon	493	5.54033	-3.56	6.4346	23.03	1.01668	2.3759	18.10	58.538	2.5	23	424	1249.7	2115	055	836.9	1643	2351	1
184	2	Wto	494	5.57598	-4.08	6.4754	22.59	1.01670	3.3345	22.53	58.886	3.5	14	425	1249.9	2115	111	930.3	1813	2347	2
185	3	Śro	495	6.01564	-4.19	6.5202	22.54	1.01672	4.3214	26.16	59.308	4.5	7	426	1250.1	2114	134	1026.7	1938	2343	3
186	4	Czw	496	6.05530	-4.30	6.5609	22.49	1.01672	5.3232	28.05	59.803	5.5	3	426	1250.2	2114	209	1125.3	2050	2339	4
187	5	Pią	497	6.09495	-4.40	7.0016	22.43	1.01673	6.3255	28.14	60.360	6.5	0	427	1250.4	2113	300	1224.1	2143	2335	5
188	6	Sob	498	6.13461	-4.50	7.0423	22.37	1.01672	7.3127	26.46	60.957	0.5	0	428	1250.6	2112	407	1320.7	2219	2331	6
189	7	Nie	499	6.17427	-4.60	7.0829	22.30	1.01671	8.2642	23.56	61.565	1.5	2	429	1250.7	2112	524	1413.6	2242	2327	7
190	8	Pon	500	6.21392	-5.09	7.1235	22.23	1.01670	9.1805	20.01	62.146	2.5	6	430	1250.9	2111	645	1502.2	2258	2323	8
191	9	Wto	501	6.25358	-5.18	7.1640	22.16	1.01667	10.0548	15.19	62.659	3.5	12	431	1251.0	2110	803	1546.8	2310	2319	9
192	10	Śro	502	6.29323	-5.27	7.2045	22.08	1.01665	10.5033	10.06	63.062	4.5	19	432	1251.2	2109	919	1628.4	2319	2315	10
193	11	Czw	503	6.33289	-5.35	7.2450	22.00	1.01661	11.3317	4.35	63.318	5.5	27	434	1251.3	2108	1032	1708.0	2327	2311	11
194	12	Pią	504	6.37254	-5.42	7.2854	21.52	1.01657	12.1504	-1.03	63.398	6.5	36	435	1251.4	2107	1143	1746.8	2335	2307	12
195	13	Sob	505	6.41220	-5.49	7.3257	21.43	1.01653	12.5659	-6.38	63.285	7.5	45	436	1251.6	2106	1254	1826.0	2343	2303	13
196	14	Nie	506	6.45185	-5.56	7.3700	21.34	1.01648	13.4006	-12.02	62.975	0.5	54	437	1251.7	2105	1408	1906.8	2353	2259	14
197	15	Pon	507	6.49151	-6.02	7.4103	21.25	1.01642	14.2531	-17.04	62.480	1.5	64	438	1251.8	2104	1524	1950.5	****	2256	15
198	16	Wto	508	6.53117	-6.07	7.4505	21.15	1.01637	15.1414	-21.31	61.827	2.5	73	440	1251.9	2103	1644	2038.2	006	2252	16
199	17	Śro	509	6.57082	-6.12	7.4907	21.04	1.01630	16.0701	-25.06	61.058	3.5	82	441	1251.9	2102	1805	2130.4	023	2248	17
200	18	Czw	510	7.01048	-6.16	7.5308	20.54	1.01624	17.0401	-27.30	60.228	4.5	89	442	1252.0	2101	1921	2227.3	050	2244	18
201	19	Pią	511	7.05013	-6.20	7.5708	20.43	1.01617	18.0430	-28.25	59.401	5.5	95	444	1252.1	2059	2025	2327.3	131	2240	19
202	20	Sob	512	7.08579	-6.24	8.0108	20.31	1.01610	19.0647	-27.36	58.640	6.5	99	445	1252.1	2058	2111	*****	232	2236	20
203	21	Nie	513	7.12545	-6.26	8.0507	20.20	1.01602	20.0842	-25.00	58.006	7.5	100	447	1252.2	2057	2141	028.2	352	2232	21
204	22	Pon	514	7.16510	-6.28	8.0906	20.08	1.01594	21.0827	-20.48	57.544	1.0	99	448	1252.2	2055	2202	127.5	524	2228	22
205	23	Wto	515	7.20476	-6.30	8.1304	19.56	1.01586	22.0511	-15.18	57.279	2.0	95	450	1252.2	2054	2217	223.7	659	2224	23
206	24	Śro	516	7.24441	-6.31	8.1701	19.43	1.01577	22.5902	-8.56	57.216	3.0	88	451	1252.3	2052	2229	316.5	832	2220	24
207	25	Czw	517	7.28407	-6.31	8.2058	19.30	1.01569	23.5050	-2.07	57.338	4.0	79	453	1252.3	2051	2239	406.6	1003	2216	25
208	26	Pią	518	7.32372	-6.31	8.2455	19.17	1.01559	0.4144	4.45	57.614	5.0	69	454	1252.3	2049	2249	455.3	1132	2212	26
209	27	Sob	519	7.36338	-6.30	8.2850	19.03	1.01550	1.3257	11.18	58.005	6.0	58	456	1252.3	2048	2301	544.0	1301	2208	27
210	28	Nie	520	7.40303	-6.29	8.3246	18.49	1.01540	2.2537	17.11	58.475	0.3	47	457	1252.2	2046	2316	633.9	1430	2204	28
211	29	Pon	521	7.44269	-6.27	8.3640	18.35	1.01529	3.2029	22.06	58.990	1.3	36	459	1252.2	2045	2337	726.2	1600	2201	29
212	30	Wto	522	7.48235	-6.25	8.4034	18.20	1.01518	4.1746	25.45	59.530	2.3	26	500	1252.2	2043	****	821.2	1726	2157	30
213	31	Śro	523	7.52200	-6.21	8.4428	18.05	1.01507	5.1654	27.55	60.077	3.3	17	502	1252.1	2041	007	918.4	1841	2153	31

Fazy Księżyca [Dm, h.mm]:      Now 6, 0.57      1kw 14, 0.49      Pełn 21, 12.17      3kw 28, 4.51

# LIPIEC 2024 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	*****	*****	5.52	22.25	4.59	21.45	1.32	16.35	2.27	18.40	23.57	11.02	1.49	17.33	0.13	12.06	22.35	6.13		
	6.729	23.06	8.036	22.35	7.265	23.23	2.939	15.79	4.445	21.00	23.404	-6.02	3.566	18.94	0.031	-1.19	20.302	-22.95	18.63598	1
3	*****	*****	6.05	22.25	5.04	21.46	1.27	16.35	2.20	18.34	23.49	10.54	1.41	17.25	0.05	11.58	22.27	6.05		
	6.867	22.90	8.278	21.50	7.442	22.95	3.034	16.22	4.476	21.07	23.403	-6.03	3.572	18.96	0.031	-1.19	20.299	-22.97	18.76740	3
5	*****	*****	6.17	22.24	5.09	21.46	1.22	16.36	2.14	18.29	23.41	10.46	1.33	17.18	23.53	11.50	22.19	5.57		
	7.004	22.72	8.506	20.58	7.619	22.63	3.129	16.63	4.506	21.14	23.402	-6.04	3.578	18.98	0.031	-1.20	20.296	-22.98	18.89882	5
7	*****	*****	6.29	22.22	5.15	21.46	1.17	16.36	2.07	18.23	23.34	10.38	1.26	17.11	23.45	11.42	22.11	5.49		
	7.141	22.51	8.721	19.60	7.794	22.26	3.225	17.03	4.536	21.20	23.401	-6.06	3.583	19.00	0.031	-1.20	20.293	-22.99	19.03025	7
9	*****	*****	6.40	22.19	5.20	21.45	1.13	16.37	2.01	18.17	23.26	10.30	1.18	17.03	23.37	11.34	22.03	5.41		
	7.278	22.27	8.923	18.57	7.968	21.85	3.320	17.42	4.565	21.26	23.400	-6.08	3.589	19.02	0.031	-1.20	20.290	-23.01	19.16167	9
11	*****	*****	6.51	22.16	5.26	21.45	1.08	16.37	1.54	18.12	23.18	10.22	1.11	16.56	23.30	11.26	21.55	5.32		
	7.414	22.01	9.113	17.51	8.142	21.40	3.415	17.80	4.595	21.32	23.398	-6.10	3.595	19.04	0.030	-1.21	20.287	-23.02	19.29309	11
13	*****	*****	7.01	22.12	5.32	21.43	1.03	16.37	1.48	18.06	23.10	10.14	1.03	16.48	23.22	11.18	21.48	5.24		
	7.549	21.72	9.290	16.43	8.314	20.90	3.511	18.17	4.624	21.38	23.395	-6.12	3.600	19.06	0.029	-1.21	20.283	-23.04	19.42451	13
15	*****	*****	7.09	22.07	5.38	21.42	0.59	16.37	1.41	18.00	23.02	10.06	0.55	16.41	23.14	11.10	21.40	5.16		
	7.684	21.41	9.454	15.33	8.485	20.37	3.606	18.52	4.653	21.44	23.393	-6.15	3.605	19.07	0.029	-1.22	20.280	-23.05	19.55593	15
17	*****	*****	7.17	22.01	5.44	21.40	0.54	16.37	1.35	17.55	22.54	9.58	0.48	16.34	23.06	11.02	21.32	5.08		
	7.818	21.07	9.605	14.24	8.654	19.80	3.702	18.87	4.681	21.49	23.390	-6.18	3.610	19.09	0.028	-1.23	20.277	-23.06	19.68735	17
19	*****	*****	7.24	21.55	5.51	21.38	0.50	16.38	1.28	17.49	22.46	9.50	0.40	16.26	22.58	10.54	21.24	4.60		
	7.952	20.71	9.743	13.17	8.822	19.19	3.797	19.20	4.709	21.55	23.386	-6.21	3.615	19.11	0.027	-1.24	20.274	-23.08	19.81877	19
21	*****	*****	7.30	21.49	5.57	21.36	0.46	16.38	1.21	17.43	22.38	9.41	0.32	16.19	22.50	10.46	21.16	4.52		
	8.085	20.33	9.868	12.12	8.989	18.54	3.892	19.52	4.737	21.60	23.382	-6.24	3.620	19.12	0.026	-1.25	20.270	-23.09	19.95020	21
23	*****	*****	7.35	21.41	6.04	21.34	0.41	16.38	1.15	17.37	22.31	9.33	0.24	16.11	22.42	10.38	21.08	4.43		
	8.218	19.93	9.979	11.10	9.155	17.86	3.988	19.82	4.764	21.65	23.378	-6.28	3.624	19.14	0.024	-1.26	20.267	-23.10	20.08162	23
25	*****	*****	7.38	21.34	6.11	21.31	0.37	16.37	1.08	17.31	22.23	9.25	0.17	16.04	22.34	10.30	20.60	4.35		
	8.350	19.50	10.076	10.14	9.319	17.15	4.083	20.12	4.791	21.69	23.373	-6.32	3.628	19.15	0.023	-1.27	20.264	-23.12	20.21304	25
27	*****	*****	7.40	21.26	6.17	21.28	0.33	16.37	1.02	17.25	22.15	9.16	0.09	15.56	22.27	10.22	20.52	4.27		
	8.481	19.05	10.157	9.25	9.482	16.41	4.178	20.40	4.818	21.74	23.368	-6.36	3.632	19.17	0.022	-1.28	20.261	-23.13	20.34445	27
29	1.19	0.03	7.41	21.17	6.24	21.25	0.29	16.37	0.55	17.19	22.07	9.08	0.01	15.49	22.19	10.14	20.44	4.19		
	8.611	18.58	10.222	8.43	9.644	15.64	4.273	20.67	4.844	21.78	23.363	-6.40	3.636	19.18	0.020	-1.29	20.257	-23.14	20.47587	29
31	1.39	23.59	7.40	21.08	6.31	21.22	0.25	16.37	0.48	17.13	21.59	8.59	23.50	15.41	22.11	10.06	20.36	4.11		
	8.741	18.09	10.270	7.70	9.805	14.84	4.368	20.93	4.870	21.83	23.357	-6.44	3.640	19.19	0.018	-1.30	20.254	-23.16	20.60730	31

# SIERPIEŃ 2024

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
2460																						
214	1	Czw	524	7.56166	-6.18	8.4821	17.50	1.01495	6.1630	28.27	60.625	4.3	10	504	1252.0	2039	052	1016.3	1940	2149	1	
215	2	Pią	525	8.00132	-6.13	8.5213	17.35	1.01482	7.1451	27.23	61.166	5.3	4	505	1252.0	2038	153	1112.9	2020	2145	2	
216	3	Sob	526	8.04097	-6.09	8.5604	17.19	1.01469	8.1029	24.55	61.693	6.3	1	507	1251.9	2036	307	1206.6	2046	2141	3	
217	4	Nie	527	8.08063	-6.03	8.5956	17.03	1.01455	9.0236	21.16	62.194	7.3	0	508	1251.8	2034	427	1256.3	2104	2137	4	
218	5	Pon	528	8.12028	-5.57	9.0346	16.47	1.01441	9.5109	16.45	62.651	0.9	1	510	1251.7	2032	546	1342.2	2117	2133	5	
219	6	Wto	529	8.15594	-5.50	9.0736	16.30	1.01426	10.3639	11.38	63.041	1.9	4	512	1251.6	2030	703	1424.7	2127	2129	6	
220	7	Śro	530	8.19559	-5.43	9.1125	16.13	1.01411	11.1955	6.10	63.338	2.9	8	513	1251.5	2028	817	1504.9	2136	2125	7	
221	8	Czw	531	8.23525	-5.35	9.1514	15.56	1.01395	12.0153	0.31	63.511	3.9	14	515	1251.3	2026	929	1543.9	2143	2121	8	
222	9	Pią	532	8.27490	-5.27	9.1902	15.39	1.01379	12.4334	-5.06	63.534	4.9	21	517	1251.2	2024	1040	1622.7	2151	2117	9	
223	10	Sob	533	8.31456	-5.17	9.2249	15.21	1.01362	13.2557	-10.34	63.386	5.9	29	519	1251.0	2022	1152	1702.5	2200	2113	10	
224	11	Nie	534	8.35421	-5.08	9.2636	15.03	1.01345	14.1005	-15.42	63.054	6.9	38	520	1250.9	2020	1306	1744.4	2211	2109	11	
225	12	Pon	535	8.39387	-4.58	9.3022	14.45	1.01327	14.5658	-20.18	62.536	7.9	48	522	1250.7	2018	1424	1829.6	2225	2105	12	
226	13	Wto	536	8.43353	-4.47	9.3408	14.27	1.01309	15.4725	-24.08	61.849	0.8	58	524	1250.5	2016	1543	1918.8	2247	2102	13	
227	14	Śro	537	8.47318	-4.35	9.3753	14.08	1.01291	16.4154	-26.57	61.024	1.8	68	525	1250.3	2014	1701	2012.6	2320	2058	14	
228	15	Czw	538	8.51284	-4.23	9.4138	13.50	1.01272	17.4012	-28.25	60.108	2.8	77	527	1250.1	2012	1810	2110.4	****	2054	15	
229	16	Pią	539	8.55249	-4.11	9.4522	13.31	1.01253	18.4113	-28.16	59.164	3.8	85	529	1249.9	2010	1904	2210.4	010	2050	16	
230	17	Sob	540	8.59215	-3.58	9.4906	13.11	1.01234	19.4306	-26.22	58.265	4.8	92	530	1249.7	2008	1940	2310.5	122	2046	17	
231	18	Nie	541	9.03181	-3.44	9.5249	12.52	1.01214	20.4359	-22.45	57.488	5.8	97	532	1249.5	2006	2005	*****	250	2042	18	
232	19	Pon	542	9.07146	-3.30	9.5631	12.32	1.01195	21.4234	-17.38	56.902	6.8	100	534	1249.3	2003	2022	008.7	425	2038	19	
233	20	Wto	543	9.11112	-3.16	10.0013	12.13	1.01175	22.3831	-11.24	56.558	0.6	99	536	1249.0	2001	2035	104.0	602	2034	20	
234	21	Śro	544	9.15077	-3.01	10.0355	11.53	1.01155	23.3220	-4.28	56.479	1.6	96	537	1248.8	1959	2046	156.6	736	2030	21	
235	22	Czw	545	9.19043	-2.45	10.0736	11.32	1.01134	0.2458	2.40	56.659	2.6	90	539	1248.5	1957	2057	247.3	909	2026	22	
236	23	Pią	546	9.23008	-2.30	10.1117	11.12	1.01114	1.1733	9.36	57.064	3.6	82	541	1248.2	1955	2108	337.5	1041	2022	23	
237	24	Sob	547	9.26574	-2.13	10.1457	10.52	1.01093	2.1111	15.53	57.643	4.6	72	542	1248.0	1952	2122	428.5	1213	2018	24	
238	25	Nie	548	9.30539	-1.57	10.1837	10.31	1.01072	3.0639	21.12	58.334	5.6	61	544	1247.7	1950	2141	521.3	1345	2014	25	
239	26	Pon	549	9.34505	-1.40	10.2216	10.10	1.01051	4.0412	25.14	59.078	0.0	50	546	1247.4	1948	2208	616.4	1515	2010	26	
240	27	Wto	550	9.38470	-1.22	10.2556	9.49	1.01029	5.0322	27.44	59.827	1.0	39	548	1247.1	1946	2247	713.6	1634	2006	27	
241	28	Śro	551	9.42436	-1.05	10.2934	9.28	1.01007	6.0257	28.37	60.544	2.0	29	549	1246.8	1943	2344	811.5	1738	2003	28	
242	29	Czw	552	9.46401	-0.46	10.3313	9.06	1.00985	7.0120	27.54	61.205	3.0	20	551	1246.5	1941	****	908.3	1823	1959	29	
243	30	Pią	553	9.50367	-0.28	10.3651	8.45	1.00962	7.5709	25.44	61.797	4.0	12	553	1246.2	1939	054	1002.5	1852	1955	30	
244	31	Sob	554	9.54333	-0.09	10.4029	8.23	1.00939	8.4936	22.21	62.317	5.0	7	554	1245.9	1936	212	1052.9	1912	1951	31	

Fazy Księżycyca [Dm, h.mm]:      Nów 4, 13.13      1kw 12, 17.19      Pełn 19, 20.26      3kw 26, 11.26



# SIERPIEŃ 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST		Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)		
1	1.47	23.52	7.39	21.04	6.34	21.20	0.23	16.36	0.45	17.10	21.55	8.55	23.46	15.37	22.07	10.02	20.32	4.07			
	8.806	17.84	10.287	7.38	9.884	14.43	4.416	21.05	4.883	21.85	23.354	-6.46	3.642	19.20	0.017	-1.31	20.252	-23.16	20.67301	1	
3	1.60	23.40	7.35	20.54	6.41	21.17	0.19	16.36	0.38	17.04	21.47	8.47	23.38	15.30	21.59	9.54	20.24	3.59			
	8.935	17.32	10.306	6.84	10.043	13.59	4.511	21.29	4.908	21.89	23.348	-6.51	3.645	19.21	0.015	-1.32	20.249	-23.18	20.80443	3	
5	2.11	23.29	7.29	20.44	6.47	21.13	0.15	16.35	0.32	16.58	21.39	8.38	23.30	15.22	21.51	9.46	20.16	3.50			
	9.063	16.78	10.306	6.43	10.200	12.72	4.605	21.51	4.933	21.93	23.342	-6.56	3.648	19.22	0.013	-1.34	20.246	-23.19	20.93585	5	
7	2.20	23.19	7.21	20.33	6.54	21.09	0.11	16.35	0.25	16.52	21.31	8.30	23.23	15.14	21.43	9.38	20.08	3.42			
	9.190	16.22	10.284	6.19	10.357	11.84	4.700	21.72	4.957	21.96	23.335	-6.61	3.651	19.23	0.011	-1.35	20.243	-23.20	21.06727	7	
9	2.29	23.10	7.11	20.23	7.01	21.05	0.08	16.34	0.18	16.46	21.23	8.21	23.15	15.07	21.35	9.30	20.00	3.34			
	9.317	15.65	10.241	6.13	10.512	10.93	4.794	21.92	4.981	22.00	23.328	-6.66	3.654	19.24	0.009	-1.37	20.240	-23.21	21.19868	9	
11	2.38	23.01	6.59	20.12	7.07	21.02	0.04	16.33	0.12	16.40	21.15	8.12	23.07	14.59	21.27	9.22	19.52	3.26			
	9.443	15.06	10.179	6.26	10.666	10.01	4.888	22.11	5.004	22.03	23.320	-6.71	3.657	19.25	0.007	-1.38	20.236	-23.22	21.33010	11	
13	2.46	22.53	6.45	20.01	7.14	20.58	23.57	16.32	0.05	16.33	21.07	8.04	22.59	14.51	21.19	9.14	19.44	3.18			
	9.569	14.45	10.099	6.58	10.819	9.06	4.981	22.28	5.026	22.06	23.313	-6.77	3.659	19.25	0.004	-1.40	20.233	-23.24	21.46152	13	
15	2.53	22.45	6.28	19.50	7.20	20.53	23.53	16.31	23.54	16.27	20.59	7.55	22.51	14.44	21.11	9.06	19.36	3.10			
	9.694	13.83	10.005	7.09	10.971	8.10	5.074	22.45	5.049	22.09	23.305	-6.82	3.661	19.26	0.002	-1.42	20.230	-23.25	21.59295	15	
17	2.60	22.37	6.11	19.40	7.27	20.49	23.50	16.30	23.47	16.21	20.51	7.47	22.44	14.36	21.03	8.58	19.28	3.02			
	9.818	13.19	9.903	7.76	11.123	7.13	5.167	22.59	5.070	22.12	23.297	-6.88	3.663	19.27	23.999	-1.44	20.227	-23.26	21.72437	17	
19	3.07	22.30	5.52	19.30	7.34	20.45	23.46	16.29	23.41	16.14	20.43	7.38	22.36	14.28	20.56	8.50	19.20	2.53			
	9.942	12.54	9.801	8.56	11.273	6.14	5.260	22.73	5.091	22.15	23.289	-6.94	3.664	19.27	23.997	-1.45	20.225	-23.27	21.85579	19	
21	3.13	22.23	5.34	19.22	7.40	20.41	23.43	16.27	23.34	16.08	20.35	7.29	22.28	14.21	20.48	8.41	19.12	2.45			
	10.065	11.88	9.705	9.43	11.424	5.15	5.352	22.86	5.111	22.17	23.280	-7.00	3.666	19.28	23.994	-1.47	20.222	-23.28	21.98721	21	
23	3.19	22.15	5.16	19.14	7.47	20.36	23.40	16.26	23.27	16.01	20.26	7.20	22.20	14.13	20.40	8.33	19.04	2.37			
	10.188	11.20	9.625	10.33	11.573	4.14	5.443	22.97	5.131	22.20	23.271	-7.06	3.667	19.28	23.991	-1.49	20.219	-23.29	22.11862	23	
25	3.25	22.08	4.60	19.08	7.53	20.32	23.37	16.24	23.20	15.55	20.18	7.12	22.12	14.05	20.32	8.25	18.56	2.29			
	10.310	10.51	9.568	11.19	11.722	3.13	5.535	23.07	5.150	22.22	23.263	-7.12	3.668	19.28	23.988	-1.51	20.216	-23.30	22.25004	25	
27	3.31	22.02	4.46	19.02	7.60	20.28	23.33	16.22	23.13	15.48	20.10	7.03	22.05	13.57	20.24	8.17	18.48	2.21			
	10.432	9.82	9.540	11.95	11.871	2.11	5.625	23.16	5.169	22.24	23.254	-7.18	3.669	19.29	23.985	-1.53	20.214	-23.31	22.38146	27	
29	3.37	21.55	4.35	18.59	8.06	20.23	23.30	16.21	23.06	15.41	20.02	6.54	21.57	13.49	20.16	8.09	18.41	2.13			
	10.554	9.11	9.545	12.57	12.019	1.08	5.715	23.24	5.186	22.26	23.244	-7.24	3.669	19.29	23.982	-1.55	20.211	-23.32	22.51288	29	
31	3.42	21.48	4.27	18.56	8.13	20.19	23.27	16.19	22.59	15.35	19.54	6.45	21.49	13.41	20.08	8.01	18.33	2.05			
	10.675	8.39	9.586	13.02	12.167	0.05	5.805	23.31	5.204	22.28	23.235	-7.30	3.669	19.29	23.979	-1.57	20.209	-23.32	22.64431	31	

# WRZESIEŃ 2024

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2460																		
245	1	Nie	555	9.58298	0.10	10.4406	8.01	1.00916	9.3833	18.03	62.761	6.0	3	556	1245.6	1934	332	1139.4	1926	1947	1
246	2	Pon	556	10.02264	0.29	10.4744	7.39	1.00892	10.2428	13.04	63.127	7.0	0	558	1245.3	1932	449	1222.8	1936	1943	2
247	3	Wto	557	10.06229	0.48	10.5121	7.17	1.00868	11.0803	7.40	63.410	0.3	0	559	1244.9	1929	604	1303.4	1945	1939	3
248	4	Śro	558	10.10195	1.08	10.5457	6.55	1.00843	11.5011	2.02	63.601	1.3	2	601	1244.6	1927	716	1342.6	1953	1935	4
249	5	Czw	559	10.14160	1.28	10.5834	6.33	1.00818	12.3148	-3.38	63.685	2.3	5	603	1244.3	1924	828	1421.3	2000	1931	5
250	6	Pią	560	10.18126	1.49	11.0210	6.11	1.00793	13.1350	-9.11	63.646	3.3	10	605	1243.9	1922	939	1500.5	2008	1927	6
251	7	Sob	561	10.22091	2.09	11.0546	5.48	1.00767	13.5713	-14.25	63.467	4.3	16	606	1243.6	1920	1052	1541.3	2018	1923	7
252	8	Nie	562	10.26057	2.30	11.0922	5.26	1.00741	14.4252	-19.10	63.132	5.3	23	608	1243.3	1917	1208	1624.8	2031	1919	8
253	9	Pon	563	10.30022	2.51	11.1258	5.03	1.00715	15.3132	-23.12	62.634	6.3	32	610	1242.9	1915	1326	1711.7	2049	1915	9
254	10	Wto	564	10.33588	3.12	11.1633	4.40	1.00688	16.2346	-26.19	61.975	7.3	42	611	1242.6	1913	1444	1802.6	2116	1911	10
255	11	Śro	565	10.37553	3.33	11.2009	4.17	1.00662	17.1933	-28.12	61.171	0.2	52	613	1242.2	1910	1556	1857.3	2157	1908	11
256	12	Czw	566	10.41519	3.54	11.2344	3.54	1.00635	18.1813	-28.39	60.256	1.2	62	615	1241.8	1908	1655	1954.8	2257	1904	12
257	13	Pią	567	10.45485	4.15	11.2719	3.32	1.00608	19.1823	-27.27	59.280	2.2	72	617	1241.5	1905	1737	2053.5	****	1900	13
258	14	Sob	568	10.49450	4.37	11.3055	3.08	1.00580	20.1826	-24.34	58.309	3.2	82	618	1241.1	1903	1806	2151.4	016	1856	14
259	15	Nie	569	10.53416	4.58	11.3430	2.45	1.00553	21.1705	-20.07	57.422	4.2	90	620	1240.8	1900	1826	2247.4	148	1852	15
260	16	Pon	570	10.57381	5.20	11.3805	2.22	1.00526	22.1343	-14.20	56.701	5.2	96	622	1240.4	1858	1840	2341.1	323	1848	16
261	17	Wto	571	11.01347	5.41	11.4140	1.59	1.00498	23.0831	-7.37	56.217	6.2	99	623	1240.1	1856	1852	*****	459	1844	17
262	18	Śro	572	11.05312	6.03	11.4515	1.36	1.00471	0.0216	-0.23	56.020	0.3	100	625	1239.7	1853	1903	033.1	633	1840	18
263	19	Czw	573	11.09278	6.24	11.4850	1.13	1.00444	0.5560	6.53	56.129	1.3	97	627	1239.3	1851	1914	124.5	808	1836	19
264	20	Pią	574	11.13243	6.46	11.5225	0.49	1.00416	1.5046	13.42	56.525	2.3	92	629	1239.0	1848	1927	216.6	943	1832	20
265	21	Sob	575	11.17209	7.07	11.5600	0.26	1.00389	2.4726	19.37	57.159	3.3	84	630	1238.6	1846	1944	310.5	1120	1828	21
266	22	Nie	576	11.21174	7.28	11.5935	0.03	1.00361	3.4616	24.14	57.963	4.3	75	632	1238.3	1843	2008	406.8	1254	1824	22
267	23	Pon	577	11.25140	7.49	12.0311	-0.21	1.00334	4.4648	27.18	58.859	5.3	65	634	1237.9	1841	2044	505.2	1421	1820	23
268	24	Wto	578	11.29105	8.10	12.0646	-0.44	1.00306	5.4746	28.38	59.775	6.3	54	635	1237.6	1839	2135	604.6	1533	1816	24
269	25	Śro	579	11.33071	8.31	12.1022	-1.07	1.00279	6.4728	28.18	60.652	0.6	43	637	1237.2	1836	2243	703.1	1624	1812	25
270	26	Czw	580	11.37037	8.52	12.1358	-1.31	1.00251	7.4422	26.26	61.445	1.6	33	639	1236.9	1834	****	758.7	1658	1809	26
271	27	Pią	581	11.41002	9.12	12.1734	-1.54	1.00223	8.3738	23.18	62.128	2.6	24	641	1236.5	1831	000	850.4	1720	1805	27
272	28	Sob	582	11.44568	9.32	12.2111	-2.17	1.00195	9.2712	19.12	62.687	3.6	16	642	1236.2	1829	119	937.9	1735	1801	28
273	29	Nie	583	11.48533	9.52	12.2448	-2.41	1.00167	10.1330	14.22	63.121	4.6	10	644	1235.9	1827	237	1021.8	1746	1757	29
274	30	Pon	584	11.52499	10.12	12.2824	-3.04	1.00139	10.5719	9.04	63.434	5.6	5	646	1235.6	1824	352	1103.0	1755	1753	30

Fazy Księżycyca [Dm, h.mm]:      Nów 3, 3.55      1kw 11, 8.06      Pełn 18, 4.34      3kw 24, 20.50

# WRZESIEŃ 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	3.45	21.45	4.24	18.55	8.16	20.16	23.26	16.18	22.56	15.31	19.50	6.41	21.45	13.38	20.04	7.57	18.29	2.01		
	10.735	8.02	9.620	13.17	12.241	-0.47	5.850	23.33	5.212	22.29	23.231	-7.33	3.669	19.29	23.978	-1.58	20.207	-23.33	22.71001	1
3	3.50	21.39	4.21	18.53	8.22	20.12	23.23	16.15	22.49	15.25	19.42	6.32	21.37	13.30	19.56	7.49	18.21	1.53		
	10.856	7.29	9.714	13.30	12.390	-1.50	5.938	23.38	5.228	22.31	23.221	-7.39	3.669	19.29	23.975	-1.61	20.205	-23.34	22.84143	3
5	3.55	21.32	4.21	18.52	8.29	20.07	23.20	16.13	22.42	15.18	19.34	6.24	21.29	13.22	19.48	7.40	18.13	1.45		
	10.976	6.55	9.840	13.20	12.538	-2.53	6.026	23.42	5.243	22.32	23.212	-7.45	3.669	19.29	23.971	-1.63	20.203	-23.34	22.97285	5
7	4.00	21.26	4.24	18.52	8.35	20.03	23.17	16.11	22.34	15.11	19.26	6.15	21.21	13.14	19.40	7.32	18.05	1.37		
	11.096	5.80	9.995	12.87	12.686	-3.55	6.114	23.45	5.258	22.34	23.202	-7.51	3.668	19.28	23.968	-1.65	20.201	-23.35	23.10427	7
9	4.05	21.20	4.31	18.51	8.42	19.59	23.14	16.08	22.27	15.04	19.18	6.06	21.13	13.06	19.32	7.24	17.57	1.29		
	11.216	5.05	10.174	12.30	12.834	-4.58	6.200	23.47	5.271	22.35	23.193	-7.58	3.668	19.28	23.965	-1.67	20.199	-23.36	23.23568	9
11	4.10	21.14	4.39	18.51	8.48	19.54	23.11	16.06	22.20	14.57	19.10	5.57	21.06	12.58	19.24	7.16	17.49	1.21		
	11.336	4.29	10.373	11.52	12.983	-5.60	6.286	23.48	5.284	22.36	23.184	-7.64	3.667	19.28	23.962	-1.69	20.197	-23.36	23.36711	11
13	4.14	21.08	4.50	18.50	8.55	19.50	23.09	16.03	22.13	14.50	19.02	5.49	20.58	12.50	19.16	7.08	17.41	1.13		
	11.455	3.53	10.585	10.55	13.133	-6.61	6.371	23.48	5.297	22.37	23.174	-7.70	3.665	19.27	23.958	-1.72	20.195	-23.37	23.49853	13
15	4.19	21.02	5.01	18.49	9.01	19.45	23.06	15.60	22.06	14.43	18.53	5.40	20.50	12.42	19.08	6.59	17.33	1.05		
	11.575	2.76	10.807	9.41	13.282	-7.61	6.455	23.48	5.308	22.39	23.165	-7.76	3.664	19.27	23.955	-1.74	20.193	-23.38	23.62995	15
17	4.23	20.56	5.14	18.48	9.08	19.41	23.03	15.57	21.58	14.36	18.45	5.31	20.42	12.34	19.00	6.51	17.25	0.57		
	11.694	1.98	11.034	8.13	13.433	-8.60	6.538	23.46	5.318	22.39	23.156	-7.82	3.662	19.26	23.952	-1.76	20.191	-23.38	23.76136	17
19	4.28	20.50	5.28	18.46	9.15	19.37	23.00	15.54	21.51	14.28	18.37	5.22	20.34	12.26	18.53	6.43	17.17	0.49		
	11.814	1.21	11.263	6.74	13.583	-9.58	6.621	23.43	5.328	22.40	23.146	-7.87	3.660	19.26	23.948	-1.78	20.190	-23.39	23.89278	19
21	4.32	20.45	5.42	18.44	9.21	19.33	22.58	15.50	21.44	14.21	18.29	5.14	20.26	12.18	18.45	6.35	17.09	0.41		
	11.933	0.43	11.491	5.28	13.735	-10.55	6.702	23.40	5.337	22.41	23.137	-7.93	3.658	19.25	23.945	-1.80	20.188	-23.39	0.02420	21
23	4.36	20.39	5.55	18.41	9.28	19.28	22.55	15.47	21.36	14.14	18.21	5.05	20.18	12.10	18.37	6.27	17.01	0.33		
	12.053	-0.34	11.718	3.77	13.888	-11.50	6.783	23.36	5.345	22.42	23.128	-7.99	3.656	19.24	23.942	-1.83	20.187	-23.39	0.15562	23
25	4.40	20.34	6.09	18.38	9.35	19.24	22.52	15.44	21.29	14.06	18.13	4.56	20.10	12.02	18.29	6.19	16.53	0.25		
	12.173	-1.12	11.942	2.22	14.041	-12.44	6.862	23.31	5.352	22.42	23.119	-8.04	3.653	19.23	23.938	-1.85	20.186	-23.40	0.28704	25
27	4.44	20.29	6.23	18.35	9.41	19.20	22.50	15.40	21.21	13.59	18.05	4.48	20.02	11.54	18.21	6.10	16.46	0.17		
	12.293	-1.90	12.162	0.65	14.196	-13.35	6.941	23.25	5.358	22.43	23.111	-8.09	3.651	19.22	23.935	-1.87	20.185	-23.40	0.41846	27
29	4.48	20.23	6.36	18.32	9.48	19.17	22.47	15.36	21.14	13.51	17.57	4.39	19.54	11.46	18.13	6.02	16.38	0.09		
	12.413	-2.68	12.379	-0.92	14.351	-14.25	7.018	23.19	5.363	22.43	23.102	-8.15	3.648	19.21	23.931	-1.89	20.184	-23.40	0.54988	29

# PAŹDZIERNIK 2024

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2460																					
275	1	Wto	585	11.56464	10.31	12.3202	-3.27	1.00111	11.3934	3.29	63.634	6.6	2	648	1235.2	1822	505	1142.2	1803	1749	1
276	2	Śro	586	12.00430	10.50	12.3539	-3.51	1.00082	12.2109	-2.12	63.727	7.6	0	649	1234.9	1819	617	1221.2	1810	1745	2
277	3	Czw	587	12.04395	11.09	12.3917	-4.14	1.00054	13.0301	-7.48	63.717	0.6	0	651	1234.6	1817	728	1260.0	1818	1741	3
278	4	Pią	588	12.08361	11.27	12.4255	-4.37	1.00025	13.4603	-13.08	63.604	1.6	2	653	1234.3	1815	841	1340.3	1827	1737	4
279	5	Sob	589	12.12326	11.45	12.4634	-4.60	0.99996	14.3106	-18.02	63.381	2.6	6	655	1234.0	1812	956	1422.8	1839	1733	5
280	6	Nie	590	12.16292	12.03	12.5013	-5.23	0.99967	15.1853	-22.17	63.043	3.6	11	656	1233.7	1810	1113	1508.4	1854	1729	6
281	7	Pon	591	12.20257	12.20	12.5352	-5.46	0.99937	16.0951	-25.38	62.581	4.6	18	658	1233.4	1808	1231	1557.5	1918	1725	7
282	8	Wto	592	12.24223	12.37	12.5732	-6.09	0.99908	17.0401	-27.50	61.992	5.6	27	700	1233.1	1805	1344	1650.2	1953	1721	8
283	9	Śro	593	12.28189	12.53	13.0112	-6.32	0.99879	18.0050	-28.42	61.280	6.6	36	702	1232.9	1803	1447	1745.5	2044	1717	9
284	10	Czw	594	12.32154	13.09	13.0453	-6.54	0.99849	18.5907	-28.01	60.461	7.6	46	704	1232.6	1801	1535	1842.2	2155	1713	10
285	11	Pią	595	12.36120	13.24	13.0834	-7.17	0.99820	19.5730	-25.46	59.566	0.6	57	705	1232.3	1758	1607	1938.5	2319	1710	11
286	12	Sob	596	12.40085	13.39	13.1216	-7.39	0.99791	20.5447	-21.60	58.643	1.6	67	707	1232.1	1756	1630	2033.3	****	1706	12
287	13	Nie	597	12.44051	13.54	13.1558	-8.02	0.99762	21.5024	-16.53	57.757	2.6	78	709	1231.9	1754	1646	2126.2	049	1702	13
288	14	Pon	598	12.48016	14.08	13.1940	-8.24	0.99733	22.4426	-10.41	56.981	3.6	87	711	1231.6	1751	1658	2217.6	222	1658	14
289	15	Wto	599	12.51582	14.21	13.2323	-8.46	0.99704	23.3734	-3.45	56.393	4.6	94	713	1231.4	1749	1709	2308.4	355	1654	15
290	16	Śro	600	12.55547	14.34	13.2707	-9.08	0.99675	0.3048	3.30	56.059	5.6	98	715	1231.2	1747	1720	2360.0	528	1650	16
291	17	Czw	601	12.59513	14.46	13.3051	-9.30	0.99647	1.2516	10.37	56.022	6.6	100	716	1231.0	1745	1732	*****	703	1646	17
292	18	Pią	602	13.03478	14.58	13.3436	-9.52	0.99619	2.2158	17.06	56.292	0.9	99	718	1230.8	1743	1747	053.5	841	1642	18
293	19	Sob	603	13.07444	15.09	13.3822	-10.14	0.99591	3.2126	22.27	56.842	1.9	94	720	1230.6	1740	1807	149.9	1019	1638	19
294	20	Nie	604	13.11409	15.20	13.4208	-10.35	0.99563	4.2322	26.17	57.616	2.9	88	722	1230.4	1738	1838	249.3	1154	1634	20
295	21	Pon	605	13.15375	15.29	13.4555	-10.56	0.99536	5.2627	28.20	58.536	3.9	79	724	1230.3	1736	1925	350.8	1316	1630	21
296	22	Wto	606	13.19341	15.38	13.4942	-11.18	0.99509	6.2840	28.32	59.521	4.9	70	726	1230.1	1734	2028	452.0	1418	1626	22
297	23	Śro	607	13.23306	15.47	13.5330	-11.39	0.99482	7.2804	27.04	60.492	5.9	59	727	1230.0	1732	2145	550.7	1459	1622	23
298	24	Czw	608	13.27272	15.54	13.5719	-11.59	0.99455	8.2327	24.13	61.386	0.1	49	729	1229.8	1730	2305	645.2	1525	1618	24
299	25	Pią	609	13.31237	16.01	14.0109	-12.20	0.99428	9.1435	20.18	62.156	1.1	39	731	1229.7	1727	****	734.8	1543	1615	25
300	26	Sob	610	13.35203	16.07	14.0459	-12.40	0.99402	10.0155	15.37	62.775	2.1	30	733	1229.6	1725	025	820.2	1555	1611	26
301	27	Nie	611	13.39168	16.13	14.0850	-13.01	0.99376	10.4620	10.25	63.230	3.1	22	735	1229.5	1723	141	902.2	1605	1607	27
301	27	Nie	611	14.39267	16.13	14.0860	-13.02	0.99375	10.4808	10.11	63.245	3.1	21	635	1129.5	1623	041	802.2	1505	1507	27
302	28	Pon	612	14.43232	16.18	14.1252	-13.22	0.99348	11.3034	4.40	63.531	4.1	14	637	1129.5	1621	154	842.0	1513	1503	28
303	29	Wto	613	14.47198	16.21	14.1645	-13.41	0.99322	12.1210	-0.59	63.665	5.1	8	639	1129.4	1619	306	920.7	1520	1459	29
304	30	Śro	614	14.51163	16.25	14.2038	-14.01	0.99296	12.5353	-6.36	63.665	6.1	4	641	1129.3	1617	417	959.5	1528	1455	30
305	31	Czw	615	14.55129	16.27	14.2432	-14.20	0.99270	13.3643	-12.01	63.549	7.1	1	642	1129.3	1615	529	1039.3	1536	1451	31

Fazy Księżycyca [Dm, h.mm]:      Now 2, 20.49      1kw 10, 20.55      Pełn 17, 13.26      3kw 24, 10.03      3kw 24, 9.03

# PAŹDZIERNIK 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	4.52	20.18	6.50	18.29	9.55	19.13	22.44	15.32	21.06	13.44	17.49	4.30	19.46	11.38	18.05	5.54	16.30	23.57		
	12.534	-3.46	12.593	-2.48	14.508	-15.12	7.095	23.12	5.367	22.43	23.094	-8.20	3.644	19.20	23.928	-1.91	20.183	-23.41	0.68130	1
3	4.56	20.13	7.03	18.25	10.02	19.09	22.41	15.29	20.58	13.36	17.41	4.22	19.38	11.29	17.57	5.46	16.22	23.49		
	12.655	-4.23	12.804	-4.02	14.666	-15.98	7.170	23.05	5.371	22.44	23.086	-8.25	3.641	19.19	23.925	-1.94	20.183	-23.41	0.81271	3
5	4.60	20.08	7.15	18.22	10.08	19.06	22.38	15.25	20.51	13.28	17.33	4.13	19.30	11.21	17.49	5.38	16.14	23.41		
	12.776	-5.00	13.011	-5.54	14.825	-16.80	7.244	22.97	5.373	22.44	23.078	-8.29	3.638	19.18	23.922	-1.96	20.182	-23.41	0.94413	5
7	5.03	20.03	7.28	18.18	10.15	19.02	22.35	15.20	20.43	13.21	17.25	4.04	19.22	11.13	17.41	5.29	16.06	23.33		
	12.898	-5.77	13.217	-7.03	14.985	-17.60	7.316	22.89	5.374	22.44	23.070	-8.34	3.634	19.17	23.918	-1.98	20.182	-23.41	1.07555	7
9	5.07	19.58	7.40	18.14	10.22	18.59	22.33	15.16	20.35	13.13	17.16	3.56	19.14	11.05	17.33	5.21	15.58	23.25		
	13.020	-6.53	13.420	-8.48	15.146	-18.37	7.388	22.81	5.375	22.44	23.063	-8.38	3.630	19.15	23.915	-2.00	20.182	-23.41	1.20697	9
11	5.11	19.54	7.52	18.11	10.29	18.56	22.30	15.12	20.27	13.05	17.08	3.47	19.06	10.57	17.25	5.13	15.50	23.17		
	13.143	-7.28	13.621	-9.90	15.309	-19.11	7.458	22.72	5.374	22.44	23.056	-8.42	3.626	19.14	23.912	-2.02	20.181	-23.41	1.33839	11
13	5.14	19.49	8.04	18.07	10.35	18.54	22.26	15.07	20.19	12.57	17.00	3.39	18.58	10.48	17.17	5.05	15.43	23.10		
	13.266	-8.03	13.821	-11.27	15.473	-19.82	7.526	22.63	5.373	22.44	23.049	-8.46	3.622	19.13	23.909	-2.04	20.181	-23.41	1.46981	13
15	5.18	19.45	8.16	18.03	10.42	18.51	22.23	15.03	20.11	12.49	16.52	3.30	18.50	10.40	17.09	4.57	15.35	23.02		
	13.390	-8.77	14.019	-12.60	15.638	-20.49	7.593	22.53	5.370	22.43	23.042	-8.50	3.617	19.11	23.906	-2.06	20.182	-23.41	1.60123	15
17	5.21	19.40	8.27	17.60	10.48	18.49	22.20	14.58	20.03	12.41	16.44	3.22	18.42	10.32	17.01	4.49	15.27	22.54		
	13.514	-9.50	14.217	-13.88	15.805	-21.13	7.659	22.44	5.367	22.43	23.036	-8.53	3.613	19.10	23.903	-2.08	20.182	-23.41	1.73264	17
19	5.25	19.36	8.38	17.56	10.55	18.47	22.17	14.53	19.55	12.33	16.36	3.14	18.34	10.24	16.53	4.41	15.19	22.46		
	13.639	-10.23	14.414	-15.11	15.973	-21.73	7.723	22.34	5.362	22.43	23.030	-8.56	3.608	19.08	23.900	-2.09	20.182	-23.41	1.86406	19
21	5.28	19.32	8.49	17.53	11.01	18.45	22.13	14.48	19.47	12.24	16.28	3.05	18.26	10.15	16.45	4.32	15.11	22.38		
	13.765	-10.94	14.611	-16.29	16.142	-22.29	7.786	22.24	5.357	22.42	23.025	-8.59	3.603	19.06	23.897	-2.11	20.183	-23.40	1.99548	21
23	5.32	19.28	9.00	17.50	11.07	18.43	22.10	14.44	19.39	12.16	16.20	2.57	18.18	10.07	16.37	4.24	15.03	22.31		
	13.892	-11.64	14.807	-17.42	16.312	-22.81	7.847	22.15	5.351	22.41	23.020	-8.62	3.598	19.05	23.894	-2.13	20.184	-23.40	2.12691	23
25	5.35	19.24	9.11	17.47	11.13	18.42	22.06	14.38	19.30	12.08	16.12	2.49	18.10	9.59	16.30	4.16	14.55	22.23		
	14.019	-12.33	15.004	-18.48	16.483	-23.30	7.906	22.05	5.343	22.41	23.015	-8.64	3.593	19.03	23.892	-2.15	20.184	-23.40	2.25833	25
27	5.39	19.20	9.22	17.44	11.19	18.41	22.03	14.33	19.22	11.59	16.04	2.40	18.02	9.51	16.22	4.08	14.48	22.15		
	14.147	-13.01	15.200	-19.48	16.656	-23.74	7.963	21.96	5.335	22.40	23.011	-8.67	3.588	19.01	23.889	-2.16	20.185	-23.39	2.38975	27
27	4.39	18.20	8.22	16.44	10.19	17.41	21.03	13.33	18.22	10.59	15.04	1.40	17.02	8.51	15.22	3.08	13.48	21.15		
	14.150	-13.03	15.204	-19.50	16.659	-23.75	7.965	21.96	5.335	22.40	23.011	-8.67	3.588	19.01	23.889	-2.16	20.185	-23.39	2.38975	27
29	4.42	18.17	8.32	16.42	10.25	17.41	20.59	13.28	18.14	10.51	14.56	1.32	16.54	8.42	15.14	3.00	13.40	21.07		
	14.279	-13.69	15.400	-20.44	16.832	-24.14	8.020	21.86	5.326	22.39	23.007	-8.69	3.583	18.99	23.887	-2.18	20.187	-23.39	2.52116	29
31	4.45	18.13	8.42	16.40	10.30	17.41	20.55	13.23	18.05	10.42	14.48	1.24	16.46	8.34	15.06	2.52	13.32	20.59		
	14.409	-14.34	15.595	-21.31	17.007	-24.49	8.074	21.77	5.316	22.38	23.003	-8.70	3.578	18.98	23.884	-2.19	20.188	-23.39	2.65258	31

# LISTOPAD 2024

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
306	1	Pią	616	14.59095	16.28	14.2828	-14.40	0.99245	14.2130	-17.02	63.335	8.1	0	644	1129.3	1613	643	1121.2	1547	1447	1
307	2	Sob	617	15.03060	16.29	14.3223	-14.59	0.99219	15.0859	-21.26	63.034	0.9	1	646	1129.3	1612	800	1206.1	1602	1443	2
308	3	Nie	618	15.07026	16.29	14.3620	-15.17	0.99193	15.5937	-24.59	62.656	1.9	3	648	1129.3	1610	919	1254.4	1623	1439	3
309	4	Pon	619	15.10591	16.28	14.4018	-15.36	0.99168	16.5324	-27.26	62.204	2.9	8	650	1129.3	1608	1034	1346.2	1654	1435	4
310	5	Wto	620	15.14557	16.26	14.4416	-15.54	0.99142	17.4943	-28.32	61.678	3.9	14	652	1129.3	1606	1141	1440.8	1740	1431	5
311	6	Śro	621	15.18523	16.23	14.4815	-16.12	0.99117	18.4721	-28.10	61.079	4.9	22	654	1129.4	1604	1233	1536.6	1844	1427	6
312	7	Czw	622	15.22488	16.20	14.5215	-16.29	0.99092	19.4452	-26.16	60.412	5.9	31	656	1129.4	1603	1309	1632.1	2003	1423	7
313	8	Pią	623	15.26454	16.16	14.5616	-16.47	0.99067	20.4104	-22.54	59.691	6.9	41	658	1129.5	1601	1334	1725.9	2129	1419	8
314	9	Sob	624	15.30419	16.11	15.0018	-17.04	0.99042	21.3522	-18.15	58.940	0.2	52	659	1129.6	1559	1351	1817.6	2258	1416	9
315	10	Nie	625	15.34385	16.05	15.0420	-17.21	0.99018	22.2753	-12.33	58.199	1.2	63	701	1129.7	1557	1404	1907.4	****	1412	10
316	11	Pon	626	15.38350	15.58	15.0823	-17.37	0.98994	23.1918	-6.05	57.520	2.2	74	703	1129.8	1556	1415	1956.4	027	1408	11
317	12	Wto	627	15.42316	15.50	15.1228	-17.53	0.98971	0.1038	0.51	56.964	3.2	84	705	1129.9	1554	1426	2045.7	156	1404	12
318	13	Śro	628	15.46281	15.42	15.1633	-18.09	0.98947	1.0306	7.52	56.593	4.2	91	707	1130.0	1553	1437	2136.7	327	1400	13
319	14	Czw	629	15.50247	15.33	15.2038	-18.25	0.98925	1.5755	14.31	56.459	5.2	97	709	1130.2	1551	1450	2230.8	501	1356	14
320	15	Pią	630	15.54212	15.23	15.2445	-18.40	0.98902	2.5558	20.20	56.592	6.2	100	710	1130.4	1550	1507	2328.8	638	1352	15
321	16	Sob	631	15.58178	15.12	15.2853	-18.55	0.98881	3.5726	24.50	56.993	0.6	100	712	1130.6	1548	1533	*****	816	1348	16
322	17	Nie	632	16.02144	14.60	15.3301	-19.09	0.98859	5.0122	27.38	57.632	1.6	97	714	1130.7	1547	1612	030.2	947	1344	17
323	18	Pon	633	16.06109	14.47	15.3710	-19.24	0.98838	6.0543	28.32	58.451	2.6	91	716	1131.0	1546	1709	133.4	1101	1340	18
324	19	Wto	634	16.10075	14.34	15.4120	-19.37	0.98818	7.0801	27.36	59.378	3.6	84	718	1131.2	1544	1823	235.4	1153	1336	19
325	20	Śro	635	16.14041	14.20	15.4531	-19.51	0.98798	8.0623	25.04	60.333	4.6	75	719	1131.4	1543	1945	333.8	1226	1332	20
326	21	Czw	636	16.18006	14.04	15.4942	-20.04	0.98779	9.0005	21.21	61.244	5.6	66	721	1131.7	1542	2107	427.0	1247	1328	21
327	22	Pią	637	16.21572	13.49	15.5355	-20.17	0.98760	9.4920	16.45	62.047	6.6	56	723	1131.9	1541	2226	515.1	1302	1324	22
328	23	Sob	638	16.25537	13.32	15.5808	-20.29	0.98741	10.3502	11.36	62.699	0.4	46	725	1132.2	1539	2341	559.0	1312	1320	23
329	24	Nie	639	16.29503	13.14	16.0222	-20.41	0.98723	11.1815	6.07	63.171	1.4	37	726	1132.5	1538	****	639.9	1321	1317	24
330	25	Pon	640	16.33468	12.56	16.0637	-20.53	0.98705	12.0007	0.30	63.453	2.4	28	728	1132.8	1537	053	719.0	1329	1313	25
331	26	Wto	641	16.37434	12.37	16.1053	-21.04	0.98687	12.4144	-5.08	63.548	3.4	20	730	1133.1	1536	204	757.7	1336	1309	26
332	27	Śro	642	16.41399	12.17	16.1509	-21.15	0.98670	13.2411	-10.35	63.473	4.4	13	731	1133.5	1535	316	837.0	1345	1305	27
333	28	Czw	643	16.45365	11.57	16.1926	-21.26	0.98653	14.0825	-15.42	63.255	5.4	7	733	1133.8	1535	429	918.2	1355	1301	28
334	29	Pią	644	16.49331	11.36	16.2344	-21.36	0.98636	14.5518	-20.17	62.922	6.4	3	734	1134.2	1534	545	1002.2	1408	1257	29
335	30	Sob	645	16.53296	11.14	16.2802	-21.45	0.98620	15.4528	-24.05	62.507	7.4	1	736	1134.5	1533	704	1049.7	1427	1253	30

Fazy Księżyca [Dm, h.mm]:      Now 1, 13.47      1kw 9, 6.55      Pełn 15, 22.29      3kw 23, 2.28

# LISTOPAD 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.47	18.12	8.47	16.39	10.33	17.41	20.53	13.20	18.01	10.38	14.44	1.20	16.42	8.30	15.02	2.48	13.28	20.56		
	14.474	-14.66	15.692	-21.72	17.094	-24.65	8.100	21.73	5.311	22.38	23.001	-8.71	3.575	18.97	23.883	-2.20	20.188	-23.38	2.71829	1
3	4.50	18.08	8.56	16.37	10.38	17.41	20.49	13.15	17.53	10.29	14.36	1.12	16.34	8.22	14.54	2.40	13.20	20.48		
	14.606	-15.29	15.885	-22.49	17.269	-24.93	8.151	21.65	5.299	22.37	22.999	-8.72	3.569	18.95	23.881	-2.21	20.190	-23.38	2.84971	3
5	4.54	18.05	9.05	16.35	10.42	17.42	20.44	13.09	17.44	10.21	14.28	1.04	16.25	8.13	14.46	2.32	13.12	20.40		
	14.738	-15.90	16.077	-23.17	17.445	-25.17	8.199	21.57	5.287	22.36	22.996	-8.73	3.564	18.93	23.879	-2.23	20.191	-23.37	2.98113	5
7	4.57	18.02	9.13	16.34	10.46	17.43	20.40	13.04	17.36	10.12	14.20	0.56	16.17	8.05	14.38	2.24	13.05	20.32		
	14.871	-16.49	16.266	-23.78	17.621	-25.35	8.246	21.49	5.274	22.34	22.994	-8.74	3.558	18.91	23.876	-2.24	20.193	-23.37	3.11256	7
9	4.60	17.59	9.20	16.33	10.50	17.44	20.35	12.58	17.27	10.03	14.12	0.48	16.09	7.57	14.30	2.16	12.57	20.25		
	15.005	-17.06	16.451	-24.30	17.797	-25.49	8.290	21.43	5.261	22.33	22.992	-8.75	3.553	18.89	23.875	-2.25	20.195	-23.36	3.24398	9
11	5.03	17.57	9.26	16.33	10.54	17.46	20.30	12.52	17.18	9.54	14.04	0.40	16.01	7.48	14.22	2.08	12.49	20.17		
	15.140	-17.62	16.630	-24.74	17.973	-25.58	8.332	21.37	5.246	22.32	22.991	-8.75	3.547	18.87	23.873	-2.26	20.197	-23.36	3.37539	11
13	5.06	17.54	9.31	16.32	10.57	17.49	20.25	12.46	17.10	9.46	13.57	0.32	15.53	7.40	14.14	1.60	12.41	20.09		
	15.276	-18.15	16.801	-25.08	18.149	-25.62	8.371	21.31	5.231	22.30	22.990	-8.75	3.541	18.85	23.871	-2.27	20.199	-23.35	3.50681	13
15	5.09	17.52	9.35	16.32	10.59	17.51	20.20	12.40	17.01	9.37	13.49	0.24	15.45	7.32	14.06	1.52	12.33	20.02		
	15.413	-18.67	16.963	-25.33	18.325	-25.62	8.408	21.27	5.215	22.29	22.990	-8.74	3.536	18.83	23.869	-2.28	20.201	-23.34	3.63823	15
17	5.12	17.50	9.37	16.32	11.01	17.54	20.14	12.34	16.52	9.28	13.41	0.16	15.37	7.23	13.58	1.44	12.26	19.54		
	15.550	-19.16	17.110	-25.48	18.501	-25.56	8.442	21.23	5.199	22.27	22.990	-8.74	3.530	18.81	23.868	-2.29	20.204	-23.34	3.76965	17
19	5.15	17.48	9.38	16.31	11.03	17.58	20.08	12.28	16.44	9.19	13.33	0.08	15.29	7.15	13.51	1.36	12.18	19.46		
	15.689	-19.62	17.239	-25.52	18.675	-25.46	8.474	21.20	5.182	22.25	22.990	-8.73	3.524	18.79	23.867	-2.30	20.206	-23.33	3.90108	19
21	5.18	17.46	9.36	16.30	11.04	18.02	20.02	12.22	16.35	9.10	13.25	23.57	15.21	7.07	13.43	1.28	12.10	19.39		
	15.828	-20.07	17.345	-25.45	18.849	-25.30	8.503	21.18	5.165	22.23	22.991	-8.72	3.519	18.77	23.865	-2.30	20.209	-23.32	4.03250	21
23	5.21	17.44	9.31	16.29	11.05	18.06	19.56	12.15	16.26	9.01	13.17	23.49	15.13	6.58	13.35	1.20	12.02	19.31		
	15.969	-20.49	17.420	-25.27	19.023	-25.10	8.529	21.18	5.147	22.22	22.993	-8.70	3.513	18.75	23.864	-2.31	20.211	-23.31	4.16392	23
25	5.23	17.43	9.23	16.25	11.06	18.10	19.50	12.09	16.17	8.51	13.09	23.41	15.05	6.50	13.27	1.12	11.55	19.23		
	16.110	-20.88	17.458	-24.96	19.195	-24.86	8.552	21.18	5.129	22.20	22.994	-8.68	3.507	18.73	23.863	-2.31	20.214	-23.30	4.29534	25
27	5.26	17.42	9.11	16.21	11.06	18.15	19.43	12.02	16.08	8.42	13.01	23.34	14.57	6.42	13.19	1.04	11.47	19.16		
	16.252	-21.25	17.451	-24.53	19.366	-24.56	8.572	21.20	5.110	22.18	22.997	-8.66	3.502	18.71	23.862	-2.32	20.217	-23.29	4.42676	27
29	5.28	17.40	8.55	16.14	11.05	18.20	19.36	11.56	15.60	8.33	12.54	23.26	14.49	6.33	13.11	0.56	11.39	19.08		
	16.395	-21.60	17.394	-23.95	19.535	-24.22	8.589	21.23	5.091	22.16	22.999	-8.64	3.496	18.70	23.862	-2.32	20.220	-23.29	4.55818	29

# GRUDZIEŃ 2024

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →								Czas strefowy [hhmm.]									
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2460																		
336	1	Nie	646	16.57262	10.51	16.3221	-21.55	0.98604	16.3902	-26.50	62.038	0.2	0	737	1134.9	1532	821	1140.9	1455	1249	1
337	2	Pon	647	17.01227	10.28	16.3641	-22.03	0.98588	17.3529	-28.17	61.537	1.2	1	739	1135.3	1532	932	1235.5	1537	1245	2
338	3	Wto	648	17.05193	10.04	16.4101	-22.12	0.98573	18.3336	-28.15	61.022	2.2	5	740	1135.7	1531	1029	1331.8	1637	1241	3
339	4	Śro	649	17.09159	9.40	16.4522	-22.20	0.98557	19.3143	-26.39	60.502	3.2	10	741	1136.1	1530	1110	1428.0	1752	1237	4
340	5	Czw	650	17.13124	9.15	16.4944	-22.27	0.98542	20.2823	-23.35	59.981	4.2	18	743	1136.5	1530	1138	1522.5	1917	1233	5
341	6	Pią	651	17.17090	8.49	16.5406	-22.34	0.98528	21.2248	-19.13	59.463	5.2	27	744	1136.9	1529	1157	1614.3	2044	1229	6
342	7	Sob	652	17.21055	8.24	16.5828	-22.41	0.98514	22.1454	-13.48	58.953	6.2	37	745	1137.4	1529	1211	1703.8	2211	1225	7
343	8	Nie	653	17.25021	7.57	17.0251	-22.47	0.98500	23.0518	-7.39	58.465	7.2	48	747	1137.8	1529	1223	1751.5	2338	1222	8
344	9	Pon	654	17.28587	7.30	17.0715	-22.53	0.98487	23.5500	-1.02	58.019	0.8	59	748	1138.2	1529	1233	1838.8	****	1218	9
345	10	Wto	655	17.32552	7.03	17.1138	-22.58	0.98474	0.4515	5.44	57.649	1.8	70	749	1138.7	1528	1243	1927.1	104	1214	10
346	11	Śro	656	17.36518	6.36	17.1602	-23.03	0.98462	1.3720	12.18	57.391	2.8	80	750	1139.2	1528	1255	2017.8	233	1210	11
347	12	Czw	657	17.40483	6.08	17.2027	-23.08	0.98450	2.3224	18.15	57.284	3.8	89	751	1139.6	1528	1309	2112.2	405	1206	12
348	13	Pią	658	17.44449	5.39	17.2452	-23.12	0.98439	3.3108	23.10	57.362	4.8	95	752	1140.1	1528	1330	2210.8	541	1202	13
349	14	Sob	659	17.48414	5.11	17.2917	-23.15	0.98429	4.3320	26.38	57.642	5.8	99	753	1140.6	1528	1402	2312.7	714	1158	14
350	15	Nie	660	17.52380	4.42	17.3342	-23.18	0.98419	5.3733	28.18	58.119	0.1	100	754	1141.0	1528	1450	*****	837	1154	15
351	16	Pon	661	17.56346	4.13	17.3808	-23.21	0.98410	6.4123	28.05	58.767	1.1	98	754	1141.5	1528	1557	015.8	940	1150	16
352	17	Wto	662	18.00311	3.44	17.4234	-23.23	0.98401	7.4222	26.08	59.538	2.1	95	755	1142.0	1529	1718	116.9	1021	1146	17
353	18	Śro	663	18.04277	3.14	17.4660	-23.24	0.98393	8.3900	22.45	60.372	3.1	89	756	1142.5	1529	1842	213.7	1048	1142	18
354	19	Czw	664	18.08243	2.45	17.5126	-23.25	0.98386	9.3056	18.20	61.202	4.1	81	757	1143.0	1529	2005	305.3	1106	1138	19
355	20	Pią	665	18.12208	2.15	17.5552	-23.26	0.98379	10.1844	13.14	61.962	5.1	73	757	1143.5	1530	2123	352.0	1118	1134	20
356	21	Sob	666	18.16174	1.45	18.0018	-23.26	0.98373	11.0324	7.45	62.599	6.1	64	758	1144.0	1530	2237	434.8	1128	1130	21
357	22	Nie	667	18.20139	1.15	18.0445	-23.26	0.98367	11.4604	2.06	63.068	7.1	54	758	1144.5	1531	2349	515.1	1136	1126	22
358	23	Pon	668	18.24105	0.46	18.0911	-23.25	0.98362	12.2754	-3.34	63.344	0.5	45	759	1145.0	1531	****	554.2	1144	1123	23
359	24	Wto	669	18.28070	0.16	18.1337	-23.24	0.98357	13.1002	-9.05	63.416	1.5	36	759	1145.5	1532	100	633.2	1152	1119	24
360	25	Śro	670	18.32036	-0.14	18.1804	-23.22	0.98353	13.5332	-14.17	63.289	2.5	27	759	1146.0	1533	213	713.5	1202	1115	25
361	26	Czw	671	18.36001	-0.44	18.2230	-23.20	0.98349	14.3925	-19.01	62.984	3.5	19	759	1146.5	1534	328	756.1	1213	1111	26
362	27	Pią	672	18.39567	-1.13	18.2656	-23.18	0.98346	15.2827	-23.04	62.535	4.5	12	800	1147.0	1534	445	842.1	1230	1107	27
363	28	Sob	673	18.43533	-1.43	18.3122	-23.15	0.98343	16.2106	-26.09	61.982	5.5	6	800	1147.5	1535	603	932.1	1254	1103	28
364	29	Nie	674	18.47499	-2.12	18.3548	-23.11	0.98340	17.1710	-27.60	61.371	6.5	2	800	1147.9	1536	718	1025.9	1331	1059	29
365	30	Pon	675	18.51464	-2.41	18.4013	-23.07	0.98338	18.1539	-28.23	60.747	7.5	0	800	1148.4	1537	821	1122.5	1425	1055	30
366	31	Wto	676	18.55430	-3.10	18.4439	-23.03	0.98336	19.1454	-27.11	60.151	0.5	0	800	1148.9	1538	909	1220.0	1537	1051	31

Fazy Księżyca [Dm, h.mm]:      Now 1, 7.21      1kw 8, 16.26      Pełn 15, 10.02      3kw 22, 23.18      Now 30, 23.27



# GRUDZIEŃ 2024 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.31	17.40	8.35	16.05	11.05	18.25	19.28	11.49	15.51	8.24	12.46	23.19	14.41	6.25	13.03	0.48	11.31	19.00		
	16.539	-21.91	17.285	-23.23	19.704	-23.84	8.602	21.27	5.072	22.13	23.002	-8.62	3.491	18.68	23.861	-2.32	20.223	-23.28	4.68960	1
3	5.33	17.39	8.12	15.54	11.03	18.30	19.21	11.42	15.42	8.15	12.38	23.11	14.33	6.17	12.55	0.40	11.24	18.53		
	16.684	-22.20	17.131	-22.38	19.870	-23.42	8.612	21.33	5.053	22.11	23.006	-8.59	3.485	18.66	23.861	-2.33	20.227	-23.27	4.82103	3
5	5.35	17.38	7.46	15.42	11.02	18.36	19.13	11.35	15.33	8.06	12.30	23.04	14.24	6.08	12.47	0.32	11.16	18.45		
	16.829	-22.46	16.947	-21.45	20.035	-22.95	8.618	21.40	5.033	22.09	23.010	-8.56	3.480	18.64	23.861	-2.33	20.230	-23.26	4.95245	5
7	5.37	17.38	7.21	15.29	11.00	18.42	19.04	11.28	15.24	7.56	12.22	22.56	14.16	5.60	12.40	0.24	11.08	18.38		
	16.975	-22.69	16.757	-20.52	20.198	-22.44	8.621	21.48	5.014	22.07	23.014	-8.52	3.475	18.62	23.860	-2.33	20.233	-23.25	5.08387	7
9	5.39	17.38	6.57	15.17	10.58	18.47	18.56	11.21	15.15	7.47	12.15	22.49	14.08	5.52	12.32	0.16	11.00	18.30		
	17.121	-22.88	16.587	-19.70	20.360	-21.90	8.620	21.58	4.994	22.04	23.019	-8.49	3.470	18.60	23.860	-2.32	20.237	-23.24	5.21529	9
11	5.41	17.38	6.37	15.05	10.55	18.53	18.47	11.13	15.06	7.38	12.07	22.42	14.00	5.43	12.24	0.09	10.53	18.23		
	17.267	-23.05	16.455	-19.08	20.519	-21.31	8.615	21.70	4.975	22.02	23.024	-8.45	3.464	18.59	23.861	-2.32	20.241	-23.23	5.34671	11
13	5.43	17.38	6.22	14.55	10.53	18.59	18.37	11.06	14.58	7.29	11.59	22.34	13.52	5.35	12.16	23.57	10.45	18.15		
	17.414	-23.19	16.371	-18.69	20.676	-20.70	8.606	21.82	4.955	21.99	23.030	-8.41	3.460	18.57	23.861	-2.32	20.244	-23.21	5.47813	13
15	5.45	17.38	6.11	14.46	10.50	19.05	18.28	10.58	14.49	7.20	11.51	22.27	13.44	5.27	12.08	23.49	10.37	18.07		
	17.562	-23.30	16.337	-18.56	20.831	-20.04	8.594	21.96	4.936	21.97	23.036	-8.37	3.455	18.55	23.861	-2.31	20.248	-23.20	5.60955	15
17	5.46	17.39	6.04	14.38	10.46	19.11	18.18	10.51	14.40	7.10	11.44	22.20	13.36	5.19	12.00	23.41	10.30	17.60		
	17.709	-23.38	16.350	-18.64	20.984	-19.36	8.577	22.12	4.917	21.95	23.043	-8.32	3.450	18.54	23.862	-2.31	20.252	-23.19	5.74098	17
19	5.47	17.40	6.01	14.32	10.43	19.17	18.07	10.43	14.31	7.01	11.36	22.13	13.28	5.10	11.52	23.33	10.22	17.52		
	17.857	-23.42	16.402	-18.89	21.134	-18.64	8.557	22.28	4.899	21.92	23.049	-8.27	3.446	18.52	23.863	-2.30	20.256	-23.18	5.87240	19
21	5.48	17.41	6.01	14.26	10.39	19.22	17.57	10.35	14.22	6.52	11.28	22.05	13.20	5.02	11.45	23.26	10.14	17.45		
	18.005	-23.44	16.487	-19.28	21.283	-17.90	8.533	22.46	4.880	21.90	23.057	-8.22	3.441	18.50	23.864	-2.30	20.260	-23.17	6.00382	21
23	5.49	17.42	6.03	14.22	10.35	19.28	17.46	10.27	14.14	6.43	11.20	21.58	13.12	4.54	11.37	23.18	10.06	17.37		
	18.153	-23.42	16.599	-19.74	21.429	-17.13	8.504	22.65	4.862	21.88	23.064	-8.17	3.437	18.49	23.865	-2.29	20.264	-23.16	6.13524	23
25	5.50	17.43	6.06	14.19	10.31	19.34	17.34	10.19	14.05	6.34	11.13	21.51	13.04	4.46	11.29	23.10	9.59	17.30		
	18.301	-23.37	16.732	-20.25	21.572	-16.34	8.472	22.85	4.845	21.85	23.072	-8.12	3.433	18.48	23.866	-2.28	20.268	-23.15	6.26666	25
27	5.51	17.45	6.11	14.16	10.26	19.40	17.23	10.10	13.56	6.25	11.05	21.44	12.56	4.38	11.21	23.02	9.51	17.22		
	18.449	-23.29	16.883	-20.78	21.714	-15.52	8.436	23.05	4.828	21.83	23.080	-8.06	3.429	18.46	23.867	-2.27	20.272	-23.13	6.39808	27
29	5.51	17.46	6.17	14.15	10.22	19.45	17.11	10.02	13.47	6.16	10.57	21.37	12.48	4.29	11.13	22.55	9.43	17.15		
	18.597	-23.18	17.047	-21.31	21.853	-14.68	8.397	23.27	4.812	21.81	23.089	-8.00	3.426	18.45	23.868	-2.26	20.277	-23.12	6.52951	29
31	5.51	17.48	6.23	14.14	10.17	19.50	16.59	9.53	13.39	6.07	10.50	21.30	12.40	4.21	11.05	22.47	9.36	17.07		
	18.744	-23.04	17.223	-21.81	21.989	-13.82	8.354	23.48	4.796	21.79	23.098	-7.94	3.422	18.44	23.870	-2.25	20.281	-23.11	6.66093	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2024

Nowy Rok	Pon	1 styczeń	Trójcy Najświętszej	Nie	26 maj
Najświętszej Maryi Panny Rodzicielki	Pon	1 styczeń	Dzień Matki	Nie	26 maj
Objawienia Pańskiego (Trzech Króli)	Sob	6 styczeń	Boże Ciało	Czw	30 maj
Juliański Nowy Rok	Nie	14 styczeń	Dzień Dziecka	Sob	1 czerwiec
Dzień Babci	Nie	21 styczeń	Dzień Dziękczynienia	Nie	2 czerwiec
Dzień Dziadka	Pon	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	7 czerwiec
Ofiarowania Pańskiego	Pią	2 luty	Dzień Ojca	Nie	23 czerwiec
Matki Boskiej Gromnicznej	Pią	2 luty	Noc Świętojańska	Nie	23 czerwiec
Tłusty czwartek	Czw	8 luty	Św. Piotra i Pawła	Sob	29 czerwiec
Środa Popielcowa	Śro	14 luty	Wniebowzięcia N.M.P.	Czw	15 sierpień
Walentynki	Śro	14 luty	Święto Wojska Polskiego	Czw	15 sierpień
Święto UMK	Pon	19 luty	Dzień Solidarności i Wolności	Sob	31 sierpień
Dzień Kobiet	Pią	8 marzec	Dzień Programisty	Pią	13 wrzesień
Niedziela Palmowa	Nie	24 marzec	Dożynki – Święto Plonów	Pon	23 wrzesień
Narodowy Dzień Życia	Nie	24 marzec	Dzień Papieski	Nie	13 październik
Niedziela Wielkanocna	Nie	31 marzec	Dzień Edukacji Narodowej	Pon	14 październik
Niedziela Miłosierdzia Bożego	Nie	7 kwiecień	Dzień Papieża Jana Pawła II	Śro	16 październik
Święto Pracy	Śro	1 maj	Wszystkich Świętych	Pią	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Czw	2 maj	Zaduszki	Sob	2 listopad
Najświętsza Maryja Królowa Polski	Pią	3 maj	Święto Niepodległości	Pon	11 listopad
Święto Konstytucji 3 Maja	Pią	3 maj	Pierwsza niedziela Adwentu	Nie	1 grudzień
Wniebowstąpienia Pańskiego	Czw	9 maj	Niepokalane Poczęcie N.M.P.	Nie	8 grudzień
Dzień Polskiej Niezapominajki	Śro	15 maj	Boże Narodzenie	Śro	25 grudzień
Zesłania Ducha Świętego	Nie	19 maj	Sylwester	Wto	31 grudzień

# Kalendarz astronomiczny 2025

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!  
*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2025 KWIECIEŃ 20**

Dla całego roku przyjęto: TDT – UT = 71 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 10.01**, Lato **VI 21, 3.42**, Jesień **IX 22, 19.20**, Zima **XII 21, 16.03**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **30 marca do 26 października 2025 r.**

### Oznaczenia:

Dr — dzień 2025 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2025

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
1	1	Śro	677	18.59395	-3.38	18.4904	-22.58	0.98335	20.1310	-24.24	59.613	1.5	3	800	1149.4	1539	941	1316.4	1701	1047	1	
2	2	Czw	678	19.03361	-4.06	18.5328	-22.52	0.98334	21.0912	-20.13	59.152	2.5	7	759	1149.8	1540	1003	1410.2	1830	1043	2	
3	3	Pią	679	19.07327	-4.34	18.5753	-22.46	0.98333	22.0236	-14.56	58.777	3.5	14	759	1150.3	1542	1018	1501.1	1959	1039	3	
4	4	Sob	680	19.11292	-5.01	19.0216	-22.40	0.98333	22.5345	-8.50	58.485	4.5	23	759	1150.8	1543	1030	1549.7	2126	1035	4	
5	5	Nie	681	19.15258	-5.28	19.0640	-22.33	0.98333	23.4331	-2.17	58.270	5.5	33	759	1151.2	1544	1041	1636.9	2252	1031	5	
6	6	Pon	682	19.19223	-5.54	19.1103	-22.26	0.98334	0.3304	4.25	58.125	6.5	44	758	1151.7	1545	1050	1724.1	****	1028	6	
7	7	Wto	683	19.23189	-6.20	19.1525	-22.18	0.98335	1.2341	10.56	58.049	0.5	55	758	1152.1	1547	1101	1812.8	019	1024	7	
8	8	Śro	684	19.27154	-6.46	19.1947	-22.10	0.98337	2.1634	16.55	58.046	1.5	66	757	1152.5	1548	1114	1904.3	147	1020	8	
9	9	Czw	685	19.31120	-7.10	19.2409	-22.02	0.98339	3.1236	21.59	58.127	2.5	77	756	1152.9	1550	1132	1959.6	319	1016	9	
10	10	Pią	686	19.35085	-7.35	19.2829	-21.53	0.98342	4.1204	25.48	58.306	3.5	86	756	1153.3	1551	1158	2058.5	451	1012	10	
11	11	Sob	687	19.39051	-7.58	19.3250	-21.44	0.98345	5.1413	27.60	58.595	4.5	93	755	1153.7	1553	1238	2159.8	616	1008	11	
12	12	Nie	688	19.43017	-8.21	19.3709	-21.34	0.98349	6.1714	28.24	59.001	5.5	97	754	1154.1	1554	1336	2301.0	726	1004	12	
13	13	Pon	689	19.46582	-8.44	19.4128	-21.24	0.98354	7.1846	27.03	59.519	6.5	100	754	1154.5	1556	1451	2359.4	816	1000	13	
14	14	Wto	690	19.50548	-9.06	19.4546	-21.13	0.98359	8.1657	24.08	60.127	0.5	100	753	1154.8	1557	1615	*****	848	956	14	
15	15	Śro	691	19.54514	-9.27	19.5004	-21.02	0.98365	9.1050	20.02	60.793	1.5	97	752	1155.2	1559	1739	053.4	909	952	15	
16	16	Czw	692	19.58479	-9.47	19.5421	-20.50	0.98372	10.0032	15.04	61.472	2.5	93	751	1155.5	1601	1901	142.6	924	948	16	
17	17	Pią	693	20.02445	-10.07	19.5837	-20.39	0.98379	10.4645	9.37	62.114	3.5	87	750	1155.9	1602	2018	227.6	934	944	17	
18	18	Sob	694	20.06410	-10.26	20.0253	-20.26	0.98387	11.3031	3.54	62.667	4.5	80	749	1156.2	1604	2131	309.4	943	940	18	
19	19	Nie	695	20.10376	-10.44	20.0708	-20.14	0.98395	12.1256	-1.51	63.085	5.5	72	748	1156.5	1606	2243	349.3	951	936	19	
20	20	Pon	696	20.14341	-11.02	20.1122	-20.01	0.98404	12.5505	-7.28	63.331	6.5	63	746	1156.8	1608	2356	428.5	959	932	20	
21	21	Wto	697	20.18307	-11.19	20.1536	-19.47	0.98413	13.3802	-12.48	63.382	7.5	54	745	1157.1	1609	****	508.3	1008	929	21	
22	22	Śro	698	20.22272	-11.35	20.1948	-19.34	0.98423	14.2249	-17.41	63.226	0.6	44	744	1157.3	1611	109	549.7	1018	925	22	
23	23	Czw	699	20.26238	-11.50	20.2400	-19.20	0.98434	15.1021	-21.56	62.871	1.6	35	743	1157.6	1613	225	633.8	1032	921	23	
24	24	Pią	700	20.30203	-12.05	20.2811	-19.05	0.98445	16.0116	-25.20	62.341	2.6	26	741	1157.8	1615	343	721.6	1052	917	24	
25	25	Sob	701	20.34169	-12.19	20.3222	-18.50	0.98456	16.5546	-27.37	61.672	3.6	18	740	1158.1	1617	459	813.3	1123	913	25	
26	26	Nie	702	20.38135	-12.32	20.3631	-18.35	0.98468	17.5319	-28.32	60.916	4.6	11	738	1158.3	1619	608	908.6	1209	909	26	
27	27	Pon	703	20.42100	-12.44	20.4040	-18.20	0.98479	18.5237	-27.53	60.131	5.6	5	737	1158.5	1621	702	1006.1	1314	905	27	
28	28	Wto	704	20.46066	-12.56	20.4448	-18.04	0.98492	19.5157	-25.36	59.380	6.6	1	736	1158.7	1622	740	1103.7	1435	901	28	
29	29	Śro	705	20.50031	-13.06	20.4855	-17.48	0.98504	20.4948	-21.47	58.719	7.6	0	734	1158.9	1624	806	1159.8	1605	857	29	
30	30	Czw	706	20.53597	-13.16	20.5302	-17.31	0.98517	21.4517	-16.40	58.194	0.9	1	732	1159.0	1626	824	1253.2	1736	853	30	
31	31	Pią	707	20.57563	-13.25	20.5707	-17.15	0.98531	22.3825	-10.35	57.834	1.9	5	731	1159.2	1628	838	1344.0	1907	849	31	

Fazy Księżyca [Dm, h.mm]: 1kw 7, 0.56 Pełn 13, 23.27 3kw 21, 21.31 Nów 29, 13.36

# STYCZEŃ 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.49	6.26	14.14	10.14	19.53	16.53	9.48	13.34	6.03	10.46	21.27	12.36	4.17	11.01	22.43	9.32	17.03		
	18.818	-22.96	17.314	-22.05	22.057	-13.39	8.332	23.59	4.788	21.78	23.103	-7.91	3.421	18.43	23.871	-2.24	20.283	-23.10	6.72664	1
3	5.51	17.51	6.33	14.14	10.09	19.58	16.40	9.40	13.26	5.54	10.38	21.20	12.28	4.09	10.54	22.35	9.24	16.56		
	18.965	-22.77	17.503	-22.49	22.190	-12.50	8.285	23.82	4.774	21.76	23.112	-7.84	3.417	18.42	23.873	-2.23	20.287	-23.09	6.85806	3
5	5.51	17.53	6.40	14.15	10.04	20.03	16.28	9.30	13.17	5.45	10.31	21.13	12.20	4.01	10.46	22.28	9.16	16.48		
	19.111	-22.55	17.698	-22.88	22.321	-11.61	8.235	24.04	4.760	21.74	23.122	-7.78	3.414	18.41	23.874	-2.21	20.292	-23.08	6.98948	5
7	5.50	17.55	6.46	14.17	9.59	20.08	16.15	9.21	13.09	5.36	10.23	21.06	12.12	3.53	10.38	22.20	9.09	16.41		
	19.257	-22.31	17.900	-23.20	22.449	-10.69	8.183	24.25	4.746	21.73	23.132	-7.71	3.412	18.40	23.876	-2.20	20.296	-23.07	7.12090	7
9	5.50	17.57	6.53	14.19	9.53	20.13	16.02	9.12	13.00	5.27	10.15	20.59	12.04	3.45	10.30	22.12	9.01	16.33		
	19.402	-22.03	18.106	-23.46	22.574	-9.77	8.129	24.47	4.734	21.71	23.143	-7.64	3.409	18.39	23.879	-2.19	20.301	-23.06	7.25232	9
11	5.49	17.60	6.59	14.22	9.48	20.18	15.49	9.02	12.52	5.19	10.08	20.52	11.56	3.37	10.22	22.05	8.53	16.26		
	19.547	-21.73	18.317	-23.65	22.697	-8.84	8.073	24.67	4.722	21.70	23.153	-7.57	3.407	18.39	23.881	-2.17	20.305	-23.04	7.38374	11
13	5.48	18.02	7.05	14.27	9.42	20.22	15.36	8.53	12.43	5.10	10.00	20.45	11.48	3.29	10.15	21.57	8.46	16.18		
	19.691	-21.39	18.531	-23.76	22.817	-7.90	8.017	24.87	4.712	21.68	23.164	-7.49	3.405	18.38	23.883	-2.15	20.310	-23.03	7.51517	13
15	5.47	18.05	7.10	14.31	9.36	20.27	15.23	8.43	12.35	5.02	9.53	20.39	11.40	3.21	10.07	21.50	8.38	16.11		
	19.834	-21.03	18.749	-23.78	22.935	-6.96	7.959	25.06	4.702	21.67	23.176	-7.42	3.403	18.37	23.886	-2.13	20.314	-23.02	7.64659	15
17	5.46	18.08	7.15	14.37	9.30	20.31	15.10	8.33	12.27	4.53	9.45	20.32	11.32	3.13	9.59	21.42	8.30	16.03		
	19.977	-20.64	18.969	-23.73	23.050	-6.02	7.902	25.23	4.693	21.66	23.187	-7.34	3.401	18.37	23.888	-2.12	20.319	-23.01	7.77801	17
19	5.44	18.10	7.19	14.44	9.23	20.35	14.58	8.23	12.18	4.45	9.37	20.25	11.25	3.05	9.51	21.34	8.23	15.56		
	20.119	-20.23	19.191	-23.58	23.162	-5.07	7.845	25.40	4.684	21.66	23.199	-7.27	3.400	18.36	23.891	-2.10	20.324	-22.99	7.90943	19
21	5.42	18.13	7.23	14.51	9.17	20.39	14.45	8.14	12.10	4.36	9.30	20.18	11.17	2.57	9.43	21.27	8.15	15.48		
	20.260	-19.79	19.416	-23.35	23.271	-4.13	7.789	25.55	4.677	21.65	23.211	-7.19	3.398	18.36	23.894	-2.08	20.328	-22.98	8.04085	21
23	5.40	18.16	7.26	14.59	9.10	20.42	14.33	8.04	12.02	4.28	9.22	20.12	11.09	2.49	9.36	21.19	8.07	15.41		
	20.400	-19.33	19.642	-23.03	23.377	-3.18	7.734	25.68	4.671	21.64	23.224	-7.10	3.397	18.36	23.897	-2.06	20.333	-22.97	8.17227	23
25	5.38	18.19	7.29	15.08	9.04	20.45	14.21	7.54	11.54	4.20	9.15	20.05	11.01	2.41	9.28	21.12	7.60	15.33		
	20.539	-18.84	19.869	-22.62	23.480	-2.25	7.681	25.80	4.665	21.64	23.236	-7.02	3.397	18.35	23.900	-2.04	20.337	-22.96	8.30369	25
27	5.36	18.23	7.31	15.17	8.57	20.48	14.09	7.44	11.46	4.12	9.07	19.59	10.53	2.33	9.20	21.04	7.52	15.26		
	20.678	-18.33	20.098	-22.11	23.579	-1.32	7.630	25.91	4.661	21.64	23.249	-6.94	3.396	18.35	23.903	-2.01	20.342	-22.95	8.43512	27
29	5.34	18.26	7.33	15.28	8.50	20.51	13.57	7.34	11.38	4.04	8.60	19.52	10.45	2.25	9.12	20.57	7.44	15.18		
	20.815	-17.80	20.327	-21.51	23.675	-0.39	7.581	26.00	4.658	21.64	23.262	-6.85	3.396	18.35	23.907	-1.99	20.346	-22.93	8.56654	29
31	5.31	18.29	7.34	15.38	8.43	20.54	13.46	7.24	11.30	3.56	8.52	19.45	10.37	2.17	9.04	20.49	7.37	15.11		
	20.952	-17.24	20.558	-20.81	23.767	0.52	7.535	26.07	4.655	21.64	23.275	-6.77	3.396	18.35	23.910	-1.97	20.351	-22.92	8.69796	31

# LUTY 2025

Piwnice, CA UMK			←———— Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) —————→										..... Czas strefowy [hhmm.] .....								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2460																		
32	1	Sob	708	21.01528	-13.33	21.0112	-16.58	0.98544	23.2947	-3.55	57.646	2.9	11	729	1159.3	1630	849	1432.9	2036	845	1
33	2	Nie	709	21.05494	-13.41	21.0516	-16.40	0.98558	0.2026	2.58	57.621	3.9	19	727	1159.4	1632	859	1521.2	2205	841	2
34	3	Pon	710	21.09459	-13.47	21.0919	-16.23	0.98572	1.1132	9.41	57.735	4.9	29	726	1159.5	1634	909	1610.1	2334	837	3
35	4	Wto	711	21.13425	-13.53	21.1321	-16.05	0.98587	2.0413	15.52	57.960	5.9	40	724	1159.6	1636	921	1701.0	****	833	4
36	5	Śro	712	21.17390	-13.58	21.1723	-15.46	0.98602	2.5925	21.09	58.264	0.1	51	722	1159.7	1638	937	1754.9	105	830	5
37	6	Czw	713	21.21356	-14.02	21.2123	-15.28	0.98617	3.5732	25.13	58.626	1.1	63	720	1159.8	1640	1000	1852.0	237	826	6
38	7	Pią	714	21.25321	-14.05	21.2523	-15.09	0.98633	4.5806	27.46	59.030	2.1	73	719	1159.8	1642	1034	1951.5	404	822	7
39	8	Sob	715	21.29287	-14.07	21.2922	-14.50	0.98650	5.5946	28.37	59.467	3.1	82	717	1159.9	1644	1124	2051.5	518	818	8
40	9	Nie	716	21.33253	-14.09	21.3320	-14.31	0.98667	7.0036	27.43	59.936	4.1	90	715	1159.9	1646	1233	2149.8	614	814	9
41	10	Pon	717	21.37218	-14.10	21.3718	-14.11	0.98684	7.5846	25.16	60.435	5.1	95	713	1159.9	1648	1353	2244.5	650	810	10
42	11	Wto	718	21.41184	-14.10	21.4114	-13.52	0.98702	8.5312	21.31	60.958	6.1	99	711	1159.9	1650	1517	2334.9	714	806	11
43	12	Śro	719	21.45149	-14.09	21.4510	-13.32	0.98720	9.4344	16.49	61.493	7.1	100	709	1159.9	1652	1639	*****	730	802	12
44	13	Czw	720	21.49115	-14.08	21.4905	-13.12	0.98739	10.3051	11.29	62.022	0.9	99	707	1159.9	1653	1758	021.1	742	758	13
45	14	Pią	721	21.53080	-14.05	21.5260	-12.51	0.98759	11.1522	5.47	62.516	1.9	97	705	1159.8	1655	1913	104.1	751	754	14
46	15	Sob	722	21.57046	-14.03	21.5653	-12.31	0.98779	11.5817	-0.01	62.942	2.9	92	703	1159.8	1657	2026	144.7	759	750	15
47	16	Nie	723	22.01011	-13.59	22.0046	-12.10	0.98799	12.4036	-5.45	63.265	3.9	86	701	1159.7	1659	2139	224.3	807	746	16
48	17	Pon	724	22.04577	-13.55	22.0438	-11.49	0.98820	13.2319	-11.14	63.449	4.9	79	659	1159.7	1701	2252	303.9	815	742	17
49	18	Wto	725	22.08542	-13.50	22.0830	-11.28	0.98841	14.0722	-16.17	63.464	5.9	71	657	1159.6	1703	****	344.5	825	738	18
50	19	Śro	726	22.12508	-13.44	22.1221	-11.06	0.98863	14.5339	-20.46	63.292	6.9	62	655	1159.5	1705	007	427.3	837	735	19
51	20	Czw	727	22.16474	-13.38	22.1611	-10.45	0.98885	15.4251	-24.26	62.923	7.9	53	653	1159.4	1707	124	513.0	854	731	20
52	21	Pią	728	22.20439	-13.31	22.2001	-10.23	0.98907	16.3519	-27.06	62.366	0.7	43	650	1159.3	1709	240	602.3	918	727	21
53	22	Sob	729	22.24405	-13.23	22.2350	-10.01	0.98930	17.3054	-28.31	61.645	1.7	33	648	1159.1	1711	352	655.1	956	723	22
54	23	Nie	730	22.28370	-13.15	22.2738	-9.39	0.98953	18.2844	-28.28	60.801	2.7	24	646	1159.0	1713	452	750.7	1051	719	23
55	24	Pon	731	22.32336	-13.06	22.3126	-9.17	0.98976	19.2727	-26.51	59.891	3.7	16	644	1158.8	1715	537	847.6	1204	715	24
56	25	Wto	732	22.36302	-12.57	22.3513	-8.55	0.99000	20.2537	-23.38	58.985	4.7	9	642	1158.7	1717	607	944.1	1331	711	25
57	26	Śro	733	22.40267	-12.47	22.3860	-8.32	0.99023	21.2211	-18.59	58.156	5.7	3	639	1158.5	1719	628	1038.9	1503	707	26
58	27	Czw	734	22.44233	-12.37	22.4246	-8.09	0.99047	22.1649	-13.10	57.477	6.7	0	637	1158.4	1720	643	1131.5	1635	703	27
59	28	Pią	735	22.48198	-12.26	22.4631	-7.47	0.99071	23.0949	-6.31	57.005	0.4	0	635	1158.2	1722	655	1222.3	1807	659	28

Fazy Księżyca [Dm, h.mm]:      1kw 5, 9.02      Pełn 12, 14.53      3kw 20, 18.33      Nów 28, 1.45

# LUTY 2025 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	5.30	18.31	7.34	15.44	8.39	20.55	13.41	7.19	11.26	3.52	8.48	19.42	10.33	2.13	9.00	20.45	7.33	15.07		
	21.020	-16.96	20.673	-20.42	23.812	0.97	7.513	26.10	4.654	21.65	23.282	-6.72	3.396	18.35	23.912	-1.96	20.353	-22.92	8.76367	1
3	5.27	18.34	7.34	15.56	8.32	20.57	13.30	7.09	11.18	3.44	8.41	19.35	10.25	2.05	8.53	20.38	7.25	14.60		
	21.155	-16.38	20.904	-19.58	23.898	1.85	7.472	26.16	4.653	21.65	23.295	-6.64	3.396	18.36	23.915	-1.93	20.358	-22.91	8.89508	3
5	5.24	18.37	7.34	16.08	8.24	20.59	13.19	6.59	11.10	3.36	8.33	19.29	10.18	1.58	8.45	20.30	7.17	14.52		
	21.290	-15.77	21.136	-18.64	23.980	2.73	7.434	26.20	4.653	21.66	23.309	-6.55	3.397	18.36	23.919	-1.91	20.362	-22.89	9.02650	5
7	5.21	18.41	7.33	16.21	8.16	20.60	13.09	6.49	11.02	3.28	8.26	19.22	10.10	1.50	8.37	20.23	7.10	14.45		
	21.423	-15.15	21.367	-17.60	0.057	3.57	7.400	26.22	4.654	21.67	23.323	-6.46	3.398	18.36	23.923	-1.88	20.367	-22.88	9.15792	7
9	5.18	18.44	7.32	16.34	8.08	21.01	12.59	6.40	10.54	3.21	8.18	19.16	10.02	1.42	8.29	20.15	7.02	14.37		
	21.556	-14.51	21.599	-16.46	0.130	4.40	7.369	26.23	4.656	21.68	23.337	-6.37	3.399	18.37	23.927	-1.86	20.371	-22.87	9.28935	9
11	5.14	18.47	7.31	16.47	7.60	21.01	12.50	6.30	10.46	3.13	8.11	19.09	9.54	1.34	8.22	20.08	6.54	14.30		
	21.687	-13.86	21.831	-15.23	0.196	5.20	7.343	26.24	4.659	21.69	23.351	-6.28	3.400	18.37	23.931	-1.83	20.376	-22.86	9.42077	11
13	5.11	18.51	7.29	17.01	7.52	21.01	12.41	6.21	10.38	3.05	8.03	19.03	9.46	1.27	8.14	20.00	6.47	14.22		
	21.818	-13.19	22.063	-13.90	0.257	5.97	7.320	26.23	4.663	21.70	23.365	-6.18	3.402	18.38	23.935	-1.81	20.380	-22.85	9.55219	13
15	5.07	18.54	7.26	17.16	7.43	21.01	12.32	6.12	10.31	2.58	7.56	18.56	9.38	1.19	8.06	19.53	6.39	14.15		
	21.948	-12.51	22.294	-12.49	0.312	6.70	7.301	26.21	4.667	21.72	23.380	-6.09	3.403	18.39	23.939	-1.78	20.384	-22.84	9.68360	15
17	5.03	18.58	7.24	17.30	7.34	20.59	12.23	6.03	10.23	2.51	7.48	18.50	9.31	1.11	7.58	19.45	6.31	14.07		
	22.077	-11.81	22.524	-10.98	0.360	7.40	7.286	26.18	4.673	21.74	23.394	-6.00	3.405	18.39	23.943	-1.75	20.388	-22.83	9.81502	17
19	4.60	19.02	7.21	17.45	7.25	20.58	12.15	5.54	10.15	2.43	7.41	18.43	9.23	1.04	7.51	19.38	6.24	13.59		
	22.206	-11.10	22.752	-9.40	0.401	8.05	7.275	26.14	4.680	21.76	23.409	-5.90	3.408	18.40	23.947	-1.72	20.393	-22.82	9.94644	19
21	4.55	19.05	7.17	17.59	7.16	20.55	12.07	5.45	10.08	2.36	7.33	18.37	9.15	0.56	7.43	19.30	6.16	13.52		
	22.333	-10.38	22.977	-7.75	0.435	8.66	7.268	26.10	4.687	21.78	23.423	-5.81	3.410	18.41	23.951	-1.70	20.397	-22.81	10.07786	21
23	4.51	19.09	7.13	18.14	7.06	20.52	11.60	5.37	10.00	2.29	7.26	18.30	9.07	0.48	7.35	19.23	6.08	13.44		
	22.461	-9.65	23.197	-6.05	0.460	9.22	7.264	26.04	4.696	21.80	23.438	-5.72	3.413	18.42	23.955	-1.67	20.401	-22.80	10.20928	23
25	4.47	19.13	7.09	18.28	6.57	20.48	11.52	5.28	9.53	2.22	7.18	18.24	8.60	0.41	7.27	19.15	6.00	13.37		
	22.587	-8.91	23.411	-4.32	0.477	9.71	7.264	25.98	4.705	21.82	23.453	-5.62	3.416	18.43	23.960	-1.64	20.405	-22.80	10.34070	25
27	4.43	19.16	7.04	18.42	6.47	20.43	11.45	5.20	9.45	2.15	7.11	18.17	8.52	0.33	7.20	19.08	5.53	13.29		
	22.713	-8.16	23.617	-2.58	0.484	10.15	7.268	25.91	4.715	21.85	23.468	-5.52	3.419	18.45	23.964	-1.61	20.409	-22.79	10.47212	27

# MARZEC 2025

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →										..... Czas strefowy [hhmm.] .....								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
60	1	Sob	736	22.52164	-12.14	22.5016	-7.24	0.99095	0.0202	0.33	56.774	1.4	3	633	1158.0	1724	706	1312.2	1939	655	1	
61	2	Nie	737	22.56129	-12.02	22.5401	-7.01	0.99119	0.5431	7.37	56.789	2.4	8	630	1157.8	1726	716	1402.5	2112	651	2	
62	3	Pon	738	23.00095	-11.50	22.5745	-6.38	0.99143	1.4821	14.14	57.030	3.4	16	628	1157.6	1728	728	1454.4	2246	647	3	
63	4	Wto	739	23.04060	-11.37	23.0129	-6.15	0.99167	2.4426	19.59	57.455	4.4	26	626	1157.4	1730	743	1548.9	****	643	4	
64	5	Śro	740	23.08026	-11.23	23.0512	-5.52	0.99192	3.4308	24.30	58.010	5.4	36	623	1157.1	1732	803	1646.3	021	639	5	
65	6	Czw	741	23.11591	-11.09	23.0854	-5.29	0.99217	4.4403	27.27	58.643	6.4	47	621	1156.9	1734	833	1746.0	152	636	6	
66	7	Pią	742	23.15557	-10.55	23.1237	-5.05	0.99242	5.4554	28.41	59.305	0.8	58	619	1156.7	1736	918	1846.3	312	632	7	
67	8	Sob	743	23.19522	-10.40	23.1619	-4.42	0.99267	6.4649	28.10	59.961	1.8	69	616	1156.4	1737	1022	1944.9	413	628	8	
68	9	Nie	744	23.23488	-10.25	23.2000	-4.18	0.99292	7.4505	26.04	60.589	2.8	78	614	1156.2	1739	1139	2040.1	454	624	9	
69	10	Pon	745	23.27454	-10.10	23.2341	-3.55	0.99318	8.3941	22.39	61.174	3.8	86	612	1155.9	1741	1301	2131.0	520	620	10	
70	11	Wto	746	23.31419	-9.54	23.2722	-3.31	0.99344	9.3025	18.13	61.713	4.8	92	609	1155.6	1743	1423	2217.7	538	616	11	
71	12	Śro	747	23.35385	-9.38	23.3103	-3.08	0.99371	10.1745	13.04	62.201	5.8	97	607	1155.4	1745	1542	2301.1	551	612	12	
72	13	Czw	748	23.39350	-9.22	23.3443	-2.44	0.99397	11.0227	7.30	62.635	6.8	99	605	1155.1	1747	1658	2342.1	600	608	13	
73	14	Pią	749	23.43316	-9.05	23.3823	-2.20	0.99424	11.4529	1.43	63.008	0.2	100	602	1154.8	1748	1811	*****	609	604	14	
74	15	Sob	750	23.47281	-8.48	23.4202	-1.57	0.99451	12.2747	-4.04	63.308	1.2	99	600	1154.5	1750	1924	021.8	616	600	15	
75	16	Nie	751	23.51247	-8.31	23.4542	-1.33	0.99479	13.1018	-9.39	63.516	2.2	96	557	1154.3	1752	2037	101.2	624	556	16	
76	17	Pon	752	23.55212	-8.14	23.4921	-1.09	0.99507	13.5355	-14.52	63.612	3.2	91	555	1154.0	1754	2151	141.4	633	552	17	
77	18	Wto	753	23.59178	-7.56	23.5300	-0.46	0.99535	14.3926	-19.32	63.573	4.2	85	553	1153.7	1756	2307	223.3	644	548	18	
78	19	Śro	754	0.03143	-7.39	23.5639	-0.22	0.99563	15.2729	-23.28	63.379	5.2	78	550	1153.4	1758	****	307.7	658	544	19	
79	20	Czw	755	0.07109	-7.21	0.0018	0.02	0.99592	16.1828	-26.26	63.015	6.2	69	548	1153.1	1759	024	355.2	719	540	20	
80	21	Pią	756	0.11074	-7.03	0.0357	0.26	0.99620	17.1216	-28.15	62.477	7.2	60	546	1152.8	1801	137	445.9	751	537	21	
81	22	Sob	757	0.15040	-6.45	0.0735	0.49	0.99649	18.0817	-28.42	61.773	8.2	50	543	1152.5	1803	241	539.3	837	533	22	
82	23	Nie	758	0.19005	-6.27	0.1114	1.13	0.99678	19.0525	-27.41	60.929	1.0	40	541	1152.2	1805	331	634.4	941	529	23	
83	24	Pon	759	0.22571	-6.09	0.1452	1.37	0.99707	20.0227	-25.08	59.987	2.0	30	538	1151.9	1807	407	729.6	1100	525	24	
84	25	Wto	760	0.26537	-5.51	0.1831	2.00	0.99735	20.5824	-21.09	59.008	3.0	21	536	1151.6	1808	431	823.8	1228	521	25	
85	26	Śro	761	0.30502	-5.33	0.2209	2.24	0.99764	21.5251	-15.53	58.064	4.0	12	534	1151.3	1810	448	916.4	1359	517	26	
86	27	Czw	762	0.34468	-5.15	0.2548	2.47	0.99793	22.4559	-9.37	57.239	5.0	6	531	1151.0	1812	501	1007.4	1531	513	27	
87	28	Pią	763	0.38433	-4.57	0.2926	3.11	0.99822	23.3831	-2.40	56.609	6.0	1	529	1150.7	1814	512	1057.7	1703	509	28	
88	29	Sob	764	0.42399	-4.39	0.3305	3.34	0.99850	0.3126	4.33	56.237	0.0	0	526	1150.4	1816	523	1148.4	1836	505	29	
89	30	Nie	765	0.46364	-4.21	0.3643	3.57	0.99879	1.2551	11.35	56.157	1.0	2	524	1150.1	1817	534	1240.7	2012	501	30	
89	30	Nie	765	23.46266	-4.22	0.3634	3.56	0.99878	1.2332	11.18	56.155	2.0	1	624	1250.1	1917	634	1340.7	2112	601	30	
90	31	Pon	766	23.50231	-4.04	0.4013	4.20	0.99906	2.2018	17.40	56.354	3.0	6	622	1249.8	1919	648	1435.9	2251	557	31	

Fazy Księżyca [Dm, h.mm]:      1kw 6, 17.32      Pełn 14, 7.55      3kw 22, 12.29      Nów 29, 11.58



# MARZEC 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	4.38	19.20	6.59	18.55	6.37	20.37	11.39	5.12	9.38	2.08	7.03	18.11	8.44	0.25	7.12	19.01	5.45	13.22		
	22.838	-7.40	23.810	-0.88	0.483	10.51	7.275	25.84	4.726	21.88	23.483	-5.43	3.422	18.46	23.969	-1.58	20.412	-22.78	10.60354	1
3	4.34	19.24	6.53	19.06	6.27	20.30	11.32	5.04	9.31	2.01	6.56	18.05	8.36	0.18	7.04	18.53	5.37	13.14		
	22.963	-6.63	23.987	0.76	0.472	10.80	7.286	25.76	4.738	21.90	23.498	-5.33	3.426	18.47	23.973	-1.55	20.416	-22.77	10.73495	3
5	4.29	19.28	6.46	19.16	6.16	20.22	11.26	4.56	9.23	1.54	6.48	17.58	8.29	0.10	6.56	18.46	5.30	13.06		
	23.087	-5.86	0.144	2.28	0.451	11.01	7.300	25.67	4.750	21.93	23.513	-5.23	3.429	18.49	23.978	-1.52	20.420	-22.76	10.86637	5
7	4.24	19.32	6.39	19.23	6.06	20.13	11.20	4.49	9.16	1.47	6.41	17.52	8.21	0.03	6.49	18.38	5.22	12.59		
	23.210	-5.09	0.277	3.65	0.420	11.13	7.317	25.58	4.764	21.96	23.529	-5.14	3.433	18.50	23.982	-1.49	20.424	-22.76	10.99779	7
9	4.19	19.36	6.31	19.28	5.56	20.03	11.14	4.41	9.09	1.40	6.33	17.45	8.13	23.51	6.41	18.31	5.14	12.51		
	23.333	-4.31	0.381	4.81	0.380	11.15	7.336	25.49	4.778	22.00	23.544	-5.04	3.438	18.52	23.987	-1.46	20.427	-22.75	11.12922	9
11	4.14	19.40	6.22	19.29	5.45	19.52	11.08	4.34	9.02	1.33	6.26	17.39	8.05	23.44	6.33	18.23	5.07	12.44		
	23.456	-3.52	0.455	5.74	0.331	11.07	7.359	25.38	4.793	22.03	23.559	-4.95	3.442	18.54	23.991	-1.43	20.430	-22.74	11.26064	11
13	4.09	19.44	6.13	19.28	5.35	19.40	11.03	4.27	8.54	1.27	6.18	17.32	7.58	23.36	6.25	18.16	4.59	12.36		
	23.579	-2.73	0.495	6.40	0.275	10.89	7.385	25.28	4.809	22.06	23.574	-4.85	3.447	18.55	23.996	-1.40	20.434	-22.74	11.39205	13
15	4.04	19.48	6.04	19.22	5.25	19.26	10.58	4.19	8.47	1.20	6.11	17.26	7.50	23.29	6.18	18.09	4.51	12.28		
	23.701	-1.94	0.502	6.76	0.211	10.62	7.413	25.16	4.825	22.09	23.589	-4.75	3.451	18.57	0.000	-1.37	20.437	-22.73	11.52347	15
17	3.58	19.52	5.54	19.13	5.15	19.12	10.53	4.12	8.40	1.13	6.03	17.19	7.42	23.22	6.10	18.01	4.43	12.21		
	23.822	-1.15	0.476	6.82	0.142	10.24	7.444	25.04	4.842	22.13	23.604	-4.66	3.456	18.59	0.005	-1.34	20.440	-22.73	11.65489	17
19	3.53	19.56	5.44	19.01	5.06	18.57	10.48	4.05	8.33	1.07	5.56	17.13	7.35	23.14	6.02	17.54	4.36	12.13		
	23.944	-0.36	0.422	6.58	0.069	9.78	7.477	24.92	4.860	22.16	23.620	-4.56	3.462	18.61	0.010	-1.31	20.443	-22.72	11.78630	19
21	3.48	20.01	5.35	18.45	4.56	18.42	10.43	3.59	8.26	1.00	5.49	17.07	7.27	23.07	5.54	17.46	4.28	12.05		
	0.066	0.43	0.345	6.05	23.995	9.24	7.512	24.79	4.879	22.20	23.635	-4.47	3.467	18.63	0.014	-1.28	20.446	-22.72	11.91773	21
23	3.42	20.05	5.26	18.28	4.47	18.26	10.39	3.52	8.19	0.54	5.41	17.00	7.19	22.59	5.47	17.39	4.20	11.58		
	0.187	1.22	0.253	5.29	23.922	8.63	7.549	24.65	4.898	22.24	23.650	-4.37	3.472	18.65	0.019	-1.25	20.449	-22.72	12.04915	23
25	3.36	20.10	5.17	18.09	4.39	18.10	10.34	3.45	8.12	0.48	5.34	16.54	7.12	22.52	5.39	17.31	4.13	11.50		
	0.309	2.00	0.154	4.36	23.851	7.97	7.589	24.51	4.918	22.27	23.665	-4.28	3.478	18.67	0.024	-1.22	20.452	-22.71	12.18057	25
27	3.31	20.14	5.09	17.50	4.31	17.55	10.30	3.38	8.05	0.41	5.26	16.47	7.04	22.45	5.31	17.24	4.05	11.42		
	0.430	2.79	0.056	3.32	23.784	7.27	7.630	24.36	4.939	22.31	23.680	-4.18	3.484	18.69	0.028	-1.19	20.454	-22.71	12.31198	27
29	3.25	20.19	5.01	17.31	4.23	17.39	10.26	3.32	7.58	0.35	5.19	16.41	6.56	22.37	5.23	17.17	3.57	11.35		
	0.551	3.57	23.969	2.26	23.723	6.55	7.673	24.21	4.960	22.35	23.695	-4.09	3.490	18.71	0.033	-1.16	20.457	-22.71	12.44340	29
31	4.19	21.24	5.54	18.13	5.16	18.24	11.22	4.25	8.52	1.29	6.11	17.34	7.49	23.30	6.16	18.09	4.49	12.27		
	0.670	4.33	23.898	1.26	23.670	5.85	7.717	24.06	4.981	22.38	23.709	-4.00	3.496	18.73	0.037	-1.14	20.459	-22.70	12.57482	31

# KWIECIEŃ 2025

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
91	1	Wto	767	23.54197	-3.46	0.4352	4.43	0.99934	3.2002	22.55	56.815	4.0	13	619	1249.5	1921	706	1534.3	****	553	1	
92	2	Śro	768	23.58162	-3.28	0.4731	5.06	0.99962	4.2224	26.36	57.478	5.0	22	617	1249.2	1923	732	1635.6	028	549	2	
93	3	Czw	769	0.02128	-3.11	0.5110	5.29	0.99991	5.2605	28.28	58.275	6.0	32	614	1248.9	1925	813	1737.9	157	545	3	
94	4	Pią	770	0.06093	-2.54	0.5449	5.52	1.00019	6.2859	28.29	59.133	7.0	43	612	1248.6	1926	912	1838.8	307	542	4	
95	5	Sob	771	0.10059	-2.36	0.5828	6.15	1.00047	7.2904	26.47	59.990	0.3	53	610	1248.4	1928	1026	1936.0	355	538	5	
96	6	Nie	772	0.14024	-2.19	1.0208	6.37	1.00075	8.2507	23.41	60.797	1.3	64	607	1248.1	1930	1149	2028.5	426	534	6	
97	7	Pon	773	0.17590	-2.02	1.0547	6.60	1.00103	9.1651	19.29	61.521	2.3	73	605	1247.8	1932	1311	2116.3	446	530	7	
98	8	Wto	774	0.21556	-1.46	1.0927	7.22	1.00131	10.0447	14.33	62.145	3.3	82	603	1247.5	1934	1431	2200.3	500	526	8	
99	9	Śro	775	0.25521	-1.29	1.1307	7.45	1.00159	10.4947	9.07	62.662	4.3	89	600	1247.2	1935	1546	2241.5	510	522	9	
100	10	Czw	776	0.29487	-1.13	1.1648	8.07	1.00187	11.3251	3.26	63.070	5.3	94	558	1247.0	1937	1700	2321.2	519	518	10	
101	11	Pią	777	0.33452	-0.57	1.2028	8.29	1.00215	12.1500	-2.19	63.376	6.3	98	556	1246.7	1939	1812	*****	526	514	11	
102	12	Sob	778	0.37418	-0.42	1.2409	8.51	1.00243	12.5712	-7.57	63.580	7.3	100	553	1246.4	1941	1924	000.4	534	510	12	
103	13	Nie	779	0.41383	-0.26	1.2751	9.13	1.00271	13.4021	-13.17	63.686	0.4	100	551	1246.2	1942	2038	040.1	542	506	13	
104	14	Pon	780	0.45349	-0.11	1.3132	9.34	1.00299	14.2515	-18.08	63.689	1.4	98	549	1245.9	1944	2154	121.3	553	502	14	
105	15	Wto	781	0.49314	0.03	1.3514	9.56	1.00328	15.1233	-22.18	63.582	2.4	95	546	1245.7	1946	2310	204.8	606	458	15	
106	16	Śro	782	0.53280	0.18	1.3856	10.17	1.00356	16.0236	-25.35	63.355	3.4	90	544	1245.5	1948	****	251.3	625	454	16	
107	17	Czw	783	0.57245	0.32	1.4239	10.38	1.00384	16.5521	-27.45	62.997	4.4	83	542	1245.2	1950	025	340.8	652	450	17	
108	18	Pią	784	1.01211	0.45	1.4622	10.59	1.00413	17.5012	-28.37	62.500	5.4	76	540	1245.0	1951	132	432.9	732	446	18	
109	19	Sob	785	1.05176	0.58	1.5006	11.20	1.00441	18.4610	-28.06	61.863	6.4	67	538	1244.8	1953	226	526.7	829	443	19	
110	20	Nie	786	1.09142	1.11	1.5350	11.40	1.00469	19.4203	-26.07	61.097	7.4	57	535	1244.6	1955	306	620.7	941	439	20	
111	21	Pon	787	1.13108	1.23	1.5734	12.01	1.00497	20.3653	-22.45	60.227	0.3	46	533	1244.4	1957	333	713.7	1104	435	21	
112	22	Wto	788	1.17073	1.35	2.0119	12.21	1.00524	21.3014	-18.08	59.291	1.3	36	531	1244.2	1959	352	805.2	1230	431	22	
113	23	Śro	789	1.21039	1.46	2.0504	12.41	1.00552	22.2214	-12.27	58.350	2.3	26	529	1244.0	2000	407	855.1	1359	427	23	
114	24	Czw	790	1.25004	1.57	2.0850	13.01	1.00579	23.1333	-5.58	57.475	3.3	16	527	1243.8	2002	418	944.1	1528	423	24	
115	25	Pią	791	1.28570	2.07	2.1236	13.20	1.00606	0.0509	1.01	56.745	4.3	8	525	1243.6	2004	429	1033.3	1658	419	25	
116	26	Sob	792	1.32535	2.17	2.1623	13.40	1.00633	0.5814	8.07	56.235	5.3	3	522	1243.5	2006	439	1124.1	1832	415	26	
117	27	Nie	793	1.36501	2.26	2.2010	13.59	1.00659	1.5358	14.51	56.002	6.3	0	520	1243.3	2008	452	1217.8	2010	411	27	
118	28	Pon	794	1.40466	2.35	2.2358	14.18	1.00685	2.5314	20.43	56.075	0.6	1	518	1243.2	2009	508	1315.5	2150	407	28	
119	29	Wto	795	1.44432	2.43	2.2747	14.36	1.00711	3.5606	25.11	56.447	1.6	4	516	1243.0	2011	530	1417.2	2327	403	29	
120	30	Śro	796	1.48397	2.51	2.3135	14.55	1.00736	5.0127	27.52	57.076	2.6	10	514	1242.9	2013	605	1521.5	****	359	30	

Fazy Księżyca [Dm, h.mm]: 1kw 5, 4.15 Pełn 13, 2.22 3kw 21, 3.35 Nów 27, 21.31

# KWIECIEŃ 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.16	21.26	5.51	18.05	5.13	18.17	11.20	4.22	8.48	1.26	6.07	17.31	7.45	23.26	6.12	18.05	4.46	12.23		
	0.731	4.71	23.868	0.78	23.647	5.50	7.740	23.97	4.992	22.40	23.717	-3.95	3.499	18.75	0.040	-1.12	20.460	-22.70	12.64052	1
3	4.10	21.31	5.45	17.50	5.06	18.03	11.17	4.16	8.41	1.19	5.60	17.24	7.37	23.19	6.04	17.58	4.38	12.15		
	0.853	5.48	23.826	-0.07	23.606	4.81	7.788	23.81	5.015	22.44	23.732	-3.86	3.505	18.77	0.044	-1.09	20.462	-22.70	12.77195	3
5	4.04	21.36	5.40	17.37	5.00	17.50	11.13	4.10	8.35	1.13	5.53	17.18	7.30	23.12	5.56	17.50	4.30	12.08		
	0.975	6.24	23.805	-0.78	23.575	4.15	7.837	23.63	5.038	22.48	23.746	-3.77	3.512	18.79	0.049	-1.06	20.464	-22.70	12.90337	5
7	3.57	21.41	5.35	17.27	4.54	17.38	11.10	4.03	8.28	1.07	5.45	17.11	7.22	23.04	5.48	17.43	4.22	11.60		
	1.097	7.00	23.807	-1.32	23.553	3.54	7.887	23.45	5.061	22.51	23.761	-3.68	3.518	18.82	0.053	-1.03	20.466	-22.70	13.03479	7
9	3.51	21.47	5.31	17.18	4.49	17.26	11.06	3.57	8.21	1.01	5.38	17.05	7.14	22.57	5.41	17.36	4.15	11.52		
	1.219	7.74	23.830	-1.69	23.542	2.99	7.939	23.26	5.086	22.55	23.775	-3.59	3.525	18.84	0.058	-1.01	20.468	-22.70	13.16621	9
11	3.44	21.52	5.26	17.12	4.43	17.15	11.03	3.51	8.14	0.55	5.30	16.58	7.07	22.50	5.33	17.28	4.07	11.44		
	1.341	8.48	23.873	-1.88	23.541	2.49	7.992	23.07	5.110	22.59	23.789	-3.50	3.532	18.87	0.062	-0.98	20.470	-22.70	13.29762	11
13	3.38	21.58	5.22	17.08	4.38	17.06	11.00	3.45	8.08	0.49	5.23	16.52	6.59	22.42	5.25	17.21	3.59	11.37		
	1.464	9.21	23.934	-1.91	23.550	2.06	8.046	22.87	5.136	22.62	23.804	-3.41	3.539	18.89	0.067	-0.95	20.471	-22.70	13.42904	13
15	3.31	22.04	5.18	17.05	4.33	16.57	10.57	3.39	8.01	0.43	5.15	16.45	6.51	22.35	5.17	17.13	3.51	11.29		
	1.587	9.93	0.011	-1.78	23.568	1.69	8.102	22.66	5.161	22.66	23.818	-3.33	3.546	18.92	0.071	-0.92	20.473	-22.70	13.56046	15
17	3.24	22.10	5.15	17.04	4.29	16.49	10.54	3.32	7.55	0.37	5.08	16.39	6.44	22.28	5.10	17.06	3.43	11.21		
	1.711	10.63	0.103	-1.51	23.596	1.39	8.158	22.45	5.187	22.70	23.831	-3.24	3.553	18.94	0.075	-0.90	20.474	-22.71	13.69188	17
19	3.17	22.16	5.11	17.05	4.24	16.42	10.52	3.26	7.48	0.31	5.00	16.32	6.36	22.21	5.02	16.58	3.36	11.13		
	1.835	11.33	0.209	-1.10	23.632	1.16	8.215	22.23	5.214	22.73	23.845	-3.16	3.561	18.97	0.079	-0.87	20.475	-22.71	13.82330	19
21	3.10	22.23	5.07	17.07	4.20	16.36	10.49	3.20	7.42	0.25	4.53	16.25	6.29	22.13	4.54	16.51	3.28	11.05		
	1.959	12.01	0.326	-0.56	23.676	1.00	8.274	22.00	5.241	22.77	23.859	-3.07	3.568	18.99	0.084	-0.84	20.476	-22.71	13.95472	21
23	3.03	22.29	5.04	17.10	4.16	16.31	10.46	3.14	7.35	0.19	4.45	16.19	6.21	22.06	4.46	16.43	3.20	10.58		
	2.085	12.68	0.454	0.08	23.727	0.90	8.333	21.76	5.268	22.80	23.872	-2.99	3.576	19.02	0.088	-0.82	20.477	-22.71	14.08614	23
25	2.55	22.36	4.60	17.14	4.12	16.26	10.44	3.08	7.29	0.13	4.38	16.12	6.13	21.59	4.39	16.36	3.12	10.50		
	2.210	13.34	0.592	0.84	23.785	0.87	8.393	21.52	5.296	22.83	23.885	-2.91	3.583	19.05	0.092	-0.79	20.478	-22.72	14.21756	25
27	2.47	22.44	4.56	17.20	4.07	16.22	10.41	3.02	7.22	0.07	4.30	16.06	6.06	21.52	4.31	16.28	3.05	10.42		
	2.336	13.98	0.740	1.69	23.850	0.89	8.454	21.27	5.324	22.86	23.898	-2.83	3.591	19.07	0.096	-0.77	20.479	-22.72	14.34897	27
29	2.39	22.51	4.53	17.27	4.03	16.19	10.39	2.56	7.16	23.57	4.23	15.59	5.58	21.44	4.23	16.21	2.57	10.34		
	2.463	14.60	0.897	2.64	23.920	0.96	8.516	21.02	5.352	22.90	23.911	-2.76	3.598	19.10	0.100	-0.74	20.479	-22.73	14.48039	29

# MAJ 2025

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
2460																						
121	1	Czw	797	1.52363	2.58	2.3525	15.13	1.00761	6.0703	28.34	57.896	3.6	18	512	1242.8	2015	657	1625.7	049	355	1	
122	2	Pią	798	1.56329	3.04	2.3915	15.31	1.00786	7.1014	27.22	58.827	4.6	28	510	1242.7	2016	809	1726.6	149	351	2	
123	3	Sob	799	2.00294	3.11	2.4305	15.48	1.00810	8.0911	24.34	59.791	5.6	38	508	1242.6	2018	932	1822.5	227	347	3	
124	4	Nie	800	2.04260	3.16	2.4656	16.06	1.00834	9.0313	20.34	60.720	6.6	48	506	1242.5	2020	1056	1913.0	251	344	4	
125	5	Pon	801	2.08225	3.21	2.5047	16.23	1.00858	9.5245	15.44	61.559	0.8	59	504	1242.4	2022	1218	1958.7	307	340	5	
126	6	Wto	802	2.12191	3.26	2.5440	16.40	1.00882	10.3844	10.22	62.273	1.8	68	503	1242.3	2023	1336	2041.0	319	336	6	
127	7	Śro	803	2.16156	3.30	2.5832	16.56	1.00905	11.2216	4.44	62.843	2.8	77	501	1242.3	2025	1450	2121.0	328	332	7	
128	8	Czw	804	2.20122	3.33	3.0225	17.13	1.00928	12.0430	-0.59	63.262	3.8	84	459	1242.2	2027	1602	2200.1	336	328	8	
129	9	Pią	805	2.24087	3.36	3.0619	17.29	1.00951	12.4631	-6.37	63.534	4.8	91	457	1242.1	2028	1714	2239.5	343	324	9	
130	10	Sob	806	2.28053	3.38	3.1013	17.44	1.00974	13.2917	-12.00	63.671	5.8	95	455	1242.1	2030	1827	2320.1	352	320	10	
131	11	Nie	807	2.32019	3.40	3.1408	17.60	1.00996	14.1341	-16.58	63.685	6.8	99	454	1242.1	2032	1941	*****	401	316	11	
132	12	Pon	808	2.35584	3.41	3.1803	18.15	1.01019	15.0027	-21.18	63.589	7.8	100	452	1242.1	2033	2058	002.9	414	312	12	
133	13	Wto	809	2.39550	3.42	3.2159	18.30	1.01041	15.4960	-24.47	63.392	0.7	100	450	1242.0	2035	2213	048.5	431	308	13	
134	14	Śro	810	2.43515	3.42	3.2556	18.44	1.01063	16.4220	-27.13	63.101	1.7	97	449	1242.0	2037	2323	137.3	455	304	14	
135	15	Czw	811	2.47481	3.41	3.2953	18.58	1.01085	17.3654	-28.24	62.717	2.7	93	447	1242.1	2038	****	228.9	532	300	15	
136	16	Pią	812	2.51447	3.40	3.3351	19.12	1.01107	18.3237	-28.12	62.240	3.7	87	445	1242.1	2040	022	322.3	624	256	16	
137	17	Sob	813	2.55412	3.38	3.3749	19.26	1.01128	19.2814	-26.34	61.669	4.7	80	444	1242.1	2041	106	416.0	731	252	17	
138	18	Nie	814	2.59378	3.36	3.4148	19.39	1.01150	20.2239	-23.34	61.008	5.7	71	442	1242.1	2043	136	508.8	850	249	18	
139	19	Pon	815	3.03343	3.33	3.4547	19.52	1.01171	21.1518	-19.20	60.269	6.7	62	441	1242.2	2045	157	559.8	1013	245	19	
140	20	Wto	816	3.07309	3.30	3.4947	20.04	1.01191	22.0616	-14.05	59.473	7.7	51	439	1242.2	2046	213	648.7	1139	241	20	
141	21	Śro	817	3.11274	3.26	3.5348	20.17	1.01211	22.5607	-8.02	58.658	0.9	40	438	1242.3	2048	225	736.3	1304	237	21	
142	22	Czw	818	3.15240	3.21	3.5749	20.28	1.01231	23.4549	-1.26	57.874	1.9	29	437	1242.4	2049	235	823.5	1430	233	22	
143	23	Pią	819	3.19205	3.16	4.0150	20.40	1.01251	0.3636	5.25	57.184	2.9	19	435	1242.5	2051	245	911.7	1559	229	23	
144	24	Sob	820	3.23171	3.11	4.0552	20.51	1.01270	1.2946	12.09	56.655	3.9	11	434	1242.6	2052	256	1002.4	1732	225	24	
145	25	Nie	821	3.27137	3.05	4.0955	21.02	1.01288	2.2630	18.18	56.348	4.9	4	433	1242.7	2053	310	1056.9	1910	221	25	
146	26	Pon	822	3.31102	2.58	4.1358	21.12	1.01306	3.2727	23.22	56.307	5.9	1	432	1242.8	2055	329	1156.2	2049	217	26	
147	27	Wto	823	3.35068	2.51	4.1802	21.22	1.01324	4.3214	26.50	56.548	0.3	0	431	1242.9	2056	357	1259.8	2220	213	27	
148	28	Śro	824	3.39033	2.44	4.2206	21.32	1.01340	5.3860	28.23	57.054	1.3	2	430	1243.0	2057	441	1405.5	2333	209	28	
149	29	Czw	825	3.42599	2.36	4.2610	21.41	1.01357	6.4454	27.54	57.781	2.3	7	428	1243.2	2059	545	1509.9	****	205	29	
150	30	Pią	826	3.46565	2.27	4.3015	21.50	1.01373	7.4715	25.36	58.660	3.3	15	428	1243.3	2100	707	1610.0	021	201	30	
151	31	Sob	827	3.50530	2.18	4.3421	21.59	1.01388	8.4438	21.52	59.614	4.3	23	427	1243.4	2101	834	1704.4	052	157	31	

Fazy Księżyca [Dm, h.mm]:      1kw 4, 15.52      Pełn 12, 18.56      3kw 20, 13.59      Nów 27, 5.02

# MAJ 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	2.31	22.60	4.49	17.34	3.59	16.17	10.37	2.50	7.09	23.51	4.15	15.52	5.51	21.37	4.15	16.13	2.49	10.26		
	2.590	15.21	1.062	3.67	23.996	1.10	8.578	20.76	5.381	22.93	23.924	-2.68	3.606	19.13	0.103	-0.72	20.480	-22.73	14.61182	1
3	2.22	23.08	4.46	17.43	3.55	16.15	10.35	2.44	7.03	23.45	4.08	15.45	5.43	21.30	4.08	16.06	2.41	10.18		
	2.718	15.81	1.235	4.78	0.077	1.28	8.641	20.48	5.410	22.96	23.936	-2.61	3.614	19.15	0.107	-0.70	20.480	-22.74	14.74324	3
5	2.12	23.18	4.43	17.52	3.51	16.13	10.33	2.38	6.57	23.39	4.00	15.39	5.36	21.23	3.60	15.58	2.33	10.10		
	2.847	16.38	1.417	5.96	0.162	1.50	8.705	20.21	5.440	22.98	23.948	-2.53	3.622	19.18	0.111	-0.67	20.480	-22.74	14.87466	5
7	2.02	23.28	4.39	18.02	3.47	16.12	10.31	2.32	6.50	23.33	3.53	15.32	5.28	21.16	3.52	15.51	2.25	10.02		
	2.976	16.94	1.607	7.20	0.251	1.77	8.770	19.92	5.470	23.01	23.960	-2.46	3.630	19.21	0.114	-0.65	20.480	-22.75	15.00608	7
9	1.51	23.40	4.36	18.13	3.43	16.11	10.29	2.26	6.44	23.27	3.45	15.25	5.20	21.08	3.44	15.43	2.18	9.55		
	3.105	17.48	1.806	8.49	0.344	2.09	8.834	19.63	5.500	23.04	23.972	-2.39	3.638	19.23	0.118	-0.63	20.480	-22.76	15.13750	9
11	1.39	23.54	4.33	18.26	3.40	16.11	10.27	2.20	6.38	23.22	3.37	15.18	5.13	21.01	3.37	15.36	2.10	9.47		
	3.236	18.00	2.013	9.83	0.441	2.44	8.900	19.33	5.530	23.06	23.983	-2.33	3.646	19.26	0.121	-0.61	20.480	-22.76	15.26891	11
13	1.23	0.23	4.30	18.39	3.36	16.11	10.25	2.14	6.32	23.16	3.30	15.11	5.05	20.54	3.29	15.28	2.02	9.39		
	3.366	18.50	2.231	11.22	0.541	2.82	8.966	19.03	5.561	23.09	23.995	-2.26	3.654	19.29	0.125	-0.59	20.479	-22.77	15.40034	13
15	*****	*****	4.28	18.53	3.32	16.12	10.23	2.08	6.26	23.10	3.22	15.05	4.58	20.47	3.21	15.21	1.54	9.31		
	3.498	18.97	2.459	12.63	0.644	3.24	9.032	18.71	5.592	23.11	0.005	-2.20	3.662	19.31	0.128	-0.57	20.479	-22.78	15.53176	15
17	*****	*****	4.26	19.08	3.28	16.13	10.21	2.02	6.19	23.04	3.15	14.58	4.50	20.40	3.13	15.13	1.46	9.23		
	3.630	19.43	2.697	14.06	0.750	3.69	9.098	18.39	5.623	23.13	0.016	-2.13	3.670	19.34	0.131	-0.55	20.478	-22.79	15.66318	17
19	*****	*****	4.24	19.23	3.24	16.14	10.20	1.56	6.13	22.58	3.07	14.51	4.43	20.32	3.05	15.05	1.38	9.15		
	3.763	19.86	2.947	15.49	0.858	4.17	9.166	18.07	5.654	23.15	0.027	-2.07	3.678	19.37	0.134	-0.54	20.477	-22.80	15.79460	19
21	*****	*****	4.23	19.40	3.20	16.15	10.18	1.50	6.07	22.52	2.60	14.44	4.35	20.25	2.58	14.58	1.31	9.07		
	3.897	20.28	3.209	16.91	0.969	4.67	9.233	17.73	5.685	23.17	0.037	-2.02	3.686	19.39	0.137	-0.52	20.476	-22.81	15.92602	21
23	*****	*****	4.22	19.58	3.16	16.17	10.16	1.44	6.01	22.47	2.52	14.37	4.27	20.18	2.50	14.50	1.23	8.59		
	4.031	20.67	3.482	18.29	1.083	5.20	9.301	17.39	5.717	23.19	0.046	-1.96	3.694	19.42	0.140	-0.50	20.475	-22.82	16.05744	23
25	*****	*****	4.23	20.16	3.12	16.19	10.15	1.38	5.55	22.41	2.45	14.30	4.20	20.11	2.42	14.43	1.15	8.51		
	4.165	21.03	3.766	19.61	1.198	5.74	9.369	17.05	5.749	23.20	0.056	-1.91	3.702	19.45	0.142	-0.49	20.474	-22.83	16.18886	25
27	*****	*****	4.24	20.34	3.08	16.21	10.13	1.32	5.49	22.35	2.37	14.23	4.12	20.04	2.34	14.35	1.07	8.43		
	4.300	21.37	4.061	20.85	1.316	6.30	9.437	16.69	5.781	23.22	0.065	-1.85	3.710	19.47	0.145	-0.47	20.473	-22.84	16.32028	27
29	*****	*****	4.26	20.53	3.04	16.24	10.12	1.26	5.43	22.29	2.29	14.16	4.05	19.56	2.27	14.27	0.59	8.35		
	4.436	21.69	4.365	21.98	1.435	6.88	9.506	16.33	5.813	23.23	0.074	-1.81	3.717	19.50	0.147	-0.46	20.472	-22.85	16.45171	29
31	*****	*****	4.29	21.11	3.00	16.26	10.11	1.20	5.37	22.23	2.22	14.09	3.57	19.49	2.19	14.20	0.51	8.27		
	4.572	21.98	4.676	22.97	1.556	7.47	9.575	15.96	5.846	23.24	0.083	-1.76	3.725	19.53	0.150	-0.44	20.470	-22.86	16.58313	31

# CZERWIEC 2025

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
152	1	Nie	828	3.54496	2.09	4.3827	22.07	1.01403	9.3655	17.08	60.566	5.3	33	426	1243.6	2102	1000	1753.3	112	153	1
153	2	Pon	829	3.58461	1.60	4.4233	22.15	1.01417	10.2454	11.48	61.448	6.3	43	425	1243.8	2103	1120	1837.7	125	150	2
154	3	Wto	830	4.02427	1.50	4.4639	22.22	1.01431	11.0945	6.08	62.210	0.3	53	424	1243.9	2104	1237	1919.1	135	146	3
155	4	Śro	831	4.06393	1.39	4.5046	22.29	1.01445	11.5242	0.23	62.816	1.3	62	423	1244.1	2105	1350	1958.8	144	142	4
156	5	Czw	832	4.10358	1.29	4.5453	22.36	1.01458	12.3455	-5.18	63.247	2.3	71	423	1244.3	2107	1502	2038.1	152	138	5
157	6	Pią	833	4.14324	1.18	4.5901	22.42	1.01471	13.1731	-10.45	63.501	3.3	79	422	1244.4	2107	1615	2118.3	200	134	6
158	7	Sob	834	4.18289	1.07	5.0308	22.48	1.01483	14.0127	-15.48	63.585	4.3	86	421	1244.6	2108	1729	2200.3	209	130	7
159	8	Nie	835	4.22255	0.55	5.0716	22.53	1.01495	14.4736	-20.17	63.517	5.3	92	421	1244.8	2109	1844	2245.0	221	126	8
160	9	Pon	836	4.26220	0.44	5.1124	22.58	1.01507	15.3633	-23.59	63.321	6.3	97	420	1245.0	2110	2000	2332.9	236	122	9
161	10	Wto	837	4.30186	0.32	5.1533	23.03	1.01519	16.2827	-26.41	63.019	7.3	99	420	1245.2	2111	2113	*****	259	118	10
162	11	Śro	838	4.34152	0.20	5.1942	23.07	1.01530	17.2255	-28.10	62.635	0.1	100	420	1245.4	2112	2216	024.0	331	114	11
163	12	Czw	839	4.38117	0.07	5.2350	23.11	1.01541	18.1855	-28.16	62.188	1.1	99	419	1245.6	2112	2305	117.4	419	110	12
164	13	Pią	840	4.42083	-0.05	5.2759	23.14	1.01551	19.1505	-26.55	61.692	2.1	96	419	1245.8	2113	2339	211.7	523	106	13
165	14	Sob	841	4.46049	-0.18	5.3209	23.17	1.01562	20.1007	-24.11	61.157	3.1	91	419	1246.0	2114	****	305.3	639	102	14
166	15	Nie	842	4.50014	-0.31	5.3618	23.20	1.01572	21.0311	-20.11	60.589	4.1	84	419	1246.3	2114	003	357.0	802	058	15
167	16	Pon	843	4.53580	-0.43	5.4027	23.22	1.01581	21.5411	-15.10	59.995	5.1	75	419	1246.5	2115	019	446.3	926	054	16
168	17	Wto	844	4.57545	-0.56	5.4437	23.23	1.01590	22.4333	-9.21	59.384	6.1	65	419	1246.7	2115	032	533.6	1050	051	17
169	18	Śro	845	5.01511	-1.10	5.4847	23.25	1.01599	23.3211	-2.59	58.774	7.1	54	419	1246.9	2115	043	619.8	1214	047	18
170	19	Czw	846	5.05476	-1.23	5.5256	23.26	1.01607	0.2113	3.38	58.191	0.6	43	419	1247.1	2116	053	706.2	1339	043	19
171	20	Pią	847	5.09442	-1.36	5.5706	23.26	1.01615	1.1158	10.12	57.672	1.6	32	419	1247.3	2116	103	754.1	1508	039	20
172	21	Sob	848	5.13407	-1.49	6.0116	23.26	1.01622	2.0543	16.22	57.261	2.6	22	419	1247.6	2116	115	845.1	1640	035	21
173	22	Nie	849	5.17373	-2.02	6.0525	23.26	1.01629	3.0328	21.42	57.006	3.6	13	419	1247.8	2116	131	940.5	1816	031	22
174	23	Pon	850	5.21339	-2.15	6.0935	23.25	1.01635	4.0531	25.42	56.946	4.6	6	420	1248.0	2116	153	1040.7	1950	027	23
175	24	Wto	851	5.25304	-2.28	6.1345	23.24	1.01641	5.1052	27.59	57.108	5.6	1	420	1248.2	2116	229	1144.8	2111	023	24
176	25	Śro	852	5.29270	-2.41	6.1754	23.22	1.01646	6.1711	28.17	57.495	6.6	0	420	1248.4	2116	323	1249.9	2211	019	25
177	26	Czw	853	5.33236	-2.54	6.2203	23.20	1.01650	7.2134	26.39	58.087	1.0	1	421	1248.6	2116	438	1352.8	2249	015	26
178	27	Pią	854	5.37201	-3.06	6.2613	23.18	1.01654	8.2148	23.22	58.838	2.0	5	421	1248.9	2116	605	1450.9	2314	011	27
179	28	Sob	855	5.41167	-3.19	6.3022	23.15	1.01657	9.1660	18.52	59.688	3.0	11	422	1249.1	2116	733	1543.3	2330	007	28
180	29	Nie	856	5.45132	-3.31	6.3430	23.12	1.01660	10.0729	13.35	60.567	4.0	19	422	1249.3	2116	858	1630.6	2342	003	29
181	30	Pon	857	5.49098	-3.43	6.3839	23.08	1.01662	10.5414	7.53	61.407	5.0	27	423	1249.5	2115	1018	1714.1	2351	2356	30

Fazy Księżyca [Dm, h.mm]:      1kw 3, 5.41      Pełn 11, 9.44      3kw 18, 21.19      Nów 25, 12.32

## CZERWIEC 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	*****	*****	4.31	21.20	2.58	16.28	10.10	1.17	5.34	22.20	2.18	14.05	3.53	19.46	2.15	14.16	0.47	8.23		
	4.641	22.12	4.832	23.40	1.618	7.77	9.610	15.78	5.862	23.25	0.087	-1.74	3.729	19.54	0.151	-0.44	20.469	-22.86	16.64884	1
3	*****	*****	4.36	21.37	2.55	16.31	10.09	1.11	5.28	22.14	2.10	13.58	3.46	19.38	2.07	14.08	0.40	8.15		
	4.778	22.37	5.147	24.14	1.742	8.38	9.679	15.40	5.895	23.26	0.095	-1.69	3.737	19.56	0.153	-0.42	20.468	-22.87	16.78026	3
5	*****	*****	4.42	21.52	2.51	16.34	10.07	1.05	5.22	22.09	2.03	13.51	3.38	19.31	1.59	14.00	0.32	8.07		
	4.915	22.59	5.459	24.71	1.868	8.99	9.749	15.02	5.927	23.26	0.103	-1.65	3.745	19.59	0.155	-0.41	20.466	-22.89	16.91168	5
7	*****	*****	4.50	22.06	2.47	16.37	10.06	0.58	5.16	22.03	1.55	13.44	3.31	19.24	1.51	13.53	0.24	7.59		
	5.052	22.79	5.768	25.08	1.995	9.61	9.818	14.63	5.960	23.27	0.110	-1.61	3.753	19.61	0.157	-0.40	20.464	-22.90	17.04310	7
9	*****	*****	4.58	22.18	2.43	16.40	10.05	0.52	5.10	21.57	1.47	13.36	3.23	19.17	1.44	13.45	0.16	7.50		
	5.190	22.97	6.069	25.28	2.124	10.24	9.888	14.23	5.993	23.27	0.117	-1.57	3.760	19.64	0.158	-0.39	20.462	-22.91	17.17452	9
11	*****	*****	5.08	22.28	2.40	16.44	10.03	0.46	5.04	21.51	1.40	13.29	3.16	19.09	1.36	13.37	0.08	7.42		
	5.328	23.11	6.360	25.30	2.255	10.86	9.959	13.83	6.026	23.28	0.124	-1.54	3.768	19.66	0.160	-0.38	20.460	-22.92	17.30594	11
13	*****	*****	5.18	22.35	2.36	16.48	10.02	0.40	4.58	21.45	1.32	13.22	3.08	19.02	1.28	13.30	23.56	7.34		
	5.467	23.23	6.641	25.16	2.387	11.49	10.029	13.42	6.059	23.28	0.130	-1.51	3.776	19.69	0.162	-0.38	20.458	-22.94	17.43737	13
15	*****	*****	5.28	22.41	2.33	16.51	10.01	0.34	4.52	21.39	1.24	13.14	3.00	18.55	1.20	13.22	23.48	7.26		
	5.605	23.33	6.908	24.88	2.522	12.11	10.100	13.01	6.092	23.28	0.136	-1.48	3.783	19.71	0.163	-0.37	20.456	-22.95	17.56879	15
17	*****	*****	5.39	22.45	2.29	16.55	9.60	0.28	4.46	21.33	1.17	13.07	2.53	18.48	1.12	13.14	23.40	7.18		
	5.744	23.39	7.162	24.47	2.657	12.73	10.170	12.59	6.125	23.28	0.142	-1.45	3.790	19.73	0.164	-0.36	20.453	-22.96	17.70021	17
19	*****	*****	5.50	22.47	2.26	16.59	9.59	0.22	4.41	21.27	1.09	12.60	2.45	18.40	1.05	13.06	23.32	7.10		
	5.882	23.43	7.403	23.95	2.795	13.35	10.241	12.16	6.158	23.27	0.147	-1.43	3.798	19.76	0.165	-0.36	20.451	-22.98	17.83163	19
21	*****	*****	6.00	22.48	2.23	17.03	9.58	0.16	4.35	21.22	1.01	12.52	2.38	18.33	0.57	12.59	23.25	7.02		
	6.021	23.44	7.628	23.34	2.934	13.96	10.312	11.73	6.191	23.27	0.152	-1.41	3.805	19.78	0.166	-0.35	20.448	-22.99	17.96305	21
23	*****	*****	6.10	22.47	2.20	17.08	9.57	0.10	4.29	21.16	0.54	12.45	2.30	18.26	0.49	12.51	23.17	6.54		
	6.160	23.42	7.840	22.64	3.074	14.55	10.384	11.30	6.224	23.26	0.156	-1.39	3.812	19.80	0.167	-0.35	20.446	-23.00	18.09447	23
25	*****	*****	6.20	22.46	2.17	17.12	9.56	0.03	4.23	21.10	0.46	12.37	2.22	18.19	0.41	12.43	23.09	6.46		
	6.298	23.37	8.036	21.88	3.216	15.14	10.455	10.86	6.257	23.25	0.160	-1.37	3.819	19.82	0.168	-0.35	20.443	-23.02	18.22590	25
27	*****	*****	6.29	22.43	2.14	17.16	9.54	23.53	4.17	21.04	0.38	12.29	2.15	18.11	0.33	12.35	23.01	6.37		
	6.437	23.30	8.218	21.07	3.360	15.71	10.527	10.41	6.291	23.24	0.164	-1.36	3.826	19.85	0.169	-0.34	20.440	-23.03	18.35732	27
29	*****	*****	6.37	22.39	2.11	17.20	9.53	23.47	4.11	20.58	0.31	12.22	2.07	18.04	0.25	12.27	22.53	6.29		
	6.575	23.20	8.385	20.23	3.505	16.27	10.598	9.96	6.324	23.23	0.167	-1.35	3.833	19.87	0.169	-0.34	20.437	-23.04	18.48874	29

# LIPIEC 2025

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Wto	2460	5.53063	-3.55	6.4247	23.04	1.01663	11.3828	2.01	62.149	6.0	37	424	1249.7	2115	1134	1755.1	****	2352	1
183	2	Śro	859	5.57029	-4.06	6.4655	23.00	1.01664	12.2123	-3.47	62.747	7.0	46	425	1249.8	2115	1248	1835.0	000	2348	2
184	3	Czw	860	6.00595	-4.17	6.5103	22.55	1.01664	13.0408	-9.21	63.167	0.6	56	425	1250.0	2114	1400	1915.0	008	2344	3
185	4	Pią	861	6.04560	-4.28	6.5510	22.50	1.01664	13.4749	-14.33	63.395	1.6	65	426	1250.2	2114	1514	1956.4	017	2340	4
186	5	Sob	862	6.08526	-4.38	6.5917	22.44	1.01664	14.3320	-19.12	63.431	2.6	74	427	1250.4	2113	1629	2040.1	027	2336	5
187	6	Nie	863	6.12491	-4.48	7.0324	22.38	1.01663	15.2127	-23.07	63.288	3.6	82	428	1250.6	2112	1746	2126.9	041	2332	6
188	7	Pon	864	6.16457	-4.58	7.0730	22.32	1.01661	16.1233	-26.07	62.990	4.6	89	429	1250.7	2112	1900	2216.9	100	2328	7
189	8	Wto	865	6.20423	-5.07	7.1136	22.25	1.01660	17.0630	-27.56	62.571	5.6	94	430	1250.9	2111	2007	2309.9	129	2324	8
190	9	Śro	866	6.24388	-5.16	7.1541	22.18	1.01658	18.0231	-28.24	62.066	6.6	98	431	1251.0	2110	2101	*****	211	2320	9
191	10	Czw	867	6.28354	-5.25	7.1946	22.10	1.01655	18.5918	-27.25	61.513	7.6	100	432	1251.2	2109	2140	004.5	310	2316	10
192	11	Pią	868	6.32319	-5.33	7.2351	22.02	1.01653	19.5524	-24.58	60.944	0.6	100	433	1251.3	2109	2207	059.2	424	2312	11
193	12	Sob	869	6.36285	-5.40	7.2755	21.54	1.01650	20.4945	-21.12	60.387	1.6	97	434	1251.4	2108	2226	152.3	547	2308	12
194	13	Nie	870	6.40251	-5.47	7.3158	21.45	1.01646	21.4153	-16.18	59.861	2.6	93	436	1251.5	2107	2240	243.1	713	2304	13
195	14	Pon	871	6.44216	-5.54	7.3602	21.36	1.01643	22.3202	-10.33	59.377	3.6	86	437	1251.6	2106	2251	331.6	838	2300	14
196	15	Wto	872	6.48182	-6.00	7.4004	21.27	1.01638	23.2056	-4.15	58.941	4.6	78	438	1251.7	2105	2301	418.3	1003	2257	15
197	16	Śro	873	6.52147	-6.06	7.4406	21.17	1.01634	0.0938	2.20	58.557	5.6	68	439	1251.8	2103	2310	504.5	1127	2253	16
198	17	Czw	874	6.56113	-6.11	7.4808	21.07	1.01629	0.5920	8.53	58.229	6.6	57	441	1251.9	2102	2321	551.3	1253	2249	17
199	18	Pią	875	7.00078	-6.15	7.5209	20.56	1.01624	1.5117	15.04	57.966	0.4	46	442	1252.0	2101	2335	640.3	1423	2245	18
200	19	Sob	876	7.04044	-6.20	7.5610	20.45	1.01618	2.4635	20.30	57.785	1.4	34	443	1252.1	2100	2355	732.7	1555	2241	19
201	20	Nie	877	7.08009	-6.23	8.0010	20.34	1.01611	3.4549	24.48	57.705	2.4	24	445	1252.1	2058	****	829.5	1728	2237	20
202	21	Pon	878	7.11575	-6.26	8.0410	20.23	1.01604	4.4836	27.33	57.750	3.4	14	446	1252.2	2057	024	930.5	1853	2233	21
203	22	Wto	879	7.15541	-6.29	8.0809	20.11	1.01597	5.5321	28.29	57.940	4.4	7	448	1252.2	2056	108	1033.9	2000	2229	22
204	23	Śro	880	7.19506	-6.30	8.1207	19.58	1.01589	6.5735	27.30	58.282	5.4	2	449	1252.3	2054	214	1136.9	2046	2225	23
205	24	Czw	881	7.23472	-6.32	8.1605	19.46	1.01580	7.5853	24.47	58.774	6.4	0	451	1252.3	2053	336	1236.5	2115	2221	24
206	25	Pią	882	7.27438	-6.33	8.2002	19.33	1.01571	8.5550	20.40	59.392	0.6	0	452	1252.3	2051	505	1331.4	2134	2217	25
207	26	Sob	883	7.31403	-6.33	8.2359	19.20	1.01561	9.4815	15.35	60.101	1.6	3	454	1252.3	2050	632	1421.1	2148	2213	26
208	27	Nie	884	7.35369	-6.32	8.2755	19.06	1.01551	10.3644	9.55	60.849	2.6	8	455	1252.3	2048	755	1506.7	2158	2209	27
209	28	Pon	885	7.39334	-6.31	8.3150	18.52	1.01540	11.2219	3.59	61.581	3.6	14	457	1252.3	2047	914	1549.2	2207	2205	28
210	29	Wto	886	7.43300	-6.29	8.3545	18.38	1.01528	12.0608	-1.57	62.241	4.6	22	458	1252.2	2045	1029	1630.0	2215	2201	29
211	30	Śro	887	7.47265	-6.27	8.3939	18.24	1.01516	12.4920	-7.42	62.780	5.6	30	500	1252.2	2043	1143	1710.4	2224	2158	30
212	31	Czw	888	7.51231	-6.24	8.4333	18.09	1.01504	13.3257	-13.05	63.158	6.6	39	502	1252.1	2042	1257	1751.5	2233	2154	31

Fazy Księżyca [Dm, h.mm]:      1kw 2, 21.30      Pełn 10, 22.37      3kw 18, 2.38      Nów 24, 21.11



# LIPIEC 2025 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST		Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)		
1	*****	*****	6.44	22.34	2.09	17.25	9.53	23.41	4.06	20.52	0.23	12.14	1.60	17.57	0.18	12.19	22.45	6.21			
	6.713	23.07	8.537	19.36	3.652	16.81	10.670	9.50	6.357	23.22	0.170	-1.34	3.839	19.89	0.169	-0.34	20.435	-23.06	18.62016	1	
3	*****	*****	6.51	22.28	2.07	17.29	9.52	23.35	3.60	20.46	0.15	12.07	1.52	17.49	0.10	12.12	22.37	6.13			
	6.851	22.92	8.674	18.49	3.800	17.34	10.742	9.04	6.390	23.20	0.172	-1.33	3.846	19.91	0.170	-0.34	20.432	-23.07	18.75158	3	
5	*****	*****	6.56	22.22	2.04	17.34	9.51	23.29	3.54	20.40	0.07	11.59	1.44	17.42	0.02	12.04	22.29	6.05			
	6.988	22.74	8.794	17.62	3.950	17.84	10.814	8.57	6.423	23.19	0.174	-1.33	3.852	19.93	0.170	-0.34	20.429	-23.09	18.88300	5	
7	*****	*****	6.59	22.15	2.02	17.38	9.50	23.23	3.48	20.34	23.56	11.51	1.37	17.35	23.50	11.56	22.21	5.57			
	7.125	22.53	8.897	16.77	4.102	18.32	10.887	8.10	6.455	23.17	0.176	-1.33	3.859	19.95	0.170	-0.35	20.426	-23.10	19.01442	7	
9	*****	*****	7.02	22.07	2.01	17.42	9.49	23.17	3.43	20.28	23.48	11.43	1.29	17.27	23.42	11.48	22.13	5.49			
	7.261	22.30	8.983	15.95	4.255	18.78	10.959	7.63	6.488	23.15	0.177	-1.33	3.865	19.97	0.169	-0.35	20.423	-23.12	19.14585	9	
11	*****	*****	7.03	21.58	1.59	17.47	9.48	23.10	3.37	20.22	23.40	11.35	1.21	17.20	23.34	11.40	22.05	5.40			
	7.397	22.04	9.051	15.18	4.409	19.22	11.032	7.15	6.521	23.13	0.178	-1.33	3.871	19.98	0.169	-0.35	20.420	-23.13	19.27727	11	
13	*****	*****	7.02	21.49	1.58	17.51	9.47	23.04	3.31	20.15	23.32	11.27	1.14	17.12	23.26	11.32	21.57	5.32			
	7.533	21.76	9.101	14.47	4.565	19.62	11.105	6.67	6.553	23.11	0.178	-1.34	3.876	20.00	0.169	-0.36	20.416	-23.14	19.40869	13	
15	*****	*****	7.00	21.39	1.57	17.55	9.46	22.58	3.25	20.09	23.24	11.20	1.06	17.05	23.19	11.24	21.49	5.24			
	7.668	21.45	9.130	13.84	4.722	20.00	11.178	6.19	6.586	23.08	0.178	-1.35	3.882	20.02	0.168	-0.36	20.413	-23.16	19.54011	15	
17	*****	*****	6.56	21.29	1.56	17.59	9.45	22.52	3.20	20.03	23.17	11.12	0.59	16.58	23.11	11.16	21.41	5.16			
	7.802	21.11	9.139	13.30	4.880	20.36	11.251	5.70	6.618	23.06	0.178	-1.36	3.888	20.03	0.167	-0.37	20.410	-23.17	19.67153	17	
19	*****	*****	6.50	21.18	1.55	18.03	9.45	22.46	3.14	19.57	23.09	11.04	0.51	16.50	23.03	11.08	21.33	5.08			
	7.936	20.76	9.128	12.87	5.040	20.68	11.324	5.20	6.650	23.03	0.177	-1.38	3.893	20.05	0.167	-0.38	20.407	-23.19	19.80295	19	
21	*****	*****	6.42	21.06	1.55	18.07	9.44	22.40	3.08	19.51	23.01	10.56	0.43	16.43	22.55	11.00	21.25	4.60			
	8.069	20.38	9.096	12.57	5.201	20.97	11.398	4.71	6.682	23.01	0.176	-1.40	3.898	20.07	0.166	-0.39	20.404	-23.20	19.93437	21	
23	*****	*****	6.32	20.54	1.55	18.11	9.43	22.34	3.02	19.45	22.53	10.48	0.36	16.35	22.47	10.52	21.18	4.51			
	8.202	19.97	9.044	12.39	5.363	21.22	11.471	4.21	6.714	22.98	0.174	-1.42	3.903	20.08	0.164	-0.39	20.400	-23.22	20.06580	23	
25	*****	*****	6.20	20.42	1.55	18.14	9.42	22.27	2.57	19.39	22.45	10.39	0.28	16.28	22.39	10.44	21.10	4.43			
	8.334	19.55	8.975	12.37	5.526	21.44	11.545	3.71	6.746	22.95	0.172	-1.44	3.908	20.09	0.163	-0.40	20.397	-23.23	20.19722	25	
27	*****	*****	6.07	20.30	1.56	18.18	9.42	22.21	2.51	19.32	22.37	10.31	0.20	16.20	22.31	10.36	21.02	4.35			
	8.465	19.10	8.892	12.48	5.690	21.63	11.619	3.20	6.777	22.92	0.169	-1.47	3.912	20.11	0.162	-0.41	20.394	-23.24	20.32864	27	
29	1.16	0.04	5.52	20.18	1.57	18.21	9.41	22.15	2.45	19.26	22.29	10.23	0.13	16.13	22.23	10.28	20.54	4.27			
	8.596	18.63	8.798	12.74	5.855	21.78	11.694	2.69	6.809	22.88	0.167	-1.49	3.917	20.12	0.160	-0.43	20.390	-23.26	20.46006	29	
31	1.37	-0.08	5.36	20.06	1.58	18.24	9.40	22.09	2.39	19.20	22.22	10.15	0.05	16.05	22.16	10.20	20.46	4.19			
	8.726	18.15	8.701	13.12	6.021	21.89	11.768	2.18	6.840	22.85	0.163	-1.53	3.921	20.13	0.159	-0.44	20.387	-23.27	20.59147	31	

# SIERPIEŃ 2025

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]										
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2460																					
213	1	Pią	889	7.55196	-6.20	8.4726	17.54	1.01491	14.1758	-17.57	63.347	7.6	49	503	1252.1	2040	1412	1834.3	2246	2150	1
214	2	Sob	890	7.59162	-6.16	8.5118	17.38	1.01477	15.0511	-22.07	63.336	0.9	58	505	1252.0	2038	1528	1919.7	2302	2146	2
215	3	Nie	891	8.03127	-6.11	8.5510	17.23	1.01464	15.5511	-25.25	63.127	1.9	68	506	1251.9	2036	1644	2008.3	2327	2142	3
216	4	Pon	892	8.07093	-6.06	8.5901	17.07	1.01449	16.4803	-27.37	62.741	2.9	76	508	1251.8	2034	1754	2060.0	****	2138	4
217	5	Wto	893	8.11059	-5.60	9.0252	16.50	1.01435	17.4321	-28.31	62.207	3.9	84	510	1251.7	2033	1854	2153.9	003	2134	5
218	6	Śro	894	8.15024	-5.53	9.0641	16.34	1.01420	18.4001	-28.00	61.570	4.9	91	511	1251.6	2031	1939	2248.9	055	2130	6
219	7	Czw	895	8.18590	-5.46	9.1031	16.17	1.01405	19.3643	-25.60	60.878	5.9	96	513	1251.5	2029	2010	2343.2	204	2126	7
220	8	Pią	896	8.22556	-5.38	9.1419	16.00	1.01389	20.3213	-22.34	60.183	6.9	99	515	1251.4	2027	2031	*****	325	2122	8
221	9	Sob	897	8.26521	-5.29	9.1807	15.43	1.01374	21.2548	-17.54	59.534	0.1	100	516	1251.2	2025	2047	035.6	452	2118	9
222	10	Nie	898	8.30487	-5.20	9.2155	15.25	1.01358	22.1725	-12.14	58.970	1.1	99	518	1251.1	2023	2059	125.9	619	2114	10
223	11	Pon	899	8.34452	-5.11	9.2542	15.08	1.01342	23.0734	-5.54	58.518	2.1	95	520	1250.9	2021	2109	214.2	746	2110	11
224	12	Wto	900	8.38418	-5.01	9.2928	14.50	1.01325	23.5710	0.48	58.192	3.1	88	521	1250.8	2019	2119	301.4	912	2106	12
225	13	Śro	901	8.42383	-4.50	9.3314	14.31	1.01308	0.4717	7.30	57.990	4.1	80	523	1250.6	2017	2130	348.8	1039	2103	13
226	14	Czw	902	8.46349	-4.39	9.3659	14.13	1.01291	1.3906	13.52	57.904	5.1	70	525	1250.4	2015	2142	437.6	1209	2059	14
227	15	Pią	903	8.50314	-4.27	9.4044	13.54	1.01274	2.3338	19.31	57.919	6.1	59	527	1250.2	2013	2159	529.1	1341	2055	15
228	16	Sob	904	8.54280	-4.15	9.4428	13.35	1.01256	3.3133	24.04	58.021	0.2	48	528	1250.0	2010	2224	624.2	1513	2051	16
229	17	Nie	905	8.58245	-4.02	9.4812	13.16	1.01238	4.3242	27.10	58.200	1.2	36	530	1249.8	2008	2303	723.1	1640	2047	17
230	18	Pon	906	9.02211	-3.48	9.5155	12.57	1.01220	5.3554	28.32	58.453	2.2	26	532	1249.6	2006	****	824.7	1753	2043	18
231	19	Wto	907	9.06176	-3.35	9.5538	12.37	1.01201	6.3906	28.04	58.778	3.2	17	533	1249.3	2004	000	926.6	1844	2039	19
232	20	Śro	908	9.10142	-3.21	9.5921	12.17	1.01181	7.4006	25.51	59.179	4.2	9	535	1249.1	2002	115	1026.3	1918	2035	20
233	21	Czw	909	9.14108	-3.06	10.0302	11.57	1.01162	8.3725	22.11	59.653	5.2	4	537	1248.8	2000	241	1121.9	1940	2031	21
234	22	Pią	910	9.18073	-2.51	10.0644	11.37	1.01141	9.3034	17.25	60.193	6.2	1	539	1248.6	1957	408	1212.9	1955	2027	22
235	23	Sob	911	9.22039	-2.35	10.1025	11.17	1.01121	10.1954	11.56	60.783	0.2	0	540	1248.3	1955	533	1259.7	2006	2023	23
236	24	Nie	912	9.26004	-2.19	10.1405	10.56	1.01100	11.0617	6.03	61.393	1.2	1	542	1248.1	1953	653	1343.3	2015	2019	24
237	25	Pon	913	9.29570	-2.03	10.1746	10.36	1.01078	11.5043	0.03	61.990	2.2	5	544	1247.8	1951	810	1424.8	2023	2015	25
238	26	Wto	914	9.33535	-1.46	10.2125	10.15	1.01056	12.3416	-5.50	62.532	3.2	10	545	1247.5	1948	925	1505.5	2031	2011	26
239	27	Śro	915	9.37501	-1.29	10.2505	9.54	1.01033	13.1755	-11.24	62.977	4.2	16	547	1247.2	1946	1039	1546.4	2040	2007	27
240	28	Czw	916	9.41466	-1.11	10.2844	9.33	1.01010	14.0235	-16.30	63.284	5.2	24	549	1246.9	1944	1154	1628.6	2052	2004	28
241	29	Pią	917	9.45432	-0.53	10.3222	9.11	1.00987	14.4905	-20.56	63.422	6.2	33	551	1246.6	1942	1310	1712.9	2106	2000	29
242	30	Sob	918	9.49397	-0.35	10.3600	8.50	1.00963	15.3760	-24.31	63.369	7.2	42	552	1246.3	1939	1426	1700.0	2127	1956	30
243	31	Nie	919	9.53363	-0.16	10.3938	8.28	1.00940	16.2934	-27.06	63.116	0.1	51	554	1246.0	1937	1539	1850.0	2157	1952	31

Fazy Księżycyca [Dm, h.mm]:      1kw 1, 14.41      Pełn 9, 9.55      3kw 16, 7.12      Now 23, 8.06      1kw 31, 8.25

# SIERPIEŃ 2025 (c.d.)

Świty, zmierychy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	1.45	23.53	5.28	20.01	1.58	18.25	9.40	22.06	2.37	19.17	22.18	10.11	23.57	16.01	22.12	10.16	20.42	4.15		
	8.791	17.90	8.653	13.34	6.104	21.94	11.806	1.93	6.855	22.83	0.162	-1.54	3.923	20.14	0.158	-0.44	20.386	-23.28	20.65718	1
3	1.58	23.41	5.11	19.51	2.00	18.28	9.39	21.60	2.31	19.10	22.10	10.02	23.49	15.54	22.04	10.08	20.34	4.07		
	8.919	17.38	8.562	13.86	6.271	21.99	11.881	1.41	6.886	22.80	0.158	-1.58	3.927	20.15	0.156	-0.46	20.382	-23.29	20.78860	3
5	2.09	23.30	4.55	19.42	2.02	18.30	9.39	21.54	2.25	19.04	22.02	9.54	23.42	15.46	21.56	10.00	20.26	3.58		
	9.048	16.84	8.484	14.44	6.439	22.01	11.956	0.90	6.916	22.76	0.153	-1.61	3.931	20.16	0.154	-0.47	20.379	-23.30	20.92003	5
7	2.19	23.20	4.40	19.34	2.05	18.32	9.38	21.48	2.19	18.58	21.54	9.46	23.34	15.39	21.48	9.52	20.18	3.50		
	9.175	16.29	8.426	15.03	6.606	21.99	12.031	0.38	6.946	22.72	0.149	-1.65	3.934	20.17	0.153	-0.48	20.376	-23.31	21.05145	7
9	2.28	23.11	4.27	19.28	2.07	18.34	9.37	21.42	2.14	18.51	21.46	9.37	23.26	15.31	21.40	9.44	20.10	3.42		
	9.302	15.72	8.392	15.63	6.774	21.93	12.107	-0.14	6.976	22.69	0.144	-1.69	3.937	20.18	0.150	-0.50	20.373	-23.33	21.18287	9
11	2.37	23.03	4.15	19.23	2.10	18.35	9.37	21.35	2.08	18.45	21.38	9.29	23.18	15.24	21.32	9.36	20.02	3.34		
	9.428	15.13	8.387	16.18	6.943	21.83	12.183	-0.66	7.006	22.65	0.139	-1.73	3.940	20.19	0.148	-0.52	20.370	-23.34	21.31429	11
13	2.45	22.54	4.06	19.20	2.13	18.36	9.36	21.29	2.02	18.39	21.30	9.21	23.11	15.16	21.24	9.28	19.54	3.26		
	9.554	14.52	8.413	16.65	7.111	21.69	12.259	-1.18	7.035	22.61	0.133	-1.78	3.943	20.20	0.146	-0.53	20.367	-23.35	21.44571	13
15	2.52	22.46	3.59	19.18	2.17	18.37	9.36	21.23	1.56	18.32	21.22	9.12	23.03	15.08	21.16	9.20	19.46	3.18		
	9.679	13.90	8.472	17.03	7.280	21.51	12.336	-1.70	7.064	22.57	0.127	-1.82	3.946	20.21	0.144	-0.55	20.364	-23.36	21.57712	15
17	2.59	22.38	3.55	19.17	2.21	18.38	9.35	21.17	1.50	18.26	21.14	9.04	22.55	15.01	21.08	9.12	19.38	3.10		
	9.803	13.27	8.564	17.29	7.449	21.28	12.413	-2.22	7.093	22.53	0.121	-1.87	3.948	20.21	0.141	-0.57	20.361	-23.37	21.70855	17
19	3.06	22.31	3.54	19.17	2.25	18.38	9.35	21.11	1.44	18.19	21.06	8.55	22.47	14.53	21.00	9.04	19.30	3.01		
	9.927	12.62	8.687	17.40	7.617	21.02	12.490	-2.74	7.121	22.48	0.114	-1.92	3.950	20.22	0.139	-0.58	20.358	-23.39	21.83997	19
21	3.12	22.23	3.55	19.18	2.29	18.38	9.34	21.05	1.39	18.13	20.58	8.47	22.40	14.45	20.52	8.56	19.22	2.53		
	10.051	11.96	8.840	17.35	7.785	20.72	12.568	-3.27	7.149	22.44	0.107	-1.98	3.952	20.23	0.136	-0.60	20.355	-23.40	21.97139	21
23	3.19	22.16	3.60	19.19	2.34	18.38	9.34	20.59	1.33	18.06	20.50	8.38	22.32	14.37	20.45	8.47	19.14	2.45		
	10.174	11.28	9.018	17.11	7.953	20.38	12.645	-3.79	7.177	22.40	0.100	-2.03	3.954	20.23	0.133	-0.62	20.352	-23.41	22.10281	23
25	3.25	22.09	4.07	19.21	2.39	18.37	9.34	20.53	1.27	17.60	20.42	8.29	22.24	14.30	20.37	8.39	19.06	2.37		
	10.296	10.59	9.220	16.67	8.120	20.01	12.724	-4.31	7.204	22.36	0.092	-2.08	3.956	20.24	0.131	-0.64	20.349	-23.42	22.23423	25
27	3.31	22.02	4.16	19.22	2.44	18.37	9.33	20.47	1.21	17.53	20.34	8.21	22.16	14.22	20.29	8.31	18.58	2.29		
	10.418	9.90	9.440	16.04	8.287	19.59	12.802	-4.84	7.231	22.31	0.085	-2.14	3.957	20.24	0.128	-0.66	20.346	-23.43	22.36564	27
29	3.36	21.56	4.27	19.23	2.49	18.36	9.33	20.41	1.15	17.46	20.26	8.12	22.08	14.14	20.21	8.23	18.50	2.21		
	10.539	9.19	9.673	15.22	8.453	19.14	12.881	-5.36	7.257	22.27	0.077	-2.20	3.958	20.24	0.125	-0.68	20.344	-23.44	22.49706	29
31	3.42	21.49	4.40	19.24	2.54	18.34	9.33	20.35	1.09	17.40	20.18	8.03	22.00	14.06	20.13	8.15	18.42	2.13		
	10.661	8.47	9.915	14.23	8.619	18.65	12.961	-5.88	7.283	22.23	0.069	-2.26	3.959	20.24	0.122	-0.70	20.341	-23.44	22.62848	31

# WRZESIEŃ 2025

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
244	1	Pon	920	9.57329	0.03	10.4316	8.06	1.00915	17.2333	-28.27	62.670	1.1	61	556	1245.7	1935	1643	1942.5	2241	1948	1	
245	2	Wto	921	10.01294	0.22	10.4653	7.45	1.00891	18.1914	-28.27	62.055	2.1	70	557	1245.4	1932	1734	2036.5	2343	1944	2	
246	3	Śro	922	10.05260	0.42	10.5030	7.23	1.00866	19.1528	-26.59	61.307	3.1	79	559	1245.0	1930	1810	2130.7	****	1940	3	
247	4	Czw	923	10.09225	1.02	10.5407	7.00	1.00841	20.1107	-24.05	60.480	4.1	87	601	1244.7	1927	1835	2223.8	059	1936	4	
248	5	Pią	924	10.13191	1.22	10.5743	6.38	1.00816	21.0523	-19.52	59.636	5.1	93	603	1244.4	1925	1852	2315.1	223	1932	5	
249	6	Sob	925	10.17156	1.42	11.0119	6.16	1.00791	21.5800	-14.30	58.840	6.1	98	604	1244.0	1923	1906	*****	351	1928	6	
250	7	Nie	926	10.21122	2.03	11.0455	5.53	1.00766	22.4918	-8.16	58.156	7.1	100	606	1243.7	1920	1917	004.7	519	1924	7	
251	8	Pon	927	10.25087	2.24	11.0831	5.31	1.00741	23.4000	-1.31	57.636	0.7	99	608	1243.4	1918	1927	053.3	648	1920	8	
252	9	Wto	928	10.29053	2.45	11.1207	5.08	1.00716	0.3107	5.25	57.311	1.7	96	609	1243.0	1916	1937	141.7	817	1916	9	
253	10	Śro	929	10.33018	3.06	11.1542	4.46	1.00690	1.2344	12.07	57.193	2.7	90	611	1242.7	1913	1950	231.3	948	1912	10	
254	11	Czw	930	10.36584	3.27	11.1918	4.23	1.00665	2.1853	18.10	57.269	3.7	82	613	1242.3	1911	2005	323.2	1122	1908	11	
255	12	Pią	931	10.40549	3.48	11.2253	3.60	1.00639	3.1709	23.08	57.510	4.7	73	614	1241.9	1908	2028	418.5	1257	1905	12	
256	13	Sob	932	10.44515	4.09	11.2628	3.37	1.00613	4.1826	26.39	57.878	5.7	62	616	1241.6	1906	2101	517.3	1428	1901	13	
257	14	Nie	933	10.48481	4.31	11.3003	3.14	1.00587	5.2138	28.26	58.335	6.7	50	618	1241.2	1903	2152	618.8	1546	1857	14	
258	15	Pon	934	10.52446	4.52	11.3338	2.51	1.00561	6.2447	28.22	58.844	1.0	39	620	1240.9	1901	2302	720.7	1644	1853	15	
259	16	Wto	935	10.56412	5.14	11.3714	2.28	1.00535	7.2548	26.34	59.381	2.0	29	621	1240.5	1859	****	820.7	1722	1849	16	
260	17	Śro	936	11.00377	5.35	11.4049	2.05	1.00508	8.2311	23.16	59.929	3.0	19	623	1240.2	1856	025	916.8	1746	1845	17	
261	18	Czw	937	11.04343	5.56	11.4424	1.41	1.00482	9.1629	18.50	60.477	4.0	12	625	1239.8	1854	151	1008.3	1803	1841	18	
262	19	Pią	938	11.08308	6.18	11.4759	1.18	1.00455	10.0559	13.35	61.019	5.0	6	626	1239.5	1851	315	1055.5	1815	1837	19	
263	20	Sob	939	11.12274	6.39	11.5134	0.55	1.00428	10.5230	7.52	61.551	6.0	2	628	1239.1	1849	436	1139.4	1824	1833	20	
264	21	Nie	940	11.16239	7.00	11.5510	0.31	1.00400	11.3702	1.55	62.061	7.0	0	630	1238.7	1846	553	1221.4	1832	1829	21	
265	22	Pon	941	11.20205	7.21	11.5845	0.08	1.00372	12.2033	-3.60	62.536	0.6	0	632	1238.4	1844	708	1301.9	1840	1825	22	
266	23	Wto	942	11.24170	7.42	12.0221	-0.15	1.00345	13.0402	-9.41	62.953	1.6	2	633	1238.0	1842	822	1342.6	1849	1821	23	
267	24	Śro	943	11.28136	8.03	12.0556	-0.39	1.00316	13.4823	-14.57	63.286	2.6	6	635	1237.7	1839	937	1424.3	1859	1817	24	
268	25	Czw	944	11.32101	8.24	12.0932	-1.02	1.00288	14.3419	-19.37	63.506	3.6	12	637	1237.3	1837	1053	1507.8	1912	1813	25	
269	26	Pią	945	11.36067	8.45	12.1308	-1.25	1.00259	15.2225	-23.29	63.584	4.6	18	639	1237.0	1834	1209	1553.7	1930	1810	26	
270	27	Sob	946	11.40032	9.05	12.1644	-1.49	1.00230	16.1256	-26.23	63.496	5.6	26	640	1236.7	1832	1323	1642.3	1956	1806	27	
271	28	Nie	947	11.43598	9.25	12.2021	-2.12	1.00201	17.0543	-28.08	63.224	6.6	35	642	1236.3	1830	1431	1733.3	2034	1802	28	
272	29	Pon	948	11.47564	9.45	12.2357	-2.35	1.00172	18.0009	-28.35	62.763	7.6	44	644	1236.0	1827	1526	1825.9	2127	1758	29	
273	30	Wto	949	11.51529	10.05	12.2734	-2.59	1.00143	18.5517	-27.39	62.123	0.4	54	646	1235.7	1825	1608	1919.0	2236	1754	30	

Fazy Księżyca [Dm, h.mm]: Pełn 7, 20.09    3kw 14, 12.33    Now 21, 21.54    1kw 30, 1.54

# WRZESIEŃ 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	3.44	21.46	4.47	19.24	2.57	18.34	9.33	20.32	1.06	17.36	20.14	7.59	21.57	14.02	20.09	8.11	18.38	2.09		
	10.721	8.11	10.038	13.67	8.701	18.39	13.001	-6.14	7.296	22.20	0.064	-2.29	3.959	20.24	0.120	-0.71	20.340	-23.45	22.69419	1
3	3.50	21.39	5.01	19.23	3.03	18.32	9.32	20.27	0.60	17.30	20.06	7.50	21.49	13.55	20.01	8.03	18.30	2.01		
	10.842	7.38	10.285	12.46	8.866	17.85	13.081	-6.66	7.322	22.16	0.056	-2.35	3.959	20.25	0.117	-0.73	20.338	-23.46	22.82561	3
5	3.55	21.33	5.16	19.23	3.08	18.30	9.32	20.21	0.54	17.23	19.58	7.42	21.41	13.47	19.53	7.54	18.22	1.53		
	10.962	6.64	10.533	11.13	9.030	17.27	13.161	-7.18	7.346	22.12	0.047	-2.41	3.960	20.25	0.114	-0.75	20.335	-23.46	22.95704	5
7	3.60	21.27	5.30	19.21	3.14	18.28	9.32	20.15	0.48	17.16	19.50	7.33	21.33	13.39	19.45	7.46	18.15	1.45		
	11.082	5.89	10.777	9.70	9.193	16.67	13.242	-7.69	7.371	22.07	0.038	-2.47	3.960	20.25	0.111	-0.77	20.333	-23.47	23.08845	7
9	4.04	21.21	5.45	19.19	3.20	18.26	9.32	20.09	0.42	17.10	19.42	7.24	21.25	13.31	19.37	7.38	18.07	1.37		
	11.202	5.14	11.017	8.21	9.355	16.03	13.324	-8.21	7.395	22.03	0.029	-2.53	3.959	20.25	0.108	-0.80	20.331	-23.48	23.21987	9
11	4.09	21.14	5.60	19.17	3.26	18.23	9.32	20.03	0.36	17.03	19.34	7.15	21.17	13.23	19.29	7.30	17.59	1.29		
	11.322	4.38	11.252	6.67	9.516	15.35	13.406	-8.72	7.418	21.98	0.020	-2.59	3.959	20.24	0.104	-0.82	20.329	-23.49	23.35128	11
13	4.14	21.09	6.14	19.15	3.32	18.21	9.31	19.58	0.29	16.56	19.25	7.07	21.09	13.15	19.21	7.22	17.51	1.21		
	11.441	3.62	11.482	5.11	9.677	14.65	13.488	-9.23	7.441	21.94	0.011	-2.66	3.958	20.24	0.101	-0.84	20.327	-23.49	23.48270	13
15	4.18	21.03	6.28	19.12	3.38	18.18	9.31	19.52	0.23	16.49	19.17	6.58	21.01	13.07	19.13	7.14	17.43	1.13		
	11.561	2.85	11.706	3.52	9.836	13.93	13.571	-9.74	7.463	21.90	0.002	-2.72	3.957	20.24	0.098	-0.86	20.325	-23.50	23.61412	15
17	4.23	20.57	6.42	19.08	3.44	18.15	9.31	19.46	0.17	16.42	19.09	6.49	20.54	12.59	19.05	7.05	17.35	1.05		
	11.680	2.08	11.925	1.93	9.995	13.17	13.654	-10.24	7.485	21.85	23.992	-2.78	3.956	20.24	0.094	-0.88	20.323	-23.50	23.74554	17
19	4.27	20.51	6.56	19.05	3.50	18.12	9.31	19.40	0.11	16.35	19.01	6.40	20.46	12.51	18.57	6.57	17.27	0.57		
	11.800	1.30	12.139	0.35	10.153	12.39	13.738	-10.74	7.506	21.81	23.983	-2.85	3.954	20.23	0.091	-0.91	20.322	-23.51	23.87696	19
21	4.31	20.46	7.09	19.01	3.57	18.09	9.31	19.35	0.04	16.28	18.53	6.32	20.38	12.43	18.49	6.49	17.19	0.49		
	11.919	0.52	12.349	-1.22	10.311	11.59	13.823	-11.23	7.527	21.77	23.973	-2.91	3.953	20.23	0.088	-0.93	20.320	-23.51	0.00838	21
23	4.35	20.40	7.21	18.57	4.03	18.06	9.31	19.29	23.54	16.21	18.45	6.23	20.30	12.35	18.41	6.41	17.11	0.41		
	12.039	-0.25	12.554	-2.76	10.467	10.76	13.908	-11.73	7.547	21.73	23.964	-2.97	3.951	20.22	0.084	-0.95	20.319	-23.52	0.13980	23
25	4.40	20.35	7.34	18.53	4.09	18.03	9.31	19.24	23.48	16.14	18.37	6.14	20.22	12.27	18.34	6.33	17.03	0.33		
	12.159	-1.03	12.756	-4.29	10.623	9.91	13.994	-12.22	7.567	21.69	23.955	-3.03	3.949	20.21	0.081	-0.97	20.317	-23.52	0.27122	25
27	4.44	20.29	7.46	18.49	4.16	17.59	9.31	19.18	23.41	16.07	18.29	6.05	20.14	12.19	18.26	6.24	16.55	0.25		
	12.279	-1.81	12.954	-5.78	10.779	9.05	14.080	-12.70	7.585	21.65	23.945	-3.10	3.946	20.21	0.077	-0.99	20.316	-23.52	0.40264	27
29	4.48	20.24	7.57	18.45	4.22	17.56	9.32	19.13	23.35	16.00	18.21	5.57	20.06	12.11	18.18	6.16	16.47	0.17		
	12.399	-2.59	13.150	-7.24	10.933	8.16	14.167	-13.18	7.604	21.62	23.936	-3.16	3.944	20.20	0.074	-1.02	20.315	-23.53	0.53406	29

# PAŹDZIERNIK 2025

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2460																			
274	1	Śro	950	11.55495	10.24	12.3111	-3.22	1.00114	19.5005	-25.20	61.328	1.4	64	647	1235.3	1822	1636	2011.4	2355	1750	1	
275	2	Czw	951	11.59460	10.43	12.3449	-3.45	1.00085	20.4349	-21.41	60.422	2.4	74	649	1235.0	1820	1656	2102.5	****	1746	2	
276	3	Pią	952	12.03426	11.02	12.3826	-4.08	1.00056	21.3611	-16.50	59.464	3.4	82	651	1234.7	1818	1711	2152.1	120	1742	3	
277	4	Sob	953	12.07391	11.21	12.4204	-4.31	1.00027	22.2726	-11.01	58.526	4.4	90	653	1234.4	1815	1723	2240.7	247	1738	4	
278	5	Nie	954	12.11357	11.39	12.4543	-4.55	0.99998	23.1812	-4.27	57.686	5.4	96	654	1234.1	1813	1734	2329.2	415	1734	5	
279	6	Pon	955	12.15322	11.57	12.4921	-5.18	0.99969	0.0928	2.30	57.019	6.4	99	656	1233.8	1811	1744	****	544	1730	6	
280	7	Wto	956	12.19288	12.14	12.5300	-5.41	0.99940	1.0220	9.27	56.584	0.3	100	658	1233.5	1808	1756	018.8	716	1726	7	
281	8	Śro	957	12.23253	12.31	12.5640	-6.03	0.99912	1.5753	15.58	56.416	1.3	98	700	1233.2	1806	1810	110.9	851	1722	8	
282	9	Czw	958	12.27219	12.48	13.0020	-6.26	0.99883	2.5653	21.32	56.519	2.3	93	701	1232.9	1804	1830	206.4	1029	1718	9	
283	10	Pią	959	12.31184	13.04	13.0400	-6.49	0.99855	3.5920	25.41	56.867	3.3	85	703	1232.7	1801	1900	306.0	1206	1714	10	
284	11	Sob	960	12.35150	13.20	13.0741	-7.12	0.99827	5.0405	28.03	57.409	4.3	76	705	1232.4	1759	1946	408.9	1333	1711	11	
285	12	Nie	961	12.39116	13.35	13.1123	-7.34	0.99799	6.0901	28.29	58.086	5.3	65	707	1232.2	1757	2052	512.8	1439	1707	12	
286	13	Pon	962	12.43081	13.50	13.1505	-7.56	0.99771	7.1142	27.03	58.834	6.3	54	709	1231.9	1754	2212	614.9	1524	1703	13	
287	14	Wto	963	12.47047	14.04	13.1847	-8.19	0.99743	8.1025	24.03	59.599	0.7	43	710	1231.7	1752	2338	712.8	1552	1659	14	
288	15	Śro	964	12.51012	14.17	13.2230	-8.41	0.99716	9.0436	19.51	60.339	1.7	33	712	1231.5	1750	****	805.8	1610	1655	15	
289	16	Czw	965	12.54578	14.30	13.2614	-9.03	0.99688	9.5435	14.49	61.027	2.7	23	714	1231.2	1748	103	853.9	1623	1651	16	
290	17	Pią	966	12.58543	14.42	13.2958	-9.25	0.99660	10.4116	9.15	61.646	3.7	15	716	1231.0	1745	223	938.3	1633	1647	17	
291	18	Sob	967	13.02509	14.54	13.3343	-9.47	0.99633	11.2542	3.25	62.191	4.7	9	718	1230.8	1743	340	1020.1	1642	1643	18	
292	19	Nie	968	13.06474	15.05	13.3728	-10.08	0.99605	12.0858	-2.26	62.659	5.7	4	720	1230.7	1741	455	1100.6	1650	1639	19	
293	20	Pon	969	13.10440	15.15	13.4114	-10.30	0.99578	12.5205	-8.09	63.049	6.7	1	721	1230.5	1739	609	1140.8	1659	1635	20	
294	21	Wto	970	13.14405	15.25	13.4501	-10.51	0.99550	13.3557	-13.30	63.359	7.7	0	723	1230.3	1736	723	1222.1	1708	1631	21	
295	22	Śro	971	13.18371	15.34	13.4849	-11.13	0.99522	14.2121	-18.20	63.582	0.9	1	725	1230.2	1734	838	1304.7	1720	1627	22	
296	23	Czw	972	13.22336	15.43	13.5237	-11.34	0.99495	15.0850	-22.25	63.705	1.9	3	727	1230.0	1732	954	1349.7	1736	1623	23	
297	24	Pią	973	13.26302	15.50	13.5626	-11.55	0.99467	15.5841	-25.35	63.712	2.9	7	729	1229.9	1730	1109	1437.4	1759	1619	24	
298	25	Sob	974	13.30268	15.58	14.0015	-12.15	0.99439	16.5045	-27.39	63.586	3.9	13	731	1229.8	1728	1219	1527.4	1833	1615	25	
299	26	Nie	975	13.34233	16.04	14.0405	-12.36	0.99412	17.4424	-28.27	63.309	4.9	20	733	1229.7	1726	1319	1619.1	1920	1612	26	
299	26	Nie	975	14.34332	16.04	14.0415	-12.37	0.99411	17.4639	-28.27	63.294	4.9	20	633	1129.7	1626	1219	1519.1	1820	1512	26	
300	27	Pon	976	14.38297	16.10	14.0806	-12.57	0.99383	18.4057	-27.52	62.848	5.9	29	635	1129.6	1624	1304	1611.3	1922	1508	27	
301	28	Wto	977	14.42263	16.14	14.1158	-13.17	0.99356	19.3450	-25.57	62.237	6.9	38	636	1129.5	1622	1337	1702.8	2036	1504	28	
302	29	Śro	978	14.46229	16.19	14.1550	-13.37	0.99329	20.2734	-22.45	61.472	7.9	48	638	1129.4	1620	1400	1753.0	2157	1500	29	
303	30	Czw	979	14.50194	16.22	14.1944	-13.56	0.99302	21.1851	-18.24	60.579	0.8	58	640	1129.4	1618	1416	1841.5	2320	1456	30	
304	31	Pią	980	14.54160	16.24	14.2338	-14.16	0.99275	22.0854	-13.04	59.604	1.8	68	642	1129.3	1616	1429	1928.9	****	1452	31	

Fazy Księżyca [Dm, h.mm]: Pełn 7, 5.48      3kw 13, 20.13      Now 21, 14.25      Now 21, 13.25      1kw 29, 17.21

# PAŹDZIERNIK 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.51	20.19	8.09	18.41	4.28	17.52	9.32	19.07	23.28	15.53	18.13	5.48	19.58	12.03	18.10	6.08	16.40	0.09		
	12.520	-3.37	13.343	-8.66	11.087	7.26	14.254	-13.65	7.621	21.58	23.926	-3.22	3.941	20.19	0.071	-1.04	20.314	-23.53	0.66548	1
3	4.55	20.14	8.20	18.37	4.35	17.48	9.32	19.02	23.22	15.46	18.05	5.39	19.50	11.55	18.02	5.60	16.32	23.57		
	12.641	-4.14	13.534	-10.04	11.241	6.35	14.342	-14.12	7.638	21.54	23.917	-3.28	3.938	20.18	0.067	-1.06	20.314	-23.53	0.79690	3
5	4.59	20.09	8.31	18.33	4.41	17.44	9.32	18.57	23.15	15.39	17.56	5.30	19.42	11.47	17.54	5.52	16.24	23.49		
	12.762	-4.91	13.723	-11.38	11.394	5.42	14.431	-14.58	7.654	21.51	23.908	-3.33	3.935	20.17	0.064	-1.08	20.313	-23.53	0.92831	5
7	5.03	20.04	8.42	18.29	4.47	17.41	9.32	18.51	23.08	15.32	17.48	5.22	19.34	11.39	17.46	5.44	16.16	23.41		
	12.883	-5.68	13.910	-12.67	11.547	4.48	14.520	-15.03	7.669	21.48	23.899	-3.39	3.932	20.16	0.061	-1.10	20.312	-23.53	1.05973	7
9	5.07	19.59	8.52	18.25	4.54	17.37	9.33	18.46	23.01	15.25	17.40	5.13	19.26	11.31	17.38	5.35	16.08	23.33		
	13.005	-6.44	14.095	-13.91	11.700	3.53	14.610	-15.48	7.684	21.45	23.890	-3.45	3.928	20.15	0.058	-1.12	20.312	-23.53	1.19115	9
11	5.10	19.54	9.03	18.21	5.00	17.33	9.33	18.41	22.55	15.17	17.32	5.04	19.18	11.22	17.30	5.27	16.00	23.25		
	13.128	-7.19	14.279	-15.10	11.852	2.57	14.701	-15.92	7.698	21.42	23.882	-3.50	3.924	20.14	0.054	-1.14	20.312	-23.53	1.32257	11
13	5.14	19.50	9.13	18.17	5.06	17.29	9.33	18.36	22.48	15.10	17.24	4.56	19.10	11.14	17.22	5.19	15.52	23.17		
	13.251	-7.94	14.461	-16.24	12.004	1.60	14.792	-16.36	7.711	21.39	23.873	-3.55	3.921	20.13	0.051	-1.16	20.312	-23.53	1.45399	13
15	5.17	19.45	9.22	18.13	5.13	17.25	9.33	18.31	22.41	15.03	17.16	4.47	19.02	11.06	17.14	5.11	15.44	23.10		
	13.375	-8.68	14.642	-17.32	12.157	0.63	14.884	-16.79	7.724	21.36	23.865	-3.60	3.917	20.12	0.048	-1.18	20.312	-23.53	1.58541	15
17	5.21	19.41	9.32	18.09	5.19	17.21	9.34	18.26	22.34	14.55	17.08	4.39	18.54	10.58	17.06	5.03	15.36	23.02		
	13.499	-9.42	14.821	-18.34	12.309	-0.34	14.977	-17.20	7.735	21.34	23.857	-3.65	3.912	20.11	0.045	-1.20	20.312	-23.53	1.71683	17
19	5.25	19.37	9.41	18.06	5.26	17.17	9.34	18.21	22.27	14.48	16.60	4.30	18.46	10.50	16.58	4.55	15.29	22.54		
	13.625	-10.14	14.997	-19.29	12.461	-1.32	15.070	-17.61	7.746	21.32	23.849	-3.70	3.908	20.09	0.042	-1.22	20.312	-23.53	1.84825	19
21	5.28	19.33	9.49	18.02	5.32	17.13	9.34	18.16	22.20	14.41	16.52	4.21	18.38	10.41	16.50	4.47	15.21	22.46		
	13.750	-10.86	15.170	-20.18	12.614	-2.30	15.164	-18.02	7.756	21.30	23.842	-3.74	3.903	20.08	0.039	-1.24	20.312	-23.53	1.97966	21
23	5.31	19.29	9.57	17.59	5.39	17.09	9.35	18.12	22.12	14.33	16.44	4.13	18.30	10.33	16.42	4.38	15.13	22.38		
	13.877	-11.56	15.339	-20.99	12.767	-3.28	15.259	-18.41	7.765	21.28	23.835	-3.78	3.899	20.07	0.036	-1.26	20.313	-23.52	2.11108	23
25	5.35	19.25	10.04	17.56	5.45	17.06	9.35	18.07	22.05	14.26	16.36	4.04	18.22	10.25	16.34	4.30	15.05	22.30		
	14.004	-12.25	15.503	-21.72	12.920	-4.25	15.355	-18.79	7.773	21.26	23.828	-3.82	3.894	20.05	0.033	-1.28	20.314	-23.52	2.24250	25
27	4.38	18.21	9.10	16.53	4.52	16.02	8.36	17.03	20.58	13.18	15.28	2.56	17.14	9.17	15.26	3.22	13.57	21.23		
	14.135	-12.95	15.663	-22.38	13.077	-5.24	15.453	-19.17	7.781	21.25	23.821	-3.86	3.889	20.04	0.031	-1.29	20.315	-23.52	2.37393	27
29	4.42	18.17	9.15	16.50	4.59	15.58	8.36	16.58	20.51	13.11	15.19	2.47	17.06	9.08	15.18	3.14	13.49	21.15		
	14.264	-13.61	15.811	-22.93	13.231	-6.20	15.550	-19.53	7.788	21.23	23.815	-3.90	3.884	20.02	0.028	-1.31	20.316	-23.51	2.50535	29
31	4.45	18.14	9.19	16.47	5.05	15.54	8.36	16.54	20.43	13.03	15.11	2.39	16.57	9.00	15.11	3.06	13.42	21.07		
	14.394	-14.27	15.947	-23.38	13.386	-7.16	15.647	-19.89	7.793	21.22	23.809	-3.93	3.878	20.01	0.026	-1.33	20.317	-23.51	2.63677	31

# LISTOPAD 2025

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Sob	981	14.58125	16.26	14.2732	-14.35	0.99248	22.5824	-6.57	58.608	2.8	78	644	1129.3	1614	1440	2016.0	044	1448	1
306	2	Nie	982	15.02091	16.27	14.3128	-14.54	0.99222	23.4818	-0.17	57.668	3.8	87	646	1129.3	1612	1450	2103.9	210	1444	2
307	3	Pon	983	15.06056	16.27	14.3524	-15.13	0.99196	0.3948	6.37	56.868	4.8	93	648	1129.3	1610	1501	2154.1	338	1440	3
308	4	Wto	984	15.10022	16.27	14.3921	-15.31	0.99171	1.3408	13.19	56.286	5.8	98	650	1129.3	1608	1514	2248.0	511	1436	4
309	5	Śro	985	15.13587	16.25	14.4319	-15.50	0.99146	2.3222	19.22	55.982	6.8	100	651	1129.3	1606	1531	2346.7	648	1432	5
310	6	Czw	986	15.17553	16.23	14.4718	-16.07	0.99121	3.3456	24.11	55.989	0.9	99	653	1129.4	1605	1557	*****	829	1428	6
311	7	Pią	987	15.21519	16.20	14.5118	-16.25	0.99097	4.4103	27.18	56.299	1.9	94	655	1129.4	1603	1636	050.0	1004	1424	7
312	8	Sob	988	15.25484	16.16	14.5518	-16.43	0.99073	5.4830	28.23	56.874	2.9	88	657	1129.5	1601	1736	156.2	1123	1420	8
313	9	Nie	989	15.29450	16.11	14.5920	-16.60	0.99050	6.5420	27.27	57.647	3.9	79	659	1129.6	1600	1854	301.9	1219	1417	9
314	10	Pon	990	15.33415	16.06	15.0322	-17.17	0.99026	7.5605	24.44	58.541	4.9	69	701	1129.7	1558	2021	403.9	1253	1413	10
315	11	Wto	991	15.37381	15.59	15.0725	-17.33	0.99004	8.5242	20.41	59.477	5.9	58	703	1129.8	1556	2149	500.3	1316	1409	11
316	12	Śro	992	15.41347	15.52	15.1129	-17.49	0.98981	9.4423	15.43	60.390	0.2	48	705	1129.9	1555	2312	551.0	1331	1405	12
317	13	Czw	993	15.45312	15.43	15.1534	-18.05	0.98959	10.3204	10.12	61.229	1.2	37	706	1130.0	1553	****	637.1	1342	1401	13
318	14	Pią	994	15.49278	15.34	15.1939	-18.21	0.98937	11.1659	4.25	61.960	2.2	28	708	1130.2	1552	030	719.7	1351	1357	14
319	15	Sob	995	15.53243	15.24	15.2346	-18.36	0.98916	12.0018	-1.25	62.567	3.2	20	710	1130.3	1550	145	800.5	1359	1353	15
320	16	Nie	996	15.57209	15.14	15.2753	-18.51	0.98894	12.4312	-7.07	63.042	4.2	13	712	1130.5	1549	259	840.5	1408	1349	16
321	17	Pon	997	16.01174	15.02	15.3202	-19.06	0.98873	13.2639	-12.29	63.391	5.2	7	714	1130.7	1547	412	921.0	1417	1345	17
322	18	Wto	998	16.05140	14.49	15.3611	-19.20	0.98852	14.1132	-17.23	63.621	6.2	3	715	1130.9	1546	526	1002.9	1428	1341	18
323	19	Śro	999	16.09105	14.36	15.4021	-19.34	0.98832	14.5831	-21.35	63.741	7.2	1	717	1131.1	1545	641	1047.1	1443	1337	19
324	20	Czw	000	16.13071	14.22	15.4431	-19.48	0.98811	15.4756	-24.56	63.757	0.2	0	719	1131.4	1543	757	1133.9	1504	1333	20
325	21	Pią	001	16.17037	14.07	15.4843	-20.01	0.98791	16.3941	-27.12	63.672	1.2	1	721	1131.6	1542	909	1223.6	1534	1329	21
326	22	Sob	002	16.21002	13.51	15.5255	-20.14	0.98771	17.3309	-28.14	63.482	2.2	4	722	1131.9	1541	1012	1314.8	1617	1325	22
327	23	Nie	003	16.24568	13.34	15.5709	-20.26	0.98751	18.2721	-27.58	63.182	3.2	9	724	1132.2	1540	1102	1406.9	1715	1321	23
328	24	Pon	004	16.28534	13.17	16.0122	-20.39	0.98732	19.2106	-26.21	62.763	4.2	15	726	1132.5	1539	1138	1458.3	1825	1318	24
329	25	Wto	005	16.32499	12.59	16.0537	-20.50	0.98713	20.1332	-23.29	62.220	5.2	23	728	1132.8	1538	1203	1548.3	1942	1314	25
330	26	Śro	006	16.36465	12.40	16.0952	-21.02	0.98694	21.0412	-19.30	61.553	6.2	32	729	1133.1	1537	1221	1636.2	2103	1310	26
331	27	Czw	007	16.40430	12.20	16.1409	-21.13	0.98676	21.5315	-14.34	60.772	7.2	41	731	1133.4	1536	1235	1722.5	2224	1306	27
332	28	Pią	008	16.44396	12.00	16.1825	-21.23	0.98657	22.4116	-8.52	59.901	0.2	52	732	1133.7	1535	1246	1807.8	2346	1302	28
333	29	Sob	009	16.48361	11.39	16.2243	-21.33	0.98640	23.2911	-2.36	58.982	1.2	62	734	1134.1	1534	1256	1853.4	****	1258	29
334	30	Nie	010	16.52327	11.18	16.2701	-21.43	0.98623	0.1811	3.58	58.070	2.2	73	735	1134.5	1533	1306	1940.5	109	1254	30

Fazy Księżyca [Dm, h.mm]: Pełn 5, 14.19    3kw 12, 6.28    Now 20, 7.47    1kw 28, 7.59



# LISTOPAD 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.47	18.12	9.20	16.45	5.09	15.52	8.36	16.51	20.39	12.59	15.07	2.35	16.53	8.56	15.07	3.02	13.38	21.03		
	14.459	-14.59	16.010	-23.56	13.464	-7.63	15.696	-20.06	7.796	21.22	23.806	-3.95	3.876	20.00	0.024	-1.33	20.317	-23.51	2.70248	1
3	4.50	18.09	9.21	16.42	5.15	15.49	8.37	16.47	20.32	12.52	14.59	2.27	16.45	8.48	14.59	2.54	13.30	20.56		
	14.590	-15.21	16.122	-23.84	13.620	-8.57	15.795	-20.39	7.800	21.21	23.800	-3.98	3.870	19.98	0.022	-1.35	20.318	-23.50	2.83389	3
5	4.53	18.06	9.20	16.38	5.22	15.45	8.37	16.43	20.24	12.44	14.51	2.18	16.37	8.39	14.51	2.46	13.22	20.48		
	14.722	-15.83	16.213	-23.99	13.777	-9.50	15.894	-20.72	7.803	21.21	23.795	-4.00	3.865	19.97	0.020	-1.36	20.320	-23.50	2.96531	5
7	4.56	18.03	9.16	16.34	5.28	15.41	8.37	16.39	20.16	12.36	14.43	2.10	16.29	8.31	14.43	2.38	13.14	20.40		
	14.855	-16.42	16.276	-23.99	13.935	-10.41	15.994	-21.03	7.806	21.21	23.791	-4.03	3.859	19.95	0.017	-1.38	20.321	-23.49	3.09673	7
9	4.60	17.60	9.08	16.29	5.35	15.38	8.38	16.35	20.09	12.28	14.35	2.02	16.21	8.23	14.35	2.30	13.06	20.32		
	14.989	-17.00	16.305	-23.82	14.093	-11.31	16.095	-21.33	7.807	21.21	23.786	-4.05	3.854	19.93	0.015	-1.39	20.323	-23.48	3.22816	9
11	5.03	17.57	8.57	16.24	5.42	15.35	8.38	16.31	20.01	12.21	14.27	1.54	16.13	8.14	14.27	2.22	12.59	20.25		
	15.124	-17.55	16.294	-23.46	14.253	-12.19	16.197	-21.61	7.808	21.21	23.782	-4.07	3.848	19.92	0.013	-1.40	20.325	-23.48	3.35958	11
13	5.06	17.55	8.42	16.17	5.49	15.31	8.38	16.28	19.53	12.13	14.19	1.45	16.05	8.06	14.19	2.14	12.51	20.17		
	15.259	-18.09	16.239	-22.88	14.414	-13.05	16.299	-21.89	7.808	21.22	23.779	-4.08	3.843	19.90	0.012	-1.41	20.327	-23.47	3.49100	13
15	5.09	17.52	8.22	16.09	5.55	15.28	8.38	16.24	19.45	12.05	14.11	1.37	15.57	7.58	14.11	2.06	12.43	20.09		
	15.396	-18.61	16.138	-22.07	14.576	-13.89	16.401	-22.15	7.806	21.23	23.776	-4.10	3.837	19.88	0.010	-1.42	20.329	-23.46	3.62242	15
17	5.12	17.50	7.58	15.60	6.02	15.25	8.38	16.21	19.37	11.57	14.03	1.29	15.49	7.49	14.03	1.58	12.35	20.02		
	15.534	-19.10	15.996	-21.03	14.740	-14.71	16.505	-22.39	7.804	21.24	23.773	-4.11	3.831	19.86	0.008	-1.43	20.331	-23.45	3.75383	17
19	5.15	17.48	7.32	15.50	6.09	15.23	8.38	16.17	19.29	11.49	13.55	1.21	15.41	7.41	13.55	1.50	12.27	19.54		
	15.672	-19.57	15.828	-19.83	14.904	-15.50	16.609	-22.62	7.801	21.25	23.771	-4.12	3.825	19.85	0.007	-1.44	20.334	-23.45	3.88525	19
21	5.17	17.46	7.05	15.40	6.16	15.20	8.38	16.14	19.20	11.41	13.47	1.13	15.33	7.33	13.47	1.42	12.20	19.46		
	15.812	-20.02	15.652	-18.58	15.070	-16.27	16.714	-22.84	7.797	21.27	23.769	-4.12	3.819	19.83	0.005	-1.45	20.336	-23.44	4.01668	21
23	5.20	17.45	6.40	15.30	6.23	15.17	8.38	16.11	19.12	11.33	13.40	1.05	15.25	7.24	13.39	1.34	12.12	19.39		
	15.952	-20.44	15.493	-17.41	15.237	-17.01	16.819	-23.04	7.792	21.28	23.767	-4.12	3.814	19.81	0.004	-1.45	20.339	-23.43	4.14810	23
25	5.23	17.43	6.19	15.21	6.29	15.15	8.38	16.08	19.04	11.25	13.32	0.57	15.16	7.16	13.32	1.26	12.04	19.31		
	16.094	-20.84	15.369	-16.46	15.406	-17.71	16.925	-23.23	7.786	21.30	23.766	-4.12	3.808	19.79	0.003	-1.46	20.341	-23.42	4.27952	25
27	5.26	17.42	6.03	15.12	6.36	15.13	8.38	16.05	18.55	11.17	13.24	0.49	15.08	7.08	13.24	1.18	11.56	19.23		
	16.236	-21.21	15.292	-15.81	15.575	-18.39	17.031	-23.40	7.779	21.33	23.766	-4.12	3.802	19.78	0.002	-1.46	20.344	-23.41	4.41094	27
29	5.28	17.41	5.51	15.05	6.42	15.11	8.38	16.03	18.47	11.09	13.16	0.42	15.00	6.59	13.16	1.10	11.49	19.16		
	16.379	-21.56	15.264	-15.49	15.747	-19.03	17.138	-23.56	7.772	21.35	23.766	-4.11	3.796	19.76	0.001	-1.47	20.347	-23.40	4.54236	29

# GRUDZIEŃ 2025

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →									Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2461																		
335	1	Pon	011	16.56292	10.55	16.3120	-21.52	0.98606	1.0936	10.34	57.238	3.2	83	737	1134.8	1532	1317	2030.8	236	1250	1
336	2	Wto	012	17.00258	10.33	16.3539	-22.01	0.98590	2.0444	16.47	56.565	4.2	91	738	1135.2	1532	1332	2125.7	408	1246	2
337	3	Śro	013	17.04223	10.09	16.3959	-22.10	0.98574	3.0436	22.07	56.123	5.2	96	740	1135.6	1531	1353	2226.1	546	1242	3
338	4	Czw	014	17.08189	9.45	16.4420	-22.18	0.98559	4.0916	26.02	55.967	6.2	100	741	1136.0	1531	1424	2331.5	724	1238	4
339	5	Pią	015	17.12155	9.21	16.4841	-22.26	0.98544	5.1716	28.03	56.121	0.5	100	742	1136.4	1530	1514	*****	854	1234	5
340	6	Sob	016	17.16120	8.55	16.5303	-22.33	0.98530	6.2542	27.57	56.574	1.5	97	744	1136.8	1530	1626	039.3	1003	1230	6
341	7	Nie	017	17.20086	8.30	16.5725	-22.40	0.98517	7.3119	25.49	57.279	2.5	91	745	1137.3	1529	1753	145.4	1048	1226	7
342	8	Pon	018	17.24052	8.04	17.0147	-22.46	0.98504	8.3156	22.05	58.166	3.5	83	746	1137.7	1529	1925	246.8	1117	1222	8
343	9	Wto	019	17.28017	7.37	17.0611	-22.52	0.98492	9.2705	17.13	59.149	4.5	74	747	1138.1	1529	2053	342.0	1135	1219	9
344	10	Śro	020	17.31583	7.10	17.1034	-22.57	0.98480	10.1723	11.40	60.149	5.5	64	749	1138.6	1528	2215	431.5	1148	1215	10
345	11	Czw	021	17.35548	6.42	17.1458	-23.02	0.98469	11.0403	5.49	61.091	6.5	54	750	1139.0	1528	2333	516.5	1158	1211	11
346	12	Pią	022	17.39514	6.15	17.1923	-23.07	0.98458	11.4826	-0.06	61.924	0.6	44	751	1139.5	1528	****	558.6	1207	1207	12
347	13	Sob	023	17.43479	5.46	17.2348	-23.11	0.98448	12.3146	-5.53	62.608	1.6	35	752	1140.0	1528	047	639.3	1216	1203	13
348	14	Nie	024	17.47445	5.18	17.2813	-23.14	0.98439	13.1510	-11.21	63.127	2.6	26	753	1140.5	1528	201	719.7	1225	1159	14
349	15	Pon	025	17.51410	4.49	17.3238	-23.17	0.98429	13.5940	-16.20	63.476	3.6	18	753	1140.9	1528	315	801.2	1236	1155	15
350	16	Wto	026	17.55376	4.20	17.3704	-23.20	0.98420	14.4603	-20.42	63.662	4.6	11	754	1141.4	1528	430	844.6	1249	1151	16
351	17	Śro	027	17.59342	3.50	17.4130	-23.22	0.98412	15.3450	-24.14	63.703	5.6	6	755	1141.9	1529	545	930.5	1308	1147	17
352	18	Czw	028	18.03307	3.21	17.4556	-23.24	0.98404	16.2607	-26.44	63.617	6.6	2	756	1142.4	1529	658	1019.3	1335	1143	18
353	19	Pią	029	18.07273	2.51	17.5022	-23.25	0.98396	17.1927	-28.04	63.425	7.6	0	756	1142.9	1529	805	1110.3	1414	1139	19
354	20	Sob	030	18.11239	2.21	17.5448	-23.26	0.98388	18.1353	-28.04	63.143	0.4	0	757	1143.4	1530	859	1202.6	1508	1135	20
355	21	Nie	031	18.15204	1.51	17.5915	-23.26	0.98381	19.0811	-26.43	62.784	1.4	2	758	1143.9	1530	939	1254.8	1616	1131	21
356	22	Pon	032	18.19170	1.21	18.0341	-23.26	0.98374	20.0114	-24.05	62.355	2.4	5	758	1144.4	1531	1007	1345.5	1732	1127	22
357	23	Wto	033	18.23136	0.52	18.0808	-23.26	0.98368	20.5223	-20.18	61.857	3.4	11	759	1144.9	1531	1027	1434.1	1852	1124	23
358	24	Śro	034	18.27101	0.22	18.1234	-23.24	0.98362	21.4132	-15.34	61.292	4.4	18	759	1145.4	1532	1042	1520.6	2013	1120	24
359	25	Czw	035	18.31067	-0.08	18.1701	-23.23	0.98356	22.2909	-10.04	60.662	5.4	26	759	1145.9	1533	1053	1605.4	2133	1116	25
360	26	Pią	036	18.35032	-0.38	18.2127	-23.21	0.98351	23.1602	-4.03	59.975	6.4	36	759	1146.4	1533	1103	1649.7	2253	1112	26
361	27	Sob	037	18.38598	-1.07	18.2553	-23.18	0.98347	0.0316	2.17	59.249	7.4	46	800	1146.9	1534	1113	1734.6	****	1108	27
362	28	Nie	038	18.42563	-1.37	18.3019	-23.15	0.98343	0.5207	8.40	58.515	0.7	57	800	1147.4	1535	1123	1821.6	016	1104	28
363	29	Pon	039	18.46529	-2.06	18.3444	-23.12	0.98339	1.4354	14.48	57.817	1.7	68	800	1147.8	1536	1135	1912.2	142	1100	29
364	30	Wto	040	18.50494	-2.35	18.3910	-23.08	0.98336	2.3952	20.18	57.212	2.7	79	800	1148.3	1537	1152	2007.8	313	1056	30
365	31	Śro	041	18.54460	-3.03	18.4335	-23.04	0.98334	3.4043	24.40	56.762	3.7	88	800	1148.8	1538	1217	2108.9	449	1052	31

Fazy Księżyca [Dm, h.mm]: Pełn 5, 0.14    3kw 11, 21.52    Nów 20, 2.43    1kw 27, 20.10

# GRUDZIEŃ 2025 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.31	17.40	5.44	14.58	6.49	15.10	8.37	16.00	18.38	11.00	13.08	0.34	14.52	6.51	13.08	1.02	11.41	19.08		
	16.522	-21.87	15.283	-15.48	15.919	-19.64	17.245	-23.70	7.763	21.38	23.766	-4.10	3.791	19.74	0.000	-1.47	20.350	-23.39	4.67378	1
3	5.33	17.39	5.41	14.52	6.55	15.08	8.37	15.58	18.30	10.52	13.00	0.26	14.44	6.43	13.00	0.54	11.33	19.01		
	16.666	-22.16	15.341	-15.72	16.093	-20.21	17.353	-23.83	7.754	21.41	23.767	-4.09	3.785	19.72	24.000	-1.47	20.353	-23.38	4.80520	3
5	5.35	17.38	5.42	14.47	7.02	15.07	8.36	15.55	18.21	10.44	12.52	0.18	14.36	6.34	12.52	0.46	11.25	18.53		
	16.811	-22.43	15.432	-16.15	16.268	-20.74	17.461	-23.93	7.743	21.44	23.768	-4.07	3.779	19.71	23.999	-1.48	20.356	-23.37	4.93663	5
7	5.37	17.38	5.44	14.43	7.08	15.07	8.36	15.53	18.12	10.36	12.44	0.11	14.28	6.26	12.44	0.38	11.17	18.45		
	16.957	-22.66	15.549	-16.72	16.444	-21.24	17.570	-24.02	7.732	21.47	23.770	-4.05	3.774	19.69	23.999	-1.48	20.359	-23.36	5.06805	7
9	5.39	17.38	5.49	14.39	7.14	15.06	8.35	15.51	18.03	10.27	12.36	0.03	14.20	6.18	12.36	0.30	11.10	18.38		
	17.103	-22.86	15.688	-17.39	16.621	-21.69	17.679	-24.10	7.720	21.51	23.772	-4.03	3.769	19.67	23.999	-1.48	20.363	-23.35	5.19947	9
11	5.41	17.38	5.55	14.36	7.19	15.06	8.34	15.50	17.54	10.19	12.29	23.51	14.12	6.10	12.29	0.22	11.02	18.30		
	17.250	-23.03	15.843	-18.11	16.800	-22.10	17.789	-24.16	7.708	21.54	23.774	-4.01	3.763	19.66	23.999	-1.47	20.366	-23.34	5.33089	11
13	5.43	17.38	6.02	14.33	7.25	15.06	8.33	15.48	17.45	10.11	12.21	23.44	14.04	6.01	12.21	0.14	10.54	18.23		
	17.397	-23.18	16.012	-18.85	16.979	-22.47	17.899	-24.20	7.694	21.58	23.777	-3.98	3.758	19.64	23.999	-1.47	20.370	-23.33	5.46231	13
15	5.44	17.38	6.10	14.31	7.30	15.07	8.32	15.47	17.36	10.02	12.13	23.36	13.56	5.53	12.13	0.07	10.47	18.15		
	17.544	-23.29	16.191	-19.59	17.160	-22.79	18.009	-24.22	7.680	21.62	23.781	-3.95	3.753	19.62	23.999	-1.47	20.374	-23.31	5.59373	15
17	5.46	17.39	6.18	14.30	7.35	15.08	8.31	15.45	17.27	9.54	12.05	23.29	13.48	5.45	12.05	23.55	10.39	18.08		
	17.692	-23.37	16.379	-20.32	17.341	-23.06	18.119	-24.22	7.665	21.66	23.784	-3.92	3.748	19.61	24.000	-1.47	20.377	-23.30	5.72515	17
19	5.47	17.40	6.27	14.29	7.40	15.09	8.29	15.44	17.18	9.45	11.57	23.22	13.40	5.36	11.57	23.47	10.31	18.00		
	17.839	-23.42	16.573	-21.01	17.523	-23.29	18.230	-24.21	7.650	21.70	23.789	-3.88	3.743	19.59	0.000	-1.46	20.381	-23.29	5.85658	19
21	5.48	17.41	6.35	14.28	7.44	15.11	8.28	15.43	17.09	9.37	11.50	23.14	13.32	5.28	11.49	23.39	10.23	17.52		
	17.987	-23.44	16.774	-21.65	17.705	-23.47	18.340	-24.18	7.634	21.74	23.793	-3.84	3.738	19.58	0.001	-1.45	20.385	-23.28	5.98800	21
23	5.49	17.42	6.44	14.29	7.49	15.13	8.26	15.42	16.60	9.28	11.42	23.07	13.24	5.20	11.41	23.32	10.16	17.45		
	18.135	-23.43	16.980	-22.24	17.888	-23.60	18.451	-24.13	7.617	21.79	23.798	-3.80	3.734	19.56	0.002	-1.45	20.389	-23.27	6.11943	23
25	5.50	17.43	6.53	14.29	7.52	15.15	8.25	15.42	16.51	9.20	11.34	22.60	13.15	5.12	11.34	23.24	10.08	17.37		
	18.283	-23.38	17.190	-22.77	18.071	-23.69	18.562	-24.06	7.600	21.83	23.804	-3.76	3.729	19.55	0.003	-1.44	20.393	-23.25	6.25085	25
27	5.50	17.44	7.01	14.31	7.56	15.18	8.23	15.41	16.42	9.11	11.26	22.52	13.07	5.03	11.26	23.16	10.00	17.30		
	18.431	-23.30	17.404	-23.23	18.255	-23.72	18.674	-23.98	7.582	21.88	23.810	-3.71	3.725	19.54	0.004	-1.43	20.397	-23.24	6.38226	27
29	5.51	17.46	7.09	14.33	7.59	15.21	8.21	15.41	16.32	9.02	11.18	22.45	12.59	4.55	11.18	23.08	9.53	17.22		
	18.579	-23.20	17.622	-23.62	18.438	-23.71	18.785	-23.88	7.565	21.92	23.816	-3.67	3.721	19.52	0.005	-1.42	20.401	-23.23	6.51368	29
31	5.51	17.48	7.17	14.36	8.01	15.25	8.19	15.40	16.23	8.54	11.11	22.38	12.51	4.47	11.10	23.01	9.45	17.15		
	18.726	-23.06	17.842	-23.93	18.621	-23.65	18.896	-23.76	7.546	21.97	23.823	-3.62	3.717	19.51	0.006	-1.41	20.406	-23.22	6.64511	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2025

Nowy Rok	Śro	1 styczeń	Dzień Dziecka	Nie	1 czerwiec
Najświętszej Maryi Panny Rodzicielki	Śro	1 styczeń	Dzień Dziękczynienia	Nie	1 czerwiec
Objawienia Pańskiego (Trzech Króli)	Pon	6 styczeń	Zesłania Ducha Świętego	Nie	8 czerwiec
Juliański Nowy Rok	Wto	14 styczeń	Trójcy Najświętszej	Nie	15 czerwiec
Dzień Babci	Wto	21 styczeń	Boże Ciało	Czw	19 czerwiec
Dzień Dziadka	Śro	22 styczeń	Dzień Ojca	Pon	23 czerwiec
Ofiarowania Pańskiego	Nie	2 luty	Noc Świętojańska	Pon	23 czerwiec
Matki Boskiej Gromnicznej	Nie	2 luty	Najświętszego Serca Pana Jezusa	Pią	27 czerwiec
Walentynki	Pią	14 luty	Św. Piotra i Pawła	Nie	29 czerwiec
Święto UMK	Śro	19 luty	Wniebowzięcia N.M.P.	Pią	15 sierpień
Tłusty czwartek	Czw	27 luty	Święto Wojska Polskiego	Pią	15 sierpień
Środa Popielcowa	Śro	5 marzec	Dzień Solidarności i Wolności	Nie	31 sierpień
Dzień Kobiet	Sob	8 marzec	Dzień Programisty	Sob	13 wrzesień
Narodowy Dzień Życia	Pon	24 marzec	Dożynki – Święto Plonów	Wto	23 wrzesień
Niedziela Palmowa	Nie	13 kwiecień	Dzień Papieski	Nie	12 październik
Niedziela Wielkanocna	Nie	20 kwiecień	Dzień Edukacji Narodowej	Wto	14 październik
Niedziela Miłosierdzia Bożego	Nie	27 kwiecień	Dzień Papieża Jana Pawła II	Czw	16 październik
Święto Pracy	Czw	1 maj	Wszystkich Świętych	Sob	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Pią	2 maj	Zaduszki	Nie	2 listopad
Najświętsza Maryja Królowa Polski	Sob	3 maj	Święto Niepodległości	Wto	11 listopad
Święto Konstytucji 3 Maja	Sob	3 maj	Pierwsza niedziela Adwentu	Nie	30 listopad
Dzień Polskiej Niezapominajki	Czw	15 maj	Niepokalane Poczęcie N.M.P.	Pon	8 grudzień
Dzień Matki	Pon	26 maj	Boże Narodzenie	Czw	25 grudzień
Wniebowstąpienia Pańskiego	Czw	29 maj	Sylwester	Śro	31 grudzień

# Kalendarz astronomiczny 2026

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2", Księżyc 10", Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!

*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2026 KWIECIEŃ 5**

Dla całego roku przyjęto: TDT – UT = 72 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 15.46**, Lato **VI 21, 9.25**, Jesień **IX 23, 1.05**, Zima **XII 21, 21.50**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **29 marca do 25 października 2026 r.**

### Oznaczenia:

Dr — dzień 2026 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2026

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
1	1	Czw	042	18.58426	-3.32	18.4760	-22.59	0.98332	4.4602	27.27	56.524	4.7	94	800	1149.3	1539	1256	2214.5	622	1048	1	
2	2	Pią	043	19.02391	-3.60	18.5224	-22.53	0.98331	5.5351	28.15	56.539	5.7	99	759	1149.7	1540	1356	2321.5	741	1044	2	
3	3	Sob	044	19.06357	-4.27	18.5649	-22.48	0.98330	7.0104	26.59	56.821	0.0	100	759	1150.2	1541	1517	*****	838	1040	3	
4	4	Nie	045	19.10323	-4.54	19.0112	-22.42	0.98330	8.0448	23.50	57.358	1.0	98	759	1150.7	1543	1649	026.1	914	1036	4	
5	5	Pon	046	19.14288	-5.21	19.0536	-22.35	0.98331	9.0329	19.16	58.103	2.0	94	759	1151.1	1544	1822	125.6	937	1032	5	
6	6	Wto	047	19.18254	-5.48	19.0959	-22.28	0.98333	9.5704	13.47	58.991	3.0	88	758	1151.5	1545	1950	219.2	953	1029	6	
7	7	Śro	048	19.22219	-6.13	19.1421	-22.20	0.98335	10.4624	7.49	59.944	4.0	80	758	1152.0	1547	2112	307.7	1004	1025	7	
8	8	Czw	049	19.26185	-6.39	19.1843	-22.12	0.98337	11.3244	1.43	60.884	5.0	71	757	1152.4	1548	2230	352.4	1014	1021	8	
9	9	Pią	050	19.30150	-7.04	19.2305	-22.04	0.98340	12.1720	-4.17	61.744	6.0	62	757	1152.8	1549	2346	434.7	1023	1017	9	
10	10	Sob	051	19.34116	-7.28	19.2726	-21.55	0.98344	13.0125	-9.57	62.469	7.0	52	756	1153.2	1551	****	516.0	1032	1013	10	
11	11	Nie	052	19.38081	-7.52	19.3146	-21.46	0.98349	13.4603	-15.09	63.022	0.8	42	755	1153.6	1552	101	557.6	1042	1009	11	
12	12	Pon	053	19.42047	-8.15	19.3606	-21.36	0.98353	14.3208	-19.43	63.384	1.8	33	755	1154.0	1554	216	640.6	1055	1005	12	
13	13	Wto	054	19.46012	-8.38	19.4025	-21.26	0.98359	15.2020	-23.29	63.552	2.8	25	754	1154.4	1555	331	725.7	1111	1001	13	
14	14	Śro	055	19.49578	-9.00	19.4444	-21.16	0.98364	16.1057	-26.16	63.537	3.8	17	753	1154.7	1557	446	813.5	1135	957	14	
15	15	Czw	056	19.53544	-9.22	19.4902	-21.05	0.98371	17.0348	-27.55	63.361	4.8	10	752	1155.1	1559	555	903.9	1210	953	15	
16	16	Pią	057	19.57509	-9.42	19.5319	-20.53	0.98377	17.5810	-28.16	63.055	5.8	5	751	1155.5	1600	654	956.0	1259	949	16	
17	17	Sob	058	20.01475	-10.02	19.5736	-20.42	0.98384	18.5255	-27.15	62.651	6.8	2	750	1155.8	1602	739	1048.7	1403	945	17	
18	18	Nie	059	20.05441	-10.22	20.0152	-20.29	0.98391	19.4651	-24.54	62.181	7.8	0	749	1156.1	1604	811	1140.4	1518	941	18	
19	19	Pon	060	20.09406	-10.40	20.0607	-20.17	0.98399	20.3908	-21.19	61.674	0.6	0	748	1156.4	1605	833	1230.5	1638	937	19	
20	20	Wto	061	20.13372	-10.58	20.1021	-20.04	0.98407	21.2924	-16.42	61.151	1.6	3	747	1156.7	1607	849	1318.3	1800	933	20	
21	21	Śro	062	20.17337	-11.16	20.1435	-19.51	0.98415	22.1751	-11.16	60.626	2.6	7	745	1157.0	1609	902	1404.1	1921	930	21	
22	22	Czw	063	20.21303	-11.32	20.1848	-19.37	0.98424	23.0510	-5.17	60.108	3.6	13	744	1157.3	1611	912	1448.7	2042	926	22	
23	23	Pią	064	20.25268	-11.48	20.2300	-19.23	0.98433	23.5215	1.02	59.601	4.6	21	743	1157.5	1613	921	1533.3	2204	922	23	
24	24	Sob	065	20.29234	-12.02	20.2711	-19.09	0.98442	0.4014	7.24	59.106	5.6	31	742	1157.8	1614	931	1619.0	2328	918	24	
25	25	Nie	066	20.33200	-12.16	20.3122	-18.54	0.98452	1.3021	13.31	58.633	6.6	42	740	1158.0	1616	942	1707.3	****	914	25	
26	26	Pon	067	20.37165	-12.29	20.3532	-18.39	0.98463	2.2346	19.04	58.196	0.3	53	739	1158.2	1618	957	1759.5	056	910	26	
27	27	Wto	068	20.41131	-12.42	20.3941	-18.24	0.98473	3.2121	23.39	57.819	1.3	64	737	1158.4	1620	1017	1856.5	227	906	27	
28	28	Śro	069	20.45096	-12.53	20.4349	-18.08	0.98485	4.2313	26.51	57.535	2.3	75	736	1158.6	1622	1048	1958.1	359	902	28	
29	29	Czw	070	20.49062	-13.04	20.4756	-17.52	0.98497	5.2814	28.18	57.381	3.3	84	734	1158.8	1624	1137	2102.6	522	858	29	
30	30	Pią	071	20.53028	-13.14	20.5202	-17.35	0.98509	6.3408	27.48	57.391	4.3	92	733	1159.0	1626	1247	2206.8	626	854	30	
31	31	Sob	072	20.56593	-13.23	20.5608	-17.19	0.98522	7.3811	25.24	57.589	5.3	97	731	1159.1	1628	1414	2307.9	710	850	31	

Fazy Księżyca [Dm, h.mm]: Pełn 3, 11.03    3kw 10, 16.48    Now 18, 20.52    1kw 26, 5.47

# STYCZEŃ 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.49	7.21	14.38	8.02	15.27	8.17	15.40	16.18	8.50	11.07	22.34	12.47	4.43	11.06	22.57	9.41	17.11		
	18.800	-22.98	17.953	-24.06	18.713	-23.60	18.952	-23.69	7.537	21.99	23.826	-3.59	3.715	19.51	0.007	-1.41	20.408	-23.21	6.71082	1
3	5.51	17.50	7.28	14.42	8.05	15.31	8.15	15.40	16.09	8.41	10.59	22.27	12.39	4.35	10.58	22.49	9.33	17.04		
	18.947	-22.80	18.177	-24.25	18.896	-23.46	19.063	-23.54	7.518	22.04	23.834	-3.54	3.711	19.49	0.009	-1.39	20.412	-23.20	6.84224	3
5	5.51	17.53	7.34	14.47	8.06	15.35	8.13	15.40	15.60	8.32	10.51	22.20	12.31	4.27	10.50	22.41	9.26	16.56		
	19.093	-22.58	18.404	-24.35	19.078	-23.28	19.174	-23.38	7.499	22.08	23.841	-3.48	3.708	19.48	0.010	-1.38	20.416	-23.18	6.97367	5
7	5.51	17.55	7.40	14.52	8.07	15.40	8.10	15.40	15.50	8.24	10.44	22.13	12.23	4.19	10.43	22.34	9.18	16.49		
	19.239	-22.34	18.632	-24.37	19.260	-23.05	19.285	-23.20	7.480	22.13	23.849	-3.42	3.705	19.47	0.012	-1.37	20.421	-23.17	7.10509	7
9	5.50	17.57	7.45	14.59	8.08	15.45	8.07	15.41	15.41	8.15	10.36	22.06	12.15	4.10	10.35	22.26	9.10	16.41		
	19.385	-22.07	18.863	-24.30	19.441	-22.77	19.396	-23.00	7.461	22.17	23.858	-3.36	3.702	19.46	0.014	-1.35	20.425	-23.16	7.23650	9
11	5.49	17.59	7.50	15.06	8.09	15.50	8.04	15.41	15.32	8.06	10.28	21.59	12.07	4.02	10.27	22.18	9.02	16.34		
	19.529	-21.76	19.094	-24.14	19.621	-22.44	19.506	-22.78	7.442	22.22	23.866	-3.30	3.699	19.46	0.016	-1.34	20.430	-23.14	7.36792	11
13	5.48	18.02	7.54	15.14	8.09	15.56	8.02	15.41	15.22	7.58	10.21	21.52	11.59	3.54	10.19	22.11	8.55	16.26		
	19.674	-21.43	19.327	-23.88	19.800	-22.07	19.617	-22.55	7.423	22.26	23.875	-3.23	3.696	19.45	0.019	-1.32	20.434	-23.13	7.49934	13
15	5.47	18.05	7.58	15.23	8.09	16.02	7.58	15.42	15.13	7.49	10.13	21.45	11.52	3.46	10.11	22.03	8.47	16.19		
	19.817	-21.08	19.561	-23.53	19.978	-21.65	19.727	-22.29	7.404	22.30	23.885	-3.16	3.694	19.44	0.021	-1.31	20.439	-23.12	7.63077	15
17	5.46	18.07	8.00	15.33	8.08	16.08	7.55	15.43	15.04	7.40	10.05	21.38	11.44	3.38	10.04	21.55	8.39	16.11		
	19.960	-20.69	19.796	-23.07	20.155	-21.19	19.837	-22.03	7.385	22.34	23.894	-3.10	3.691	19.43	0.024	-1.29	20.443	-23.11	7.76219	17
19	5.44	18.10	8.03	15.43	8.07	16.14	7.52	15.43	14.54	7.31	9.58	21.31	11.36	3.30	9.56	21.48	8.32	16.04		
	20.102	-20.28	20.031	-22.52	20.331	-20.69	19.947	-21.74	7.366	22.39	23.904	-3.02	3.689	19.43	0.026	-1.27	20.448	-23.09	7.89361	19
21	5.43	18.13	8.04	15.54	8.06	16.20	7.48	15.44	14.45	7.23	9.50	21.24	11.28	3.22	9.48	21.40	8.24	15.56		
	20.243	-19.84	20.267	-21.87	20.506	-20.15	20.056	-21.44	7.348	22.43	23.915	-2.95	3.688	19.42	0.029	-1.25	20.452	-23.08	8.02503	21
23	5.41	18.16	8.05	16.05	8.05	16.27	7.45	15.45	14.36	7.14	9.43	21.17	11.20	3.14	9.40	21.33	8.16	15.49		
	20.383	-19.38	20.502	-21.12	20.679	-19.57	20.165	-21.12	7.330	22.46	23.925	-2.88	3.686	19.42	0.032	-1.23	20.457	-23.07	8.15645	23
25	5.39	18.19	8.05	16.18	8.03	16.33	7.41	15.46	14.27	7.06	9.35	21.11	11.12	3.06	9.32	21.25	8.09	15.41		
	20.523	-18.90	20.738	-20.26	20.851	-18.95	20.274	-20.79	7.312	22.50	23.936	-2.80	3.685	19.41	0.035	-1.21	20.461	-23.05	8.28787	25
27	5.36	18.22	8.05	16.30	8.01	16.40	7.37	15.47	14.17	6.57	9.27	21.04	11.04	2.58	9.25	21.17	8.01	15.34		
	20.661	-18.39	20.972	-19.30	21.022	-18.29	20.382	-20.44	7.294	22.54	23.948	-2.72	3.684	19.41	0.038	-1.19	20.466	-23.04	8.41929	27
29	5.34	18.25	8.04	16.43	7.59	16.46	7.34	15.48	14.08	6.48	9.20	20.57	10.56	2.50	9.17	21.10	7.53	15.26		
	20.799	-17.86	21.206	-18.25	21.191	-17.60	20.490	-20.08	7.278	22.57	23.959	-2.64	3.683	19.41	0.041	-1.17	20.470	-23.03	8.55071	29
31	5.32	18.28	8.03	16.57	7.57	16.53	7.30	15.49	13.59	6.40	9.12	20.50	10.48	2.42	9.09	21.02	7.46	15.19		
	20.936	-17.31	21.438	-17.09	21.359	-16.88	20.598	-19.70	7.261	22.61	23.971	-2.56	3.683	19.41	0.044	-1.15	20.475	-23.02	8.68214	31

# LUTY 2026

Piwnice, CA UMK			←———— Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) —————→								..... Czas strefowy [hhmm.] .....											
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
32	1	Nie	073	21.00559	-13.31	21.0013	-17.02	0.98536	8.3823	21.23	57.982	6.3	100	730	1159.3	1630	1547	*****	738	846	1	
33	2	Pon	074	21.04524	-13.39	21.0417	-16.44	0.98550	9.3402	16.13	58.554	0.5	100	728	1159.4	1632	1718	004.1	757	842	2	
34	3	Wto	075	21.08490	-13.45	21.0820	-16.27	0.98565	10.2529	10.19	59.269	1.5	97	726	1159.5	1634	1844	055.3	810	838	3	
35	4	Śro	076	21.12455	-13.51	21.1222	-16.09	0.98580	11.1340	4.07	60.072	2.5	92	724	1159.6	1635	2005	142.3	821	834	4	
36	5	Czw	077	21.16421	-13.56	21.1624	-15.51	0.98596	11.5944	-2.06	60.900	3.5	86	723	1159.7	1637	2124	226.5	830	831	5	
37	6	Pią	078	21.20386	-14.00	21.2024	-15.32	0.98613	12.4449	-8.03	61.689	4.5	78	721	1159.7	1639	2241	309.1	839	827	6	
38	7	Sob	079	21.24352	-14.04	21.2424	-15.14	0.98629	13.3000	-13.32	62.377	5.5	69	719	1159.8	1641	2357	351.4	848	823	7	
39	8	Nie	080	21.28317	-14.06	21.2824	-14.55	0.98647	14.1611	-18.25	62.916	6.5	60	717	1159.8	1643	****	434.5	900	819	8	
40	9	Pon	081	21.32283	-14.08	21.3222	-14.36	0.98665	15.0404	-22.30	63.272	7.5	51	715	1159.9	1645	114	519.2	915	815	9	
41	10	Wto	082	21.36249	-14.09	21.3620	-14.16	0.98683	15.5406	-25.37	63.426	0.9	41	713	1159.9	1647	230	606.2	936	811	10	
42	11	Śro	083	21.40214	-14.09	21.4017	-13.56	0.98702	16.4616	-27.38	63.374	1.9	32	711	1159.9	1649	342	655.6	1005	807	11	
43	12	Czw	084	21.44180	-14.09	21.4413	-13.37	0.98721	17.4006	-28.24	63.132	2.9	24	710	1159.9	1651	445	747.0	1048	803	12	
44	13	Pią	085	21.48145	-14.08	21.4808	-13.16	0.98740	18.3442	-27.49	62.727	3.9	16	708	1159.9	1653	535	839.5	1146	759	13	
45	14	Sob	086	21.52111	-14.06	21.5203	-12.56	0.98759	19.2860	-25.53	62.196	4.9	9	706	1159.8	1655	612	931.7	1258	755	14	
46	15	Nie	087	21.56077	-14.03	21.5557	-12.35	0.98779	20.2204	-22.40	61.585	5.9	4	703	1159.8	1657	638	1022.7	1417	751	15	
47	16	Pon	088	22.00042	-14.00	21.5950	-12.15	0.98799	21.1325	-18.18	60.941	6.9	1	701	1159.7	1659	656	1111.8	1540	747	16	
48	17	Wto	089	22.04008	-13.56	22.0343	-11.54	0.98820	22.0305	-12.60	60.310	7.9	0	659	1159.7	1701	709	1159.1	1703	743	17	
49	18	Śro	090	22.07573	-13.51	22.0734	-11.33	0.98840	22.5132	-7.01	59.729	1.0	1	657	1159.6	1703	720	1245.0	1826	739	18	
50	19	Czw	091	22.11539	-13.46	22.1126	-11.11	0.98861	23.3933	-0.37	59.224	2.0	4	655	1159.5	1705	730	1330.5	1949	736	19	
51	20	Pią	092	22.15504	-13.40	22.1516	-10.50	0.98882	0.2808	5.54	58.811	3.0	10	653	1159.4	1707	740	1416.6	2114	732	20	
52	21	Sob	093	22.19470	-13.33	22.1906	-10.28	0.98903	1.1823	12.13	58.492	4.0	18	651	1159.3	1709	751	1504.8	2242	728	21	
53	22	Nie	094	22.23435	-13.26	22.2255	-10.06	0.98924	2.1122	17.58	58.263	5.0	27	649	1159.2	1710	804	1556.1	****	724	22	
54	23	Pon	095	22.27401	-13.18	22.2643	-9.44	0.98946	3.0753	22.48	58.114	6.0	38	647	1159.0	1712	822	1651.4	013	720	23	
55	24	Wto	096	22.31366	-13.09	22.3031	-9.22	0.98968	4.0807	26.19	58.041	7.0	49	644	1158.9	1714	849	1750.8	144	716	24	
56	25	Śro	097	22.35332	-12.60	22.3419	-8.60	0.98990	5.1116	28.11	58.041	0.9	61	642	1158.7	1716	930	1853.0	310	712	25	
57	26	Czw	098	22.39297	-12.50	22.3805	-8.37	0.99013	6.1529	28.12	58.119	1.9	72	640	1158.6	1718	1031	1955.8	419	708	26	
58	27	Pią	099	22.43263	-12.39	22.4151	-8.15	0.99036	7.1828	26.23	58.284	2.9	81	638	1158.4	1720	1151	2056.4	509	704	27	
59	28	Sob	100	22.47229	-12.28	22.4537	-7.52	0.99059	8.1821	22.57	58.549	3.9	89	635	1158.2	1722	1320	2152.9	541	700	28	

Fazy Księżyca [Dm, h.mm]: Pełn 1, 23.09    3kw 9, 13.43    Nów 17, 13.01    1kw 24, 13.27



# LUTY 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	18.30	8.02	17.03	7.55	16.57	7.28	15.50	13.55	6.35	9.08	20.47	10.44	2.39	9.05	20.59	7.42	15.15		
	21.004	-17.03	21.554	-16.48	21.442	-16.50	20.652	-19.51	7.253	22.62	23.977	-2.52	3.682	19.41	0.046	-1.13	20.477	-23.01	8.74785	1
3	5.27	18.33	7.60	17.17	7.53	17.03	7.23	15.51	13.46	6.27	9.01	20.40	10.36	2.31	8.57	20.51	7.34	15.07		
	21.139	-16.45	21.782	-15.18	21.608	-15.73	20.759	-19.11	7.238	22.65	23.989	-2.44	3.682	19.41	0.049	-1.11	20.482	-23.00	8.87927	3
5	5.24	18.37	7.57	17.31	7.50	17.10	7.19	15.52	13.37	6.18	8.53	20.34	10.28	2.23	8.50	20.44	7.26	14.60		
	21.273	-15.85	22.007	-13.80	21.772	-14.93	20.865	-18.70	7.223	22.68	0.001	-2.35	3.682	19.41	0.053	-1.09	20.486	-22.99	9.01069	5
7	5.21	18.40	7.54	17.45	7.47	17.17	7.15	15.54	13.28	6.10	8.46	20.27	10.21	2.15	8.42	20.36	7.19	14.52		
	21.407	-15.23	22.227	-12.35	21.935	-14.10	20.971	-18.27	7.209	22.71	0.014	-2.27	3.682	19.41	0.057	-1.06	20.490	-22.98	9.14210	7
9	5.18	18.43	7.50	17.58	7.44	17.24	7.11	15.55	13.19	6.01	8.38	20.20	10.13	2.07	8.34	20.28	7.11	14.45		
	21.539	-14.59	22.440	-10.83	22.097	-13.25	21.077	-17.83	7.195	22.74	0.027	-2.18	3.683	19.41	0.060	-1.04	20.495	-22.96	9.27352	9
11	5.15	18.47	7.46	18.11	7.40	17.31	7.06	15.56	13.10	5.53	8.30	20.14	10.05	1.59	8.26	20.21	7.03	14.37		
	21.671	-13.94	22.644	-9.28	22.257	-12.38	21.182	-17.38	7.182	22.76	0.040	-2.09	3.684	19.42	0.064	-1.01	20.499	-22.95	9.40494	11
13	5.11	18.50	7.41	18.24	7.37	17.38	7.02	15.58	13.01	5.45	8.23	20.07	9.57	1.52	8.18	20.13	6.56	14.30		
	21.802	-13.27	22.834	-7.72	22.416	-11.48	21.287	-16.91	7.170	22.78	0.053	-2.00	3.685	19.42	0.068	-0.99	20.504	-22.94	9.53637	13
15	5.08	18.54	7.35	18.34	7.33	17.44	6.57	15.59	12.53	5.36	8.15	20.01	9.49	1.44	8.11	20.06	6.48	14.22		
	21.932	-12.59	23.009	-6.18	22.574	-10.56	21.391	-16.44	7.159	22.81	0.066	-1.91	3.686	19.43	0.072	-0.96	20.508	-22.93	9.66779	15
17	5.04	18.58	7.28	18.44	7.29	17.51	6.52	16.00	12.44	5.28	8.08	19.54	9.41	1.36	8.03	19.59	6.40	14.15		
	22.062	-11.90	23.163	-4.72	22.732	-9.62	21.495	-15.95	7.149	22.83	0.080	-1.82	3.688	19.43	0.076	-0.93	20.512	-22.92	9.79921	17
19	4.60	19.01	7.21	18.51	7.26	17.58	6.48	16.02	12.35	5.20	8.00	19.48	9.34	1.28	7.55	19.51	6.33	14.07		
	22.190	-11.19	23.290	-3.37	22.888	-8.67	21.599	-15.45	7.139	22.84	0.094	-1.73	3.689	19.44	0.080	-0.91	20.516	-22.91	9.93062	19
21	4.56	19.05	7.13	18.55	7.22	18.05	6.43	16.03	12.27	5.11	7.53	19.41	9.26	1.21	7.47	19.44	6.25	13.60		
	22.318	-10.47	23.387	-2.20	23.043	-7.70	21.702	-14.94	7.131	22.86	0.108	-1.63	3.691	19.44	0.084	-0.88	20.520	-22.90	10.06204	21
23	4.52	19.08	7.03	18.56	7.18	18.11	6.38	16.04	12.18	5.03	7.45	19.34	9.18	1.13	7.40	19.36	6.17	13.52		
	22.445	-9.74	23.449	-1.26	23.197	-6.72	21.804	-14.42	7.123	22.88	0.122	-1.54	3.694	19.45	0.088	-0.85	20.525	-22.89	10.19346	23
25	4.48	19.12	6.53	18.53	7.14	18.18	6.33	16.06	12.10	4.55	7.38	19.28	9.10	1.05	7.32	19.29	6.09	13.45		
	22.572	-9.00	23.472	-0.58	23.351	-5.72	21.906	-13.89	7.116	22.89	0.136	-1.44	3.696	19.46	0.093	-0.82	20.529	-22.88	10.32488	25
27	4.43	19.16	6.43	18.46	7.09	18.25	6.28	16.07	12.02	4.47	7.30	19.21	9.03	0.58	7.24	19.21	6.02	13.37		
	22.698	-8.25	23.458	-0.22	23.504	-4.72	22.008	-13.36	7.110	22.90	0.150	-1.35	3.699	19.47	0.097	-0.79	20.532	-22.87	10.45630	27

# MARZEC 2026

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →											Czas strefowy [hhmm.]									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
60	1	Nie	101	22.51194	-12.17	22.4922	-7.30	0.99083	9.1414	18.14	58.921	4.9	95	633	1158.0	1724	1450	2244.9	602	656	1	
61	2	Pon	102	22.55160	-12.05	22.5307	-7.07	0.99107	10.0614	12.38	59.400	5.9	99	631	1157.8	1726	1617	2333.0	617	652	2	
62	3	Wto	103	22.59125	-11.52	22.5651	-6.44	0.99131	10.5506	6.33	59.971	6.9	100	629	1157.6	1728	1740	*****	628	648	3	
63	4	Śro	104	23.03091	-11.39	23.0034	-6.21	0.99156	11.4148	0.19	60.610	1.0	99	626	1157.4	1729	1900	018.1	637	644	4	
64	5	Czw	105	23.07056	-11.26	23.0417	-5.57	0.99181	12.2725	-5.48	61.276	2.0	96	624	1157.2	1731	2018	101.4	646	640	5	
65	6	Pią	106	23.11022	-11.12	23.0800	-5.34	0.99207	13.1255	-11.34	61.924	3.0	91	622	1156.9	1733	2135	144.1	656	637	6	
66	7	Sob	107	23.14587	-10.58	23.1142	-5.11	0.99233	13.5912	-16.45	62.504	4.0	84	619	1156.7	1735	2253	227.3	707	633	7	
67	8	Nie	108	23.18553	-10.43	23.1524	-4.48	0.99259	14.4657	-21.11	62.969	5.0	77	617	1156.5	1737	****	311.8	720	629	8	
68	9	Pon	109	23.22518	-10.28	23.1906	-4.24	0.99286	15.3636	-24.41	63.278	6.0	68	615	1156.2	1739	010	358.3	738	625	9	
69	10	Wto	110	23.26484	-10.13	23.2247	-4.01	0.99313	16.2813	-27.06	63.400	7.0	59	612	1156.0	1741	125	446.9	804	621	10	
70	11	Śro	111	23.30449	-9.57	23.2628	-3.37	0.99340	17.2126	-28.18	63.321	0.1	49	610	1155.7	1742	232	537.5	840	617	11	
71	12	Czw	112	23.34415	-9.41	23.3009	-3.13	0.99367	18.1530	-28.11	63.039	1.1	40	608	1155.4	1744	328	629.3	932	613	12	
72	13	Pią	113	23.38381	-9.25	23.3349	-2.50	0.99394	19.0929	-26.45	62.569	2.1	31	605	1155.2	1746	410	721.3	1037	609	13	
73	14	Sob	114	23.42346	-9.09	23.3729	-2.26	0.99422	20.0233	-24.00	61.943	3.1	22	603	1154.9	1748	439	812.3	1153	605	14	
74	15	Nie	115	23.46312	-8.52	23.4109	-2.02	0.99449	20.5411	-20.04	61.206	4.1	14	600	1154.6	1750	500	901.9	1314	601	15	
75	16	Pon	116	23.50277	-8.35	23.4449	-1.39	0.99477	21.4420	-15.07	60.414	5.1	8	558	1154.3	1752	516	949.8	1437	557	16	
76	17	Wto	117	23.54243	-8.18	23.4828	-1.15	0.99505	22.3324	-9.20	59.628	6.1	3	556	1154.0	1753	528	1036.4	1601	553	17	
77	18	Śro	118	23.58208	-8.01	23.5207	-0.51	0.99532	23.2205	-2.59	58.909	7.1	0	553	1153.8	1755	538	1122.6	1725	549	18	
78	19	Czw	119	0.02174	-7.43	23.5547	-0.27	0.99560	0.1120	3.39	58.310	0.4	0	551	1153.5	1757	548	1209.4	1851	545	19	
79	20	Pią	120	0.06139	-7.26	23.5926	-0.04	0.99588	1.0212	10.14	57.869	1.4	3	548	1153.2	1759	559	1258.0	2020	541	20	
80	21	Sob	121	0.10105	-7.08	0.0304	0.20	0.99615	1.5545	16.21	57.606	2.4	8	546	1152.9	1801	611	1349.5	2153	538	21	
81	22	Nie	122	0.14070	-6.50	0.0643	0.44	0.99643	2.5244	21.36	57.518	3.4	15	544	1152.6	1803	628	1445.0	2327	534	22	
82	23	Pon	123	0.18036	-6.32	0.1022	1.07	0.99671	3.5321	25.34	57.588	4.4	24	541	1152.3	1804	652	1544.5	****	530	23	
83	24	Wto	124	0.22001	-6.14	0.1400	1.31	0.99698	4.5646	27.52	57.788	5.4	35	539	1152.0	1806	729	1646.9	057	526	24	
84	25	Śro	125	0.25567	-5.56	0.1739	1.55	0.99726	6.0109	28.18	58.086	6.4	46	536	1151.7	1808	824	1749.8	213	522	25	
85	26	Czw	126	0.29533	-5.38	0.2117	2.18	0.99754	7.0413	26.54	58.454	0.7	57	534	1151.4	1810	938	1850.7	308	518	26	
86	27	Pią	127	0.33498	-5.20	0.2456	2.42	0.99781	8.0406	23.52	58.871	1.7	68	532	1151.1	1812	1104	1947.6	344	514	27	
87	28	Sob	128	0.37464	-5.02	0.2834	3.05	0.99809	8.5955	19.31	59.324	2.7	78	529	1150.8	1813	1232	2039.9	408	510	28	
88	29	Nie	129	0.41429	-4.44	0.3212	3.28	0.99837	9.5148	14.15	59.805	3.7	86	527	1150.5	1815	1359	2128.1	424	506	29	
88	29	Nie	129	23.41331	-4.44	0.3203	3.28	0.99836	9.4942	14.29	59.784	4.7	86	627	1250.5	1915	1459	2228.1	524	606	29	
89	30	Pon	130	23.45296	-4.26	0.3542	3.51	0.99864	10.3830	8.40	60.288	5.7	93	625	1250.2	1917	1621	2313.2	536	602	30	
90	31	Wto	131	23.49262	-4.08	0.3920	4.14	0.99893	11.2503	2.34	60.813	6.7	97	622	1249.9	1919	1740	2356.3	546	558	31	

Fazy Księżyca [Dm, h.mm]: Pełn 3, 12.38    3kw 11, 10.38    Now 19, 2.24    1kw 25, 20.18

# MARZEC 2026 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( <sup>0h</sup> UT)	
1	4.39	19.20	6.32	18.35	7.05	18.31	6.23	16.09	11.54	4.39	7.23	19.15	8.55	0.50	7.16	19.14	5.54	13.29		
	22.823	-7.49	23.407	-0.18	23.656	-3.71	22.109	-12.81	7.105	22.91	0.165	-1.25	3.702	19.48	0.101	-0.77	20.536	-22.86	10.58772	1
3	4.34	19.23	6.20	18.21	7.01	18.38	6.18	16.10	11.45	4.31	7.15	19.09	8.47	0.42	7.09	19.06	5.46	13.22		
	22.947	-6.73	23.324	-0.47	23.808	-2.69	22.210	-12.25	7.101	22.92	0.179	-1.15	3.705	19.49	0.106	-0.74	20.540	-22.86	10.71914	3
5	4.29	19.27	6.09	18.04	6.57	18.45	6.13	16.11	11.37	4.23	7.08	19.02	8.39	0.35	7.01	18.59	5.39	13.14		
	23.071	-5.96	23.219	-1.04	23.959	-1.66	22.310	-11.69	7.098	22.93	0.194	-1.06	3.708	19.50	0.110	-0.71	20.544	-22.85	10.85056	5
7	4.25	19.31	5.59	17.45	6.53	18.51	6.08	16.13	11.29	4.15	7.00	18.56	8.32	0.27	6.53	18.51	5.31	13.07		
	23.195	-5.18	23.100	-1.83	0.110	-0.63	22.410	-11.12	7.096	22.93	0.209	-0.96	3.712	19.52	0.115	-0.68	20.548	-22.84	10.98197	7
9	4.20	19.35	5.49	17.25	6.48	18.58	6.03	16.14	11.21	4.07	6.53	18.49	8.24	0.20	6.45	18.44	5.23	12.59		
	23.318	-4.40	22.981	-2.78	0.261	0.40	22.509	-10.54	7.095	22.94	0.224	-0.86	3.715	19.53	0.119	-0.65	20.551	-22.83	11.11339	9
11	4.15	19.39	5.39	17.05	6.44	19.05	5.57	16.15	11.13	3.59	6.45	18.43	8.16	0.12	6.38	18.37	5.16	12.51		
	23.441	-3.62	22.871	-3.79	0.412	1.43	22.608	-9.96	7.094	22.94	0.239	-0.76	3.720	19.54	0.124	-0.62	20.555	-22.83	11.24481	11
13	4.10	19.43	5.31	16.46	6.40	19.11	5.52	16.17	11.06	3.51	6.38	18.36	8.08	0.05	6.30	18.29	5.08	12.44		
	23.564	-2.83	22.778	-4.78	0.563	2.45	22.707	-9.37	7.095	22.94	0.254	-0.67	3.724	19.56	0.128	-0.59	20.558	-22.82	11.37624	13
15	4.04	19.47	5.24	16.29	6.35	19.18	5.47	16.18	10.58	3.43	6.30	18.30	8.01	23.53	6.22	18.22	5.00	12.36		
	23.686	-2.04	22.708	-5.70	0.713	3.48	22.805	-8.77	7.097	22.94	0.269	-0.57	3.728	19.57	0.133	-0.56	20.561	-22.81	11.50765	15
17	3.59	19.52	5.18	16.14	6.31	19.25	5.42	16.19	10.50	3.36	6.23	18.23	7.53	23.46	6.14	18.14	4.52	12.29		
	23.808	-1.25	22.665	-6.49	0.865	4.50	22.903	-8.17	7.099	22.94	0.284	-0.47	3.733	19.59	0.138	-0.53	20.565	-22.81	11.63907	17
19	3.54	19.56	5.13	16.02	6.27	19.31	5.36	16.21	10.42	3.28	6.15	18.17	7.45	23.38	6.07	18.07	4.45	12.21		
	23.930	-0.46	22.647	-7.13	1.016	5.52	23.001	-7.56	7.103	22.93	0.300	-0.37	3.738	19.60	0.142	-0.50	20.568	-22.80	11.77049	19
21	3.48	20.00	5.08	15.52	6.22	19.38	5.31	16.22	10.35	3.20	6.08	18.11	7.38	23.31	5.59	17.59	4.37	12.13		
	0.051	0.33	22.655	-7.61	1.168	6.52	23.098	-6.95	7.107	22.93	0.315	-0.27	3.743	19.62	0.147	-0.47	20.571	-22.80	11.90190	21
23	3.43	20.05	5.04	15.44	6.18	19.45	5.25	16.23	10.27	3.13	6.00	18.04	7.30	23.23	5.51	17.52	4.29	12.06		
	0.173	1.12	22.686	-7.93	1.320	7.52	23.195	-6.34	7.112	22.92	0.330	-0.17	3.748	19.64	0.152	-0.44	20.574	-22.79	12.03332	23
25	3.37	20.09	4.60	15.38	6.14	19.51	5.20	16.24	10.20	3.05	5.53	17.58	7.22	23.16	5.43	17.45	4.22	11.58		
	0.294	1.91	22.739	-8.10	1.472	8.51	23.292	-5.72	7.118	22.91	0.345	-0.07	3.753	19.65	0.156	-0.41	20.576	-22.79	12.16474	25
27	3.31	20.14	4.56	15.35	6.10	19.58	5.15	16.26	10.13	2.58	5.45	17.51	7.15	23.09	5.36	17.37	4.14	11.50		
	0.415	2.69	22.811	-8.11	1.626	9.48	23.389	-5.10	7.125	22.90	0.361	0.02	3.759	19.67	0.161	-0.38	20.579	-22.79	12.29616	27
29	3.25	20.18	4.53	15.33	6.06	20.05	5.09	16.27	10.05	2.50	5.38	17.45	7.07	23.01	5.28	17.30	4.06	11.43		
	0.537	3.47	22.899	-7.98	1.780	10.44	23.485	-4.48	7.133	22.89	0.376	0.12	3.764	19.69	0.165	-0.35	20.582	-22.78	12.42758	29
29	4.25	21.18	5.53	16.33	7.06	21.05	6.09	17.27	11.05	3.50	6.38	18.45	8.07	0.05	6.28	18.30	5.06	12.43		
	0.534	3.46	22.897	-7.98	1.776	10.42	23.483	-4.50	7.133	22.89	0.376	0.12	3.764	19.69	0.165	-0.35	20.582	-22.78	12.42758	29
31	4.20	21.23	5.50	16.33	7.02	21.11	6.04	17.28	10.58	3.43	6.30	18.38	7.59	23.54	6.20	18.22	4.58	12.35		
	0.656	4.24	23.000	-7.72	1.931	11.36	23.579	-3.87	7.142	22.88	0.391	0.22	3.770	19.71	0.170	-0.32	20.584	-22.78	12.55900	31

# KWIECIEŃ 2026

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
91	1	Śro	132	23.53227	-3.50	0.4259	4.37	0.99921	12.1025	-3.32	61.349	7.7	100	620	1249.6	1921	1858	*****	555	554	1	
92	2	Czw	133	23.57193	-3.33	0.4638	5.00	0.99950	12.5536	-9.23	61.881	0.3	100	617	1249.3	1922	2015	038.8	604	550	2	
93	3	Pią	134	0.01158	-3.15	0.5016	5.23	0.99979	13.4129	-14.48	62.385	1.3	98	615	1249.0	1924	2133	121.5	614	546	3	
94	4	Sob	135	0.05124	-2.57	0.5356	5.46	1.00007	14.2846	-19.32	62.831	2.3	95	613	1248.7	1926	2250	205.5	627	543	4	
95	5	Nie	136	0.09089	-2.40	0.5735	6.09	1.00036	15.1754	-23.24	63.187	3.3	90	610	1248.4	1928	****	251.4	643	539	5	
96	6	Pon	137	0.13055	-2.23	1.0114	6.32	1.00066	16.0859	-26.14	63.418	4.3	83	608	1248.1	1930	007	339.3	705	535	6	
97	7	Wto	138	0.17020	-2.06	1.0454	6.54	1.00095	17.0142	-27.53	63.493	5.3	75	606	1247.8	1931	117	429.3	738	531	7	
98	8	Śro	139	0.20586	-1.49	1.0834	7.17	1.00124	17.5519	-28.16	63.390	6.3	67	603	1247.6	1933	218	520.6	823	527	8	
99	9	Czw	140	0.24551	-1.33	1.1214	7.39	1.00153	18.4855	-27.19	63.094	7.3	58	601	1247.3	1935	305	612.1	922	523	9	
100	10	Pią	141	0.28517	-1.17	1.1554	8.01	1.00182	19.4139	-25.06	62.608	0.2	48	559	1247.0	1937	339	702.9	1033	519	10	
101	11	Sob	142	0.32483	-1.01	1.1935	8.24	1.00211	20.3259	-21.42	61.948	1.2	38	556	1246.8	1938	403	752.2	1151	515	11	
102	12	Nie	143	0.36448	-0.45	1.2316	8.45	1.00240	21.2250	-17.15	61.147	2.2	29	554	1246.5	1940	420	839.8	1311	511	12	
103	13	Pon	144	0.40414	-0.30	1.2657	9.07	1.00269	22.1132	-11.54	60.255	3.2	20	552	1246.2	1942	434	926.1	1433	507	13	
104	14	Wto	145	0.44379	-0.15	1.3039	9.29	1.00297	22.5947	-5.52	59.336	4.2	12	549	1246.0	1944	445	1011.9	1556	503	14	
105	15	Śro	146	0.48345	0.00	1.3421	9.50	1.00326	23.4831	0.38	58.462	5.2	6	547	1245.8	1946	455	1058.0	1720	459	15	
106	16	Czw	147	0.52310	0.14	1.3803	10.12	1.00354	0.3852	7.17	57.707	6.2	2	545	1245.5	1947	505	1145.9	1848	455	16	
107	17	Pią	148	0.56276	0.28	1.4146	10.33	1.00382	1.3158	13.43	57.136	7.2	0	543	1245.3	1949	517	1236.9	2021	451	17	
108	18	Sob	149	1.00241	0.41	1.4529	10.54	1.00409	2.2850	19.30	56.793	0.9	1	540	1245.1	1951	532	1332.0	2157	447	18	
109	19	Nie	150	1.04207	0.54	1.4912	11.15	1.00437	3.2951	24.07	56.700	1.9	5	538	1244.8	1953	554	1431.8	2333	444	19	
110	20	Pon	151	1.08172	1.07	1.5256	11.35	1.00464	4.3426	27.08	56.848	2.9	12	536	1244.6	1955	626	1535.5	****	440	20	
111	21	Wto	152	1.12138	1.19	1.5641	11.56	1.00491	5.4041	28.13	57.202	3.9	21	534	1244.4	1956	716	1640.6	058	436	21	
112	22	Śro	153	1.16104	1.31	2.0025	12.16	1.00517	6.4556	27.19	57.716	4.9	31	531	1244.2	1958	826	1744.0	203	432	22	
113	23	Czw	154	1.20069	1.42	2.0411	12.36	1.00544	7.4750	24.40	58.333	5.9	42	529	1244.0	2000	951	1843.2	246	428	23	
114	24	Pią	155	1.24035	1.53	2.0756	12.56	1.00570	8.4512	20.37	59.003	0.3	53	527	1243.9	2002	1120	1937.2	313	424	24	
115	25	Sob	156	1.28000	2.03	2.1142	13.16	1.00596	9.3803	15.35	59.683	1.3	64	525	1243.7	2004	1246	2026.3	331	420	25	
116	26	Nie	157	1.31566	2.13	2.1529	13.35	1.00622	10.2709	9.56	60.344	2.3	74	523	1243.5	2005	1409	2111.8	345	416	26	
117	27	Pon	158	1.35531	2.23	2.1916	13.54	1.00648	11.1337	3.59	60.966	3.3	83	521	1243.4	2007	1528	2154.8	355	412	27	
118	28	Wto	159	1.39497	2.32	2.2304	14.13	1.00673	11.5837	-2.02	61.539	4.3	90	519	1243.2	2009	1645	2236.8	404	408	28	
119	29	Śro	160	1.43462	2.40	2.2652	14.32	1.00699	12.4314	-7.52	62.059	5.3	95	517	1243.1	2011	1801	2318.8	413	404	29	
120	30	Czw	161	1.47428	2.49	2.3040	14.50	1.00724	13.2825	-13.20	62.521	6.3	98	515	1242.9	2012	1917	*****	423	400	30	

Fazy Księżycyca [Dm, h.mm]: Pełn 2, 4.12      3kw 10, 6.52      Nów 17, 13.52      1kw 24, 4.32

# KWIECIEŃ 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.17	21.26	5.48	16.33	6.60	21.15	6.01	17.29	10.54	3.39	6.27	18.35	7.56	23.50	6.16	18.19	4.55	12.31		
	0.716	4.62	23.056	-7.54	2.009	11.82	23.627	-3.56	7.146	22.87	0.399	0.27	3.773	19.72	0.172	-0.31	20.585	-22.78	12.62471	1
3	4.10	21.31	5.45	16.35	6.56	21.22	5.55	17.30	10.47	3.32	6.19	18.29	7.48	23.43	6.09	18.11	4.47	12.23		
	0.838	5.39	23.177	-7.09	2.165	12.74	23.722	-2.93	7.156	22.86	0.414	0.36	3.779	19.74	0.177	-0.28	20.587	-22.78	12.75612	3
5	4.04	21.36	5.42	16.38	6.52	21.29	5.50	17.31	10.40	3.24	6.12	18.22	7.40	23.35	6.01	18.04	4.39	12.16		
	0.960	6.15	23.309	-6.53	2.321	13.63	23.818	-2.31	7.167	22.84	0.429	0.46	3.786	19.76	0.181	-0.25	20.590	-22.78	12.88754	5
7	3.58	21.41	5.39	16.42	6.48	21.35	5.44	17.32	10.33	3.17	6.04	18.16	7.33	23.28	5.53	17.56	4.31	12.08		
	1.082	6.91	23.450	-5.86	2.479	14.51	23.913	-1.68	7.179	22.82	0.444	0.56	3.792	19.78	0.186	-0.22	20.592	-22.78	13.01896	7
9	3.52	21.46	5.36	16.47	6.45	21.42	5.39	17.33	10.26	3.10	5.57	18.09	7.25	23.21	5.45	17.49	4.24	12.00		
	1.204	7.65	23.600	-5.09	2.638	15.35	0.008	-1.05	7.191	22.80	0.459	0.65	3.799	19.80	0.190	-0.19	20.594	-22.78	13.15039	9
11	3.45	21.52	5.33	16.54	6.41	21.49	5.33	17.34	10.19	3.02	5.49	18.03	7.17	23.14	5.38	17.41	4.16	11.52		
	1.326	8.39	23.757	-4.22	2.798	16.18	0.103	-0.42	7.204	22.78	0.474	0.75	3.805	19.82	0.195	-0.16	20.595	-22.78	13.28181	11
13	3.39	21.57	5.30	17.01	6.38	21.56	5.28	17.36	10.12	2.55	5.42	17.56	7.10	23.06	5.30	17.34	4.08	11.45		
	1.449	9.12	23.922	-3.27	2.959	16.98	0.198	0.21	7.218	22.76	0.489	0.84	3.812	19.85	0.199	-0.13	20.597	-22.78	13.41323	13
15	3.32	22.03	5.27	17.09	6.35	22.03	5.22	17.37	10.06	2.48	5.34	17.50	7.02	22.59	5.22	17.26	4.00	11.37		
	1.572	9.84	0.093	-2.23	3.122	17.74	0.293	0.83	7.233	22.73	0.504	0.93	3.819	19.87	0.204	-0.11	20.599	-22.78	13.54464	15
17	3.25	22.09	5.23	17.17	6.32	22.10	5.17	17.38	9.99	2.41	5.27	17.43	6.55	22.52	5.14	17.19	3.52	11.29		
	1.696	10.55	0.271	-1.11	3.285	18.48	0.387	1.46	7.248	22.71	0.519	1.02	3.826	19.89	0.208	-0.08	20.600	-22.78	13.67606	17
19	3.18	22.15	5.20	17.27	6.29	22.16	5.11	17.39	9.92	2.34	5.20	17.37	6.47	22.44	5.07	17.12	3.45	11.21		
	1.820	11.25	0.455	0.09	3.450	19.19	0.482	2.08	7.264	22.68	0.534	1.12	3.833	19.91	0.212	-0.05	20.601	-22.78	13.80748	19
21	3.11	22.22	5.17	17.37	6.27	22.23	5.06	17.40	9.45	2.27	5.12	17.30	6.39	22.37	4.59	17.04	3.37	11.13		
	1.945	11.93	0.645	1.35	3.616	19.86	0.576	2.70	7.281	22.65	0.548	1.21	3.841	19.94	0.217	-0.03	20.603	-22.78	13.93890	21
23	3.04	22.28	5.14	17.48	6.24	22.30	5.00	17.41	9.39	2.20	5.05	17.24	6.32	22.30	4.51	16.57	3.29	11.06		
	2.070	12.60	0.842	2.69	3.783	20.50	0.671	3.31	7.298	22.62	0.563	1.30	3.848	19.96	0.221	0.00	20.604	-22.79	14.07032	23
25	2.56	22.35	5.11	17.60	6.22	22.36	4.55	17.42	9.32	2.13	4.57	17.17	6.24	22.23	4.43	16.49	3.21	10.58		
	2.195	13.26	1.045	4.08	3.951	21.10	0.765	3.93	7.316	22.59	0.577	1.38	3.855	19.98	0.225	0.03	20.604	-22.79	14.20174	25
27	2.48	22.43	5.08	18.12	6.20	22.43	4.49	17.43	9.26	2.06	4.50	17.11	6.17	22.15	4.36	16.42	3.14	10.50		
	2.321	13.90	1.256	5.53	4.120	21.66	0.860	4.54	7.335	22.56	0.592	1.47	3.863	20.01	0.229	0.05	20.605	-22.79	14.33316	27
29	2.40	22.50	5.05	18.26	6.19	22.49	4.44	17.44	9.19	1.59	4.42	17.04	6.09	22.08	4.28	16.34	3.06	10.42		
	2.448	14.53	1.474	7.03	4.291	22.19	0.954	5.14	7.354	22.52	0.606	1.56	3.871	20.03	0.233	0.08	20.606	-22.80	14.46457	29

# MAJ 2026

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
121	1	Pią	162	1.51393	2.56	2.3429	15.08	1.00750	14.1458	-18.12	62.920	7.3	100	513	1242.8	2014	2034	001.9	435	356	1	
122	2	Sob	163	1.55359	3.03	2.3819	15.26	1.00775	15.0325	-22.17	63.245	0.7	100	511	1242.7	2016	2151	046.8	449	352	2	
123	3	Nie	164	1.59324	3.09	2.4209	15.44	1.00800	15.5356	-25.24	63.482	1.7	97	509	1242.6	2018	2304	134.0	510	348	3	
124	4	Pon	165	2.03290	3.15	2.4560	16.02	1.00825	16.4615	-27.23	63.612	2.7	93	507	1242.5	2019	****	223.3	538	345	4	
125	5	Wto	166	2.07256	3.20	2.4951	16.19	1.00850	17.3938	-28.07	63.614	3.7	88	505	1242.4	2021	008	314.1	619	341	5	
126	6	Śro	167	2.11221	3.25	2.5343	16.36	1.00875	18.3306	-27.32	63.468	4.7	81	503	1242.3	2023	100	405.5	713	337	6	
127	7	Czw	168	2.15187	3.29	2.5735	16.52	1.00899	19.2541	-25.42	63.159	5.7	73	501	1242.3	2025	138	456.3	820	333	7	
128	8	Pią	169	2.19153	3.33	3.0128	17.09	1.00924	20.1645	-22.41	62.678	6.7	64	459	1242.2	2026	205	545.5	934	329	8	
129	9	Sob	170	2.23118	3.36	3.0522	17.25	1.00948	21.0605	-18.37	62.031	7.7	55	457	1242.2	2028	224	632.8	1052	325	9	
130	10	Nie	171	2.27084	3.38	3.0916	17.41	1.00972	21.5359	-13.41	61.235	0.5	45	456	1242.1	2030	239	718.4	1211	321	10	
131	11	Pon	172	2.31049	3.40	3.1311	17.56	1.00995	22.4107	-8.03	60.327	1.5	35	454	1242.1	2031	250	803.0	1331	317	11	
132	12	Wto	173	2.35015	3.41	3.1706	18.11	1.01018	23.2825	-1.53	59.358	2.5	25	452	1242.1	2033	301	847.6	1452	313	12	
133	13	Śro	174	2.38580	3.42	3.2102	18.26	1.01041	0.1703	4.35	58.397	3.5	16	451	1242.1	2035	311	933.5	1616	309	13	
134	14	Czw	175	2.42546	3.42	3.2459	18.41	1.01064	1.0815	11.03	57.522	4.5	8	449	1242.1	2036	322	1022.1	1745	305	14	
135	15	Pią	176	2.46511	3.41	3.2856	18.55	1.01085	2.0317	17.06	56.813	5.5	3	447	1242.1	2038	335	1114.8	1919	301	15	
136	16	Sob	177	2.50477	3.40	3.3254	19.09	1.01107	3.0302	22.16	56.339	6.5	0	446	1242.1	2040	354	1212.7	2057	257	16	
137	17	Nie	178	2.54442	3.38	3.3652	19.23	1.01128	4.0728	26.01	56.145	0.6	1	444	1242.1	2041	421	1316.1	2230	253	17	
138	18	Pon	179	2.58408	3.36	3.4051	19.36	1.01148	5.1506	27.53	56.245	1.6	4	443	1242.1	2043	504	1422.9	2347	250	18	
139	19	Wto	180	3.02374	3.33	3.4450	19.49	1.01169	6.2306	27.40	56.618	2.6	10	441	1242.2	2044	607	1529.7	****	246	19	
140	20	Śro	181	3.06339	3.30	3.4850	20.01	1.01188	7.2823	25.28	57.218	3.6	18	440	1242.3	2046	730	1633.0	040	242	20	
141	21	Czw	182	3.10305	3.26	3.5250	20.14	1.01207	8.2857	21.40	57.978	4.6	28	438	1242.3	2047	901	1730.8	114	238	21	
142	22	Pią	183	3.14271	3.21	3.5651	20.26	1.01226	9.2419	16.45	58.825	5.6	39	437	1242.4	2049	1031	1822.8	136	234	22	
143	23	Sob	184	3.18236	3.17	4.0053	20.37	1.01244	10.1509	11.07	59.693	6.6	49	436	1242.5	2050	1157	1910.1	151	230	23	
144	24	Nie	185	3.22202	3.11	4.0455	20.48	1.01262	11.0238	5.10	60.529	0.9	60	434	1242.6	2052	1318	1954.1	203	226	24	
145	25	Pon	186	3.26167	3.05	4.0857	20.59	1.01280	11.4802	-0.50	61.292	1.9	70	433	1242.7	2053	1435	2036.4	213	222	25	
146	26	Wto	187	3.30133	2.59	4.1300	21.10	1.01297	12.3234	-6.41	61.960	2.9	79	432	1242.8	2054	1551	2118.1	222	218	26	
147	27	Śro	188	3.34098	2.52	4.1703	21.20	1.01314	13.1719	-12.11	62.520	3.9	86	431	1242.9	2056	1706	2200.5	232	214	27	
148	28	Czw	189	3.38064	2.45	4.2107	21.30	1.01331	14.0313	-17.08	62.970	4.9	92	430	1243.0	2057	1822	2244.5	243	210	28	
149	29	Pią	190	3.42029	2.37	4.2511	21.39	1.01347	14.5055	-21.22	63.311	5.9	97	429	1243.1	2058	1938	2330.6	256	206	29	
150	30	Sob	191	3.45595	2.29	4.2916	21.48	1.01363	15.4045	-24.42	63.548	6.9	99	428	1243.3	2100	2052	****	315	202	30	
151	31	Nie	192	3.49560	2.21	4.3321	21.57	1.01379	16.3234	-26.56	63.681	0.1	100	427	1243.4	2101	2200	019.2	340	158	31	

Fazy Księżyca [Dm, h.mm]: Pełn 1, 19.23    3kw 9, 23.10    Nów 16, 22.01    1kw 23, 13.11    Pełn 31, 10.45

# MAJ 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	2.32	22.59	5.02	18.40	6.17	22.55	4.38	17.45	9.13	1.52	4.35	16.58	6.02	22.01	4.20	16.27	2.58	10.34		
	2.575	15.14	1.701	8.57	4.462	22.67	1.049	5.74	7.373	22.48	0.620	1.64	3.878	20.05	0.237	0.10	20.606	-22.80	14.59599	1
3	2.23	23.07	4.59	18.55	6.16	23.01	4.33	17.46	9.07	1.45	4.27	16.51	5.54	21.54	4.12	16.19	2.50	10.26		
	2.702	15.74	1.936	10.14	4.634	23.12	1.143	6.34	7.394	22.44	0.633	1.73	3.886	20.08	0.241	0.12	20.607	-22.81	14.72741	3
5	2.14	23.16	4.57	19.11	6.16	23.06	4.27	17.48	9.00	1.38	4.20	16.45	5.46	21.46	4.04	16.12	2.42	10.18		
	2.831	16.31	2.181	11.74	4.807	23.52	1.238	6.93	7.415	22.40	0.647	1.81	3.894	20.10	0.245	0.15	20.607	-22.82	14.85884	5
7	2.04	23.27	4.55	19.28	6.15	23.12	4.22	17.49	8.54	1.31	4.12	16.38	5.39	21.39	3.57	16.04	2.35	10.10		
	2.960	16.87	2.435	13.34	4.981	23.87	1.332	7.52	7.436	22.36	0.661	1.89	3.902	20.12	0.248	0.17	20.607	-22.82	14.99026	7
9	1.53	23.38	4.53	19.45	6.15	23.17	4.17	17.50	8.48	1.24	4.05	16.31	5.31	21.32	3.49	15.57	2.27	10.03		
	3.089	17.41	2.699	14.94	5.155	24.18	1.427	8.10	7.458	22.32	0.674	1.97	3.910	20.15	0.252	0.19	20.607	-22.83	15.12168	9
11	1.40	23.52	4.52	20.04	6.16	23.22	4.11	17.51	8.42	1.17	3.57	16.25	5.24	21.25	3.41	15.49	2.19	9.55		
	3.220	17.93	2.973	16.50	5.330	24.45	1.522	8.67	7.480	22.27	0.687	2.05	3.918	20.17	0.255	0.21	20.607	-22.84	15.25310	11
13	1.25	0.20	4.51	20.23	6.17	23.26	4.06	17.52	8.36	1.10	3.50	16.18	5.16	21.18	3.33	15.41	2.11	9.47		
	3.351	18.44	3.255	18.02	5.506	24.67	1.617	9.24	7.503	22.22	0.700	2.12	3.926	20.20	0.259	0.23	20.607	-22.84	15.38451	13
15	****	****	4.51	20.42	6.18	23.30	4.00	17.53	8.29	1.03	3.42	16.11	5.09	21.10	3.26	15.34	2.03	9.39		
	3.482	18.92	3.546	19.45	5.681	24.84	1.712	9.80	7.527	22.17	0.713	2.20	3.934	20.22	0.262	0.25	20.606	-22.85	15.51593	15
17	****	****	4.51	21.01	6.19	23.34	3.55	17.53	8.23	0.57	3.35	16.04	5.01	21.03	3.18	15.26	1.55	9.31		
	3.614	19.38	3.843	20.77	5.857	24.97	1.807	10.36	7.550	22.12	0.725	2.27	3.942	20.24	0.265	0.27	20.606	-22.86	15.64736	17
19	****	****	4.53	21.20	6.21	23.37	3.50	17.54	8.17	0.50	3.27	15.58	4.54	20.56	3.10	15.19	1.48	9.23		
	3.747	19.81	4.143	21.96	6.033	25.05	1.902	10.90	7.575	22.07	0.737	2.34	3.950	20.27	0.268	0.29	20.605	-22.87	15.77878	19
21	****	****	4.55	21.38	6.24	23.40	3.45	17.55	8.11	0.43	3.20	15.51	4.46	20.49	3.02	15.11	1.40	9.15		
	3.881	20.23	4.445	22.99	6.209	25.08	1.997	11.44	7.599	22.02	0.750	2.41	3.958	20.29	0.271	0.31	20.604	-22.88	15.91020	21
23	****	****	4.58	21.55	6.27	23.43	3.39	17.56	8.05	0.36	3.12	15.44	4.38	20.41	2.55	15.04	1.32	9.07		
	4.015	20.62	4.743	23.85	6.384	25.06	2.093	11.97	7.624	21.96	0.761	2.48	3.966	20.32	0.274	0.33	20.604	-22.89	16.04162	23
25	****	****	5.03	22.10	6.30	23.45	3.34	17.57	7.60	0.29	3.05	15.37	4.31	20.34	2.47	14.56	1.24	8.59		
	4.149	20.99	5.037	24.54	6.559	25.00	2.188	12.49	7.650	21.90	0.773	2.55	3.974	20.34	0.277	0.34	20.603	-22.90	16.17304	25
27	****	****	5.08	22.23	6.33	23.46	3.29	17.58	7.54	0.23	2.57	15.31	4.23	20.27	2.39	14.48	1.16	8.51		
	4.284	21.33	5.323	25.05	6.733	24.89	2.284	13.00	7.676	21.84	0.784	2.61	3.983	20.36	0.280	0.36	20.601	-22.91	16.30446	27
29	****	****	5.13	22.35	6.37	23.48	3.24	17.59	7.48	0.16	2.50	15.24	4.16	20.20	2.31	14.41	1.08	8.43		
	4.420	21.65	5.599	25.39	6.907	24.73	2.380	13.51	7.702	21.78	0.795	2.67	3.991	20.39	0.282	0.38	20.600	-22.92	16.43588	29
31	****	****	5.20	22.44	6.41	23.48	3.19	17.60	7.42	0.09	2.42	15.17	4.08	20.13	2.23	14.33	1.01	8.35		
	4.556	21.95	5.863	25.57	7.080	24.53	2.476	14.00	7.728	21.72	0.806	2.74	3.999	20.41	0.285	0.39	20.599	-22.93	16.56730	31

# CZERWIEC 2026

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
152	1	Pon	193	3.53526	2.12	4.3727	22.05	1.01395	17.2545	-27.56	63.710	1.1	99	426	1243.6	2102	2255	109.6	417	154	1
153	2	Wto	194	3.57492	2.02	4.4133	22.13	1.01410	18.1917	-27.40	63.629	2.1	96	425	1243.7	2103	2338	200.9	507	151	2
154	3	Śro	195	4.01457	1.53	4.4539	22.20	1.01425	19.1206	-26.06	63.430	3.1	92	424	1243.9	2104	****	251.9	611	147	3
155	4	Czw	196	4.05423	1.42	4.4946	22.27	1.01440	20.0321	-23.22	63.103	4.1	86	423	1244.0	2105	008	341.5	723	143	4
156	5	Pią	197	4.09389	1.32	4.5353	22.34	1.01455	20.5240	-19.35	62.640	5.1	78	423	1244.2	2106	029	429.1	839	139	5
157	6	Sob	198	4.13354	1.21	4.5800	22.40	1.01469	21.4012	-14.56	62.040	6.1	70	422	1244.4	2107	045	514.6	956	135	6
158	7	Nie	199	4.17320	1.10	5.0208	22.46	1.01482	22.2631	-9.34	61.308	7.1	60	422	1244.6	2108	057	558.5	1114	131	7
159	8	Pon	200	4.21285	0.59	5.0616	22.52	1.01496	23.1228	-3.42	60.467	8.1	50	421	1244.8	2109	107	641.7	1232	127	8
160	9	Wto	201	4.25251	0.47	5.1024	22.57	1.01509	23.5909	2.29	59.550	1.0	39	421	1245.0	2110	117	725.5	1352	123	9
161	10	Śro	202	4.29216	0.35	5.1432	23.02	1.01521	0.4749	8.46	58.610	2.0	29	420	1245.2	2111	127	811.2	1516	119	10
162	11	Czw	203	4.33182	0.23	5.1841	23.06	1.01533	1.3950	14.50	57.716	3.0	19	420	1245.4	2111	139	900.4	1645	115	11
163	12	Pią	204	4.37147	0.10	5.2250	23.10	1.01544	2.3624	20.17	56.942	4.0	11	419	1245.6	2112	155	954.4	1819	111	12
164	13	Sob	205	4.41113	-0.02	5.2659	23.13	1.01555	3.3811	24.36	56.366	5.0	4	419	1245.8	2113	217	1054.3	1955	107	13
165	14	Nie	206	4.45079	-0.15	5.3109	23.16	1.01565	4.4437	27.18	56.051	6.0	1	419	1246.0	2113	251	1159.5	2121	103	14
166	15	Pon	207	4.49044	-0.28	5.3518	23.19	1.01575	5.5331	27.57	56.034	0.3	0	419	1246.2	2114	344	1307.5	2227	059	15
167	16	Wto	208	4.53010	-0.41	5.3928	23.21	1.01584	7.0133	26.29	56.319	1.3	3	419	1246.4	2114	500	1414.4	2310	055	16
168	17	Śro	209	4.56576	-0.54	5.4337	23.23	1.01592	8.0548	23.08	56.874	2.3	8	419	1246.6	2115	632	1516.7	2338	052	17
169	18	Czw	210	5.00541	-1.07	5.4747	23.24	1.01600	9.0449	18.24	57.642	3.3	15	419	1246.9	2115	806	1613.1	2356	048	18
170	19	Pią	211	5.04507	-1.21	5.5157	23.26	1.01607	9.5843	12.47	58.546	4.3	24	419	1247.1	2116	936	1703.9	****	044	19
171	20	Sob	212	5.08472	-1.34	5.5607	23.26	1.01614	10.4828	6.43	59.507	5.3	34	419	1247.3	2116	1101	1750.4	009	040	20
172	21	Nie	213	5.12438	-1.47	6.0016	23.26	1.01620	11.3523	0.34	60.453	6.3	45	419	1247.5	2116	1222	1834.1	020	036	21
173	22	Pon	214	5.16404	-1.60	6.0426	23.26	1.01626	12.2047	-5.26	61.324	0.5	55	419	1247.7	2116	1339	1916.6	030	032	22
174	23	Wto	215	5.20369	-2.13	6.0835	23.25	1.01631	13.0552	-11.04	62.080	1.5	65	419	1248.0	2116	1455	1959.1	039	028	23
175	24	Śro	216	5.24335	-2.26	6.1245	23.24	1.01636	13.5138	-16.10	62.695	2.5	74	420	1248.2	2116	1611	2042.6	050	024	24
176	25	Czw	217	5.28300	-2.39	6.1654	23.23	1.01640	14.3854	-20.34	63.160	3.5	82	420	1248.4	2116	1728	2128.1	103	020	25
177	26	Pią	218	5.32266	-2.51	6.2103	23.21	1.01644	15.2810	-24.05	63.475	4.5	89	421	1248.6	2116	1842	2215.8	120	016	26
178	27	Sob	219	5.36231	-3.04	6.2512	23.19	1.01648	16.1928	-26.33	63.650	5.5	94	421	1248.8	2116	1952	2305.6	143	012	27
179	28	Nie	220	5.40197	-3.16	6.2921	23.16	1.01651	17.1222	-27.50	63.696	6.5	98	422	1249.0	2116	2051	2356.8	216	008	28
180	29	Pon	221	5.44163	-3.28	6.3330	23.13	1.01654	18.0558	-27.50	63.627	7.5	100	422	1249.2	2116	2138	****	302	004	29
181	30	Wto	222	5.48128	-3.40	6.3738	23.09	1.01656	18.5910	-26.32	63.454	0.4	100	423	1249.4	2116	2211	048.2	402	000	30

Fazy Księżyca [Dm, h.mm]:      3kw 8, 12.00      Now 15, 4.54      1kw 21, 23.55      Pełn 30, 1.57



## CZERWIEC 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	*****	*****	5.23	22.48	6.43	23.49	3.16	18.00	7.39	0.06	2.38	15.13	4.05	20.09	2.19	14.29	0.57	8.31		
	4.624	22.08	5.990	25.60	7.166	24.41	2.524	14.24	7.741	21.69	0.811	2.76	4.003	20.42	0.286	0.40	20.598	-22.94	16.63301	1
3	*****	*****	5.30	22.55	6.48	23.49	3.11	18.01	7.33	23.55	2.31	15.06	3.57	20.02	2.12	14.22	0.49	8.23		
	4.761	22.34	6.234	25.56	7.337	24.14	2.621	14.72	7.768	21.62	0.822	2.82	4.011	20.45	0.288	0.41	20.597	-22.95	16.76444	3
5	*****	*****	5.37	22.59	6.53	23.49	3.06	18.02	7.28	23.48	2.23	14.59	3.49	19.55	2.04	14.14	0.41	8.15		
	4.898	22.57	6.464	25.39	7.507	23.82	2.718	15.19	7.796	21.55	0.832	2.88	4.019	20.47	0.291	0.42	20.595	-22.96	16.89586	5
7	*****	*****	5.45	23.02	6.58	23.48	3.01	18.03	7.22	23.42	2.16	14.52	3.42	19.47	1.56	14.06	0.33	8.07		
	5.035	22.77	6.678	25.11	7.676	23.47	2.814	15.65	7.823	21.49	0.841	2.93	4.027	20.49	0.293	0.43	20.593	-22.97	17.02728	7
9	*****	*****	5.52	23.02	7.03	23.47	2.57	18.03	7.16	23.35	2.08	14.45	3.34	19.40	1.48	13.59	0.25	7.59		
	5.173	22.95	6.876	24.74	7.843	23.07	2.911	16.10	7.851	21.41	0.851	2.98	4.035	20.51	0.295	0.44	20.591	-22.99	17.15870	9
11	*****	*****	5.59	23.02	7.09	23.46	2.52	18.04	7.11	23.28	2.00	14.38	3.27	19.33	1.40	13.51	0.17	7.51		
	5.311	23.10	7.057	24.28	8.009	22.63	3.008	16.53	7.879	21.34	0.860	3.03	4.043	20.54	0.296	0.45	20.589	-23.00	17.29012	11
13	*****	*****	6.05	22.59	7.14	23.44	2.47	18.05	7.05	23.22	1.53	14.31	3.19	19.26	1.33	13.43	0.09	7.42		
	5.450	23.22	7.222	23.76	8.174	22.15	3.106	16.96	7.907	21.27	0.869	3.08	4.051	20.56	0.298	0.46	20.587	-23.01	17.42154	13
15	*****	*****	6.10	22.56	7.20	23.42	2.42	18.05	6.59	23.15	1.45	14.24	3.12	19.18	1.25	13.35	0.01	7.34		
	5.588	23.32	7.369	23.18	8.337	21.63	3.203	17.37	7.935	21.19	0.877	3.12	4.058	20.58	0.300	0.47	20.585	-23.02	17.55297	15
17	*****	*****	6.15	22.51	7.26	23.40	2.38	18.06	6.54	23.08	1.38	14.17	3.04	19.11	1.17	13.28	23.50	7.26		
	5.727	23.38	7.498	22.57	8.498	21.07	3.301	17.77	7.964	21.11	0.886	3.17	4.066	20.60	0.301	0.48	20.583	-23.04	17.68439	17
19	*****	*****	6.19	22.45	7.32	23.37	2.33	18.07	6.48	23.01	1.30	14.10	2.57	19.04	1.09	13.20	23.42	7.18		
	5.866	23.43	7.609	21.93	8.657	20.48	3.399	18.16	7.993	21.03	0.893	3.21	4.074	20.62	0.302	0.49	20.581	-23.05	17.81581	19
21	*****	*****	6.21	22.38	7.38	23.34	2.29	18.07	6.43	22.55	1.22	14.03	2.49	18.57	1.01	13.12	23.34	7.10		
	6.005	23.44	7.700	21.28	8.815	19.86	3.497	18.54	8.022	20.95	0.901	3.24	4.081	20.64	0.304	0.49	20.578	-23.07	17.94723	21
23	*****	*****	6.22	22.29	7.44	23.31	2.24	18.08	6.37	22.48	1.15	13.55	2.41	18.49	0.54	13.04	23.26	7.02		
	6.143	23.42	7.770	20.64	8.971	19.20	3.595	18.91	8.051	20.87	0.908	3.28	4.089	20.66	0.305	0.50	20.576	-23.08	18.07865	23
25	*****	*****	6.22	22.20	7.50	23.28	2.20	18.08	6.32	22.41	1.07	13.48	2.34	18.42	0.46	12.57	23.18	6.54		
	6.282	23.38	7.820	20.01	9.125	18.51	3.693	19.26	8.081	20.79	0.915	3.31	4.096	20.68	0.305	0.50	20.573	-23.09	18.21007	25
27	*****	*****	6.19	22.10	7.56	23.24	2.15	18.08	6.26	22.35	0.60	13.41	2.26	18.35	0.38	12.49	23.10	6.46		
	6.420	23.31	7.849	19.41	9.277	17.79	3.791	19.60	8.110	20.70	0.921	3.34	4.103	20.70	0.306	0.50	20.571	-23.11	18.34149	27
29	*****	*****	6.16	21.59	8.02	23.21	2.11	18.09	6.21	22.28	0.52	13.33	2.19	18.27	0.30	12.41	23.02	6.38		
	6.558	23.21	7.856	18.85	9.428	17.05	3.890	19.93	8.140	20.61	0.927	3.37	4.110	20.72	0.307	0.51	20.568	-23.12	18.47292	29

# LIPIEC 2026

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce				Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Śro	223	5.52094	-3.52	6.4147	23.05	1.01659	19.5060	-24.01	63.184	1.4	98	424	1249.6	2115	2234	138.5	512	2353	1
183	2	Czw	224	5.56060	-4.03	6.4554	23.01	1.01661	20.4053	-20.26	62.820	2.4	95	424	1249.8	2115	2251	226.8	628	2349	2
184	3	Pią	225	6.00025	-4.14	6.5002	22.56	1.01662	21.2847	-15.56	62.365	3.4	89	425	1250.0	2114	2304	312.9	746	2345	3
185	4	Sob	226	6.03591	-4.25	6.5409	22.51	1.01663	22.1505	-10.44	61.817	4.4	83	426	1250.2	2114	2315	357.1	903	2341	4
186	5	Nie	227	6.07556	-4.35	6.5817	22.46	1.01664	23.0032	-5.02	61.179	5.4	74	427	1250.3	2113	2325	440.0	1020	2337	5
187	6	Pon	228	6.11522	-4.45	7.0223	22.40	1.01664	23.4606	1.00	60.460	6.4	65	428	1250.5	2113	2334	522.7	1138	2333	6
188	7	Wto	229	6.15487	-4.55	7.0630	22.34	1.01664	0.3257	7.08	59.680	7.4	54	429	1250.7	2112	2345	606.5	1258	2329	7
189	8	Śro	230	6.19453	-5.05	7.1036	22.27	1.01664	1.2221	13.07	58.870	0.6	43	430	1250.8	2111	2358	652.7	1422	2325	8
190	9	Czw	231	6.23418	-5.14	7.1441	22.20	1.01663	2.1535	18.38	58.078	1.6	32	431	1251.0	2110	0**	742.8	1551	2321	9
191	10	Pią	232	6.27384	-5.22	7.1846	22.12	1.01661	3.1338	23.15	57.361	2.6	22	432	1251.1	2110	016	838.2	1724	2317	10
192	11	Sob	233	6.31350	-5.31	7.2251	22.04	1.01659	4.1642	26.31	56.787	3.6	13	433	1251.3	2109	043	939.2	1853	2313	11
193	12	Nie	234	6.35315	-5.39	7.2656	21.56	1.01656	5.2338	27.59	56.419	4.6	6	434	1251.4	2108	126	1044.8	2009	2309	12
194	13	Pon	235	6.39281	-5.46	7.3060	21.47	1.01653	6.3145	27.23	56.305	5.6	1	435	1251.5	2107	230	1152.0	2102	2305	13
195	14	Wto	236	6.43247	-5.53	7.3503	21.39	1.01649	7.3757	24.46	56.470	0.0	0	437	1251.6	2106	355	1257.0	2136	2301	14
196	15	Śro	237	6.47212	-5.59	7.3906	21.29	1.01644	8.3957	20.29	56.907	1.0	2	438	1251.7	2105	531	1357.1	2159	2258	15
197	16	Czw	238	6.51178	-6.05	7.4308	21.19	1.01639	9.3658	15.02	57.579	2.0	6	439	1251.8	2104	705	1451.7	2214	2254	16
198	17	Pią	239	6.55143	-6.10	7.4710	21.09	1.01633	10.2929	8.56	58.422	3.0	12	440	1251.9	2103	836	1541.4	2226	2250	17
199	18	Sob	240	6.59109	-6.15	7.5112	20.59	1.01627	11.1837	2.35	59.362	4.0	20	442	1252.0	2101	1000	1627.6	2237	2246	18
200	19	Nie	241	7.03074	-6.20	7.5513	20.48	1.01620	12.0538	-3.40	60.321	5.0	30	443	1252.1	2100	1121	1711.7	2246	2242	19
201	20	Pon	242	7.07040	-6.23	7.5913	20.37	1.01613	12.5145	-9.34	61.227	6.0	40	445	1252.1	2059	1239	1755.1	2257	2238	20
202	21	Wto	243	7.11005	-6.26	8.0312	20.25	1.01605	13.3804	-14.56	62.025	7.0	50	446	1252.2	2057	1357	1839.0	2309	2234	21
203	22	Śro	244	7.14571	-6.29	8.0712	20.14	1.01596	14.2526	-19.35	62.675	1.0	59	447	1252.2	2056	1514	1924.2	2324	2230	22
204	23	Czw	245	7.18537	-6.31	8.1110	20.01	1.01587	15.1429	-23.22	63.153	2.0	69	449	1252.3	2055	1630	2011.5	2345	2226	23
205	24	Pią	246	7.22502	-6.32	8.1508	19.49	1.01578	16.0526	-26.07	63.452	3.0	77	450	1252.3	2053	1742	2100.7	****	2222	24
206	25	Sob	247	7.26468	-6.33	8.1905	19.36	1.01568	16.5803	-27.43	63.578	4.0	85	452	1252.3	2052	1846	2151.6	015	2218	25
207	26	Nie	248	7.30433	-6.33	8.2302	19.23	1.01558	17.5136	-28.02	63.546	5.0	91	453	1252.3	2050	1936	2243.1	056	2214	26
208	27	Pon	249	7.34399	-6.32	8.2658	19.09	1.01548	18.4506	-27.03	63.379	6.0	96	455	1252.3	2049	2014	2334.0	152	2210	27
209	28	Wto	250	7.38365	-6.31	8.3053	18.56	1.01537	19.3733	-24.48	63.100	7.0	99	456	1252.3	2047	2040	*****	300	2206	28
210	29	Śro	251	7.42330	-6.30	8.3448	18.42	1.01526	20.2815	-21.25	62.733	8.0	100	458	1252.2	2045	2059	023.4	415	2202	29
211	30	Czw	252	7.46296	-6.27	8.3842	18.27	1.01515	21.1660	-17.05	62.300	0.8	99	500	1252.2	2044	2113	110.6	533	2159	30
212	31	Pią	253	7.50261	-6.24	8.4236	18.12	1.01503	22.0360	-11.58	61.815	1.8	97	501	1252.2	2042	2124	155.7	651	2155	31

Fazy Księżyca [Dm, h.mm]:      3kw 7, 21.29      Now 14, 11.44      1kw 21, 13.05      Pełn 29, 16.36

# LIPIEC 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		VENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	*****	*****	6.10	21.47	8.08	23.17	2.07	18.09	6.15	22.21	0.44	13.26	2.11	18.20	0.22	12.33	22.54	6.29		
	6.696	23.09	7.842	18.35	9.576	16.28	3.988	20.24	8.170	20.52	0.933	3.40	4.117	20.74	0.307	0.51	20.565	-23.14	18.60434	1
3	*****	*****	6.03	21.34	8.14	23.13	2.03	18.09	6.10	22.14	0.37	13.19	2.04	18.13	0.14	12.25	22.46	6.21		
	6.834	22.94	7.807	17.92	9.723	15.48	4.087	20.54	8.200	20.43	0.938	3.42	4.124	20.76	0.308	0.51	20.562	-23.15	18.73576	3
5	*****	*****	5.55	21.20	8.20	23.09	1.59	18.09	6.04	22.08	0.29	13.11	1.56	18.06	0.07	12.17	22.38	6.13		
	6.971	22.76	7.754	17.57	9.868	14.66	4.186	20.83	8.230	20.34	0.943	3.44	4.131	20.78	0.308	0.51	20.559	-23.17	18.86718	5
7	*****	*****	5.44	21.07	8.25	23.04	1.55	18.09	5.59	22.01	0.21	13.04	1.48	17.58	23.55	12.10	22.30	6.05		
	7.108	22.56	7.685	17.30	10.011	13.82	4.285	21.10	8.260	20.25	0.947	3.46	4.138	20.80	0.308	0.51	20.557	-23.18	18.99860	7
9	*****	*****	5.33	20.53	8.31	22.60	1.51	18.09	5.54	21.54	0.13	12.56	1.41	17.51	23.47	12.02	22.23	5.57		
	7.245	22.33	7.604	17.13	10.153	12.96	4.383	21.36	8.290	20.15	0.951	3.47	4.144	20.82	0.308	0.50	20.554	-23.20	19.13002	9
11	*****	*****	5.20	20.39	8.37	22.55	1.47	18.09	5.48	21.48	0.06	12.48	1.33	17.44	23.39	11.54	22.15	5.49		
	7.381	22.07	7.515	17.05	10.292	12.08	4.482	21.61	8.320	20.06	0.955	3.49	4.151	20.83	0.308	0.50	20.551	-23.21	19.26144	11
13	*****	*****	5.07	20.26	8.42	22.50	1.44	18.09	5.43	21.41	23.54	12.41	1.26	17.36	23.31	11.46	22.07	5.40		
	7.517	21.79	7.425	17.07	10.430	11.19	4.581	21.84	8.350	19.96	0.958	3.50	4.157	20.85	0.308	0.50	20.547	-23.23	19.39287	13
15	*****	*****	4.53	20.14	8.48	22.45	1.40	18.08	5.37	21.34	23.46	12.33	1.18	17.29	23.23	11.38	21.59	5.32		
	7.652	21.49	7.338	17.18	10.567	10.28	4.680	22.06	8.381	19.86	0.961	3.50	4.163	20.86	0.307	0.49	20.544	-23.24	19.52429	15
17	*****	*****	4.39	20.03	8.53	22.40	1.37	18.08	5.32	21.27	23.39	12.26	1.10	17.21	23.15	11.30	21.51	5.24		
	7.786	21.16	7.263	17.37	10.701	9.35	4.779	22.27	8.411	19.76	0.963	3.51	4.169	20.88	0.307	0.49	20.541	-23.26	19.65571	17
19	*****	*****	4.26	19.53	8.59	22.35	1.33	18.08	5.27	21.21	23.31	12.18	1.03	17.14	23.08	11.22	21.43	5.16		
	7.920	20.80	7.202	17.64	10.834	8.42	4.878	22.46	8.442	19.66	0.965	3.51	4.175	20.90	0.306	0.48	20.538	-23.27	19.78713	19
21	*****	*****	4.14	19.45	9.04	22.30	1.30	18.07	5.21	21.14	23.23	12.10	0.55	17.07	22.60	11.14	21.35	5.08		
	8.053	20.42	7.162	17.96	10.966	7.47	4.977	22.64	8.472	19.56	0.967	3.51	4.180	20.91	0.305	0.47	20.535	-23.28	19.91855	21
23	*****	*****	4.03	19.38	9.09	22.24	1.27	18.06	5.16	21.07	23.15	12.02	0.47	16.59	22.52	11.06	21.27	4.60		
	8.186	20.02	7.145	18.32	11.096	6.51	5.075	22.80	8.502	19.45	0.968	3.51	4.186	20.92	0.304	0.47	20.532	-23.30	20.04997	23
25	*****	*****	3.53	19.33	9.14	22.19	1.24	18.05	5.11	21.00	23.08	11.54	0.40	16.52	22.44	10.58	21.19	4.51		
	8.318	19.60	7.154	18.71	11.224	5.55	5.174	22.95	8.533	19.35	0.969	3.50	4.191	20.94	0.303	0.46	20.528	-23.31	20.18139	25
27	*****	*****	3.44	19.30	9.19	22.14	1.21	18.05	5.05	20.53	22.60	11.46	0.32	16.44	22.36	10.50	21.11	4.43		
	8.449	19.16	7.192	19.10	11.351	4.58	5.272	23.09	8.563	19.24	0.969	3.49	4.196	20.95	0.302	0.45	20.525	-23.33	20.31282	27
29	1.12	0.05	3.38	19.29	9.24	22.08	1.18	18.04	5.00	20.47	22.52	11.39	0.24	16.37	22.28	10.42	21.03	4.35		
	8.580	18.69	7.258	19.47	11.476	3.61	5.370	23.21	8.593	19.13	0.969	3.48	4.201	20.96	0.301	0.44	20.522	-23.34	20.44424	29
31	1.35	-0.06	3.33	19.29	9.29	22.02	1.15	18.02	4.55	20.40	22.44	11.31	0.17	16.29	22.20	10.34	20.55	4.27		
	8.710	18.21	7.353	19.80	11.600	2.63	5.468	23.32	8.624	19.02	0.968	3.47	4.206	20.98	0.299	0.43	20.519	-23.36	20.57566	31

# SIERPIEŃ 2026

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
213	1	Sob	254	7.54227	-6.21	8.4629	17.57	1.01491	22.4952	-6.18	61.291	2.8	92	503	1252.1	2040	2134	239.3	809	2151	1	
214	2	Nie	255	7.58192	-6.17	8.5021	17.42	1.01479	23.3526	-0.17	60.734	3.8	86	504	1252.0	2038	2143	322.2	927	2147	2	
215	3	Pon	256	8.02158	-6.12	8.5413	17.27	1.01467	0.2144	5.50	60.150	4.8	78	506	1251.9	2037	2153	405.4	1046	2143	3	
216	4	Wto	257	8.06123	-6.07	8.5805	17.11	1.01454	1.0955	11.50	59.548	5.8	68	508	1251.9	2035	2205	450.3	1208	2139	4	
217	5	Śro	258	8.10089	-6.01	9.0155	16.54	1.01440	2.0109	17.23	58.941	6.8	58	509	1251.8	2033	2221	538.2	1334	2135	5	
218	6	Czw	259	8.14054	-5.54	9.0545	16.38	1.01427	2.5626	22.10	58.353	0.3	46	511	1251.7	2031	2243	630.2	1503	2131	6	
219	7	Pią	260	8.18020	-5.47	9.0935	16.21	1.01412	3.5615	25.46	57.816	1.3	35	513	1251.5	2029	2317	727.4	1632	2127	7	
220	8	Sob	261	8.21586	-5.40	9.1324	16.04	1.01398	5.0005	27.47	57.375	2.3	24	514	1251.4	2027	****	829.2	1752	2123	8	
221	9	Nie	262	8.25551	-5.31	9.1712	15.47	1.01383	6.0608	27.55	57.074	3.3	15	516	1251.3	2025	010	934.0	1853	2119	9	
222	10	Pon	263	8.29517	-5.23	9.2060	15.30	1.01367	7.1146	26.05	56.958	4.3	7	518	1251.1	2023	125	1038.5	1934	2115	10	
223	11	Wto	264	8.33482	-5.13	9.2447	15.12	1.01351	8.1433	22.28	57.058	5.3	2	519	1251.0	2021	255	1140.1	2001	2111	11	
224	12	Śro	265	8.37448	-5.03	9.2834	14.54	1.01335	9.1312	17.28	57.384	6.3	0	521	1250.8	2019	430	1236.9	2019	2107	12	
225	13	Czw	266	8.41414	-4.53	9.3220	14.36	1.01317	10.0738	11.32	57.923	0.7	1	523	1250.6	2017	603	1329.0	2032	2104	13	
226	14	Pią	267	8.45379	-4.42	9.3605	14.17	1.01300	10.5835	5.09	58.635	1.7	4	525	1250.4	2015	731	1417.3	2043	2100	14	
227	15	Sob	268	8.49345	-4.30	9.3951	13.59	1.01282	11.4708	-1.18	59.464	2.7	9	526	1250.3	2013	855	1503.2	2053	2056	15	
228	16	Nie	269	8.53310	-4.18	9.4335	13.40	1.01263	12.3427	-7.30	60.342	3.7	16	528	1250.1	2011	1017	1547.8	2104	2052	16	
229	17	Pon	270	8.57276	-4.06	9.4719	13.21	1.01244	13.2135	-13.12	61.200	4.7	24	530	1249.8	2009	1137	1632.4	2115	2048	17	
230	18	Wto	271	9.01241	-3.53	9.5102	13.01	1.01224	14.0926	-18.13	61.973	5.7	34	531	1249.6	2007	1256	1717.9	2129	2044	18	
231	19	Śro	272	9.05207	-3.39	9.5445	12.42	1.01204	14.5839	-22.21	62.613	6.7	43	533	1249.4	2005	1414	1805.1	2148	2040	19	
232	20	Czw	273	9.09172	-3.25	9.5828	12.22	1.01184	15.4931	-25.28	63.081	0.3	53	535	1249.2	2002	1529	1854.1	2214	2036	20	
233	21	Pią	274	9.13138	-3.10	10.0210	12.02	1.01163	16.4157	-27.25	63.359	1.3	62	536	1248.9	2000	1636	1944.7	2251	2032	21	
234	22	Sob	275	9.17103	-2.55	10.0551	11.42	1.01142	17.3523	-28.07	63.441	2.3	71	538	1248.7	1958	1732	2036.1	2341	2028	22	
235	23	Nie	276	9.21069	-2.40	10.0932	11.22	1.01121	18.2859	-27.31	63.339	3.3	79	540	1248.4	1956	1814	2127.3	****	2024	23	
236	24	Pon	277	9.25035	-2.23	10.1312	11.01	1.01099	19.2148	-25.39	63.075	4.3	87	542	1248.1	1953	1844	2217.3	045	2020	24	
237	25	Wto	278	9.29000	-2.07	10.1653	10.41	1.01078	20.1309	-22.35	62.679	5.3	93	543	1247.9	1951	1905	2305.5	158	2016	25	
238	26	Śro	279	9.32566	-1.50	10.2032	10.20	1.01056	21.0242	-18.29	62.189	6.3	97	545	1247.6	1949	1920	2351.7	316	2012	26	
239	27	Czw	280	9.36531	-1.33	10.2412	9.59	1.01033	21.5034	-13.31	61.642	7.3	99	547	1247.3	1947	1933	*****	435	2008	27	
240	28	Pią	281	9.40497	-1.15	10.2750	9.38	1.01011	22.3715	-7.54	61.074	0.2	100	548	1247.0	1944	1943	036.3	554	2005	28	
241	29	Sob	282	9.44462	-0.57	10.3129	9.17	1.00989	23.2329	-1.52	60.514	1.2	98	550	1246.7	1942	1953	120.0	713	2001	29	
242	30	Nie	283	9.48428	-0.39	10.3507	8.55	1.00966	0.1011	4.21	59.983	2.2	95	552	1246.4	1940	2002	203.7	833	1957	30	
243	31	Pon	284	9.52393	-0.20	10.3845	8.34	1.00943	0.5825	10.28	59.495	3.2	89	554	1246.1	1937	2014	248.6	955	1953	31	

Fazy Księżycyca [Dm, h.mm]:      3kw 6, 4.21      Now 12, 19.37      1kw 20, 4.46      Pełn 28, 6.18

# SIERPIEŃ 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	1.43	23.55	3.32	19.30	9.31	21.59	1.13	18.02	4.52	20.37	22.40	11.27	0.13	16.25	22.16	10.30	20.51	4.23		
	8.775	17.96	7.411	19.95	11.661	2.14	5.517	23.37	8.639	18.97	0.968	3.46	4.208	20.98	0.299	0.42	20.517	-23.36	20.64137	1
3	1.57	23.43	3.31	19.32	9.36	21.54	1.11	18.00	4.47	20.30	22.32	11.19	0.05	16.18	22.08	10.22	20.43	4.15		
	8.904	17.44	7.549	20.18	11.783	1.16	5.615	23.46	8.669	18.86	0.967	3.45	4.212	20.99	0.297	0.41	20.514	-23.38	20.77279	3
5	2.08	23.32	3.32	19.35	9.40	21.48	1.08	17.59	4.42	20.23	22.24	11.10	23.54	16.10	22.01	10.14	20.35	4.07		
	9.032	16.91	7.714	20.31	11.903	0.18	5.713	23.53	8.699	18.75	0.965	3.43	4.217	21.00	0.295	0.40	20.511	-23.39	20.90420	5
7	2.18	23.22	3.35	19.38	9.45	21.42	1.05	17.57	4.36	20.16	22.17	11.02	23.46	16.03	21.53	10.06	20.27	3.58		
	9.160	16.36	7.903	20.31	12.022	-0.80	5.810	23.59	8.729	18.64	0.963	3.40	4.221	21.01	0.293	0.38	20.507	-23.40	21.03562	7
9	2.27	23.12	3.41	19.42	9.49	21.36	1.03	17.56	4.31	20.09	22.09	10.54	23.38	15.55	21.45	9.58	20.19	3.50		
	9.287	15.79	8.115	20.17	12.139	-1.78	5.907	23.64	8.759	18.52	0.961	3.38	4.224	21.02	0.291	0.37	20.504	-23.42	21.16705	9
11	2.36	23.04	3.49	19.46	9.53	21.30	1.01	17.54	4.26	20.02	22.01	10.46	23.31	15.48	21.37	9.50	20.11	3.42		
	9.413	15.20	8.347	19.87	12.255	-2.75	6.003	23.67	8.789	18.41	0.958	3.35	4.228	21.03	0.289	0.35	20.501	-23.43	21.29847	11
13	2.44	22.55	3.59	19.50	9.57	21.23	0.58	17.52	4.20	19.56	21.53	10.38	23.23	15.40	21.29	9.42	20.03	3.34		
	9.539	14.60	8.594	19.39	12.369	-3.71	6.100	23.70	8.819	18.30	0.955	3.32	4.231	21.04	0.287	0.34	20.498	-23.44	21.42989	13
15	2.51	22.47	4.11	19.53	10.01	21.17	0.56	17.50	4.15	19.49	21.45	10.30	23.15	15.32	21.21	9.34	19.55	3.26		
	9.664	13.98	8.853	18.73	12.482	-4.67	6.196	23.70	8.849	18.18	0.951	3.29	4.235	21.05	0.285	0.32	20.495	-23.45	21.56131	15
17	2.58	22.39	4.25	19.55	10.05	21.11	0.54	17.48	4.10	19.42	21.37	10.21	23.07	15.25	21.13	9.26	19.48	3.18		
	9.789	13.34	9.118	17.90	12.593	-5.62	6.291	23.70	8.878	18.07	0.947	3.26	4.238	21.06	0.283	0.31	20.492	-23.46	21.69272	17
19	3.05	22.32	4.40	19.57	10.09	21.04	0.52	17.45	4.04	19.35	21.29	10.13	22.60	15.17	21.05	9.18	19.40	3.10		
	9.913	12.70	9.386	16.91	12.703	-6.56	6.386	23.68	8.908	17.95	0.943	3.22	4.240	21.07	0.280	0.29	20.489	-23.48	21.82414	19
21	3.12	22.24	4.55	19.58	10.13	20.58	0.50	17.43	3.59	19.28	21.21	10.05	22.52	15.10	20.57	9.10	19.32	3.01		
	10.036	12.04	9.654	15.77	12.810	-7.49	6.481	23.65	8.937	17.84	0.938	3.18	4.243	21.07	0.278	0.27	20.486	-23.49	21.95556	21
23	3.18	22.17	5.11	19.58	10.16	20.51	0.48	17.40	3.54	19.21	21.13	9.56	22.44	15.02	20.49	9.01	19.24	2.53		
	10.159	11.36	9.918	14.51	12.916	-8.41	6.575	23.61	8.966	17.72	0.933	3.14	4.245	21.08	0.275	0.25	20.483	-23.50	22.08698	23
25	3.24	22.10	5.27	19.57	10.19	20.45	0.46	17.38	3.48	19.14	21.05	9.48	22.36	14.54	20.41	8.53	19.16	2.45		
	10.281	10.68	10.177	13.15	13.019	-9.31	6.669	23.56	8.995	17.60	0.927	3.10	4.247	21.08	0.272	0.23	20.480	-23.51	22.21840	25
27	3.30	22.03	5.42	19.56	10.23	20.38	0.45	17.35	3.43	19.07	20.57	9.39	22.28	14.46	20.33	8.45	19.08	2.37		
	10.403	9.98	10.429	11.72	13.121	-10.19	6.762	23.49	9.023	17.49	0.922	3.05	4.249	21.09	0.270	0.21	20.478	-23.52	22.34982	27
29	3.36	21.56	5.58	19.54	10.26	20.31	0.43	17.32	3.37	19.01	20.49	9.31	22.21	14.39	20.26	8.37	18.60	2.29		
	10.525	9.28	10.673	10.23	13.220	-11.06	6.855	23.41	9.052	17.37	0.915	3.01	4.251	21.09	0.267	0.19	20.475	-23.53	22.48124	29
31	3.41	21.50	6.12	19.52	10.28	20.24	0.41	17.29	3.32	18.54	20.41	9.22	22.13	14.31	20.18	8.29	18.52	2.21		
	10.646	8.56	10.910	8.70	13.316	-11.91	6.947	23.32	9.080	17.25	0.909	2.96	4.252	21.09	0.264	0.17	20.472	-23.54	22.61266	31

# WRZESIEŃ 2026

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
244	1	Wto	285	9.56359	-0.01	10.4223	8.12	1.00920	1.4914	16.12	59.055	4.2	81	555	1245.8	1935	2028	335.9	1120	1949	1	
245	2	Śro	286	10.00324	0.18	10.4560	7.50	1.00897	2.4332	21.11	58.666	5.2	71	557	1245.4	1933	2048	426.8	1249	1945	2	
246	3	Czw	287	10.04290	0.38	10.4937	7.28	1.00874	3.4148	25.04	58.332	6.2	60	559	1245.1	1930	2117	522.0	1418	1941	3	
247	4	Pią	288	10.08255	0.57	10.5314	7.06	1.00850	4.4342	27.27	58.058	0.1	49	600	1244.8	1928	2202	621.4	1540	1937	4	
248	5	Sob	289	10.12221	1.17	10.5650	6.44	1.00826	5.4750	28.05	57.857	1.1	38	602	1244.5	1926	2307	723.9	1646	1933	5	
249	6	Nie	290	10.16187	1.38	11.0027	6.21	1.00802	6.5200	26.51	57.750	2.1	27	604	1244.1	1923	****	826.9	1733	1929	6	
250	7	Pon	291	10.20152	1.58	11.0403	5.59	1.00777	7.5403	23.51	57.758	3.1	17	606	1243.8	1921	030	927.9	1803	1925	7	
251	8	Wto	292	10.24118	2.19	11.0739	5.36	1.00753	8.5237	19.24	57.902	4.1	9	607	1243.4	1918	202	1025.0	1824	1921	8	
252	9	Śro	293	10.28083	2.39	11.1115	5.14	1.00727	9.4723	13.52	58.197	5.1	4	609	1243.1	1916	334	1117.9	1839	1917	9	
253	10	Czw	294	10.32049	3.00	11.1450	4.51	1.00702	10.3853	7.42	58.643	6.1	1	611	1242.7	1914	503	1207.1	1850	1913	10	
254	11	Pią	295	10.36014	3.21	11.1826	4.28	1.00676	11.2802	1.16	59.224	0.3	0	612	1242.4	1911	628	1253.7	1901	1909	11	
255	12	Sob	296	10.39580	3.42	11.2201	4.05	1.00650	12.1553	-5.04	59.908	1.3	2	614	1242.0	1909	751	1338.9	1911	1906	12	
256	13	Nie	297	10.43545	4.03	11.2537	3.42	1.00624	13.0326	-11.03	60.648	2.3	6	616	1241.7	1906	912	1424.0	1922	1902	13	
257	14	Pon	298	10.47511	4.25	11.2912	3.19	1.00597	13.5135	-16.25	61.390	3.3	12	618	1241.3	1904	1032	1509.7	1935	1858	14	
258	15	Wto	299	10.51476	4.46	11.3247	2.56	1.00570	14.4057	-20.57	62.076	4.3	19	619	1241.0	1902	1152	1556.8	1952	1854	15	
259	16	Śro	300	10.55442	5.07	11.3622	2.33	1.00542	15.3152	-24.28	62.655	5.3	27	621	1240.6	1859	1310	1645.7	2015	1850	16	
260	17	Czw	301	10.59407	5.29	11.3957	2.10	1.00515	16.2417	-26.51	63.081	6.3	36	623	1240.3	1857	1422	1736.1	2047	1846	17	
261	18	Pią	302	11.03373	5.50	11.4333	1.47	1.00487	17.1741	-27.59	63.324	7.3	46	624	1239.9	1854	1523	1827.5	2132	1842	18	
262	19	Sob	303	11.07339	6.12	11.4708	1.24	1.00459	18.1117	-27.48	63.367	0.6	55	626	1239.6	1852	1610	1918.8	2231	1838	19	
263	20	Nie	304	11.11304	6.33	11.5043	1.00	1.00431	19.0414	-26.21	63.208	1.6	65	628	1239.2	1850	1645	2009.1	2340	1834	20	
264	21	Pon	305	11.15270	6.54	11.5418	0.37	1.00403	19.5549	-23.42	62.862	2.6	73	630	1238.8	1847	1709	2057.8	****	1830	21	
265	22	Wto	306	11.19235	7.16	11.5753	0.14	1.00374	20.4543	-19.58	62.358	3.6	82	631	1238.5	1845	1726	2144.5	056	1826	22	
266	23	Śro	307	11.23201	7.37	12.0129	-0.10	1.00346	21.3402	-15.18	61.736	4.6	89	633	1238.1	1842	1740	2229.7	214	1822	23	
267	24	Czw	308	11.27166	7.58	12.0504	-0.33	1.00318	22.2110	-9.53	61.046	5.6	94	635	1237.8	1840	1751	2313.9	333	1818	24	
268	25	Pią	309	11.31132	8.19	12.0840	-0.56	1.00289	23.0752	-3.57	60.339	6.6	98	636	1237.4	1837	1801	2358.1	452	1814	25	
269	26	Sob	310	11.35097	8.40	12.1216	-1.20	1.00261	23.5500	2.19	59.668	7.6	100	638	1237.1	1835	1811	*****	613	1811	26	
270	27	Nie	311	11.39063	9.00	12.1552	-1.43	1.00233	0.4336	8.36	59.076	0.7	99	640	1236.7	1833	1822	043.3	735	1807	27	
271	28	Pon	312	11.43028	9.21	12.1928	-2.06	1.00205	1.3443	14.35	58.595	1.7	96	642	1236.4	1830	1836	130.7	901	1803	28	
272	29	Wto	313	11.46594	9.41	12.2304	-2.30	1.00177	2.2913	19.54	58.242	2.7	91	643	1236.1	1828	1854	221.5	1031	1759	29	
273	30	Śro	314	11.50559	10.01	12.2641	-2.53	1.00149	3.2734	24.09	58.019	3.7	83	645	1235.7	1825	1920	316.5	1202	1755	30	

Fazy Księżyca [Dm, h.mm]:      3kw 4, 9.51      Nów 11, 5.27      1kw 18, 22.44      Pełn 26, 18.49

# WRZESIEŃ 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	3.44	21.47	6.20	19.51	10.30	20.21	0.41	17.27	3.29	18.50	20.37	9.18	22.09	14.27	20.14	8.25	18.48	2.17		
	10.706	8.20	11.026	7.92	13.363	-12.32	6.993	23.28	9.094	17.19	0.906	2.94	4.253	21.10	0.262	0.16	20.471	-23.54	22.67837	1
3	3.49	21.40	6.34	19.48	10.32	20.14	0.39	17.24	3.24	18.43	20.29	9.10	22.01	14.19	20.06	8.17	18.40	2.09		
	10.827	7.47	11.252	6.36	13.456	-13.14	7.085	23.17	9.122	17.08	0.899	2.88	4.253	21.10	0.259	0.14	20.469	-23.55	22.80979	3
5	3.54	21.34	6.48	19.45	10.34	20.06	0.37	17.21	3.18	18.36	20.21	9.01	21.53	14.11	19.58	8.09	18.32	2.01		
	10.947	6.73	11.472	4.78	13.545	-13.93	7.176	23.06	9.150	16.96	0.891	2.83	4.254	21.10	0.256	0.12	20.466	-23.56	22.94121	5
7	3.59	21.27	7.01	19.41	10.36	19.59	0.36	17.17	3.13	18.29	20.13	8.52	21.45	14.04	19.50	8.00	18.24	1.53		
	11.067	5.98	11.685	3.21	13.630	-14.70	7.266	22.93	9.178	16.84	0.884	2.78	4.255	21.10	0.253	0.10	20.464	-23.57	23.07263	7
9	4.04	21.21	7.14	19.37	10.37	19.52	0.34	17.14	3.07	18.22	20.05	8.44	21.38	13.56	19.42	7.52	18.16	1.45		
	11.187	5.23	11.892	1.65	13.712	-15.44	7.356	22.79	9.205	16.73	0.876	2.72	4.255	21.10	0.250	0.08	20.462	-23.57	23.20405	9
11	4.09	21.15	7.27	19.33	10.39	19.44	0.33	17.10	3.02	18.15	19.57	8.35	21.30	13.48	19.34	7.44	18.08	1.37		
	11.307	4.47	12.094	0.10	13.790	-16.15	7.445	22.65	9.232	16.61	0.868	2.67	4.255	21.10	0.247	0.06	20.459	-23.58	23.33547	11
13	4.13	21.09	7.39	19.29	10.39	19.36	0.32	17.07	2.56	18.08	19.49	8.26	21.22	13.40	19.26	7.36	18.00	1.29		
	11.427	3.71	12.291	-1.42	13.864	-16.83	7.533	22.49	9.259	16.49	0.859	2.61	4.255	21.10	0.244	0.04	20.457	-23.59	23.46688	13
15	4.18	21.03	7.50	19.25	10.40	19.29	0.30	17.03	2.51	18.01	19.41	8.18	21.14	13.32	19.18	7.28	17.52	1.21		
	11.546	2.94	12.483	-2.92	13.932	-17.48	7.621	22.33	9.285	16.38	0.851	2.55	4.254	21.10	0.240	0.02	20.455	-23.59	23.59830	15
17	4.22	20.58	8.01	19.20	10.39	19.21	0.29	16.59	2.45	17.54	19.33	8.09	21.06	13.24	19.10	7.20	17.44	1.13		
	11.666	2.17	12.672	-4.40	13.995	-18.09	7.708	22.15	9.311	16.26	0.842	2.49	4.254	21.10	0.237	-0.01	20.454	-23.60	23.72972	17
19	4.27	20.52	8.12	19.16	10.39	19.12	0.28	16.55	2.40	17.47	19.25	8.00	20.58	13.16	19.02	7.11	17.36	1.05		
	11.785	1.39	12.857	-5.83	14.052	-18.66	7.794	21.97	9.337	16.15	0.833	2.43	4.253	21.10	0.234	-0.03	20.452	-23.60	23.86114	19
21	4.31	20.46	8.23	19.11	10.37	19.04	0.26	16.50	2.34	17.40	19.17	7.52	20.50	13.08	18.54	7.03	17.29	0.57		
	11.905	0.62	13.038	-7.24	14.103	-19.18	7.879	21.78	9.363	16.04	0.824	2.37	4.252	21.09	0.230	-0.05	20.450	-23.61	23.99256	21
23	4.35	20.41	8.33	19.06	10.35	18.56	0.25	16.46	2.28	17.33	19.09	7.43	20.42	13.00	18.46	6.55	17.21	0.49		
	12.025	-0.16	13.216	-8.60	14.147	-19.66	7.964	21.59	9.388	15.93	0.815	2.31	4.250	21.09	0.227	-0.07	20.449	-23.61	0.12398	23
25	4.39	20.35	8.43	19.02	10.32	18.47	0.24	16.42	2.23	17.26	19.01	7.34	20.34	12.52	18.38	6.47	17.13	0.41		
	12.144	-0.94	13.391	-9.92	14.183	-20.09	8.048	21.38	9.413	15.81	0.806	2.25	4.249	21.09	0.223	-0.10	20.447	-23.62	0.25540	25
27	4.43	20.30	8.53	18.57	10.29	18.38	0.22	16.37	2.17	17.19	18.53	7.25	20.27	12.44	18.30	6.39	17.05	0.33		
	12.264	-1.72	13.563	-11.19	14.210	-20.46	8.132	21.17	9.437	15.70	0.796	2.18	4.247	21.08	0.220	-0.12	20.446	-23.62	0.38681	27
29	4.47	20.25	9.02	18.52	10.24	18.30	0.21	16.33	2.11	17.12	18.45	7.17	20.19	12.36	18.22	6.30	16.57	0.25		
	12.385	-2.49	13.731	-12.42	14.230	-20.77	8.214	20.95	9.461	15.59	0.787	2.12	4.245	21.08	0.217	-0.14	20.445	-23.62	0.51823	29

# PAŹDZIERNIK 2026

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2461																					
274	1	Czw	315	11.54525	10.20	12.3018	-3.16	1.00121	4.2926	26.57	57.917	4.7	74	647	1235.4	1823	2001	415.6	1328	1751	1
275	2	Pią	316	11.58490	10.39	12.3355	-3.39	1.00093	5.3325	27.59	57.921	5.7	63	649	1235.1	1821	2100	517.8	1440	1747	2
276	3	Sob	317	12.02456	10.58	12.3733	-4.03	1.00065	6.3723	27.11	58.013	6.7	52	650	1234.8	1818	2217	620.7	1532	1743	3
277	4	Nie	318	12.06422	11.17	12.4111	-4.26	1.00037	7.3911	24.37	58.182	0.9	40	652	1234.5	1816	2345	721.6	1606	1739	4
278	5	Pon	319	12.10387	11.35	12.4449	-4.49	1.00009	8.3727	20.35	58.420	1.9	29	654	1234.2	1813	****	818.8	1629	1735	5
279	6	Wto	320	12.14353	11.53	12.4828	-5.12	0.99981	9.3156	15.28	58.727	2.9	20	656	1233.9	1811	115	911.7	1646	1731	6
280	7	Śro	321	12.18318	12.10	12.5207	-5.35	0.99953	10.2306	9.37	59.103	3.9	12	657	1233.6	1809	242	1000.8	1658	1727	7
281	8	Czw	322	12.22284	12.27	12.5547	-5.58	0.99925	11.1153	3.23	59.550	4.9	6	659	1233.3	1806	407	1047.2	1709	1723	8
282	9	Pią	323	12.26249	12.44	12.5927	-6.21	0.99896	11.5920	-2.54	60.064	5.9	2	701	1233.0	1804	529	1132.1	1719	1719	9
283	10	Sob	324	12.30215	12.60	13.0307	-6.43	0.99868	12.4630	-8.57	60.632	6.9	0	703	1232.7	1802	649	1216.7	1729	1715	10
284	11	Nie	325	12.34180	13.16	13.0648	-7.06	0.99839	13.3416	-14.30	61.232	0.8	1	705	1232.5	1759	809	1301.9	1742	1712	11
285	12	Pon	326	12.38146	13.31	13.1030	-7.29	0.99811	14.2318	-19.20	61.832	1.8	3	706	1232.2	1757	930	1348.6	1757	1708	12
286	13	Wto	327	12.42111	13.45	13.1411	-7.51	0.99782	15.1359	-23.14	62.391	2.8	8	708	1232.0	1755	1049	1437.0	1817	1704	13
287	14	Śro	328	12.46077	13.59	13.1754	-8.13	0.99753	16.0616	-26.02	62.868	3.8	14	710	1231.8	1753	1204	1527.3	1846	1700	14
288	15	Czw	329	12.50042	14.13	13.2137	-8.36	0.99724	16.5941	-27.35	63.220	4.8	21	712	1231.5	1750	1310	1618.6	1926	1656	15
289	16	Pią	330	12.54008	14.26	13.2520	-8.58	0.99695	17.5323	-27.50	63.414	5.8	29	714	1231.3	1748	1403	1710.1	2019	1652	16
290	17	Sob	331	12.57574	14.38	13.2905	-9.20	0.99667	18.4627	-26.48	63.421	6.8	38	716	1231.1	1746	1442	1800.6	2124	1648	17
291	18	Nie	332	13.01539	14.50	13.3249	-9.42	0.99638	19.3807	-24.34	63.228	7.8	48	717	1230.9	1744	1510	1849.5	2237	1644	18
292	19	Pon	333	13.05505	15.02	13.3635	-10.03	0.99609	20.2801	-21.14	62.837	0.7	57	719	1230.7	1741	1530	1936.4	2353	1640	19
293	20	Wto	334	13.09470	15.12	13.4020	-10.25	0.99581	21.1611	-16.58	62.263	1.7	66	721	1230.5	1739	1545	2021.5	****	1636	20
294	21	Śro	335	13.13436	15.22	13.4407	-10.46	0.99552	22.0304	-11.54	61.542	2.7	75	723	1230.4	1737	1557	2105.5	110	1632	21
295	22	Czw	336	13.17401	15.32	13.4754	-11.08	0.99524	22.4924	-6.13	60.721	3.7	84	725	1230.2	1735	1608	2149.2	228	1628	22
296	23	Pią	337	13.21367	15.40	13.5142	-11.29	0.99496	23.3605	-0.07	59.861	4.7	91	727	1230.1	1733	1618	2233.7	347	1624	23
297	24	Sob	338	13.25332	15.49	13.5530	-11.49	0.99468	0.2412	6.10	59.029	5.7	96	728	1229.9	1731	1629	2320.4	508	1620	24
298	25	Nie	339	13.29298	15.56	13.5920	-12.10	0.99441	1.1452	12.21	58.293	6.7	99	730	1229.8	1729	1641	*****	633	1616	25
298	25	Nie	339	14.29397	15.56	13.5929	-12.11	0.99440	1.1703	12.36	58.265	6.8	99	630	1129.8	1629	1541	2310.5	533	1516	25
299	26	Pon	340	14.33362	16.03	14.0319	-12.32	0.99413	2.1130	18.15	57.689	0.3	100	632	1129.7	1626	1558	*****	703	1513	26
300	27	Wto	341	14.37328	16.09	14.0710	-12.52	0.99386	3.1014	22.57	57.310	1.3	98	634	1129.6	1624	1622	005.0	836	1509	27
301	28	Śro	342	14.41293	16.14	14.1101	-13.12	0.99359	4.1303	26.14	57.143	2.3	93	636	1129.5	1622	1658	104.4	1008	1505	28
302	29	Czw	343	14.45259	16.18	14.1453	-13.32	0.99333	5.1830	27.44	57.183	3.3	86	638	1129.4	1620	1752	207.7	1128	1501	29
303	30	Pią	344	14.49224	16.22	14.1846	-13.52	0.99307	6.2411	27.17	57.402	4.3	76	640	1129.4	1618	1905	312.4	1228	1457	30
304	31	Sob	345	14.53190	16.24	14.2240	-14.11	0.99282	7.2731	25.00	57.763	5.3	66	642	1129.3	1616	2032	415.5	1308	1453	31

Fazy Księżycyca [Dm, h.mm]:      3kw 3, 15.25      Nów 10, 17.50      1kw 18, 18.13      1kw 18, 17.13      Pełn 26, 5.12



# PAŹDZIERNIK 2026 (c.d.)

Świty, zmierychy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.51	20.19	9.11	18.47	10.19	18.21	0.20	16.28	2.06	17.05	18.36	7.08	20.11	12.28	18.14	6.22	16.49	0.17		
	12.505	-3.27	13.897	-13.59	14.240	-21.01	8.296	20.72	9.485	15.49	0.777	2.06	4.242	21.07	0.213	-0.16	20.444	-23.63	0.64965	1
3	4.55	20.14	9.19	18.42	10.12	18.12	0.18	16.24	1.60	16.58	18.28	6.59	20.03	12.20	18.07	6.14	16.41	0.09		
	12.626	-4.04	14.058	-14.70	14.240	-21.19	8.377	20.49	9.508	15.38	0.768	2.00	4.240	21.07	0.210	-0.18	20.443	-23.63	0.78107	3
5	4.59	20.09	9.27	18.38	10.04	18.02	0.17	16.19	1.54	16.50	18.20	6.50	19.55	12.12	17.59	6.06	16.33	23.57		
	12.747	-4.82	14.215	-15.75	14.231	-21.28	8.457	20.26	9.531	15.27	0.758	1.94	4.237	21.06	0.207	-0.21	20.442	-23.63	0.91249	5
7	5.02	20.04	9.34	18.33	9.55	17.53	0.15	16.14	1.48	16.43	18.12	6.42	19.47	12.04	17.51	5.58	16.25	23.49		
	12.869	-5.58	14.367	-16.73	14.212	-21.29	8.536	20.01	9.554	15.17	0.748	1.88	4.234	21.05	0.203	-0.23	20.442	-23.63	1.04391	7
9	5.06	19.60	9.41	18.28	9.45	17.44	0.14	16.09	1.42	16.36	18.04	6.33	19.39	11.56	17.43	5.50	16.17	23.41		
	12.991	-6.34	14.512	-17.64	14.184	-21.22	8.615	19.77	9.576	15.07	0.739	1.81	4.231	21.04	0.200	-0.25	20.441	-23.63	1.17533	9
11	5.10	19.55	9.47	18.23	9.34	17.35	0.12	16.04	1.36	16.29	17.56	6.24	19.31	11.48	17.35	5.41	16.09	23.33		
	13.113	-7.10	14.650	-18.46	14.146	-21.05	8.693	19.52	9.598	14.97	0.729	1.75	4.228	21.03	0.197	-0.27	20.441	-23.63	1.30674	11
13	5.13	19.50	9.51	18.18	9.22	17.27	0.11	15.59	1.30	16.22	17.48	6.15	19.23	11.40	17.27	5.33	16.02	23.25		
	13.237	-7.85	14.778	-19.19	14.099	-20.79	8.769	19.26	9.619	14.87	0.720	1.69	4.224	21.03	0.193	-0.29	20.440	-23.63	1.43816	13
15	5.17	19.46	9.55	18.13	9.08	17.18	0.09	15.54	1.24	16.15	17.40	6.07	19.15	11.32	17.19	5.25	15.54	23.17		
	13.360	-8.59	14.895	-19.82	14.044	-20.43	8.845	19.00	9.639	14.77	0.710	1.64	4.220	21.02	0.190	-0.31	20.440	-23.63	1.56958	15
17	5.21	19.41	9.56	18.08	8.53	17.09	0.08	15.49	1.18	16.07	17.31	5.58	19.07	11.23	17.11	5.17	15.46	23.10		
	13.485	-9.33	14.997	-20.33	13.983	-19.97	8.920	18.74	9.660	14.68	0.701	1.58	4.217	21.01	0.187	-0.33	20.440	-23.63	1.70100	17
19	5.24	19.37	9.56	18.02	8.38	17.01	0.06	15.44	1.12	16.00	17.23	5.49	18.59	11.15	17.03	5.09	15.38	23.02		
	13.610	-10.06	15.080	-20.70	13.916	-19.43	8.994	18.47	9.679	14.59	0.692	1.52	4.212	21.00	0.184	-0.35	20.440	-23.63	1.83242	19
21	5.28	19.33	9.53	17.57	8.21	16.53	0.04	15.39	1.06	15.53	17.15	5.40	18.51	11.07	16.55	5.01	15.30	22.54		
	13.735	-10.77	15.141	-20.92	13.846	-18.80	9.067	18.20	9.699	14.50	0.683	1.47	4.208	20.99	0.181	-0.37	20.441	-23.62	1.96384	21
23	5.31	19.29	9.48	17.50	8.05	16.46	0.03	15.33	0.60	15.45	17.07	5.32	18.42	10.59	16.47	4.52	15.22	22.46		
	13.862	-11.48	15.175	-20.95	13.775	-18.09	9.140	17.93	9.717	14.41	0.674	1.41	4.204	20.97	0.178	-0.39	20.441	-23.62	2.09526	23
25	5.34	19.25	9.39	17.44	7.48	16.39	23.57	15.28	0.53	15.38	16.59	5.23	18.34	10.51	16.39	4.44	15.14	22.38		
	13.989	-12.17	15.176	-20.77	13.704	-17.34	9.211	17.66	9.735	14.33	0.665	1.36	4.199	20.96	0.175	-0.41	20.441	-23.62	2.22668	25
25	4.34	18.25	8.39	16.44	6.48	15.39	22.57	14.28	23.49	14.38	15.59	4.23	17.34	9.51	15.39	3.44	14.14	21.38		
	13.991	-12.18	15.176	-20.76	13.703	-17.32	9.212	17.66	9.736	14.32	0.665	1.36	4.199	20.96	0.175	-0.41	20.441	-23.62	2.22668	25
27	4.38	18.21	8.25	16.37	6.31	15.32	22.55	14.22	23.43	14.31	15.51	4.14	17.26	9.42	15.31	3.36	14.07	21.31		
	14.119	-12.87	15.139	-20.32	13.635	-16.52	9.283	17.38	9.753	14.24	0.656	1.31	4.194	20.95	0.172	-0.42	20.442	-23.61	2.35810	27
29	4.41	18.18	8.08	16.29	6.14	15.25	22.53	14.17	23.37	14.24	15.43	4.06	17.18	9.34	15.23	3.28	13.59	21.23		
	14.248	-13.53	15.063	-19.61	13.571	-15.70	9.352	17.11	9.770	14.16	0.648	1.26	4.189	20.94	0.170	-0.44	20.443	-23.61	2.48952	29
31	4.45	18.14	7.47	16.21	5.58	15.19	22.51	14.11	23.30	14.16	15.35	3.57	17.10	9.26	15.15	3.20	13.51	21.15		
	14.378	-14.19	14.951	-18.61	13.515	-14.88	9.420	16.84	9.786	14.08	0.640	1.22	4.184	20.93	0.167	-0.46	20.444	-23.60	2.62094	31

# LISTOPAD 2026

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Nie	346	14.57156	16.26	14.2635	-14.30	0.99256	8.2655	21.12	58.221	6.3	54	643	1129.3	1614	2202	514.5	1334	1449	1
306	2	Pon	347	15.01121	16.28	14.3030	-14.49	0.99231	9.2157	16.16	58.739	0.6	43	645	1129.3	1613	2330	608.7	1352	1445	2
307	3	Wto	348	15.05087	16.28	14.3426	-15.08	0.99206	10.1312	10.36	59.285	1.6	33	647	1129.3	1611	****	658.5	1406	1441	3
308	4	Śro	349	15.09052	16.27	14.3823	-15.27	0.99182	11.0140	4.33	59.840	2.6	23	649	1129.3	1609	054	744.9	1417	1437	4
309	5	Czw	350	15.13018	16.26	14.4221	-15.45	0.99157	11.4832	-1.36	60.391	3.6	15	651	1129.3	1607	214	829.3	1427	1433	5
310	6	Pią	351	15.16583	16.24	14.4620	-16.03	0.99133	12.3456	-7.35	60.932	4.6	8	653	1129.3	1605	333	913.1	1437	1429	6
311	7	Sob	352	15.20549	16.21	14.5020	-16.21	0.99109	13.2150	-13.10	61.459	5.6	3	655	1129.4	1603	452	957.3	1449	1425	7
312	8	Nie	353	15.24514	16.17	14.5420	-16.38	0.99085	14.1003	-18.06	61.965	6.6	1	657	1129.5	1602	611	1042.8	1503	1421	8
313	9	Pon	354	15.28480	16.12	14.5822	-16.56	0.99061	15.0002	-22.13	62.440	0.2	0	659	1129.5	1600	730	1130.2	1522	1418	9
314	10	Wto	355	15.32445	16.07	15.0224	-17.13	0.99037	15.5151	-25.16	62.865	1.2	1	700	1129.6	1558	846	1219.9	1547	1414	10
315	11	Śro	356	15.36411	16.00	15.0627	-17.29	0.99013	16.4504	-27.08	63.217	2.2	4	702	1129.7	1557	956	1310.9	1623	1410	11
316	12	Czw	357	15.40377	15.53	15.1031	-17.46	0.98990	17.3851	-27.42	63.468	3.2	9	704	1129.9	1555	1054	1402.5	1711	1406	12
317	13	Pią	358	15.44342	15.45	15.1435	-18.02	0.98967	18.3208	-26.59	63.588	4.2	15	706	1130.0	1553	1139	1453.5	1812	1402	13
318	14	Sob	359	15.48308	15.36	15.1841	-18.17	0.98943	19.2360	-25.03	63.552	5.2	23	708	1130.2	1552	1211	1542.8	1922	1358	14
319	15	Nie	360	15.52273	15.26	15.2247	-18.33	0.98921	20.1354	-22.01	63.338	6.2	31	710	1130.3	1550	1233	1629.9	2036	1354	15
320	16	Pon	361	15.56239	15.15	15.2654	-18.48	0.98898	21.0149	-18.03	62.936	7.2	40	711	1130.5	1549	1250	1714.8	2151	1350	16
321	17	Wto	362	16.00205	15.04	15.3102	-19.02	0.98876	21.4807	-13.19	62.348	8.2	50	713	1130.7	1548	1303	1758.2	2307	1346	17
322	18	Śro	363	16.04170	14.52	15.3511	-19.17	0.98854	22.3331	-7.57	61.595	1.0	59	715	1130.9	1546	1313	1840.8	****	1342	18
323	19	Czw	364	16.08136	14.38	15.3921	-19.31	0.98832	23.1856	-2.08	60.711	2.0	69	717	1131.1	1545	1323	1923.7	023	1338	19
324	20	Pią	365	16.12101	14.25	15.4331	-19.45	0.98811	0.0529	3.57	59.752	3.0	78	719	1131.3	1544	1334	2008.3	141	1334	20
325	21	Sob	366	16.16067	14.10	15.4742	-19.58	0.98791	0.5422	10.05	58.786	4.0	87	720	1131.6	1542	1345	2055.9	302	1330	21
326	22	Nie	367	16.20032	13.55	15.5154	-20.11	0.98770	1.4652	15.55	57.892	5.0	93	722	1131.8	1541	1400	2148.0	429	1326	22
327	23	Pon	368	16.23598	13.38	15.5607	-20.23	0.98751	2.4400	21.03	57.148	6.0	98	724	1132.1	1540	1420	2245.5	600	1322	23
328	24	Wto	369	16.27563	13.21	16.0021	-20.36	0.98731	3.4608	24.59	56.624	7.0	100	725	1132.4	1539	1451	2348.5	734	1319	24
329	25	Śro	370	16.31529	13.04	16.0435	-20.48	0.98713	4.5223	27.15	56.365	0.8	99	727	1132.7	1538	1537	*****	903	1315	25
330	26	Czw	371	16.35495	12.45	16.0850	-20.59	0.98695	6.0022	27.30	56.387	1.8	95	729	1133.0	1537	1645	055.0	1014	1311	26
331	27	Pią	372	16.39460	12.26	16.1306	-21.10	0.98677	7.0658	25.44	56.673	2.8	88	730	1133.3	1536	1811	201.6	1104	1307	27
332	28	Sob	373	16.43426	12.06	16.1722	-21.21	0.98660	8.0941	22.13	57.178	3.8	80	732	1133.7	1535	1944	304.7	1136	1303	28
333	29	Nie	374	16.47392	11.45	16.2140	-21.31	0.98643	9.0731	17.24	57.843	4.8	70	734	1134.0	1534	2115	402.6	1157	1259	29
334	30	Pon	375	16.51357	11.24	16.2558	-21.41	0.98627	10.0043	11.46	58.600	5.8	59	735	1134.4	1533	2242	455.1	1213	1255	30

Fazy Księżyca [Dm, h.mm]:      3kw 1, 21.28      Now 9, 8.02      1kw 17, 12.48      Pełn 24, 15.54

# LISTOPAD 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.46	18.12	7.35	16.17	5.50	15.16	22.50	14.09	23.27	14.13	15.31	3.53	17.06	9.22	15.11	3.16	13.47	21.11		
	14.443	-14.51	14.882	-18.01	13.489	-14.47	9.454	16.70	9.794	14.05	0.636	1.19	4.182	20.92	0.166	-0.46	20.444	-23.60	2.68665	1
3	4.49	18.09	7.10	16.09	5.35	15.10	22.48	14.03	23.21	14.05	15.23	3.44	16.58	9.13	15.03	3.08	13.39	21.03		
	14.574	-15.14	14.731	-16.67	13.444	-13.68	9.521	16.43	9.810	13.98	0.629	1.15	4.177	20.91	0.163	-0.48	20.446	-23.60	2.81807	3
5	4.53	18.06	6.44	16.00	5.20	15.04	22.46	13.57	23.14	13.58	15.15	3.36	16.50	9.05	14.55	2.60	13.31	20.56		
	14.706	-15.75	14.574	-15.22	13.408	-12.93	9.587	16.15	9.825	13.91	0.621	1.11	4.171	20.89	0.161	-0.49	20.447	-23.59	2.94949	5
7	4.56	18.03	6.19	15.52	5.07	14.59	22.44	13.52	23.07	13.50	15.06	3.27	16.42	8.57	14.48	2.52	13.23	20.48		
	14.839	-16.35	14.431	-13.82	13.382	-12.23	9.651	15.88	9.839	13.84	0.614	1.07	4.166	20.88	0.158	-0.51	20.448	-23.59	3.08091	7
9	4.59	18.00	5.57	15.45	4.54	14.54	22.41	13.46	23.01	13.43	14.58	3.19	16.34	8.49	14.40	2.44	13.16	20.40		
	14.973	-16.93	14.319	-12.63	13.367	-11.60	9.715	15.61	9.852	13.78	0.607	1.03	4.160	20.86	0.156	-0.52	20.450	-23.58	3.21232	9
11	5.02	17.57	5.40	15.38	4.43	14.49	22.39	13.40	22.54	13.35	14.50	3.10	16.26	8.40	14.32	2.36	13.08	20.32		
	15.107	-17.49	14.250	-11.78	13.361	-11.04	9.777	15.34	9.865	13.72	0.601	1.00	4.155	20.85	0.154	-0.53	20.451	-23.57	3.34375	11
13	5.05	17.55	5.28	15.31	4.33	14.44	22.36	13.34	22.47	13.28	14.42	3.02	16.18	8.32	14.24	2.27	12.60	20.25		
	15.243	-18.03	14.229	-11.29	13.365	-10.55	9.838	15.08	9.877	13.66	0.595	0.96	4.149	20.83	0.152	-0.55	20.453	-23.56	3.47517	13
15	5.08	17.53	5.21	15.26	4.23	14.39	22.34	13.28	22.40	13.21	14.34	2.54	16.10	8.24	14.16	2.19	12.52	20.17		
	15.380	-18.54	14.253	-11.17	13.379	-10.14	9.898	14.81	9.889	13.61	0.589	0.93	4.144	20.82	0.150	-0.56	20.455	-23.56	3.60659	15
17	5.11	17.50	5.18	15.20	4.15	14.35	22.31	13.22	22.33	13.13	14.26	2.45	16.01	8.15	14.08	2.11	12.44	20.09		
	15.517	-19.04	14.316	-11.37	13.402	-9.80	9.957	14.56	9.900	13.56	0.584	0.91	4.138	20.80	0.148	-0.57	20.457	-23.55	3.73801	17
19	5.14	17.48	5.19	15.16	4.07	14.30	22.28	13.16	22.26	13.05	14.18	2.37	15.53	8.07	14.00	2.03	12.37	20.02		
	15.656	-19.51	14.412	-11.83	13.434	-9.55	10.014	14.30	9.910	13.52	0.579	0.88	4.132	20.79	0.147	-0.58	20.459	-23.54	3.86943	19
21	5.17	17.46	5.22	15.11	4.01	14.26	22.25	13.10	22.19	12.58	14.10	2.29	15.45	7.59	13.52	1.55	12.29	19.54		
	15.795	-19.96	14.535	-12.48	13.474	-9.36	10.070	14.05	9.919	13.48	0.574	0.86	4.126	20.77	0.145	-0.59	20.462	-23.53	4.00085	21
23	5.20	17.45	5.27	15.08	3.55	14.21	22.22	13.04	22.12	12.50	14.02	2.21	15.37	7.50	13.44	1.47	12.21	19.46		
	15.935	-20.39	14.678	-13.27	13.523	-9.25	10.125	13.81	9.927	13.44	0.570	0.84	4.120	20.76	0.144	-0.59	20.464	-23.52	4.13227	23
25	5.23	17.43	5.34	15.04	3.51	14.17	22.19	12.58	22.05	12.43	13.54	2.12	15.29	7.42	13.36	1.39	12.13	19.39		
	16.076	-20.79	14.838	-14.15	13.578	-9.21	10.179	13.57	9.935	13.41	0.566	0.83	4.114	20.74	0.143	-0.60	20.467	-23.51	4.26369	25
27	5.25	17.42	5.42	15.01	3.47	14.13	22.15	12.52	21.58	12.35	13.46	2.04	15.21	7.34	13.28	1.31	12.05	19.31		
	16.218	-21.17	15.010	-15.08	13.641	-9.23	10.231	13.34	9.942	13.38	0.563	0.81	4.108	20.73	0.141	-0.61	20.469	-23.50	4.39512	27
29	5.28	17.41	5.51	14.58	3.43	14.09	22.12	12.46	21.50	12.27	13.38	1.56	15.13	7.25	13.21	1.24	11.58	19.23		
	16.361	-21.52	15.191	-16.04	13.711	-9.31	10.281	13.11	9.948	13.35	0.560	0.80	4.103	20.71	0.140	-0.61	20.472	-23.49	4.52654	29

# GRUDZIEŃ 2026

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →									Czas strefowy [hhmm.]									
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
335	1	Wto	376	16.55323	11.01	16.3016	-21.50	0.98611	10.5021	5.42	59.388	0.2	48	737	1134.7	1533	****	543.2	1225	1251	1	
336	2	Śro	377	16.59288	10.39	16.3436	-21.59	0.98596	11.3740	-0.26	60.159	1.2	37	738	1135.1	1532	004	628.4	1235	1247	2	
337	3	Czw	378	17.03254	10.15	16.3856	-22.08	0.98581	12.2357	-6.26	60.878	2.2	27	739	1135.5	1531	123	712.1	1246	1243	3	
338	4	Pią	379	17.07219	9.51	16.4316	-22.16	0.98567	13.1018	-12.02	61.526	3.2	19	741	1135.9	1531	241	755.7	1257	1239	4	
339	5	Sob	380	17.11185	9.27	16.4737	-22.24	0.98553	13.5741	-17.03	62.093	4.2	12	742	1136.3	1530	359	840.3	1310	1235	5	
340	6	Nie	381	17.15150	9.02	16.5159	-22.31	0.98539	14.4643	-21.18	62.578	5.2	6	743	1136.7	1530	517	926.6	1327	1231	6	
341	7	Pon	382	17.19116	8.36	16.5621	-22.38	0.98525	15.3740	-24.34	62.980	6.2	2	745	1137.1	1529	633	1015.0	1350	1227	7	
342	8	Wto	383	17.23082	8.10	17.0044	-22.44	0.98512	16.3018	-26.42	63.301	7.2	0	746	1137.6	1529	745	1105.4	1422	1223	8	
343	9	Śro	384	17.27047	7.43	17.0507	-22.50	0.98499	17.2354	-27.35	63.538	0.4	0	747	1138.0	1529	847	1156.8	1506	1220	9	
344	10	Czw	385	17.31013	7.16	17.0931	-22.56	0.98487	18.1723	-27.10	63.681	1.4	2	748	1138.5	1528	936	1248.0	1603	1216	10	
345	11	Pią	386	17.34579	6.48	17.1355	-23.01	0.98475	19.0941	-25.31	63.718	2.4	5	749	1138.9	1528	1011	1338.0	1710	1212	11	
346	12	Sob	387	17.38544	6.20	17.1820	-23.06	0.98463	20.0003	-22.45	63.633	3.4	10	750	1139.4	1528	1037	1425.8	1823	1208	12	
347	13	Nie	388	17.42510	5.52	17.2244	-23.10	0.98451	20.4813	-19.02	63.407	4.4	16	751	1139.9	1528	1055	1511.1	1938	1204	13	
348	14	Pon	389	17.46475	5.24	17.2709	-23.13	0.98440	21.3424	-14.31	63.028	5.4	24	752	1140.4	1528	1109	1554.4	2052	1200	14	
349	15	Wto	390	17.50441	4.55	17.3135	-23.17	0.98430	22.1911	-9.25	62.486	6.4	33	753	1140.8	1528	1120	1636.2	2207	1156	15	
350	16	Śro	391	17.54406	4.26	17.3600	-23.19	0.98419	23.0327	-3.51	61.787	7.4	42	754	1141.3	1528	1130	1717.7	2321	1152	16	
351	17	Czw	392	17.58372	3.57	17.4026	-23.22	0.98410	23.4811	1.60	60.948	0.2	52	755	1141.8	1529	1139	1700.0	****	1148	17	
352	18	Pią	393	18.02337	3.27	17.4452	-23.24	0.98400	0.3437	7.56	60.004	1.2	63	756	1142.3	1529	1150	1844.5	038	1144	18	
353	19	Sob	394	18.06303	2.58	17.4918	-23.25	0.98392	1.2402	13.43	59.010	2.2	73	756	1142.8	1529	1203	1932.7	159	1140	19	
354	20	Nie	395	18.10269	2.28	17.5344	-23.26	0.98384	2.1741	19.02	58.035	3.2	82	757	1143.3	1530	1219	2026.0	325	1136	20	
355	21	Pon	396	18.14234	1.58	17.5811	-23.26	0.98376	3.1632	23.27	57.163	4.2	90	757	1143.8	1530	1243	2125.2	456	1132	21	
356	22	Wto	397	18.18200	1.29	18.0237	-23.26	0.98369	4.2036	26.27	56.476	5.2	96	758	1144.3	1531	1320	2229.9	628	1128	22	
357	23	Śro	398	18.22165	0.59	18.0703	-23.26	0.98363	5.2826	27.37	56.046	6.2	99	758	1144.8	1531	1418	2337.7	749	1125	23	
358	24	Czw	399	18.26131	0.29	18.1130	-23.25	0.98357	6.3708	26.41	55.919	0.4	100	759	1145.3	1532	1537	*****	851	1121	24	
359	25	Pią	400	18.30097	-0.01	18.1556	-23.23	0.98352	7.4329	23.45	56.108	1.4	97	759	1145.8	1532	1711	044.6	932	1117	25	
360	26	Sob	401	18.34062	-0.30	18.2022	-23.21	0.98348	8.4521	19.13	56.586	2.4	91	759	1146.3	1533	1847	147.3	959	1113	26	
361	27	Nie	402	18.38028	-0.60	18.2448	-23.19	0.98344	9.4212	13.36	57.297	3.4	84	800	1146.7	1534	2020	244.4	1017	1109	27	
362	28	Pon	403	18.41594	-1.29	18.2914	-23.16	0.98341	10.3443	7.25	58.165	4.4	74	800	1147.2	1535	2147	336.2	1031	1105	28	
363	29	Wto	404	18.45559	-1.58	18.3340	-23.13	0.98338	11.2405	1.04	59.108	5.4	64	800	1147.7	1536	2309	424.1	1042	1101	29	
364	30	Śro	405	18.49525	-2.27	18.3805	-23.09	0.98336	12.1139	-5.08	60.054	6.4	54	800	1148.2	1537	****	509.5	1053	1057	30	
365	31	Czw	406	18.53490	-2.56	18.4230	-23.05	0.98335	12.5837	-10.55	60.941	0.7	43	800	1148.7	1538	029	553.9	1104	1053	31	

Fazy Księżyca [Dm, h.mm]:      3kw 1, 7.09      Now 9, 1.52      1kw 17, 6.43      Pełn 24, 2.28      3kw 30, 19.59

# GRUDZIEŃ 2026 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	17.40	6.01	14.56	3.41	14.05	22.08	12.40	21.43	12.20	13.30	1.48	15.05	7.17	13.13	1.16	11.50	19.16		
	16.505	-21.84	15.381	-17.00	13.786	-9.44	10.331	12.89	9.954	13.33	0.558	0.80	4.097	20.70	0.140	-0.62	20.475	-23.48	4.65796	1
3	5.33	17.39	6.10	14.53	3.39	14.00	22.04	12.33	21.35	12.12	13.22	1.40	14.57	7.09	13.05	1.08	11.42	19.08		
	16.649	-22.13	15.576	-17.95	13.867	-9.63	10.378	12.68	9.958	13.32	0.556	0.79	4.091	20.68	0.139	-0.62	20.478	-23.47	4.78938	3
5	5.35	17.38	6.21	14.52	3.37	13.57	22.00	12.27	21.28	12.04	13.14	1.32	14.49	7.00	12.57	0.60	11.34	19.01		
	16.794	-22.40	15.777	-18.86	13.954	-9.86	10.424	12.48	9.962	13.31	0.554	0.79	4.085	20.67	0.138	-0.62	20.481	-23.46	4.92080	5
7	5.37	17.38	6.31	14.50	3.36	13.53	21.56	12.21	21.20	11.57	13.06	1.24	14.40	6.52	12.49	0.52	11.27	18.53		
	16.939	-22.63	15.982	-19.73	14.045	-10.13	10.468	12.28	9.965	13.30	0.553	0.79	4.079	20.65	0.138	-0.62	20.484	-23.45	5.05222	7
9	5.39	17.38	6.41	14.49	3.36	13.49	21.52	12.14	21.12	11.49	12.58	1.16	14.32	6.44	12.41	0.44	11.19	18.46		
	17.085	-22.84	16.191	-20.55	14.141	-10.44	10.511	12.10	9.967	13.30	0.552	0.79	4.074	20.63	0.137	-0.63	20.487	-23.44	5.18364	9
11	5.41	17.38	6.51	14.49	3.36	13.45	21.48	12.08	21.05	11.41	12.50	1.08	14.24	6.35	12.33	0.36	11.11	18.38		
	17.232	-23.02	16.404	-21.31	14.241	-10.78	10.551	11.93	9.968	13.30	0.552	0.80	4.068	20.62	0.137	-0.63	20.491	-23.43	5.31507	11
13	5.43	17.38	7.01	14.49	3.37	13.41	21.43	12.01	20.57	11.33	12.43	1.01	14.16	6.27	12.25	0.28	11.03	18.30		
	17.379	-23.16	16.619	-22.01	14.345	-11.15	10.590	11.77	9.969	13.31	0.552	0.81	4.063	20.61	0.137	-0.62	20.494	-23.41	5.44649	13
15	5.44	17.38	7.11	14.49	3.37	13.37	21.38	11.55	20.49	11.26	12.35	0.53	14.08	6.19	12.17	0.20	10.56	18.23		
	17.526	-23.28	16.837	-22.64	14.452	-11.55	10.627	11.62	9.968	13.32	0.552	0.82	4.057	20.59	0.137	-0.62	20.498	-23.40	5.57791	15
17	5.46	17.39	7.20	14.51	3.39	13.34	21.33	11.48	20.41	11.18	12.27	0.45	13.60	6.11	12.10	0.13	10.48	18.15		
	17.674	-23.36	17.058	-23.20	14.564	-11.97	10.661	11.48	9.967	13.33	0.553	0.84	4.052	20.58	0.137	-0.62	20.501	-23.39	5.70933	17
19	5.47	17.40	7.30	14.52	3.40	13.30	21.28	11.42	20.33	11.10	12.19	0.37	13.52	6.02	12.02	0.05	10.40	18.08		
	17.822	-23.41	17.282	-23.69	14.678	-12.41	10.694	11.35	9.965	13.35	0.555	0.86	4.047	20.56	0.138	-0.62	20.505	-23.38	5.84075	19
21	5.48	17.41	7.38	14.55	3.42	13.27	21.23	11.35	20.24	11.02	12.11	0.30	13.44	5.54	11.54	23.53	10.32	18.00		
	17.970	-23.44	17.507	-24.09	14.796	-12.86	10.725	11.24	9.962	13.38	0.557	0.88	4.041	20.55	0.138	-0.61	20.509	-23.36	5.97217	21
23	5.49	17.42	7.47	14.58	3.44	13.24	21.17	11.28	20.16	10.54	12.03	0.22	13.36	5.46	11.46	23.45	10.25	17.53		
	18.118	-23.43	17.735	-24.41	14.917	-13.32	10.753	11.14	9.958	13.41	0.559	0.91	4.036	20.53	0.139	-0.61	20.513	-23.35	6.10359	23
25	5.50	17.43	7.54	15.02	3.46	13.20	21.11	11.21	20.08	10.46	11.55	0.15	13.28	5.38	11.38	23.37	10.17	17.45		
	18.265	-23.39	17.965	-24.64	15.041	-13.80	10.779	11.06	9.954	13.44	0.562	0.93	4.032	20.52	0.140	-0.60	20.517	-23.34	6.23502	25
27	5.50	17.44	8.02	15.07	3.49	13.17	21.05	11.15	19.59	10.38	11.47	0.07	13.20	5.29	11.30	23.30	10.09	17.38		
	18.413	-23.32	18.197	-24.79	15.168	-14.28	10.802	10.99	9.948	13.48	0.565	0.96	4.027	20.51	0.141	-0.59	20.521	-23.32	6.36644	27
29	5.51	17.46	8.08	15.13	3.52	13.14	20.59	11.08	19.51	10.30	11.40	23.56	13.12	5.21	11.22	23.22	10.01	17.30		
	18.561	-23.21	18.430	-24.85	15.297	-14.76	10.823	10.94	9.942	13.52	0.569	1.00	4.022	20.50	0.142	-0.58	20.525	-23.31	6.49786	29
31	5.51	17.47	8.14	15.19	3.55	13.11	20.52	11.01	19.42	10.22	11.32	23.48	13.04	5.13	11.15	23.14	9.54	17.23		
	18.708	-23.08	18.664	-24.81	15.429	-15.24	10.841	10.90	9.935	13.56	0.573	1.03	4.018	20.48	0.143	-0.57	20.529	-23.30	6.62928	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2026

Nowy Rok	Czw	1 styczeń	Dzień Matki	Wto	26 maj
Najświętszej Maryi Panny Rodzicielki	Czw	1 styczeń	Trójcy Najświętszej	Nie	31 maj
Objawienia Pańskiego (Trzech Króli)	Wto	6 styczeń	Dzień Dziecka	Pon	1 czerwiec
Juliański Nowy Rok	Śro	14 styczeń	Boże Ciało	Czw	4 czerwiec
Dzień Babci	Śro	21 styczeń	Dzień Dziełczynienia	Nie	7 czerwiec
Dzień Dziadka	Czw	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	12 czerwiec
Ofiarowania Pańskiego	Pon	2 luty	Dzień Ojca	Wto	23 czerwiec
Matki Boskiej Gromnicznej	Pon	2 luty	Noc Świętojańska	Wto	23 czerwiec
Tłusty czwartek	Czw	12 luty	Św. Piotra i Pawła	Pon	29 czerwiec
Walentynki	Sob	14 luty	Wniebowzięcia N.M.P.	Sob	15 sierpień
Środa Popielcowa	Śro	18 luty	Święto Wojska Polskiego	Sob	15 sierpień
Święto UMK	Czw	19 luty	Dzień Solidarności i Wolności	Pon	31 sierpień
Dzień Kobiet	Nie	8 marzec	Dzień Programisty	Nie	13 wrzesień
Narodowy Dzień Życia	Wto	24 marzec	Dożynki – Święto Plonów	Śro	23 wrzesień
Niedziela Palmowa	Nie	29 marzec	Dzień Papieski	Nie	11 październik
Niedziela Wielkanocna	Nie	5 kwiecień	Dzień Edukacji Narodowej	Śro	14 październik
Niedziela Miłosierdzia Bożego	Nie	12 kwiecień	Dzień Papieża Jana Pawła II	Pią	16 październik
Święto Pracy	Pią	1 maj	Wszystkich Świętych	Nie	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Sob	2 maj	Zaduszki	Pon	2 listopad
Najświętsza Maryja Królowa Polski	Nie	3 maj	Święto Niepodległości	Śro	11 listopad
Święto Konstytucji 3 Maja	Nie	3 maj	Pierwsza niedziela Adwentu	Nie	29 listopad
Wniebowstąpienia Pańskiego	Czw	14 maj	Niepokalane Poczęcie N.M.P.	Wto	8 grudzień
Dzień Polskiej Niezapominajki	Pią	15 maj	Boże Narodzenie	Pią	25 grudzień
Zesłania Ducha Świętego	Nie	24 maj	Sylwester	Czw	31 grudzień

# Kalendarz astronomiczny 2027

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!

*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2027 MARZEC 28**

Dla całego roku przyjęto: TDT – UT = 72 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 21.25**, Lato **VI 21, 15.11**, Jesień **IX 23, 7.01**, Zima **XII 22, 3.42**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **28 marca do 31 października 2027 r.**

### Oznaczenia:

Dr — dzień 2027 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2027

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
1	1	Pią	407	18.57456	-3.24	18.4655	-22.60	0.98334	13.4603	-16.07	61.727	1.7	33	800	1149.2	1539	148	638.5	1117	1049	1	
2	2	Sob	408	19.01421	-3.53	18.5120	-22.55	0.98333	14.3443	-20.32	62.388	2.7	24	800	1149.6	1540	306	724.4	1132	1045	2	
3	3	Nie	409	19.05387	-4.20	18.5545	-22.49	0.98333	15.2504	-24.01	62.912	3.7	16	759	1150.1	1541	423	812.0	1153	1041	3	
4	4	Pon	410	19.09352	-4.48	19.0009	-22.43	0.98334	16.1707	-26.23	63.302	4.7	10	759	1150.5	1542	536	901.5	1222	1037	4	
5	5	Wto	411	19.13318	-5.15	19.0432	-22.37	0.98335	17.1019	-27.32	63.564	5.7	5	759	1151.0	1544	641	952.4	1302	1033	5	
6	6	Śro	412	19.17284	-5.42	19.0856	-22.30	0.98336	18.0345	-27.25	63.710	6.7	2	758	1151.4	1545	734	1043.7	1355	1029	6	
7	7	Czw	413	19.21249	-6.08	19.1318	-22.22	0.98337	18.5624	-26.02	63.749	7.7	0	758	1151.9	1546	813	1134.0	1500	1026	7	
8	8	Pią	414	19.25215	-6.34	19.1741	-22.14	0.98339	19.4721	-23.30	63.688	0.6	0	757	1152.3	1548	841	1222.9	1612	1022	8	
9	9	Sob	415	19.29181	-6.59	19.2202	-22.06	0.98342	20.3610	-19.57	63.527	1.6	2	757	1152.7	1549	901	1309.0	1727	1018	9	
10	10	Nie	416	19.33146	-7.24	19.2624	-21.57	0.98344	21.2252	-15.35	63.265	2.6	6	756	1153.1	1550	916	1352.9	1842	1014	10	
11	11	Pon	417	19.37112	-7.48	19.3044	-21.48	0.98347	22.0751	-10.36	62.894	3.6	11	755	1153.5	1552	928	1435.1	1956	1010	11	
12	12	Wto	418	19.41077	-8.11	19.3504	-21.38	0.98351	22.5150	-5.09	62.408	4.6	18	755	1153.9	1554	938	1516.2	2109	1006	12	
13	13	Śro	419	19.45043	-8.34	19.3924	-21.28	0.98355	23.3544	0.34	61.803	5.6	26	754	1154.3	1555	948	1557.4	2224	1002	13	
14	14	Czw	420	19.49008	-8.56	19.4342	-21.18	0.98359	0.2036	6.23	61.084	6.6	36	753	1154.7	1557	957	1639.8	2341	958	14	
15	15	Pią	421	19.52574	-9.18	19.4801	-21.07	0.98364	1.0736	12.05	60.266	7.6	46	752	1155.0	1558	1008	1724.8	****	954	15	
16	16	Sob	422	19.56539	-9.39	19.5218	-20.56	0.98369	1.5759	17.24	59.381	0.6	56	751	1155.4	1600	1022	1813.9	102	950	16	
17	17	Nie	423	20.00505	-9.59	19.5635	-20.44	0.98375	2.5249	22.00	58.477	1.6	67	750	1155.7	1602	1042	1908.1	228	946	17	
18	18	Pon	424	20.04471	-10.18	20.0051	-20.32	0.98382	3.5244	25.30	57.617	2.6	77	749	1156.0	1603	1111	2008.1	357	942	18	
19	19	Wto	425	20.08436	-10.37	20.0506	-20.20	0.98389	4.5717	27.26	56.877	3.6	87	748	1156.4	1605	1155	2112.8	521	938	19	
20	20	Śro	426	20.12402	-10.55	20.0920	-20.07	0.98397	6.0436	27.26	56.333	4.6	94	747	1156.7	1607	1302	2219.4	632	934	20	
21	21	Czw	427	20.16368	-11.12	20.1334	-19.54	0.98405	7.1149	25.25	56.048	5.6	98	746	1156.9	1609	1429	2324.5	723	931	21	
22	22	Pią	428	20.20333	-11.28	20.1747	-19.40	0.98414	8.1614	21.32	56.064	6.6	100	745	1157.2	1610	1606	*****	757	927	22	
23	23	Sob	429	20.24299	-11.44	20.2159	-19.26	0.98423	9.1622	16.14	56.385	0.9	99	743	1157.5	1612	1743	025.4	819	923	23	
24	24	Nie	430	20.28264	-11.59	20.2611	-19.12	0.98433	10.1208	10.04	56.982	1.9	94	742	1157.7	1614	1916	121.3	835	919	24	
25	25	Pon	431	20.32230	-12.13	20.3021	-18.58	0.98444	11.0421	3.30	57.795	2.9	88	741	1158.0	1616	2044	212.7	848	915	25	
26	26	Wto	432	20.36195	-12.26	20.3431	-18.43	0.98455	11.5412	-3.01	58.743	3.9	80	739	1158.2	1618	2208	300.9	859	911	26	
27	27	Śro	433	20.40161	-12.39	20.3840	-18.27	0.98467	12.4251	-9.11	59.743	4.9	70	738	1158.4	1620	2330	347.4	911	907	27	
28	28	Czw	434	20.44127	-12.51	20.4249	-18.12	0.98480	13.3125	-14.45	60.717	5.9	60	736	1158.6	1622	****	433.4	923	903	28	
29	29	Pią	435	20.48092	-13.01	20.4656	-17.56	0.98493	14.2044	-19.30	61.602	0.0	50	735	1158.8	1623	051	519.9	937	859	29	
30	30	Sob	436	20.52057	-13.12	20.5103	-17.39	0.98506	15.1120	-23.18	62.352	1.0	40	733	1158.9	1625	210	607.7	957	855	30	
31	31	Nie	437	20.56023	-13.21	20.5509	-17.23	0.98520	16.0321	-25.59	62.940	2.0	31	732	1159.1	1627	326	657.1	1023	851	31	

Fazy Księżyca [Dm, h.mm]:      Nów 7, 21.24      1kw 15, 21.34      Pełn 22, 13.17      3kw 29, 11.55



# STYCZEŃ 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.48	8.17	15.23	3.56	13.10	20.49	10.57	19.38	10.18	11.28	23.45	12.60	5.09	11.11	23.10	9.50	17.19		
	18.782	-23.00	18.782	-24.75	15.496	-15.48	10.849	10.89	9.931	13.59	0.575	1.05	4.016	20.48	0.144	-0.57	20.531	-23.29	6.69499	1
3	5.51	17.50	8.21	15.31	3.59	13.07	20.42	10.50	19.29	10.10	11.20	23.37	12.52	5.01	11.03	23.03	9.42	17.11		
	18.929	-22.82	19.018	-24.57	15.632	-15.95	10.863	10.88	9.923	13.64	0.580	1.09	4.012	20.47	0.145	-0.56	20.535	-23.28	6.82641	3
5	5.51	17.52	8.25	15.39	4.03	13.05	20.35	10.43	19.21	10.02	11.12	23.30	12.44	4.52	10.55	22.55	9.34	17.04		
	19.076	-22.61	19.255	-24.29	15.770	-16.42	10.874	10.89	9.914	13.70	0.585	1.13	4.008	20.46	0.147	-0.55	20.539	-23.26	6.95783	5
7	5.51	17.54	8.29	15.48	4.06	13.02	20.27	10.36	19.12	9.54	11.05	23.23	12.35	4.44	10.47	22.47	9.27	16.56		
	19.222	-22.37	19.492	-23.90	15.910	-16.88	10.883	10.91	9.904	13.76	0.590	1.18	4.004	20.45	0.148	-0.53	20.544	-23.25	7.08926	7
9	5.50	17.57	8.31	15.58	4.10	13.00	20.19	10.28	19.03	9.46	10.57	23.15	12.27	4.36	10.39	22.39	9.19	16.49		
	19.367	-22.10	19.730	-23.42	16.053	-17.33	10.888	10.96	9.894	13.82	0.596	1.22	4.001	20.44	0.150	-0.52	20.548	-23.24	7.22068	9
11	5.49	17.59	8.33	16.09	4.13	12.58	20.11	10.21	18.54	9.38	10.49	23.08	12.19	4.28	10.32	22.32	9.11	16.41		
	19.512	-21.80	19.966	-22.83	16.198	-17.76	10.890	11.02	9.883	13.89	0.603	1.27	3.997	20.43	0.152	-0.51	20.552	-23.22	7.35210	11
13	5.48	18.02	8.34	16.20	4.17	12.57	20.03	10.14	18.45	9.30	10.41	23.01	12.11	4.20	10.24	22.24	9.04	16.34		
	19.657	-21.47	20.202	-22.14	16.345	-18.18	10.888	11.11	9.871	13.95	0.610	1.32	3.994	20.42	0.154	-0.49	20.557	-23.21	7.48352	13
15	5.47	18.04	8.35	16.32	4.20	12.55	19.54	10.06	18.36	9.21	10.34	22.54	12.04	4.12	10.16	22.16	8.56	16.26		
	19.800	-21.12	20.436	-21.34	16.493	-18.58	10.884	11.21	9.858	14.03	0.617	1.38	3.991	20.41	0.156	-0.48	20.561	-23.19	7.61494	15
17	5.46	18.07	8.35	16.45	4.24	12.54	19.45	9.58	18.27	9.13	10.26	22.47	11.56	4.04	10.08	22.09	8.48	16.19		
	19.943	-20.74	20.668	-20.44	16.644	-18.96	10.876	11.33	9.845	14.10	0.624	1.44	3.988	20.40	0.159	-0.46	20.566	-23.18	7.74636	17
19	5.44	18.10	8.34	16.57	4.28	12.53	19.36	9.51	18.18	9.05	10.18	22.40	11.48	3.56	10.00	22.01	8.41	16.11		
	20.085	-20.33	20.897	-19.45	16.796	-19.31	10.865	11.47	9.832	14.18	0.632	1.49	3.986	20.40	0.161	-0.44	20.570	-23.17	7.87778	19
21	5.43	18.13	8.32	17.10	4.31	12.52	19.26	9.43	18.09	8.57	10.11	22.33	11.40	3.48	9.53	21.54	8.33	16.04		
	20.226	-19.90	21.121	-18.36	16.950	-19.64	10.850	11.63	9.817	14.26	0.641	1.56	3.984	20.39	0.164	-0.42	20.574	-23.15	8.00920	21
23	5.41	18.16	8.30	17.23	4.35	12.51	19.16	9.35	17.59	8.48	10.03	22.26	11.32	3.40	9.45	21.46	8.25	15.56		
	20.366	-19.44	21.339	-17.18	17.106	-19.95	10.832	11.81	9.803	14.34	0.649	1.62	3.982	20.39	0.166	-0.40	20.579	-23.14	8.14063	23
25	5.39	18.19	8.27	17.35	4.38	12.51	19.06	9.27	17.50	8.40	9.55	22.19	11.24	3.32	9.37	21.38	8.17	15.49		
	20.506	-18.96	21.549	-15.94	17.264	-20.22	10.811	12.01	9.788	14.43	0.658	1.68	3.980	20.38	0.169	-0.38	20.583	-23.13	8.27205	25
27	5.37	18.22	8.23	17.47	4.41	12.51	18.55	9.19	17.41	8.32	9.48	22.12	11.16	3.24	9.29	21.31	8.10	15.41		
	20.645	-18.45	21.747	-14.64	17.422	-20.47	10.786	12.22	9.772	14.51	0.668	1.75	3.978	20.38	0.172	-0.36	20.588	-23.11	8.40346	27
29	5.34	18.25	8.18	17.58	4.45	12.51	18.44	9.11	17.31	8.24	9.40	22.05	11.08	3.16	9.21	21.23	8.02	15.34		
	20.782	-17.93	21.932	-13.31	17.583	-20.68	10.758	12.45	9.756	14.60	0.677	1.82	3.977	20.37	0.175	-0.34	20.592	-23.10	8.53488	29
31	5.32	18.28	8.13	18.08	4.48	12.52	18.33	9.02	17.22	8.15	9.32	21.58	10.60	3.08	9.14	21.16	7.54	15.26		
	20.919	-17.38	22.097	-11.99	17.744	-20.87	10.726	12.69	9.740	14.69	0.687	1.89	3.976	20.37	0.178	-0.32	20.597	-23.09	8.66630	31

# LUTY 2027

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
32	1	Pon	438	20.59589	-13.30	20.5914	-17.06	0.98534	16.5626	-27.27	63.354	3.0	22	730	1159.2	1629	434	747.9	1059	847	1
33	2	Wto	439	21.03554	-13.37	21.0318	-16.49	0.98549	17.4952	-27.38	63.597	4.0	15	728	1159.4	1631	531	839.1	1148	843	2
34	3	Śro	440	21.07520	-13.44	21.0722	-16.31	0.98564	18.4243	-26.33	63.684	5.0	9	727	1159.5	1633	614	929.9	1249	839	3
35	4	Czw	441	21.11485	-13.50	21.1124	-16.13	0.98579	19.3409	-24.18	63.633	6.0	4	725	1159.6	1635	646	1019.1	1400	835	4
36	5	Pią	442	21.15451	-13.56	21.1526	-15.55	0.98595	20.2338	-20.58	63.466	7.0	1	723	1159.7	1637	708	1106.3	1514	832	5
37	6	Sob	443	21.19417	-14.00	21.1927	-15.37	0.98610	21.1104	-16.46	63.204	8.0	0	721	1159.8	1639	724	1151.1	1630	828	6
38	7	Nie	444	21.23382	-14.04	21.2328	-15.18	0.98627	21.5645	-11.52	62.862	0.8	1	719	1159.8	1641	737	1234.1	1744	824	7
39	8	Pon	445	21.27348	-14.07	21.2727	-14.59	0.98643	22.4114	-6.28	62.453	1.8	3	718	1159.9	1643	747	1315.8	1859	820	8
40	9	Wto	446	21.31313	-14.09	21.3126	-14.40	0.98660	23.2520	-0.45	61.981	2.8	7	716	1159.9	1645	757	1357.1	2014	816	9
41	10	Śro	447	21.35279	-14.11	21.3524	-14.21	0.98677	0.0957	5.04	61.448	3.8	13	714	1159.9	1647	807	1439.1	2130	812	10
42	11	Czw	448	21.39244	-14.11	21.3921	-14.01	0.98694	0.5607	10.47	60.857	4.8	21	712	1159.9	1649	817	1522.9	2249	808	11
43	12	Pią	449	21.43210	-14.11	21.4317	-13.41	0.98712	1.4454	16.10	60.213	5.8	30	710	1159.9	1651	830	1609.7	****	804	12
44	13	Sob	450	21.47175	-14.10	21.4713	-13.21	0.98730	2.3719	20.53	59.526	6.8	40	708	1159.9	1653	846	1700.7	012	800	13
45	14	Nie	451	21.51141	-14.08	21.5108	-13.01	0.98748	3.3402	24.38	58.820	0.1	51	706	1159.9	1655	910	1756.6	137	756	14
46	15	Pon	452	21.55107	-14.06	21.5502	-12.40	0.98767	4.3501	27.01	58.132	1.1	63	704	1159.8	1656	946	1857.1	301	752	15
47	16	Wto	453	21.59072	-14.02	21.5855	-12.20	0.98786	5.3911	27.42	57.510	2.1	73	702	1159.8	1658	1041	2000.6	416	748	16
48	17	Śro	454	22.03038	-13.58	22.0248	-11.59	0.98806	6.4425	26.30	57.011	3.1	83	700	1159.7	1700	1156	2104.4	514	744	17
49	18	Czw	455	22.07003	-13.54	22.0639	-11.38	0.98826	7.4821	23.27	56.693	4.1	91	658	1159.6	1702	1327	2205.8	554	740	18
50	19	Pią	456	22.10569	-13.48	22.1031	-11.16	0.98847	8.4916	18.49	56.605	5.1	97	656	1159.6	1704	1503	2303.4	620	736	19
51	20	Sob	457	22.14535	-13.42	22.1421	-10.55	0.98868	9.4631	13.02	56.773	6.1	100	654	1159.5	1706	1638	2357.0	639	733	20
52	21	Nie	458	22.18500	-13.36	22.1811	-10.33	0.98889	10.4029	6.34	57.197	0.5	100	651	1159.3	1708	1809	*****	653	729	21
53	22	Pon	459	22.22465	-13.28	22.2200	-10.11	0.98911	11.3202	-0.07	57.846	1.5	97	649	1159.2	1710	1937	047.3	705	725	22
54	23	Wto	460	22.26431	-13.20	22.2549	-9.50	0.98934	12.2215	-6.38	58.664	2.5	92	647	1159.1	1712	2102	135.6	717	721	23
55	24	Śro	461	22.30396	-13.12	22.2937	-9.27	0.98957	13.1208	-12.38	59.581	3.5	85	645	1158.9	1714	2226	223.1	729	717	24
56	25	Czw	462	22.34362	-13.02	22.3324	-9.05	0.98980	14.0232	-17.51	60.519	4.5	76	643	1158.8	1716	2349	310.8	743	713	25
57	26	Pią	463	22.38327	-12.53	22.3711	-8.43	0.99004	14.5359	-22.07	61.406	5.5	67	640	1158.6	1718	****	359.5	800	709	26
58	27	Sob	464	22.42293	-12.42	22.4057	-8.20	0.99028	15.4639	-25.14	62.182	6.5	57	638	1158.5	1720	108	449.5	824	705	27
59	28	Nie	465	22.46259	-12.32	22.4443	-7.58	0.99052	16.4014	-27.07	62.801	0.2	48	636	1158.3	1721	221	540.7	856	701	28

Fazy Księżyca [Dm, h.mm]:      Nów 6, 16.56      1kw 14, 8.58      Pełn 21, 0.24      3kw 28, 6.16

# LUTY 2027 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST (0 <sup>h</sup> UT)	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	5.31	18.30	8.09	18.12	4.49	12.52	18.27	8.58	17.17	8.11	9.28	21.54	10.56	3.04	9.10	21.12	7.51	15.23		
	20.987	-17.10	22.171	-11.34	17.825	-20.94	10.709	12.81	9.731	14.73	0.692	1.93	3.975	20.37	0.180	-0.31	20.599	-23.08	8.73201	1
3	5.28	18.33	8.02	18.19	4.52	12.53	18.16	8.50	17.08	8.03	9.21	21.48	10.48	2.56	9.02	21.04	7.43	15.15		
	21.123	-16.52	22.299	-10.10	17.988	-21.08	10.673	13.08	9.715	14.82	0.703	2.00	3.975	20.37	0.183	-0.29	20.604	-23.07	8.86344	3
5	5.25	18.36	7.54	18.23	4.55	12.54	18.04	8.41	16.59	7.55	9.13	21.41	10.40	2.48	8.54	20.57	7.35	15.08		
	21.257	-15.92	22.394	-9.00	18.152	-21.17	10.634	13.35	9.698	14.91	0.714	2.08	3.974	20.37	0.187	-0.27	20.608	-23.06	8.99486	5
7	5.22	18.40	7.44	18.23	4.57	12.56	17.52	8.32	16.49	7.46	9.06	21.34	10.32	2.40	8.46	20.49	7.27	15.00		
	21.391	-15.30	22.451	-8.07	18.317	-21.23	10.593	13.63	9.681	15.00	0.725	2.15	3.974	20.37	0.190	-0.24	20.613	-23.04	9.12628	7
9	5.19	18.43	7.34	18.20	4.59	12.58	17.40	8.24	16.40	7.38	8.58	21.27	10.24	2.32	8.39	20.42	7.20	14.53		
	21.524	-14.67	22.466	-7.39	18.483	-21.26	10.549	13.91	9.664	15.09	0.736	2.23	3.974	20.37	0.194	-0.22	20.617	-23.03	9.25770	9
11	5.15	18.47	7.22	18.12	5.01	12.60	17.27	8.15	16.30	7.30	8.50	21.21	10.17	2.24	8.31	20.34	7.12	14.45		
	21.656	-14.02	22.436	-7.00	18.649	-21.24	10.502	14.20	9.646	15.18	0.748	2.31	3.974	20.37	0.198	-0.19	20.621	-23.02	9.38911	11
13	5.12	18.50	7.09	18.01	5.03	13.02	17.15	8.06	16.21	7.21	8.43	21.14	10.09	2.16	8.23	20.27	7.04	14.38		
	21.787	-13.35	22.364	-6.92	18.815	-21.19	10.454	14.49	9.629	15.27	0.760	2.39	3.975	20.37	0.201	-0.17	20.626	-23.01	9.52053	13
15	5.08	18.54	6.56	17.45	5.04	13.05	17.02	7.57	16.11	7.13	8.35	21.07	10.01	2.09	8.15	20.19	6.57	14.30		
	21.917	-12.67	22.257	-7.15	18.982	-21.10	10.405	14.78	9.612	15.36	0.772	2.48	3.975	20.37	0.205	-0.14	20.630	-23.00	9.65195	15
17	5.04	18.57	6.43	17.27	5.06	13.08	16.50	7.48	16.02	7.05	8.28	21.00	9.53	2.01	8.07	20.12	6.49	14.22		
	22.047	-11.98	22.126	-7.65	19.149	-20.97	10.354	15.07	9.595	15.44	0.784	2.56	3.976	20.38	0.209	-0.12	20.634	-22.99	9.78337	17
19	5.00	19.01	6.31	17.06	5.07	13.11	16.37	7.38	15.52	6.56	8.20	20.54	9.45	1.53	7.60	20.04	6.41	14.15		
	22.175	-11.27	21.983	-8.36	19.316	-20.80	10.303	15.35	9.578	15.53	0.797	2.65	3.978	20.38	0.213	-0.09	20.638	-22.97	9.91480	19
21	4.56	19.04	6.19	16.46	5.07	13.15	16.24	7.29	15.43	6.48	8.13	20.47	9.37	1.45	7.52	19.57	6.34	14.07		
	22.303	-10.55	21.844	-9.19	19.483	-20.59	10.252	15.62	9.561	15.61	0.810	2.73	3.979	20.39	0.217	-0.06	20.643	-22.96	10.04622	21
23	4.52	19.08	6.09	16.26	5.08	13.19	16.12	7.20	15.34	6.39	8.05	20.41	9.30	1.38	7.44	19.49	6.26	13.60		
	22.430	-9.83	21.721	-10.06	19.650	-20.35	10.200	15.88	9.545	15.70	0.823	2.82	3.981	20.39	0.221	-0.03	20.647	-22.95	10.17763	23
25	4.48	19.12	5.60	16.07	5.08	13.23	15.59	7.11	15.24	6.31	7.57	20.34	9.22	1.30	7.36	19.42	6.18	13.52		
	22.557	-9.09	21.623	-10.89	19.817	-20.06	10.149	16.13	9.528	15.78	0.836	2.91	3.983	20.40	0.226	-0.01	20.651	-22.94	10.30905	25
27	4.44	19.15	5.52	15.51	5.08	13.27	15.47	7.01	15.15	6.23	7.50	20.27	9.14	1.22	7.29	19.34	6.10	13.45		
	22.683	-8.34	21.556	-11.65	19.984	-19.74	10.099	16.37	9.512	15.85	0.850	3.00	3.985	20.41	0.230	0.02	20.655	-22.93	10.44047	27

# MARZEC 2027

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
60	1	Pon	466	22.50224	-12.20	22.4828	-7.35	0.99077	17.3406	-27.41	63.236	1.2	38	634	1158.1	1723	324	632.5	941	657	1	
61	2	Wto	467	22.54190	-12.09	22.5213	-7.12	0.99102	18.2722	-26.59	63.477	2.2	29	631	1157.9	1725	412	723.7	1038	653	2	
62	3	Śro	468	22.58155	-11.56	22.5557	-6.49	0.99127	19.1916	-25.03	63.528	3.2	21	629	1157.7	1727	448	813.6	1146	649	3	
63	4	Czw	469	23.02121	-11.44	22.5941	-6.26	0.99152	20.0918	-22.02	63.407	4.2	14	627	1157.5	1729	513	901.5	1259	645	4	
64	5	Pią	470	23.06087	-11.30	23.0325	-6.03	0.99178	20.5720	-18.04	63.140	5.2	8	625	1157.3	1731	531	947.2	1414	641	5	
65	6	Sob	471	23.10052	-11.17	23.0707	-5.40	0.99203	21.4338	-13.21	62.761	6.2	4	622	1157.0	1733	545	1031.0	1530	638	6	
66	7	Nie	472	23.14017	-11.03	23.1050	-5.16	0.99229	22.2843	-8.03	62.302	7.2	1	620	1156.8	1735	556	1113.4	1645	634	7	
67	8	Pon	473	23.17583	-10.49	23.1432	-4.53	0.99255	23.1321	-2.21	61.796	0.1	0	618	1156.6	1737	606	1155.3	1800	630	8	
68	9	Wto	474	23.21548	-10.34	23.1814	-4.30	0.99281	23.5822	3.32	61.268	1.1	1	615	1156.3	1738	616	1237.6	1917	626	9	
69	10	Śro	475	23.25514	-10.19	23.2155	-4.06	0.99306	0.4443	9.22	60.738	2.1	4	613	1156.1	1740	626	1321.4	2036	622	10	
70	11	Czw	476	23.29479	-10.03	23.2537	-3.42	0.99332	1.3323	14.54	60.217	3.1	10	611	1155.8	1742	639	1407.7	2158	618	11	
71	12	Pią	477	23.33445	-9.47	23.2917	-3.19	0.99359	2.2514	19.49	59.713	4.1	17	608	1155.5	1744	654	1457.7	2324	614	12	
72	13	Sob	478	23.37411	-9.31	23.3258	-2.55	0.99385	3.2052	23.48	59.228	5.1	26	606	1155.3	1746	715	1551.9	****	610	13	
73	14	Nie	479	23.41376	-9.15	23.3638	-2.32	0.99411	4.2016	26.29	58.768	6.1	36	603	1155.0	1748	747	1650.3	048	606	14	
74	15	Pon	480	23.45342	-8.58	23.4018	-2.08	0.99438	5.2231	27.36	58.342	7.1	47	601	1154.7	1749	834	1751.5	205	602	15	
75	16	Wto	481	23.49307	-8.41	23.4358	-1.44	0.99464	6.2553	26.57	57.970	0.8	59	559	1154.4	1751	941	1853.4	308	558	16	
76	17	Śro	482	23.53273	-8.24	23.4737	-1.20	0.99491	7.2820	24.31	57.676	1.8	70	556	1154.2	1753	1103	1953.7	352	554	17	
77	18	Czw	483	23.57238	-8.07	23.5116	-0.57	0.99518	8.2816	20.32	57.495	2.8	80	554	1153.9	1755	1235	2050.8	422	550	18	
78	19	Pią	484	0.01204	-7.49	23.5455	-0.33	0.99545	9.2503	15.18	57.459	3.8	88	551	1153.6	1757	1407	2144.3	443	546	19	
79	20	Sob	485	0.05169	-7.32	23.5834	-0.09	0.99573	10.1853	9.13	57.594	4.8	95	549	1153.3	1759	1537	2234.9	459	542	20	
80	21	Nie	486	0.09135	-7.14	0.0213	0.14	0.99601	11.1029	2.43	57.914	5.8	99	547	1153.0	1800	1705	2323.4	511	539	21	
81	22	Pon	487	0.13100	-6.56	0.0551	0.38	0.99629	12.0052	-3.51	58.413	0.0	100	544	1152.7	1802	1831	*****	523	535	22	
82	23	Wto	488	0.17066	-6.38	0.0930	1.02	0.99657	12.5100	-10.06	59.063	1.0	99	542	1152.4	1804	1956	011.2	535	531	23	
83	24	Śro	489	0.21031	-6.20	0.1308	1.25	0.99685	13.4144	-15.43	59.819	2.0	95	539	1152.1	1806	2121	059.1	548	527	24	
84	25	Czw	490	0.24597	-6.02	0.1647	1.49	0.99714	14.3338	-20.27	60.623	3.0	89	537	1151.8	1808	2243	148.2	604	523	25	
85	26	Pią	491	0.28562	-5.43	0.2025	2.13	0.99743	15.2652	-24.04	61.413	4.0	82	535	1151.5	1809	****	238.6	625	519	26	
86	27	Sob	492	0.32528	-5.25	0.2403	2.36	0.99772	16.2110	-26.27	62.127	5.0	74	532	1151.2	1811	001	330.4	654	515	27	
87	28	Nie	493	0.36494	-5.07	0.2742	2.60	0.99801	17.1549	-27.29	62.713	6.0	65	530	1150.9	1813	110	423.0	734	511	28	
87	28	Nie	493	23.36395	-5.08	0.2733	2.59	0.99800	17.1333	-27.28	62.692	6.0	65	630	1250.9	1913	210	523.0	834	611	28	
88	29	Pon	494	23.40361	-4.50	0.3111	3.22	0.99829	18.0740	-27.14	63.117	7.0	56	628	1250.6	1915	305	615.2	927	607	29	
89	30	Wto	495	23.44326	-4.32	0.3450	3.45	0.99858	19.0022	-25.44	63.350	0.4	46	625	1250.3	1917	346	706.1	1031	603	30	
90	31	Śro	496	23.48292	-4.14	0.3828	4.09	0.99888	19.5106	-23.07	63.380	1.4	37	623	1250.0	1918	415	754.9	1142	559	31	

Fazy Księżyca [Dm, h.mm]:      Nów 8, 10.29      1kw 15, 17.25      Pełn 22, 11.44      Pełn 22, 12.44      3kw 30, 2.54

# MARZEC 2027 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	4.39	19.19	5.46	15.37	5.07	13.32	15.35	6.52	15.06	6.14	7.42	20.21	9.06	1.15	7.21	19.27	6.03	13.37		
	22.808	-7.58	21.520	-12.28	20.150	-19.38	10.049	16.59	9.497	15.93	0.863	3.09	3.987	20.41	0.234	0.05	20.659	-22.92	10.57189	1
3	4.35	19.23	5.40	15.26	5.07	13.36	15.23	6.42	14.57	6.06	7.35	20.14	8.59	1.07	7.13	19.20	5.55	13.30		
	22.933	-6.82	21.514	-12.79	20.315	-18.98	10.002	16.79	9.482	16.00	0.877	3.18	3.990	20.42	0.238	0.08	20.662	-22.92	10.70331	3
5	4.30	19.27	5.36	15.18	5.06	13.41	15.11	6.33	14.47	5.58	7.27	20.08	8.51	0.59	7.05	19.12	5.47	13.22		
	23.057	-6.05	21.537	-13.16	20.480	-18.55	9.956	16.97	9.467	16.07	0.891	3.27	3.993	20.43	0.243	0.11	20.666	-22.91	10.83473	5
7	4.25	19.31	5.33	15.11	5.05	13.46	14.59	6.23	14.38	5.50	7.20	20.01	8.43	0.52	6.58	19.05	5.40	13.14		
	23.181	-5.27	21.585	-13.40	20.645	-18.08	9.912	17.14	9.453	16.14	0.906	3.37	3.996	20.44	0.247	0.14	20.670	-22.90	10.96615	7
9	4.20	19.35	5.29	15.07	5.04	13.51	14.48	6.14	14.29	5.41	7.12	19.55	8.35	0.44	6.50	18.57	5.32	13.07		
	23.304	-4.49	21.655	-13.50	20.808	-17.58	9.871	17.29	9.440	16.20	0.920	3.46	3.999	20.45	0.252	0.17	20.673	-22.89	11.09756	9
11	4.15	19.39	5.27	15.04	5.02	13.57	14.37	6.05	14.20	5.33	7.05	19.48	8.28	0.37	6.42	18.50	5.24	12.59		
	23.427	-3.71	21.743	-13.48	20.971	-17.04	9.833	17.41	9.427	16.26	0.935	3.56	4.003	20.46	0.256	0.20	20.677	-22.88	11.22898	11
13	4.10	19.43	5.24	15.04	5.00	14.02	14.26	5.55	14.11	5.25	6.57	19.42	8.20	0.29	6.34	18.42	5.17	12.52		
	23.549	-2.92	21.849	-13.34	21.133	-16.47	9.797	17.52	9.414	16.32	0.949	3.65	4.007	20.47	0.261	0.23	20.680	-22.88	11.36040	13
15	4.05	19.47	5.22	15.04	4.59	14.07	14.16	5.46	14.02	5.17	6.50	19.35	8.12	0.21	6.27	18.35	5.09	12.44		
	23.672	-2.13	21.968	-13.08	21.294	-15.87	9.765	17.60	9.402	16.37	0.964	3.75	4.011	20.48	0.265	0.26	20.684	-22.87	11.49182	15
17	3.60	19.51	5.20	15.07	4.56	14.13	14.06	5.37	13.53	5.08	6.42	19.29	8.04	0.14	6.19	18.27	5.01	12.36		
	23.794	-1.34	22.099	-12.71	21.455	-15.24	9.736	17.67	9.391	16.42	0.979	3.84	4.015	20.50	0.270	0.29	20.687	-22.86	11.62324	17
19	3.54	19.55	5.18	15.10	4.54	14.19	13.56	5.28	13.45	5.00	6.35	19.22	7.57	0.06	6.11	18.20	4.53	12.29		
	23.915	-0.55	22.240	-12.24	21.614	-14.58	9.710	17.71	9.381	16.47	0.994	3.94	4.019	20.51	0.275	0.32	20.690	-22.86	11.75466	19
21	3.49	19.60	5.16	15.14	4.52	14.24	13.47	5.19	13.36	4.52	6.27	19.16	7.49	23.55	6.03	18.13	4.46	12.21		
	0.037	0.24	22.390	-11.67	21.772	-13.90	9.688	17.74	9.372	16.51	1.009	4.03	4.024	20.52	0.279	0.35	20.693	-22.85	11.88608	21
23	3.43	20.04	5.13	15.20	4.49	14.30	13.38	5.10	13.27	4.44	6.20	19.10	7.41	23.48	5.56	18.05	4.38	12.14		
	0.158	1.03	22.548	-11.00	21.930	-13.18	9.669	17.75	9.363	16.55	1.024	4.13	4.029	20.54	0.284	0.38	20.696	-22.85	12.01749	23
25	3.38	20.09	5.11	15.26	4.46	14.36	13.29	5.01	13.19	4.36	6.12	19.03	7.34	23.40	5.48	17.58	4.30	12.06		
	0.280	1.82	22.712	-10.23	22.087	-12.45	9.654	17.74	9.355	16.59	1.040	4.23	4.034	20.55	0.289	0.41	20.699	-22.84	12.14891	25
27	3.32	20.13	5.09	15.33	4.43	14.42	13.21	4.52	13.10	4.28	6.05	18.57	7.26	23.33	5.40	17.50	4.23	11.58		
	0.401	2.60	22.883	-9.38	22.243	-11.69	9.642	17.71	9.347	16.62	1.055	4.32	4.039	20.57	0.293	0.43	20.702	-22.84	12.28033	27
29	4.26	21.18	6.06	16.41	5.40	15.47	14.13	5.44	14.02	5.20	6.58	19.50	8.18	0.29	6.32	18.43	5.15	12.51		
	0.520	3.37	23.055	-8.47	22.395	-10.92	9.633	17.67	9.341	16.64	1.070	4.42	4.045	20.58	0.298	0.46	20.705	-22.84	12.41175	29
31	4.20	21.23	6.03	16.49	5.37	15.53	14.05	5.35	13.54	5.12	6.50	19.44	8.11	0.22	6.25	18.35	5.07	12.43		
	0.641	4.14	23.236	-7.45	22.549	-10.12	9.628	17.61	9.335	16.67	1.086	4.51	4.050	20.60	0.302	0.49	20.707	-22.83	12.54317	31

# KWIECIEŃ 2027

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
91	1	Czw	497	23.52257	-3.56	0.4207	4.32	0.99917	20.3942	-19.30	63.214	2.4	28	620	1249.7	1920	436	841.3	1257	555	1	
92	2	Pią	498	23.56223	-3.38	0.4546	4.55	0.99946	21.2625	-15.05	62.872	3.4	20	618	1249.4	1922	451	925.6	1412	551	2	
93	3	Sob	499	24.00188	-3.21	0.4925	5.18	0.99976	22.1148	-10.01	62.386	4.4	13	616	1249.1	1924	504	1008.4	1527	547	3	
94	4	Nie	500	0.04154	-3.03	0.5304	5.41	1.00005	22.5635	-4.28	61.800	5.4	7	613	1248.8	1926	514	1050.4	1642	543	4	
95	5	Pon	501	0.08119	-2.46	0.5643	6.04	1.00034	23.4141	1.23	61.159	6.4	3	611	1248.5	1927	524	1132.6	1758	540	5	
96	6	Wto	502	0.12085	-2.29	1.0023	6.26	1.00062	0.2802	7.17	60.511	7.4	0	608	1248.2	1929	535	1216.5	1917	536	6	
97	7	Śro	503	0.16050	-2.12	1.0403	6.49	1.00091	1.1638	13.01	59.897	0.4	0	606	1247.9	1931	546	1302.6	2040	532	7	
98	8	Czw	504	0.20016	-1.55	1.0743	7.12	1.00119	2.0825	18.14	59.352	1.4	2	604	1247.7	1933	601	1352.3	2206	528	8	
99	9	Pią	505	0.23581	-1.39	1.1123	7.34	1.00148	3.0360	22.36	58.896	2.4	7	601	1247.4	1935	621	1446.3	2333	524	9	
100	10	Sob	506	0.27547	-1.23	1.1503	7.56	1.00176	4.0323	25.43	58.539	3.4	14	559	1247.1	1936	650	1544.5	****	520	10	
101	11	Nie	507	0.31512	-1.07	1.1844	8.18	1.00204	5.0541	27.17	58.279	4.4	22	557	1246.9	1938	732	1645.7	054	516	11	
102	12	Pon	508	0.35478	-0.51	1.2225	8.40	1.00232	6.0906	27.05	58.111	5.4	33	554	1246.6	1940	833	1747.7	202	512	12	
103	13	Wto	509	0.39444	-0.36	1.2606	9.02	1.00259	7.1133	25.08	58.025	6.4	44	552	1246.3	1942	951	1848.0	251	508	13	
104	14	Śro	510	0.43409	-0.21	1.2947	9.24	1.00287	8.1121	21.37	58.017	0.5	55	550	1246.1	1943	1119	1945.0	325	504	14	
105	15	Czw	511	0.47375	-0.06	1.3329	9.45	1.00315	9.0748	16.50	58.087	1.5	66	548	1245.9	1945	1249	2038.3	348	500	15	
106	16	Pią	512	0.51340	0.08	1.3711	10.07	1.00342	10.0106	11.10	58.240	2.5	77	545	1245.6	1947	1417	2128.3	405	456	16	
107	17	Sob	513	0.55306	0.22	1.4054	10.28	1.00369	10.5200	4.58	58.484	3.5	86	543	1245.4	1949	1543	2216.2	418	452	17	
108	18	Nie	514	0.59271	0.36	1.4437	10.49	1.00397	11.4133	-1.25	58.827	4.5	92	541	1245.1	1951	1707	2303.0	430	448	18	
109	19	Pon	515	1.03237	0.49	1.4820	11.10	1.00424	12.3046	-7.39	59.271	5.5	97	539	1244.9	1952	1831	2349.9	442	445	19	
110	20	Wto	516	1.07202	1.02	1.5204	11.31	1.00452	13.2037	-13.27	59.807	6.5	100	536	1244.7	1954	1955	*****	454	441	20	
111	21	Śro	517	1.11168	1.15	1.5548	11.51	1.00479	14.1148	-18.30	60.415	0.5	100	534	1244.5	1956	2118	038.0	509	437	21	
112	22	Czw	518	1.15133	1.27	1.5932	12.11	1.00507	15.0437	-22.35	61.062	1.5	98	532	1244.3	1958	2238	127.8	528	433	22	
113	23	Pią	519	1.19099	1.38	2.0317	12.31	1.00534	15.5856	-25.28	61.706	2.5	93	530	1244.1	2000	2352	219.4	553	429	23	
114	24	Sob	520	1.23065	1.49	2.0703	12.51	1.00561	16.5403	-27.02	62.300	3.5	88	528	1243.9	2001	****	312.2	629	425	24	
115	25	Nie	521	1.27030	1.60	2.1049	13.11	1.00589	17.4857	-27.15	62.798	4.5	80	526	1243.7	2003	053	405.3	717	421	25	
116	26	Pon	522	1.30596	2.10	2.1435	13.30	1.00616	18.4234	-26.09	63.158	5.5	72	523	1243.6	2005	140	457.2	818	417	26	
117	27	Wto	523	1.34561	2.20	2.1822	13.50	1.00643	19.3408	-23.52	63.346	6.5	63	521	1243.4	2007	214	547.1	927	413	27	
118	28	Śro	524	1.38527	2.29	2.2209	14.09	1.00670	20.2320	-20.35	63.340	7.5	54	519	1243.3	2008	238	634.5	1040	409	28	
119	29	Czw	525	1.42492	2.37	2.2557	14.27	1.00697	21.1021	-16.27	63.134	0.6	45	517	1243.1	2010	256	719.3	1154	405	29	
120	30	Pią	526	1.46458	2.45	2.2946	14.46	1.00723	21.5544	-11.39	62.736	1.6	35	515	1243.0	2012	309	802.3	1308	401	30	

Fazy Księżyca [Dm, h.mm]:      Nów 7, 1.51      1kw 14, 0.57      Pełn 21, 0.27      3kw 28, 22.18

# KWIECIEŃ 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.17	21.25	6.02	16.54	5.35	15.56	14.01	5.31	13.49	5.08	6.46	19.41	8.07	0.18	6.21	18.32	5.03	12.39		
	0.702	4.53	23.328	-6.91	22.626	-9.71	9.626	17.57	9.333	16.68	1.094	4.56	4.053	20.61	0.305	0.51	20.708	-22.83	12.60888	1
3	4.11	21.30	5.59	17.03	5.32	16.02	13.54	5.22	13.41	4.59	6.39	19.34	7.59	0.11	6.13	18.24	4.55	12.31		
	0.824	5.30	23.516	-5.77	22.779	-8.88	9.626	17.49	9.328	16.70	1.109	4.66	4.059	20.62	0.309	0.54	20.711	-22.83	12.74030	3
5	4.05	21.35	5.56	17.13	5.29	16.08	13.47	5.14	13.33	4.51	6.31	19.28	7.52	0.03	6.05	18.17	4.48	12.24		
	0.945	6.06	23.709	-4.55	22.932	-8.03	9.628	17.39	9.324	16.71	1.125	4.76	4.065	20.64	0.314	0.57	20.713	-22.83	12.87171	5
7	3.59	21.40	5.53	17.24	5.25	16.14	13.40	5.06	13.25	4.44	6.24	19.21	7.44	23.52	5.58	18.09	4.40	12.16		
	1.067	6.82	23.907	-3.26	23.083	-7.17	9.634	17.28	9.321	16.72	1.140	4.85	4.071	20.66	0.318	0.60	20.715	-22.83	13.00313	7
9	3.52	21.46	5.50	17.36	5.22	16.20	13.33	4.58	13.17	4.36	6.17	19.15	7.37	23.45	5.50	18.02	4.32	12.08		
	1.190	7.57	0.110	-1.90	23.235	-6.29	9.643	17.15	9.319	16.72	1.156	4.95	4.077	20.68	0.323	0.63	20.717	-22.83	13.13455	9
11	3.46	21.51	5.47	17.48	5.18	16.26	13.27	4.50	13.09	4.28	6.09	19.09	7.29	23.37	5.42	17.55	4.24	12.00		
	1.312	8.31	0.317	-0.47	23.386	-5.40	9.655	17.01	9.318	16.73	1.172	5.04	4.084	20.69	0.328	0.65	20.719	-22.83	13.26597	11
13	3.39	21.57	5.44	18.01	5.14	16.32	13.21	4.42	13.01	4.20	6.02	19.02	7.21	23.30	5.34	17.47	4.17	11.53		
	1.435	9.04	0.530	1.03	23.536	-4.50	9.669	16.86	9.318	16.72	1.187	5.14	4.090	20.71	0.332	0.68	20.721	-22.83	13.39739	13
15	3.33	22.02	5.41	18.14	5.11	16.38	13.15	4.34	12.53	4.12	5.54	18.56	7.14	23.23	5.27	17.40	4.09	11.45		
	1.558	9.76	0.749	2.58	23.686	-3.59	9.686	16.69	9.318	16.72	1.203	5.23	4.097	20.73	0.336	0.71	20.723	-22.83	13.52881	15
17	3.26	22.08	5.38	18.29	5.07	16.44	13.10	4.26	12.45	4.04	5.47	18.49	7.06	23.15	5.19	17.32	4.01	11.37		
	1.682	10.47	0.974	4.19	23.835	-2.67	9.706	16.51	9.320	16.71	1.218	5.33	4.104	20.75	0.341	0.74	20.724	-22.83	13.66023	17
19	3.19	22.15	5.35	18.44	5.03	16.50	13.05	4.18	12.38	3.56	5.39	18.43	6.59	23.08	5.11	17.25	3.53	11.29		
	1.806	11.17	1.206	5.85	23.985	-1.74	9.728	16.32	9.322	16.70	1.234	5.42	4.111	20.77	0.345	0.77	20.726	-22.83	13.79165	19
21	3.12	22.21	5.33	18.59	4.59	16.56	12.59	4.11	12.30	3.48	5.32	18.36	6.51	23.01	5.03	17.17	3.46	11.21		
	1.930	11.85	1.446	7.54	0.134	-0.81	9.753	16.12	9.325	16.68	1.249	5.51	4.118	20.79	0.350	0.79	20.727	-22.83	13.92306	21
23	3.04	22.28	5.30	19.16	4.55	17.02	12.54	4.03	12.23	3.41	5.24	18.30	6.43	22.53	4.56	17.10	3.38	11.14		
	2.055	12.52	1.692	9.27	0.283	0.12	9.780	15.91	9.329	16.66	1.265	5.60	4.125	20.81	0.354	0.82	20.728	-22.84	14.05448	23
25	2.57	22.35	5.27	19.33	4.51	17.08	12.50	3.55	12.15	3.33	5.17	18.24	6.36	22.46	4.48	17.02	3.30	11.06		
	2.180	13.18	1.947	11.01	0.432	1.06	9.809	15.69	9.333	16.63	1.280	5.69	4.133	20.83	0.358	0.84	20.729	-22.84	14.18590	25
27	2.49	22.42	5.25	19.51	4.47	17.14	12.45	3.48	12.08	3.25	5.10	18.17	6.28	22.39	4.40	16.55	3.22	10.58		
	2.306	13.83	2.209	12.74	0.581	1.99	9.840	15.46	9.338	16.61	1.296	5.78	4.140	20.85	0.362	0.87	20.730	-22.84	14.31733	27
29	2.41	22.50	5.23	20.10	4.43	17.20	12.41	3.41	12.01	3.17	5.02	18.11	6.21	22.32	4.32	16.47	3.15	10.50		
	2.433	14.46	2.478	14.46	0.731	2.93	9.873	15.22	9.344	16.57	1.311	5.87	4.148	20.87	0.366	0.90	20.731	-22.85	14.44875	29

# MAJ 2027

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
2461																						
121	1	Sob	527	1.50424	2.53	2.3335	15.04	1.00749	22.4014	-6.20	62.170	2.6	26	513	1242.9	2014	321	844.1	1422	357	1	
122	2	Nie	528	1.54389	2.60	2.3725	15.22	1.00775	23.2446	-0.39	61.474	3.6	18	511	1242.8	2016	331	925.8	1537	353	2	
123	3	Pon	529	1.58355	3.06	2.4115	15.40	1.00801	0.1024	5.12	60.700	4.6	11	509	1242.6	2017	341	1008.6	1654	349	3	
124	4	Wto	530	2.02320	3.12	2.4506	15.58	1.00826	0.5812	10.59	59.906	5.6	5	507	1242.5	2019	353	1053.6	1815	346	4	
125	5	Śro	531	2.06286	3.17	2.4857	16.15	1.00851	1.4915	16.25	59.154	6.6	1	505	1242.5	2021	406	1142.2	1940	342	5	
126	6	Czw	532	2.10251	3.22	2.5249	16.32	1.00875	2.4422	21.09	58.501	7.6	0	503	1242.4	2022	424	1235.3	2109	338	6	
127	7	Pią	533	2.14217	3.26	2.5641	16.49	1.00899	3.4351	24.45	57.992	1.0	1	502	1242.3	2024	450	1333.3	2235	334	7	
128	8	Sob	534	2.18182	3.30	3.0034	17.05	1.00923	4.4658	26.50	57.655	2.0	5	500	1242.3	2026	528	1435.3	2350	330	8	
129	9	Nie	535	2.22148	3.33	3.0428	17.21	1.00946	5.5152	27.07	57.497	3.0	11	458	1242.2	2028	624	1539.0	****	326	9	
130	10	Pon	536	2.26114	3.35	3.0822	17.37	1.00969	6.5606	25.33	57.508	4.0	20	456	1242.2	2029	739	1641.5	047	322	10	
131	11	Wto	537	2.30079	3.37	3.1217	17.53	1.00991	7.5733	22.19	57.665	5.0	30	454	1242.1	2031	906	1740.5	126	318	11	
132	12	Śro	538	2.34045	3.38	3.1612	18.08	1.01014	8.5510	17.45	57.935	6.0	41	453	1242.1	2033	1036	1835.2	152	314	12	
133	13	Czw	539	2.38010	3.39	3.2008	18.23	1.01035	9.4903	12.16	58.290	0.2	52	451	1242.1	2034	1205	1925.9	211	310	13	
134	14	Pią	540	2.41576	3.39	3.2404	18.37	1.01057	10.3958	6.14	58.703	1.2	64	449	1242.1	2036	1330	2013.7	226	306	14	
135	15	Sob	541	2.45541	3.39	3.2801	18.52	1.01078	11.2900	0.00	59.157	2.2	74	448	1242.1	2038	1453	2059.8	238	302	15	
136	16	Nie	542	2.49507	3.38	3.3158	19.06	1.01099	12.1721	-6.09	59.639	3.2	83	446	1242.1	2039	1615	2145.7	249	258	16	
137	17	Pon	543	2.53472	3.37	3.3556	19.19	1.01120	13.0604	-11.56	60.146	4.2	90	445	1242.1	2041	1737	2232.3	301	254	17	
138	18	Wto	544	2.57438	3.35	3.3955	19.33	1.01140	13.5560	-17.06	60.670	5.2	96	443	1242.2	2042	1859	2320.6	315	250	18	
139	19	Śro	545	3.01403	3.32	3.4354	19.46	1.01161	14.4741	-21.24	61.205	6.2	99	442	1242.2	2044	2019	*****	332	247	19	
140	20	Czw	546	3.05369	3.29	3.4753	19.58	1.01181	15.4110	-24.37	61.737	7.2	100	440	1242.3	2045	2135	011.0	355	243	20	
141	21	Pią	547	3.09335	3.26	3.5153	20.11	1.01201	16.3557	-26.34	62.245	1.0	99	439	1242.3	2047	2241	103.2	427	239	21	
142	22	Sob	548	3.13300	3.21	3.5554	20.23	1.01220	17.3103	-27.10	62.703	2.0	96	437	1242.4	2048	2334	156.2	510	235	22	
143	23	Nie	549	3.17266	3.17	3.5955	20.34	1.01240	18.2517	-26.27	63.080	3.0	92	436	1242.5	2050	****	248.8	606	231	23	
144	24	Pon	550	3.21232	3.12	4.0357	20.46	1.01259	19.1739	-24.30	63.344	4.0	86	435	1242.6	2051	012	339.8	713	227	24	
145	25	Wto	551	3.25197	3.06	4.0759	20.57	1.01278	20.0736	-21.30	63.463	5.0	78	434	1242.6	2053	040	428.2	825	223	25	
146	26	Śro	552	3.29163	2.60	4.1202	21.07	1.01297	20.5507	-17.37	63.412	6.0	70	432	1242.8	2054	100	513.8	938	219	26	
147	27	Czw	553	3.33128	2.53	4.1605	21.17	1.01315	21.4035	-13.03	63.176	7.0	61	431	1242.9	2055	114	557.1	1052	215	27	
148	28	Pią	554	3.37094	2.46	4.2009	21.27	1.01333	22.2445	-7.57	62.750	8.0	52	430	1243.0	2057	127	638.7	1204	211	28	
149	29	Sob	555	3.41059	2.38	4.2413	21.37	1.01350	23.0830	-2.29	62.147	0.8	42	429	1243.1	2058	137	719.7	1317	207	29	
150	30	Nie	556	3.45025	2.30	4.2818	21.46	1.01367	23.5253	3.12	61.393	1.8	32	428	1243.2	2059	147	801.1	1432	203	30	
151	31	Pon	557	3.48590	2.21	4.3223	21.55	1.01384	0.3902	8.55	60.532	2.8	23	427	1243.4	2101	158	844.2	1550	159	31	

Fazy Księżyca [Dm, h.mm]:      Now 6, 12.59      1kw 13, 6.44      Pełn 20, 12.59      3kw 28, 15.58



## MAJ 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		VENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	2.33	22.58	5.21	20.28	4.39	17.26	12.37	3.33	11.53	3.10	4.55	18.04	6.13	22.24	4.25	16.40	3.07	10.42		
	2.560	15.07	2.754	16.12	0.880	3.87	9.908	14.97	9.351	16.54	1.326	5.96	4.155	20.89	0.370	0.92	20.731	-22.85	14.58016	1
3	2.24	23.06	5.20	20.48	4.35	17.32	12.33	3.26	11.46	3.02	4.47	17.58	6.06	22.17	4.17	16.32	2.59	10.34		
	2.687	15.67	3.034	17.70	1.030	4.80	9.945	14.70	9.359	16.50	1.341	6.05	4.163	20.91	0.374	0.94	20.732	-22.86	14.71158	3
5	2.15	23.15	5.19	21.06	4.32	17.38	12.29	3.19	11.39	2.55	4.40	17.51	5.58	22.10	4.09	16.25	2.51	10.26		
	2.816	16.25	3.317	19.18	1.181	5.72	9.983	14.43	9.367	16.46	1.356	6.14	4.171	20.93	0.378	0.97	20.732	-22.86	14.84300	5
7	2.05	23.25	5.19	21.25	4.28	17.45	12.25	3.12	11.32	2.47	4.32	17.45	5.51	22.03	4.01	16.17	2.43	10.19		
	2.945	16.81	3.600	20.53	1.331	6.64	10.023	14.16	9.376	16.41	1.371	6.22	4.179	20.95	0.382	0.99	20.733	-22.87	14.97442	7
9	1.54	23.37	5.19	21.43	4.24	17.51	12.21	3.05	11.25	2.39	4.25	17.38	5.43	21.55	3.54	16.10	2.36	10.11		
	3.074	17.35	3.880	21.73	1.483	7.55	10.065	13.87	9.386	16.36	1.386	6.31	4.187	20.97	0.386	1.01	20.733	-22.88	15.10584	9
11	1.42	23.50	5.20	21.59	4.20	17.57	12.18	2.57	11.18	2.32	4.17	17.32	5.35	21.48	3.46	16.02	2.28	10.03		
	3.205	17.88	4.155	22.77	1.635	8.45	10.108	13.57	9.397	16.31	1.400	6.39	4.195	20.99	0.389	1.04	20.733	-22.88	15.23727	11
13	1.27	0.17	5.21	22.14	4.16	18.03	12.14	2.50	11.11	2.24	4.10	17.25	5.28	21.41	3.38	15.55	2.20	9.55		
	3.335	18.38	4.421	23.64	1.787	9.34	10.153	13.27	9.408	16.25	1.415	6.47	4.203	21.02	0.393	1.06	20.733	-22.89	15.36869	13
15	1.09	1.20	5.23	22.27	4.13	18.10	12.11	2.43	11.05	2.17	4.03	17.19	5.20	21.34	3.30	15.47	2.12	9.47		
	3.467	18.86	4.677	24.34	1.941	10.21	10.199	12.95	9.420	16.19	1.429	6.55	4.211	21.04	0.396	1.08	20.732	-22.90	15.50010	15
17	*****	*****	5.25	22.38	4.09	18.16	12.08	2.37	10.58	2.09	3.55	17.12	5.13	21.26	3.22	15.40	2.04	9.39		
	3.599	19.32	4.921	24.88	2.095	11.07	10.246	12.63	9.432	16.13	1.443	6.63	4.219	21.06	0.399	1.10	20.732	-22.91	15.63152	17
19	*****	*****	5.28	22.47	4.06	18.22	12.05	2.30	10.51	2.02	3.48	17.05	5.05	21.19	3.15	15.32	1.56	9.31		
	3.732	19.76	5.151	25.26	2.250	11.92	10.294	12.30	9.446	16.06	1.457	6.71	4.227	21.08	0.403	1.12	20.731	-22.92	15.76294	19
21	*****	*****	5.31	22.54	4.02	18.28	12.02	2.23	10.45	1.54	3.40	16.59	4.58	21.12	3.07	15.25	1.49	9.23		
	3.865	20.18	5.365	25.49	2.406	12.74	10.344	11.97	9.459	16.00	1.471	6.79	4.235	21.10	0.406	1.14	20.731	-22.93	15.89436	21
23	*****	*****	5.34	22.59	3.59	18.35	11.59	2.16	10.38	1.47	3.33	16.52	4.50	21.05	2.59	15.17	1.41	9.15		
	3.999	20.57	5.563	25.60	2.563	13.55	10.394	11.62	9.474	15.92	1.485	6.86	4.244	21.12	0.409	1.16	20.730	-22.94	16.02579	23
25	*****	*****	5.37	23.02	3.56	18.41	11.56	2.09	10.32	1.39	3.25	16.45	4.43	20.58	2.51	15.09	1.33	9.07		
	4.133	20.94	5.743	25.58	2.721	14.34	10.446	11.27	9.489	15.85	1.498	6.94	4.252	21.14	0.412	1.17	20.729	-22.95	16.15721	25
27	*****	*****	5.40	23.03	3.53	18.47	11.54	2.02	10.25	1.32	3.18	16.39	4.35	20.50	2.44	15.02	1.25	8.59		
	4.268	21.29	5.905	25.46	2.880	15.10	10.499	10.91	9.504	15.77	1.511	7.01	4.260	21.16	0.415	1.19	20.728	-22.96	16.28863	27
29	*****	*****	5.42	23.01	3.50	18.54	11.51	1.56	10.19	1.24	3.10	16.32	4.28	20.43	2.36	14.54	1.17	8.51		
	4.404	21.61	6.048	25.24	3.041	15.84	10.552	10.55	9.520	15.69	1.524	7.08	4.268	21.18	0.417	1.21	20.727	-22.97	16.42005	29
31	*****	*****	5.44	22.58	3.47	19.00	11.49	1.49	10.12	1.17	3.03	16.25	4.20	20.36	2.28	14.47	1.09	8.43		
	4.540	21.91	6.170	24.94	3.203	16.56	10.607	10.17	9.537	15.61	1.537	7.15	4.277	21.20	0.420	1.22	20.726	-22.98	16.55147	31

# CZERWIEC 2027

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
152	1	Wto	2461	558	3.52556	2.12	4.3629	22.03	1.01400	1.2809	14.26	59.623	3.8	15	426	1243.5	2102	210	930.4	1712	155	1
153	2	Śro	559	559	3.56522	2.03	4.4035	22.11	1.01416	2.2119	19.25	58.734	4.8	8	425	1243.7	2103	226	1021.0	1838	152	2
154	3	Czw	560	560	4.00487	1.53	4.4441	22.19	1.01431	3.1916	23.29	57.940	5.8	3	424	1243.9	2104	248	1116.8	2007	148	3
155	4	Pią	561	561	4.04453	1.43	4.4848	22.26	1.01446	4.2150	26.12	57.307	6.8	0	424	1244.0	2105	320	1217.8	2129	144	4
156	5	Sob	562	562	4.08418	1.32	4.5255	22.33	1.01460	5.2737	27.09	56.889	0.6	1	423	1244.2	2106	409	1322.6	2235	140	5
157	6	Nie	563	563	4.12384	1.22	4.5702	22.39	1.01473	6.3402	26.10	56.714	1.6	4	422	1244.4	2107	518	1427.8	2323	136	6
158	7	Pon	564	564	4.16350	1.10	5.0110	22.45	1.01486	7.3823	23.20	56.784	2.6	10	422	1244.6	2108	645	1530.4	2354	132	7
159	8	Wto	565	565	4.20315	0.59	5.0518	22.51	1.01498	8.3853	18.58	57.074	3.6	18	421	1244.8	2109	817	1628.5	****	128	8
160	9	Śro	566	566	4.24281	0.47	5.0926	22.56	1.01510	9.3507	13.33	57.540	4.6	28	421	1245.0	2110	949	1721.8	016	124	9
161	10	Czw	567	567	4.28246	0.35	5.1335	23.01	1.01521	10.2739	7.30	58.128	5.6	38	420	1245.2	2111	1117	1811.3	032	120	10
162	11	Pią	568	568	4.32212	0.23	5.1743	23.05	1.01532	11.1735	1.13	58.786	6.6	50	420	1245.4	2111	1242	1858.3	045	116	11
163	12	Sob	569	569	4.36178	0.11	5.2152	23.09	1.01543	12.0609	-4.59	59.467	1.0	61	419	1245.6	2112	1404	1944.2	057	112	12
164	13	Nie	570	570	4.40143	-0.01	5.2601	23.12	1.01553	12.5432	-10.50	60.138	2.0	71	419	1245.8	2113	1525	2030.2	109	108	13
165	14	Pon	571	571	4.44109	-0.14	5.3010	23.16	1.01562	13.4342	-16.05	60.775	3.0	80	419	1246.0	2113	1646	2117.5	122	104	14
166	15	Wto	572	572	4.48074	-0.27	5.3419	23.18	1.01571	14.3422	-20.31	61.366	4.0	88	419	1246.2	2114	1806	2206.5	138	100	15
167	16	Śro	573	573	4.52040	-0.39	5.3829	23.21	1.01580	15.2649	-23.57	61.903	5.0	93	419	1246.4	2114	1923	2257.5	158	056	16
168	17	Czw	574	574	4.56005	-0.52	5.4238	23.23	1.01589	16.2048	-26.11	62.382	6.0	97	419	1246.6	2115	2032	2349.8	227	053	17
169	18	Pią	575	575	4.59571	-1.05	5.4648	23.24	1.01597	17.1531	-27.07	62.799	7.0	100	419	1246.8	2115	2129	*****	306	049	18
170	19	Sob	576	576	5.03537	-1.18	5.5057	23.25	1.01605	18.0952	-26.44	63.144	0.4	100	419	1247.0	2116	2211	042.4	357	045	19
171	20	Nie	577	577	5.07502	-1.31	5.5507	23.26	1.01612	19.0243	-25.05	63.406	1.4	98	419	1247.3	2116	2242	133.9	501	041	20
172	21	Pon	578	578	5.11468	-1.44	5.5916	23.26	1.01619	19.5320	-22.20	63.565	2.4	95	419	1247.5	2116	2304	223.2	611	037	21
173	22	Wto	579	579	5.15434	-1.57	6.0326	23.26	1.01626	20.4127	-18.40	63.604	3.4	90	419	1247.7	2116	2320	309.8	725	033	22
174	23	Śro	580	580	5.19399	-2.10	6.0735	23.26	1.01633	21.2718	-14.16	63.502	4.4	84	419	1247.9	2116	2333	353.8	838	029	23
175	24	Czw	581	581	5.23365	-2.23	6.1145	23.25	1.01639	22.1127	-9.20	63.243	5.4	76	420	1248.1	2116	2344	435.6	951	025	24
176	25	Pią	582	582	5.27330	-2.36	6.1554	23.23	1.01644	22.5443	-4.00	62.815	6.4	67	420	1248.3	2116	2354	516.2	1102	021	25
177	26	Sob	583	583	5.31296	-2.48	6.2003	23.21	1.01650	23.3804	1.32	62.220	7.4	58	421	1248.6	2116	****	556.6	1215	017	26
178	27	Nie	584	584	5.35261	-3.01	6.2412	23.19	1.01654	0.2234	7.09	61.472	0.2	48	421	1248.8	2116	004	638.0	1329	013	27
179	28	Pon	585	585	5.39227	-3.13	6.2821	23.17	1.01659	1.0924	12.37	60.599	1.2	38	422	1249.0	2116	015	721.5	1447	009	28
180	29	Wto	586	586	5.43192	-3.26	6.3230	23.14	1.01663	1.5945	17.42	59.650	2.2	28	422	1249.2	2116	029	808.7	1610	005	29
181	30	Śro	587	587	5.47158	-3.38	6.3639	23.10	1.01666	2.5438	22.04	58.688	3.2	18	423	1249.4	2116	047	900.8	1736	001	30

Fazy Księżyca [Dm, h.mm]:      Now 4, 21.40      1kw 11, 12.56      Pełn 19, 2.44      3kw 27, 6.54

# CZERWIEC 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST ( $0^h$ UT) Dm	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	*****	*****	5.45	22.56	3.46	19.03	11.47	1.46	10.09	1.13	2.59	16.22	4.16	20.32	2.24	14.43	1.06	8.39		
	4.608	22.05	6.224	24.76	3.284	16.91	10.634	9.99	9.545	15.56	1.543	7.19	4.281	21.21	0.421	1.23	20.725	-22.99	16.61718	1
3	*****	*****	5.46	22.50	3.44	19.10	11.45	1.39	10.03	1.06	2.52	16.15	4.09	20.25	2.16	14.35	0.58	8.31		
	4.745	22.31	6.315	24.36	3.447	17.58	10.690	9.60	9.563	15.48	1.556	7.25	4.289	21.23	0.424	1.24	20.724	-23.00	16.74860	3
5	*****	*****	5.46	22.43	3.41	19.16	11.43	1.32	9.57	0.59	2.44	16.08	4.01	20.18	2.09	14.27	0.50	8.23		
	4.882	22.54	6.384	23.91	3.612	18.22	10.747	9.21	9.581	15.39	1.568	7.32	4.297	21.25	0.426	1.26	20.722	-23.01	16.88002	5
7	*****	*****	5.45	22.34	3.39	19.22	11.41	1.26	9.51	0.51	2.37	16.02	3.54	20.11	2.01	14.20	0.42	8.15		
	5.019	22.75	6.431	23.42	3.778	18.84	10.804	8.82	9.599	15.29	1.580	7.38	4.305	21.27	0.428	1.27	20.721	-23.02	17.01145	7
9	*****	*****	5.42	22.24	3.38	19.28	11.38	1.19	9.44	0.44	2.29	15.55	3.46	20.03	1.53	14.12	0.34	8.07		
	5.157	22.93	6.455	22.90	3.945	19.42	10.863	8.42	9.618	15.20	1.592	7.44	4.314	21.29	0.430	1.28	20.719	-23.03	17.14287	9
11	*****	*****	5.39	22.12	3.36	19.34	11.36	1.12	9.38	0.37	2.22	15.48	3.39	19.56	1.45	14.04	0.26	7.59		
	5.295	23.08	6.457	22.36	4.113	19.96	10.922	8.01	9.638	15.10	1.603	7.50	4.322	21.31	0.432	1.29	20.717	-23.05	17.27429	11
13	*****	*****	5.34	21.59	3.35	19.40	11.34	1.06	9.32	0.29	2.14	15.41	3.31	19.49	1.37	13.57	0.18	7.51		
	5.434	23.21	6.437	21.81	4.283	20.48	10.981	7.60	9.657	15.00	1.615	7.56	4.330	21.33	0.434	1.30	20.715	-23.06	17.40571	13
15	*****	*****	5.28	21.44	3.34	19.46	11.32	0.59	9.26	0.22	2.07	15.34	3.24	19.42	1.30	13.49	0.10	7.43		
	5.572	23.31	6.398	21.27	4.454	20.95	11.042	7.18	9.678	14.89	1.626	7.62	4.338	21.35	0.436	1.31	20.713	-23.07	17.53713	15
17	*****	*****	5.20	21.29	3.33	19.51	11.31	0.53	9.20	0.15	1.59	15.27	3.16	19.34	1.22	13.41	0.03	7.34		
	5.711	23.38	6.342	20.75	4.625	21.39	11.103	6.75	9.698	14.79	1.636	7.67	4.346	21.37	0.438	1.32	20.711	-23.09	17.66855	17
19	*****	*****	5.12	21.14	3.32	19.57	11.29	0.46	9.14	0.08	1.52	15.20	3.09	19.27	1.14	13.34	23.51	7.26		
	5.849	23.42	6.273	20.26	4.798	21.79	11.164	6.32	9.719	14.68	1.647	7.72	4.354	21.39	0.439	1.33	20.709	-23.10	17.79997	19
21	*****	*****	5.02	20.58	3.32	20.02	11.27	0.40	9.08	23.56	1.44	15.13	3.01	19.20	1.06	13.26	23.43	7.18		
	5.988	23.44	6.195	19.81	4.972	22.14	11.227	5.89	9.741	14.57	1.657	7.77	4.361	21.41	0.440	1.33	20.707	-23.12	17.93140	21
23	*****	*****	4.52	20.43	3.32	20.07	11.25	0.33	9.03	23.49	1.36	15.06	2.54	19.13	0.58	13.18	23.35	7.10		
	6.126	23.43	6.113	19.43	5.146	22.46	11.289	5.45	9.763	14.46	1.666	7.82	4.369	21.43	0.442	1.34	20.704	-23.13	18.06282	23
25	*****	*****	4.42	20.28	3.33	20.12	11.24	0.27	8.57	23.42	1.29	14.59	2.46	19.05	0.50	13.10	23.27	7.02		
	6.265	23.39	6.033	19.12	5.322	22.73	11.353	5.01	9.785	14.34	1.676	7.87	4.377	21.45	0.443	1.34	20.702	-23.15	18.19424	25
27	*****	*****	4.31	20.14	3.34	20.16	11.22	0.20	8.51	23.35	1.21	14.52	2.39	18.58	0.43	13.02	23.19	6.54		
	6.403	23.32	5.960	18.89	5.498	22.96	11.417	4.56	9.807	14.22	1.685	7.91	4.384	21.46	0.444	1.35	20.699	-23.16	18.32566	27
29	*****	*****	4.20	20.02	3.35	20.20	11.20	0.14	8.45	23.27	1.14	14.45	2.31	18.51	0.35	12.55	23.11	6.46		
	6.542	23.23	5.899	18.76	5.675	23.15	11.481	4.10	9.830	14.10	1.694	7.95	4.392	21.48	0.444	1.35	20.697	-23.17	18.45708	29

# LIPIEC 2027

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Czw	588	5.51124	-3.50	6.4047	23.06	1.01668	3.5432	25.19	57.787	4.2	10	423	1249.6	2115	113	958.5	1901	2354	1
183	2	Pią	589	5.55089	-4.01	6.4455	23.02	1.01670	4.5851	27.01	57.028	5.2	4	424	1249.8	2115	153	1101.2	2016	2350	2
184	3	Sob	590	5.59055	-4.12	6.4903	22.58	1.01672	6.0537	26.49	56.483	6.2	1	425	1250.0	2114	252	1206.9	2113	2346	3
185	4	Nie	591	6.03021	-4.23	6.5311	22.52	1.01673	7.1203	24.40	56.204	0.3	0	426	1250.1	2114	413	1312.1	2152	2342	4
186	5	Pon	592	6.06586	-4.34	6.5718	22.47	1.01673	8.1538	20.44	56.216	1.3	3	427	1250.3	2113	546	1414.1	2218	2338	5
187	6	Wto	593	6.10552	-4.44	7.0125	22.41	1.01672	9.1508	15.29	56.510	2.3	8	428	1250.5	2113	722	1511.3	2237	2334	6
188	7	Śro	594	6.14517	-4.54	7.0532	22.35	1.01671	10.1033	9.23	57.044	3.3	15	429	1250.7	2112	855	1604.1	2252	2330	7
189	8	Czw	595	6.18483	-5.04	7.0938	22.28	1.01670	11.0245	2.56	57.758	4.3	25	430	1250.8	2111	1024	1653.5	2304	2326	8
190	9	Pią	596	6.22448	-5.13	7.1343	22.21	1.01668	11.5254	-3.30	58.580	5.3	35	431	1251.0	2111	1149	1741.0	2316	2322	9
191	10	Sob	597	6.26414	-5.22	7.1749	22.14	1.01665	12.4213	-9.34	59.442	6.3	46	432	1251.1	2110	1312	1827.8	2329	2318	10
192	11	Nie	598	6.30379	-5.30	7.2153	22.06	1.01662	13.3145	-15.03	60.286	0.6	57	433	1251.2	2109	1434	1915.1	2344	2314	11
193	12	Pon	599	6.34345	-5.38	7.2558	21.58	1.01658	14.2219	-19.42	61.069	1.6	67	434	1251.4	2108	1555	2003.8	****	2310	12
194	13	Wto	600	6.38311	-5.45	7.3002	21.50	1.01654	15.1420	-23.21	61.761	2.6	76	435	1251.5	2107	1713	2054.1	003	2306	13
195	14	Śro	601	6.42276	-5.52	7.3405	21.41	1.01649	16.0746	-25.51	62.349	3.6	84	436	1251.6	2106	1825	2145.8	028	2302	14
196	15	Czw	602	6.46242	-5.58	7.3808	21.31	1.01644	17.0204	-27.04	62.828	4.6	91	438	1251.7	2105	1925	2238.0	104	2259	15
197	16	Pią	603	6.50207	-6.04	7.4210	21.22	1.01639	17.5616	-26.59	63.198	5.6	95	439	1251.8	2104	2012	2329.7	151	2255	16
198	17	Sob	604	6.54173	-6.10	7.4612	21.12	1.01634	18.4919	-25.38	63.464	6.6	99	440	1251.9	2103	2045	****	251	2251	17
199	18	Nie	605	6.58139	-6.14	7.5014	21.01	1.01628	19.4024	-23.08	63.627	7.6	100	441	1252.0	2102	2110	019.6	400	2247	18
200	19	Pon	606	7.02104	-6.19	7.5414	20.51	1.01621	20.2907	-19.40	63.688	0.8	99	443	1252.1	2100	2127	107.0	513	2243	19
201	20	Wto	607	7.06070	-6.22	7.5815	20.40	1.01615	21.1531	-15.25	63.642	1.8	97	444	1252.1	2059	2141	151.8	626	2239	20
202	21	Śro	608	7.10035	-6.25	8.0214	20.28	1.01608	22.0002	-10.35	63.481	2.8	93	446	1252.2	2058	2152	234.3	739	2235	21
203	22	Czw	609	7.14001	-6.28	8.0613	20.16	1.01600	22.4320	-5.21	63.197	3.8	88	447	1252.2	2056	2203	315.1	851	2231	22
204	23	Pią	610	7.17566	-6.30	8.1012	20.04	1.01593	23.2617	0.08	62.779	4.8	81	449	1252.2	2055	2212	355.2	1003	2227	23
205	24	Sob	611	7.21532	-6.31	8.1410	19.52	1.01585	0.0950	5.41	62.224	5.8	73	450	1252.3	2054	2223	435.7	1116	2223	24
206	25	Nie	612	7.25498	-6.32	8.1807	19.39	1.01576	0.5503	11.07	61.535	6.8	63	451	1252.3	2052	2235	517.5	1231	2219	25
207	26	Pon	613	7.29463	-6.32	8.2204	19.26	1.01567	1.4303	16.13	60.729	7.8	53	453	1252.3	2051	2250	602.1	1349	2215	26
208	27	Wto	614	7.33429	-6.32	8.2600	19.13	1.01558	2.3453	20.44	59.835	0.7	42	455	1252.3	2049	2312	650.6	1512	2211	27
209	28	Śro	615	7.37394	-6.31	8.2956	18.59	1.01548	3.3117	24.19	58.900	1.7	32	456	1252.3	2047	2344	744.0	1635	2207	28
210	29	Czw	616	7.41360	-6.30	8.3351	18.45	1.01538	4.3218	26.36	57.989	2.7	22	458	1252.2	2046	****	842.7	1754	2203	29
211	30	Pią	617	7.45325	-6.28	8.3746	18.31	1.01527	5.3651	27.11	57.175	3.7	13	459	1252.2	2044	032	945.6	1859	2200	30
212	31	Sob	618	7.49291	-6.25	8.4140	18.16	1.01516	6.4248	25.53	56.535	4.7	6	501	1252.2	2042	141	1050.4	1946	2156	31

Fazy Księżyca [Dm, h.mm]:      Now 4, 5.02      1kw 10, 20.39      Pełn 18, 17.45      3kw 26, 18.55

# LIPIEC 2027 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	*****	*****	4.10	19.51	3.37	20.24	11.19	0.07	8.39	23.20	1.06	14.38	2.23	18.43	0.27	12.47	23.03	6.38		
	6.680	23.11	5.853	18.73	5.852	23.29	11.546	3.65	9.853	13.98	1.702	7.99	4.399	21.50	0.445	1.35	20.694	-23.19	18.58850	1
3	*****	*****	4.00	19.42	3.39	20.28	11.17	23.57	8.34	23.13	0.59	14.31	2.16	18.36	0.19	12.39	22.55	6.30		
	6.818	22.96	5.827	18.80	6.030	23.39	11.612	3.18	9.877	13.86	1.710	8.03	4.406	21.52	0.446	1.35	20.691	-23.20	18.71992	3
5	*****	*****	3.51	19.35	3.41	20.31	11.16	23.51	8.28	23.06	0.51	14.24	2.08	18.29	0.11	12.31	22.47	6.21		
	6.955	22.78	5.823	18.96	6.208	23.44	11.678	2.72	9.900	13.73	1.718	8.06	4.414	21.53	0.446	1.35	20.688	-23.22	18.85135	5
7	*****	*****	3.42	19.30	3.44	20.34	11.15	23.44	8.22	22.59	0.43	14.16	2.01	18.22	0.03	12.23	22.40	6.13		
	7.092	22.58	5.841	19.20	6.386	23.44	11.745	2.25	9.924	13.61	1.725	8.10	4.421	21.55	0.446	1.35	20.686	-23.24	18.98277	7
9	*****	*****	3.35	19.27	3.47	20.36	11.13	23.38	8.17	22.51	0.36	14.09	1.53	18.14	23.52	12.15	22.32	6.05		
	7.229	22.36	5.883	19.50	6.564	23.40	11.812	1.77	9.949	13.48	1.732	8.13	4.428	21.56	0.446	1.35	20.683	-23.25	19.11419	9
11	*****	*****	3.29	19.25	3.51	20.38	11.12	23.31	8.11	22.44	0.28	14.02	1.46	18.07	23.44	12.08	22.24	5.57		
	7.365	22.10	5.950	19.86	6.743	23.32	11.880	1.30	9.973	13.34	1.738	8.16	4.434	21.58	0.446	1.35	20.680	-23.27	19.24561	11
13	*****	*****	3.23	19.26	3.54	20.40	11.11	23.25	8.06	22.37	0.21	13.54	1.38	17.60	23.36	11.60	22.16	5.49		
	7.500	21.83	6.041	20.25	6.920	23.18	11.948	0.82	9.998	13.21	1.745	8.18	4.441	21.59	0.446	1.35	20.677	-23.28	19.37703	13
15	*****	*****	3.20	19.28	3.59	20.41	11.10	23.19	7.60	22.30	0.13	13.47	1.31	17.52	23.28	11.52	22.08	5.41		
	7.636	21.52	6.157	20.66	7.098	23.00	12.017	0.33	10.023	13.08	1.750	8.20	4.448	21.61	0.446	1.35	20.674	-23.30	19.50845	15
17	*****	*****	3.17	19.31	4.03	20.42	11.09	23.13	7.54	22.23	0.05	13.40	1.23	17.45	23.20	11.44	21.60	5.32		
	7.770	21.20	6.296	21.07	7.275	22.78	12.086	-0.15	10.048	12.94	1.756	8.23	4.454	21.62	0.446	1.34	20.671	-23.31	19.63988	17
19	*****	*****	3.16	19.36	4.08	20.43	11.07	23.06	7.49	22.16	23.54	13.32	1.15	17.37	23.12	11.36	21.52	5.24		
	7.904	20.84	6.460	21.44	7.451	22.51	12.156	-0.64	10.074	12.80	1.761	8.24	4.460	21.64	0.445	1.34	20.667	-23.33	19.77130	19
21	*****	*****	3.17	19.41	4.13	20.43	11.06	22.60	7.43	22.08	23.46	13.25	1.08	17.30	23.04	11.28	21.44	5.16		
	8.037	20.47	6.647	21.76	7.627	22.20	12.226	-1.13	10.099	12.66	1.765	8.26	4.466	21.65	0.445	1.33	20.664	-23.34	19.90272	21
23	*****	*****	3.20	19.48	4.18	20.43	11.05	22.54	7.38	22.01	23.38	13.17	1.00	17.23	22.57	11.20	21.36	5.08		
	8.170	20.07	6.856	22.00	7.802	21.84	12.297	-1.62	10.125	12.52	1.770	8.28	4.472	21.66	0.444	1.32	20.661	-23.36	20.03414	23
25	*****	*****	3.25	19.55	4.24	20.43	11.04	22.47	7.32	21.54	23.31	13.10	0.53	17.15	22.49	11.12	21.28	4.60		
	8.302	19.65	7.085	22.13	7.976	21.44	12.368	-2.12	10.151	12.38	1.773	8.29	4.478	21.68	0.443	1.32	20.658	-23.37	20.16555	25
27	*****	*****	3.32	20.01	4.29	20.42	11.04	22.41	7.27	21.47	23.23	13.02	0.45	17.08	22.41	11.04	21.20	4.52		
	8.433	19.21	7.333	22.13	8.150	21.00	12.440	-2.61	10.177	12.23	1.777	8.30	4.484	21.69	0.442	1.31	20.655	-23.39	20.29697	27
29	1.07	0.05	3.41	20.08	4.35	20.41	11.03	22.35	7.22	21.40	23.15	12.54	0.37	17.00	22.33	10.56	21.12	4.43		
	8.564	18.75	7.597	21.98	8.322	20.52	12.512	-3.11	10.203	12.08	1.779	8.30	4.489	21.70	0.441	1.30	20.651	-23.40	20.42840	29
31	1.33	-0.05	3.52	20.15	4.41	20.40	11.02	22.29	7.16	21.33	23.07	12.47	0.30	16.53	22.25	10.48	21.04	4.35		
	8.694	18.27	7.872	21.66	8.493	20.00	12.585	-3.61	10.230	11.94	1.782	8.31	4.494	21.71	0.439	1.29	20.648	-23.41	20.55982	31

# SIERPIEŃ 2027

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
213	1	Nie	619	7.53257	-6.22	8.4533	18.01	1.01504	7.4734	22.42	56.140	5.7	2	502	1252.1	2041	308	1154.0	2018	2152	1	
214	2	Pon	620	7.57222	-6.18	8.4926	17.46	1.01491	8.4921	17.56	56.033	6.7	0	504	1252.0	2039	444	1254.1	2040	2148	2	
215	3	Wto	621	8.01188	-6.14	8.5318	17.30	1.01478	9.4726	12.01	56.229	1.0	2	506	1252.0	2037	621	1350.2	2056	2144	3	
216	4	Śro	622	8.05153	-6.09	8.5709	17.14	1.01464	10.4212	5.29	56.709	2.0	6	507	1251.9	2035	754	1442.6	2110	2140	4	
217	5	Czw	623	8.09119	-6.03	9.0100	16.58	1.01450	11.3434	-1.12	57.418	3.0	13	509	1251.8	2033	924	1532.4	2123	2136	5	
218	6	Pią	624	8.13084	-5.57	9.0450	16.42	1.01435	12.2539	-7.38	58.287	4.0	21	511	1251.7	2032	1051	1621.1	2136	2132	6	
219	7	Sob	625	8.17050	-5.50	9.0840	16.25	1.01420	13.1631	-13.30	59.234	5.0	31	512	1251.6	2030	1216	1709.6	2150	2128	7	
220	8	Nie	626	8.21015	-5.42	9.1229	16.08	1.01404	14.0758	-18.32	60.184	6.0	42	514	1251.5	2028	1339	1759.0	2208	2124	8	
221	9	Pon	627	8.24581	-5.34	9.1618	15.51	1.01388	15.0031	-22.33	61.076	0.2	52	516	1251.3	2026	1500	1849.7	2231	2120	9	
222	10	Wto	628	8.28547	-5.25	9.2005	15.34	1.01371	15.5413	-25.23	61.862	1.2	62	517	1251.2	2024	1615	1941.5	2303	2116	10	
223	11	Śro	629	8.32512	-5.16	9.2353	15.16	1.01354	16.4838	-26.55	62.514	2.2	72	519	1251.0	2022	1720	2033.9	2347	2112	11	
224	12	Czw	630	8.36478	-5.06	9.2739	14.58	1.01337	17.4259	-27.09	63.018	3.2	80	521	1250.9	2020	1811	2125.8	****	2108	12	
225	13	Pią	631	8.40443	-4.56	9.3125	14.40	1.01319	18.3618	-26.06	63.372	4.2	87	522	1250.7	2018	1848	2216.2	043	2104	13	
226	14	Sob	632	8.44409	-4.45	9.3511	14.22	1.01302	19.2747	-23.52	63.584	5.2	93	524	1250.5	2016	1915	2304.3	149	2101	14	
227	15	Nie	633	8.48375	-4.33	9.3856	14.03	1.01283	20.1702	-20.38	63.666	6.2	97	526	1250.3	2014	1935	2349.9	301	2057	15	
228	16	Pon	634	8.52340	-4.21	9.4240	13.44	1.01265	21.0401	-16.34	63.631	7.2	99	527	1250.1	2012	1950	*****	415	2053	16	
229	17	Wto	635	8.56306	-4.08	9.4624	13.25	1.01246	21.4904	-11.51	63.492	0.1	100	529	1249.9	2009	2002	033.2	528	2049	17	
230	18	Śro	636	9.00271	-3.55	9.5008	13.06	1.01227	22.3246	-6.40	63.256	1.1	99	531	1249.7	2007	2012	114.7	641	2045	18	
231	19	Czw	637	9.04237	-3.42	9.5351	12.47	1.01208	23.1554	-1.13	62.928	2.1	96	533	1249.4	2005	2022	155.1	753	2041	19	
232	20	Pią	638	9.08202	-3.27	9.5733	12.27	1.01189	23.5919	4.20	62.508	3.1	91	534	1249.2	2003	2032	235.5	905	2037	20	
233	21	Sob	639	9.12168	-3.13	10.0115	12.07	1.01169	0.4357	9.48	61.997	4.1	85	536	1249.0	2001	2044	316.7	1019	2033	21	
234	22	Nie	640	9.16133	-2.58	10.0456	11.47	1.01149	1.3047	14.58	61.394	5.1	77	538	1248.7	1958	2058	300.0	1136	2029	22	
235	23	Pon	641	9.20099	-2.42	10.0837	11.27	1.01129	2.2045	19.35	60.705	6.1	68	539	1248.5	1956	2116	446.4	1256	2025	23	
236	24	Wto	642	9.24064	-2.26	10.1218	11.06	1.01109	3.1436	23.23	59.947	7.1	57	541	1248.2	1954	2143	536.9	1417	2021	24	
237	25	Śro	643	9.28030	-2.10	10.1558	10.46	1.01088	4.1234	26.00	59.145	0.3	47	543	1247.9	1952	2222	631.9	1536	2017	25	
238	26	Czw	644	9.31595	-1.53	10.1938	10.25	1.01067	5.1406	27.09	58.343	1.3	36	545	1247.6	1949	2320	731.2	1645	2013	26	
239	27	Pią	645	9.35561	-1.36	10.2318	10.04	1.01046	6.1740	26.35	57.596	2.3	25	546	1247.4	1947	****	833.2	1738	2009	27	
240	28	Sob	646	9.39527	-1.19	10.2657	9.43	1.01024	7.2115	24.12	56.968	3.3	16	548	1247.1	1945	037	935.5	1815	2006	28	
241	29	Nie	647	9.43492	-1.01	10.3036	9.22	1.01001	8.2301	20.09	56.527	4.3	8	550	1246.8	1943	207	1036.0	1841	2002	29	
242	30	Pon	648	9.47458	-0.43	10.3414	9.00	1.00979	9.2157	14.46	56.326	5.3	3	551	1246.5	1940	343	1133.3	1900	1958	30	
243	31	Wto	649	9.51423	-0.25	10.3752	8.39	1.00956	10.1801	8.28	56.401	6.3	0	553	1246.2	1938	518	1227.3	1915	1954	31	

Fazy Księżycyca [Dm, h.mm]:      Nów 2, 12.05      1kw 9, 6.54      Pełn 17, 9.29      3kw 25, 4.27      Nów 31, 19.41

# SIERPIEŃ 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ			SATURN		URAN		NEPTUN		PLUTON		ST		
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	1.41	23.57	3.58	20.17	4.44	20.39	11.01	22.26	7.13	21.29	23.03	12.43	0.26	16.49	22.21	10.44	21.00	4.31				
	8.759	18.02	8.014	21.43	8.578	19.73	12.622	-3.86	10.243	11.86	1.783	8.31	4.497	21.72	0.439	1.28	20.647	-23.42	20.62553		1	
3	1.55	23.44	4.12	20.22	4.51	20.37	11.01	22.20	7.08	21.22	22.56	12.35	0.18	16.42	22.13	10.36	20.52	4.23				
	8.888	17.50	8.300	20.85	8.748	19.15	12.696	-4.36	10.270	11.71	1.785	8.31	4.502	21.73	0.437	1.27	20.643	-23.44	20.75695		3	
5	2.07	23.33	4.27	20.26	4.57	20.35	10.60	22.14	7.03	21.15	22.48	12.27	0.11	16.34	22.05	10.28	20.44	4.15				
	9.017	16.97	8.589	20.09	8.916	18.54	12.770	-4.86	10.296	11.56	1.786	8.31	4.506	21.74	0.436	1.26	20.640	-23.45	20.88837		5	
7	2.17	23.23	4.42	20.29	5.03	20.33	10.59	22.07	6.57	21.08	22.40	12.19	0.03	16.27	21.57	10.20	20.36	4.07				
	9.144	16.42	8.875	19.18	9.083	17.89	12.845	-5.37	10.323	11.41	1.787	8.30	4.511	21.75	0.434	1.25	20.637	-23.46	21.01979		7	
9	2.26	23.13	4.58	20.31	5.10	20.31	10.59	22.01	6.52	21.01	22.32	12.11	23.51	16.19	21.49	10.12	20.29	3.59				
	9.272	15.85	9.158	18.12	9.249	17.21	12.920	-5.87	10.350	11.26	1.788	8.30	4.515	21.76	0.432	1.23	20.634	-23.48	21.15121		9	
11	2.35	23.05	5.15	20.32	5.16	20.28	10.58	21.55	6.47	20.53	22.25	12.04	23.44	16.11	21.42	10.04	20.21	3.50				
	9.398	15.27	9.433	16.94	9.414	16.49	12.996	-6.37	10.377	11.11	1.788	8.29	4.519	21.77	0.430	1.22	20.631	-23.49	21.28263		11	
13	2.43	22.56	5.31	20.32	5.23	20.26	10.57	21.49	6.41	20.46	22.17	11.56	23.36	16.04	21.34	9.56	20.13	3.42				
	9.524	14.67	9.700	15.66	9.578	15.75	13.072	-6.87	10.404	10.95	1.787	8.27	4.523	21.78	0.428	1.20	20.628	-23.50	21.41405		13	
15	2.50	22.48	5.47	20.31	5.30	20.23	10.57	21.43	6.36	20.39	22.09	11.48	23.28	15.56	21.26	9.48	20.05	3.34				
	9.649	14.05	9.958	14.30	9.740	14.97	13.149	-7.37	10.431	10.80	1.786	8.26	4.527	21.78	0.426	1.19	20.625	-23.52	21.54547		15	
17	2.57	22.40	6.02	20.30	5.36	20.19	10.56	21.37	6.30	20.32	22.01	11.40	23.20	15.49	21.18	9.40	19.57	3.26				
	9.773	13.42	10.207	12.88	9.901	14.17	13.226	-7.87	10.459	10.64	1.785	8.24	4.531	21.79	0.424	1.17	20.622	-23.53	21.67689		17	
19	3.04	22.33	6.17	20.28	5.43	20.16	10.56	21.31	6.25	20.25	21.53	11.31	23.13	15.41	21.10	9.32	19.49	3.18				
	9.897	12.78	10.447	11.41	10.061	13.35	13.305	-8.37	10.486	10.48	1.784	8.22	4.534	21.80	0.422	1.16	20.619	-23.54	21.80831		19	
21	3.11	22.25	6.32	20.25	5.50	20.13	10.55	21.26	6.20	20.18	21.45	11.23	23.05	15.33	21.02	9.24	19.41	3.10				
	10.021	12.12	10.677	9.92	10.220	12.50	13.383	-8.87	10.513	10.32	1.781	8.20	4.537	21.81	0.419	1.14	20.616	-23.55	21.93972		21	
23	3.17	22.18	6.46	20.22	5.56	20.09	10.55	21.20	6.14	20.11	21.37	11.15	22.57	15.26	20.54	9.16	19.33	3.02				
	10.144	11.45	10.900	8.40	10.378	11.62	13.462	-9.37	10.540	10.17	1.779	8.18	4.540	21.81	0.417	1.12	20.613	-23.56	22.07114		23	
25	3.23	22.11	6.59	20.19	6.03	20.06	10.55	21.14	6.09	20.04	21.30	11.07	22.50	15.18	20.46	9.07	19.25	2.53				
	10.266	10.76	11.114	6.87	10.535	10.73	13.542	-9.86	10.568	10.01	1.776	8.15	4.542	21.82	0.414	1.10	20.610	-23.57	22.20256		25	
27	3.29	22.04	7.12	20.15	6.10	20.02	10.54	21.08	6.04	19.56	21.22	10.59	22.42	15.10	20.38	8.59	19.17	2.45				
	10.388	10.07	11.321	5.35	10.691	9.82	13.623	-10.35	10.595	9.85	1.773	8.13	4.545	21.82	0.411	1.09	20.607	-23.58	22.33398		27	
29	3.35	21.57	7.24	20.11	6.16	19.58	10.54	21.02	5.59	19.49	21.14	10.51	22.34	15.03	20.30	8.51	19.09	2.37				
	10.510	9.36	11.521	3.83	10.846	8.88	13.704	-10.84	10.622	9.69	1.769	8.10	4.547	21.83	0.409	1.07	20.604	-23.59	22.46540		29	
31	3.40	21.51	7.36	20.07	6.23	19.54	10.54	20.57	5.53	19.42	21.06	10.42	22.26	14.55	20.22	8.43	19.01	2.29				
	10.631	8.65	11.715	2.32	11.000	7.94	13.786	-11.33	10.650	9.53	1.765	8.06	4.549	21.83	0.406	1.05	20.602	-23.60	22.59682		31	

# WRZESIEŃ 2027

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j	astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2461																			
244	1	Śro	650	9.55389	-0.06	10.4130	8.17	1.00932	11.1149	1.45	56.753	0.7	1	555	1245.8	1936	650	1318.9	1928	1950	1	
245	2	Czw	651	9.59354	0.13	10.4507	7.55	1.00908	12.0419	-4.56	57.356	1.7	4	557	1245.5	1933	820	1409.1	1941	1946	2	
246	3	Pią	652	10.03320	0.33	10.4845	7.33	1.00884	12.5629	-11.13	58.152	2.7	10	558	1245.2	1931	948	1459.0	1955	1942	3	
247	4	Sob	653	10.07285	0.52	10.5221	7.11	1.00859	13.4907	-16.44	59.069	3.7	18	600	1244.9	1929	1115	1549.5	2012	1938	4	
248	5	Nie	654	10.11251	1.12	10.5558	6.49	1.00834	14.4244	-21.15	60.028	4.7	27	602	1244.5	1926	1239	1641.2	2034	1934	5	
249	6	Pon	655	10.15216	1.32	10.5935	6.27	1.00809	15.3723	-24.33	60.954	5.7	36	603	1244.2	1924	1359	1734.0	2103	1930	6	
250	7	Wto	656	10.19182	1.53	11.0311	6.04	1.00783	16.3241	-26.31	61.787	6.7	46	605	1243.9	1921	1509	1827.2	2143	1926	7	
251	8	Śro	657	10.23147	2.13	11.0647	5.42	1.00757	17.2748	-27.08	62.481	0.6	56	607	1243.5	1919	1606	1920.1	2235	1922	8	
252	9	Czw	658	10.27113	2.34	11.1023	5.19	1.00731	18.2151	-26.26	63.009	1.6	66	609	1243.2	1917	1649	2011.4	2339	1918	9	
253	10	Pią	659	10.31079	2.55	11.1358	4.57	1.00705	19.1400	-24.31	63.359	2.6	74	610	1242.8	1914	1719	2100.4	****	1914	10	
254	11	Sob	660	10.35044	3.16	11.1734	4.34	1.00678	20.0352	-21.33	63.533	3.6	82	612	1242.5	1912	1741	2146.9	049	1910	11	
255	12	Nie	661	10.39010	3.37	11.2109	4.11	1.00652	20.5125	-17.42	63.544	4.6	89	614	1242.1	1909	1757	2230.9	202	1907	12	
256	13	Pon	662	10.42575	3.59	11.2444	3.48	1.00625	21.3660	-13.09	63.414	5.6	94	615	1241.8	1907	1810	2313.0	316	1903	13	
257	14	Wto	663	10.46541	4.20	11.2819	3.25	1.00598	22.2111	-8.05	63.167	6.6	98	617	1241.4	1905	1821	2353.9	428	1859	14	
258	15	Śro	664	10.50506	4.42	11.3154	3.02	1.00571	23.0441	-2.41	62.829	7.6	100	619	1241.1	1902	1831	*****	541	1855	15	
259	16	Czw	665	10.54472	5.03	11.3529	2.39	1.00545	23.4821	2.53	62.420	0.5	100	621	1240.7	1900	1842	034.6	654	1851	16	
260	17	Pią	666	10.58437	5.25	11.3904	2.16	1.00518	0.3304	8.25	61.958	1.5	98	622	1240.3	1857	1853	116.0	808	1847	17	
261	18	Sob	667	11.02403	5.46	11.4239	1.53	1.00491	1.1943	13.42	61.456	2.5	94	624	1240.0	1855	1906	159.0	924	1843	18	
262	19	Nie	668	11.06368	6.08	11.4615	1.29	1.00464	2.0909	18.29	60.921	3.5	88	626	1239.6	1853	1924	244.7	1043	1839	19	
263	20	Pon	669	11.10334	6.29	11.4950	1.06	1.00437	3.0202	22.28	60.357	4.5	81	627	1239.3	1850	1947	333.9	1204	1835	20	
264	21	Wto	670	11.14299	6.50	11.5325	0.43	1.00410	3.5833	25.21	59.771	5.5	72	629	1238.9	1848	2022	427.2	1324	1831	21	
265	22	Śro	671	11.18265	7.12	11.5700	0.19	1.00383	4.5814	26.52	59.173	6.5	61	631	1238.6	1845	2112	524.3	1435	1827	22	
266	23	Czw	672	11.22230	7.33	12.0036	-0.04	1.00355	5.5951	26.46	58.582	7.5	50	633	1238.2	1843	2220	624.0	1532	1823	23	
267	24	Pią	673	11.26196	7.54	12.0411	-0.27	1.00328	7.0141	24.58	58.027	1.0	39	634	1237.8	1840	2343	724.4	1613	1819	24	
268	25	Sob	674	11.30162	8.15	12.0747	-0.51	1.00301	8.0206	21.35	57.548	2.0	28	636	1237.5	1838	****	823.5	1642	1815	25	
269	26	Nie	675	11.34127	8.35	12.1123	-1.14	1.00273	9.0010	16.49	57.192	3.0	18	638	1237.2	1836	114	920.1	1704	1811	26	
270	27	Pon	676	11.38093	8.56	12.1459	-1.37	1.00245	9.5544	11.01	57.003	4.0	10	639	1236.8	1833	246	1013.9	1720	1808	27	
271	28	Wto	677	11.42058	9.16	12.1835	-2.01	1.00217	10.4919	4.35	57.021	5.0	4	641	1236.5	1831	417	1105.4	1734	1804	28	
272	29	Śro	678	11.46024	9.36	12.2212	-2.24	1.00189	11.4146	-2.04	57.263	6.0	1	643	1236.1	1828	546	1155.6	1747	1800	29	
273	30	Czw	679	11.49589	9.56	12.2548	-2.47	1.00160	12.3401	-8.31	57.726	0.3	0	645	1235.8	1826	715	1245.6	1800	1756	30	

Fazy Księżyca [Dm, h.mm]:      Now 0, 19.41      1kw 7, 20.31      Pełn 16, 1.04      3kw 23, 12.20      Now 30, 4.36



# WRZESIEŃ 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	(0 <sup>h</sup> UT) Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	3.43	21.47	7.42	20.04	6.26	19.52	10.54	20.54	5.51	19.39	21.02	10.38	22.22	14.51	20.18	8.39	18.57	2.25		
	10.692	8.28	11.810	1.57	11.077	7.46	13.827	-11.57	10.663	9.45	1.762	8.05	4.550	21.83	0.404	1.04	20.600	-23.61	22.66253	1
3	3.48	21.41	7.53	19.60	6.33	19.48	10.54	20.48	5.45	19.31	20.54	10.30	22.15	14.43	20.11	8.31	18.49	2.17		
	10.812	7.55	11.996	0.09	11.230	6.49	13.910	-12.05	10.691	9.29	1.757	8.01	4.551	21.84	0.401	1.02	20.598	-23.62	22.79395	3
5	3.53	21.34	8.04	19.55	6.40	19.44	10.54	20.42	5.40	19.24	20.46	10.21	22.07	14.36	20.03	8.23	18.41	2.09		
	10.933	6.82	12.176	-1.36	11.383	5.51	13.993	-12.53	10.718	9.12	1.752	7.97	4.553	21.84	0.398	1.00	20.595	-23.63	22.92536	5
7	3.58	21.28	8.14	19.50	6.46	19.40	10.54	20.37	5.35	19.17	20.38	10.13	21.59	14.28	19.55	8.15	18.33	2.01		
	11.053	6.07	12.350	-2.79	11.535	4.52	14.078	-13.00	10.745	8.96	1.747	7.94	4.554	21.84	0.395	0.98	20.593	-23.63	23.05678	7
9	4.03	21.22	8.24	19.45	6.53	19.36	10.54	20.31	5.29	19.10	20.30	10.05	21.51	14.20	19.47	8.06	18.25	1.53		
	11.173	5.32	12.520	-4.18	11.687	3.51	14.163	-13.47	10.772	8.80	1.741	7.89	4.555	21.84	0.392	0.96	20.591	-23.64	23.18821	9
11	4.08	21.16	8.33	19.39	6.59	19.32	10.54	20.26	5.24	19.03	20.22	9.56	21.43	14.12	19.39	7.58	18.17	1.45		
	11.293	4.56	12.685	-5.53	11.838	2.51	14.248	-13.94	10.799	8.64	1.734	7.85	4.555	21.84	0.389	0.93	20.588	-23.65	23.31963	11
13	4.13	21.10	8.42	19.34	7.06	19.27	10.54	20.20	5.19	18.56	20.14	9.48	21.35	14.04	19.31	7.50	18.09	1.37		
	11.412	3.80	12.845	-6.83	11.990	1.49	14.334	-14.40	10.826	8.48	1.728	7.81	4.555	21.85	0.386	0.91	20.586	-23.66	23.45105	13
15	4.17	21.04	8.50	19.29	7.13	19.23	10.54	20.15	5.13	18.49	20.06	9.39	21.28	13.57	19.23	7.42	18.01	1.29		
	11.532	3.03	13.000	-8.09	12.141	0.48	14.421	-14.85	10.853	8.32	1.721	7.76	4.556	21.85	0.383	0.89	20.584	-23.66	23.58246	15
17	4.22	20.58	8.58	19.23	7.19	19.19	10.54	20.10	5.08	18.41	19.58	9.30	21.20	13.49	19.15	7.34	17.54	1.21		
	11.651	2.26	13.150	-9.30	12.291	-0.54	14.509	-15.30	10.880	8.16	1.714	7.71	4.555	21.85	0.379	0.87	20.582	-23.67	23.71388	17
19	4.26	20.52	9.05	19.17	7.26	19.15	10.54	20.04	5.02	18.34	19.50	9.22	21.12	13.41	19.07	7.25	17.46	1.13		
	11.771	1.49	13.293	-10.45	12.442	-1.56	14.597	-15.74	10.907	8.00	1.706	7.66	4.555	21.84	0.376	0.85	20.580	-23.67	23.84529	19
21	4.30	20.47	9.11	19.12	7.32	19.10	10.54	19.59	4.57	18.27	19.42	9.13	21.04	13.33	18.59	7.17	17.38	1.05		
	11.890	0.71	13.430	-11.54	12.593	-2.58	14.687	-16.18	10.933	7.84	1.698	7.61	4.554	21.84	0.373	0.83	20.579	-23.68	23.97671	21
23	4.34	20.41	9.17	19.06	7.39	19.06	10.54	19.54	4.52	18.20	19.34	9.05	20.56	13.25	18.51	7.09	17.30	0.57		
	12.010	-0.06	13.559	-12.55	12.745	-3.60	14.777	-16.61	10.960	7.68	1.690	7.56	4.554	21.84	0.369	0.80	20.577	-23.68	0.10814	23
25	4.39	20.36	9.22	18.59	7.46	19.02	10.54	19.49	4.46	18.13	19.26	8.56	20.48	13.17	18.43	7.01	17.22	0.49		
	12.130	-0.84	13.680	-13.48	12.896	-4.61	14.867	-17.03	10.986	7.52	1.682	7.51	4.553	21.84	0.366	0.78	20.576	-23.69	0.23956	25
27	4.43	20.30	9.25	18.53	7.52	18.58	10.55	19.44	4.41	18.06	19.18	8.47	20.40	13.09	18.35	6.53	17.14	0.41		
	12.250	-1.62	13.789	-14.32	13.048	-5.62	14.959	-17.45	11.012	7.36	1.673	7.45	4.551	21.84	0.363	0.76	20.574	-23.69	0.37098	27
29	4.47	20.25	9.28	18.47	7.59	18.54	10.55	19.39	4.35	17.58	19.09	8.39	20.32	13.01	18.27	6.45	17.06	0.33		
	12.370	-2.40	13.887	-15.04	13.201	-6.62	15.051	-17.85	11.038	7.20	1.664	7.40	4.550	21.83	0.359	0.74	20.573	-23.70	0.50239	29

# PAŹDZIERNIK 2027

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →											Czas strefowy [hhmm.]									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
274	1	Pią	680	11.53555	10.15	12.2925	-3.11	1.00132	13.2656	-14.25	58.380	1.3	2	646	1235.5	1824	843	1336.4	1816	1752	1	
275	2	Sob	681	11.57520	10.35	12.3303	-3.34	1.00103	14.2103	-19.25	59.173	2.3	7	648	1235.2	1821	1010	1428.5	1836	1748	2	
276	3	Nie	682	12.01486	10.54	12.3640	-3.57	1.00074	15.1630	-23.16	60.041	3.3	13	650	1234.9	1819	1134	1522.1	1902	1744	3	
277	4	Pon	683	12.05451	11.12	12.4018	-4.20	1.00045	16.1251	-25.47	60.911	4.3	21	652	1234.5	1816	1251	1616.5	1938	1740	4	
278	5	Wto	684	12.09417	11.30	12.4357	-4.43	1.00016	17.0913	-26.53	61.719	5.3	30	653	1234.2	1814	1355	1710.8	2026	1736	5	
279	6	Śro	685	12.13382	11.48	12.4735	-5.06	0.99986	18.0432	-26.35	62.408	6.3	40	655	1233.9	1812	1444	1803.6	2127	1732	6	
280	7	Czw	686	12.17348	12.06	12.5114	-5.29	0.99957	18.5752	-25.02	62.935	7.3	49	657	1233.7	1809	1519	1854.1	2235	1728	7	
281	8	Pią	687	12.21314	12.23	12.5454	-5.52	0.99928	19.4841	-22.22	63.275	0.9	59	659	1233.4	1807	1544	1941.7	2348	1724	8	
282	9	Sob	688	12.25279	12.40	12.5834	-6.15	0.99898	20.3658	-18.47	63.419	1.9	68	701	1233.1	1805	1602	2026.6	****	1720	9	
283	10	Nie	689	12.29245	12.56	13.0214	-6.38	0.99869	21.2302	-14.28	63.372	2.9	76	702	1232.8	1802	1617	2109.3	101	1716	10	
284	11	Pon	690	12.33210	13.12	13.0555	-7.01	0.99840	22.0732	-9.35	63.153	3.9	84	704	1232.5	1800	1629	2150.6	214	1713	11	
285	12	Wto	691	12.37176	13.27	13.0936	-7.23	0.99811	22.5113	-4.17	62.792	4.9	90	706	1232.3	1758	1639	2231.3	326	1709	12	
286	13	Śro	692	12.41141	13.42	13.1317	-7.46	0.99782	23.3457	1.14	62.325	5.9	95	708	1232.0	1755	1650	2312.6	438	1705	13	
287	14	Czw	693	12.45107	13.57	13.1660	-8.08	0.99753	0.1941	6.48	61.790	6.9	99	710	1231.8	1753	1701	2355.5	552	1701	14	
288	15	Pią	694	12.49072	14.10	13.2042	-8.30	0.99725	1.0619	12.12	61.226	7.9	100	711	1231.6	1751	1714	*****	708	1657	15	
289	16	Sob	695	12.53038	14.24	13.2425	-8.52	0.99697	1.5543	17.10	60.665	0.8	99	713	1231.4	1749	1731	040.9	828	1653	16	
290	17	Nie	696	12.57003	14.36	13.2809	-9.14	0.99669	2.4833	21.25	60.131	1.8	96	715	1231.1	1746	1753	129.8	949	1649	17	
291	18	Pon	697	13.00569	14.48	13.3154	-9.36	0.99641	3.4501	24.37	59.640	2.8	91	717	1230.9	1744	1824	222.6	1111	1645	18	
292	19	Wto	698	13.04534	14.60	13.3539	-9.58	0.99613	4.4437	26.27	59.200	3.8	84	719	1230.7	1742	1910	319.4	1226	1641	19	
293	20	Śro	699	13.08500	15.11	13.3925	-10.20	0.99586	5.4602	26.42	58.811	4.8	75	721	1230.6	1740	2013	418.8	1327	1637	20	
294	21	Czw	700	13.12466	15.21	13.4311	-10.41	0.99558	6.4729	25.18	58.474	5.8	65	722	1230.4	1738	2131	518.9	1413	1633	21	
295	22	Pią	701	13.16431	15.31	13.4658	-11.02	0.99531	7.4722	22.18	58.192	6.8	54	724	1230.2	1735	2257	617.6	1445	1629	22	
296	23	Sob	702	13.20397	15.39	13.5046	-11.23	0.99504	8.4441	17.59	57.975	0.7	42	726	1230.1	1733	****	713.7	1508	1625	23	
297	24	Nie	703	13.24362	15.47	13.5434	-11.44	0.99477	9.3921	12.37	57.838	1.7	31	728	1230.0	1731	026	806.7	1525	1621	24	
298	25	Pon	704	13.28328	15.55	13.5823	-12.05	0.99451	10.3151	6.34	57.802	2.7	21	730	1229.8	1729	155	857.3	1540	1617	25	
299	26	Wto	705	13.32293	16.02	14.0213	-12.26	0.99424	11.2307	0.11	57.890	3.7	12	732	1229.7	1727	322	946.3	1553	1614	26	
300	27	Śro	706	13.36259	16.07	14.0604	-12.46	0.99398	12.1410	-6.11	58.120	4.7	6	734	1229.6	1725	448	1035.0	1606	1610	27	
301	28	Czw	707	13.40224	16.13	14.0955	-13.06	0.99371	13.0557	-12.11	58.500	5.7	2	735	1229.5	1723	614	1124.4	1621	1606	28	
302	29	Pią	708	13.44190	16.17	14.1347	-13.26	0.99345	13.5912	-17.29	59.023	6.7	0	737	1229.5	1721	741	1215.5	1638	1602	29	
303	30	Sob	709	13.48155	16.21	14.1740	-13.46	0.99318	14.5413	-21.46	59.663	0.8	1	739	1229.4	1719	906	1308.5	1702	1558	30	
304	31	Nie	710	13.52121	16.24	14.2134	-14.06	0.99292	15.5044	-24.48	60.379	1.8	4	741	1229.4	1717	1027	1403.1	1734	1554	31	
304	31	Nie	710	14.52219	16.24	14.2144	-14.06	0.99291	15.5307	-24.54	60.410	2.8	4	641	1129.4	1617	927	1303.1	1634	1454	31	

Fazy Księżyca [Dm, h.mm]: 1kw 7, 13.47 Pełn 15, 15.47 3kw 22, 19.29 Nów 29, 15.37

# PAŹDZIERNIK 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.51	20.20	9.29	18.40	8.06	18.50	10.55	19.34	4.30	17.51	19.01	8.30	20.24	12.53	18.19	6.36	16.58	0.25		
	12.490	-3.18	13.969	-15.65	13.354	-7.61	15.144	-18.25	11.064	7.04	1.655	7.34	4.548	21.83	0.356	0.71	20.572	-23.70	0.63381	1
3	4.54	20.15	9.27	18.33	8.12	18.46	10.55	19.29	4.24	17.44	18.53	8.21	20.16	12.45	18.11	6.28	16.50	0.17		
	12.611	-3.95	14.033	-16.11	13.508	-8.59	15.238	-18.64	11.090	6.89	1.646	7.29	4.546	21.83	0.352	0.69	20.571	-23.70	0.76522	3
5	4.58	20.10	9.24	18.26	8.19	18.42	10.56	19.25	4.19	17.37	18.45	8.12	20.08	12.37	18.03	6.20	16.42	0.09		
	12.732	-4.72	14.076	-16.40	13.663	-9.56	15.332	-19.02	11.116	6.73	1.636	7.23	4.543	21.82	0.349	0.67	20.570	-23.70	0.89665	5
7	5.02	20.05	9.18	18.19	8.26	18.38	10.56	19.20	4.13	17.30	18.37	8.04	20.00	12.29	17.55	6.12	16.34	23.57		
	12.854	-5.49	14.094	-16.49	13.818	-10.52	15.428	-19.39	11.141	6.58	1.627	7.17	4.541	21.82	0.346	0.65	20.569	-23.70	1.02807	7
9	5.06	20.00	9.08	18.11	8.33	18.34	10.56	19.16	4.08	17.22	18.29	7.55	19.52	12.21	17.48	6.04	16.26	23.49		
	12.976	-6.25	14.083	-16.34	13.975	-11.45	15.524	-19.76	11.166	6.42	1.617	7.11	4.538	21.81	0.342	0.63	20.568	-23.70	1.15949	9
11	5.09	19.55	8.55	18.03	8.40	18.30	10.57	19.11	4.02	17.15	18.21	7.46	19.44	12.13	17.40	5.55	16.19	23.41		
	13.098	-7.01	14.040	-15.92	14.132	-12.37	15.621	-20.11	11.191	6.27	1.607	7.06	4.535	21.81	0.339	0.61	20.568	-23.70	1.29091	11
13	5.13	19.51	8.38	17.55	8.46	18.26	10.57	19.07	3.57	17.08	18.13	7.37	19.36	12.05	17.32	5.47	16.11	23.33		
	13.221	-7.76	13.965	-15.21	14.290	-13.27	15.718	-20.45	11.216	6.12	1.597	7.00	4.532	21.80	0.336	0.59	20.567	-23.70	1.42232	13
15	5.17	19.46	8.18	17.47	8.53	18.23	10.57	19.03	3.51	17.01	18.04	7.29	19.28	11.57	17.24	5.39	16.03	23.25		
	13.345	-8.50	13.859	-14.20	14.450	-14.15	15.817	-20.77	11.240	5.97	1.588	6.94	4.529	21.79	0.333	0.56	20.567	-23.70	1.55374	15
17	5.20	19.42	7.55	17.39	9.00	18.20	10.58	18.58	3.46	16.54	17.56	7.20	19.20	11.49	17.16	5.31	15.55	23.18		
	13.469	-9.24	13.731	-12.93	14.611	-15.01	15.916	-21.09	11.264	5.82	1.578	6.88	4.525	21.79	0.329	0.54	20.567	-23.70	1.68516	17
19	5.24	19.38	7.30	17.31	9.07	18.16	10.58	18.54	3.40	16.46	17.48	7.11	19.12	11.40	17.08	5.23	15.47	23.10		
	13.594	-9.97	13.591	-11.46	14.773	-15.84	16.016	-21.40	11.288	5.68	1.568	6.82	4.522	21.78	0.326	0.52	20.567	-23.70	1.81658	19
21	5.27	19.34	7.06	17.24	9.14	18.13	10.58	18.50	3.34	16.39	17.40	7.02	19.04	11.32	16.60	5.15	15.39	23.02		
	13.720	-10.68	13.456	-9.95	14.936	-16.65	16.116	-21.69	11.312	5.53	1.558	6.77	4.518	21.77	0.323	0.50	20.567	-23.70	1.94800	21
23	5.31	19.30	6.43	17.17	9.21	18.10	10.58	18.47	3.29	16.32	17.32	6.53	18.56	11.24	16.52	5.07	15.31	22.54		
	13.846	-11.39	13.342	-8.53	15.101	-17.42	16.218	-21.97	11.335	5.39	1.548	6.71	4.514	21.76	0.320	0.49	20.567	-23.69	2.07942	23
25	5.34	19.26	6.24	17.11	9.28	18.08	10.58	18.43	3.23	16.25	17.24	6.45	18.48	11.16	16.44	4.58	15.23	22.46		
	13.973	-12.09	13.262	-7.37	15.267	-18.17	16.320	-22.24	11.358	5.25	1.538	6.65	4.509	21.75	0.317	0.47	20.568	-23.69	2.21084	25
27	5.37	19.22	6.10	17.05	9.34	18.05	10.59	18.39	3.17	16.17	17.16	6.36	18.40	11.08	16.36	4.50	15.16	22.38		
	14.101	-12.77	13.224	-6.56	15.434	-18.89	16.423	-22.49	11.381	5.11	1.528	6.60	4.505	21.74	0.314	0.45	20.568	-23.69	2.34226	27
29	5.41	19.18	6.00	17.00	9.41	18.03	10.59	18.36	3.11	16.10	17.07	6.27	18.32	10.59	16.28	4.42	15.08	22.31		
	14.230	-13.44	13.231	-6.14	15.603	-19.57	16.526	-22.73	11.404	4.97	1.518	6.54	4.500	21.73	0.311	0.43	20.569	-23.68	2.47367	29
31	5.44	19.15	5.55	16.55	9.48	18.01	10.59	18.33	3.06	16.03	16.59	6.18	18.24	10.51	16.20	4.34	14.60	22.23		
	14.359	-14.09	13.280	-6.10	15.773	-20.22	16.631	-22.96	11.426	4.83	1.509	6.49	4.495	21.72	0.309	0.41	20.570	-23.68	2.60509	31
31	4.44	18.15	4.55	15.55	8.48	17.01	9.59	17.33	2.06	15.03	15.59	5.18	17.24	9.51	15.20	3.34	13.60	21.23		
	14.362	-14.11	13.281	-6.10	15.776	-20.23	16.633	-22.96	11.426	4.83	1.509	6.49	4.495	21.72	0.309	0.41	20.570	-23.68	2.60509	31

# LISTOPAD 2027

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Pon	711	14.56185	16.26	14.2538	-14.26	0.99264	16.5017	-26.28	61.151	3.8	9	643	1129.3	1615	1038	1358.4	1717	1450	1
306	2	Wto	712	15.00151	16.27	14.2934	-14.45	0.99238	17.4649	-26.36	61.858	4.8	16	645	1129.3	1613	1134	1452.8	1813	1446	2
307	3	Śro	713	15.04116	16.27	14.3330	-15.04	0.99212	18.4131	-25.23	62.476	4.9	24	647	1129.3	1611	1216	1545.1	1920	1442	3
308	4	Czw	714	15.08082	16.27	14.3727	-15.22	0.99186	19.3335	-23.00	62.956	5.9	33	649	1129.3	1609	1245	1634.3	2032	1438	4
309	5	Pią	715	15.12047	16.26	14.4124	-15.41	0.99160	20.2249	-19.40	63.262	6.9	42	651	1129.3	1607	1306	1720.5	2145	1434	5
310	6	Sob	716	15.16013	16.24	14.4523	-15.59	0.99135	21.0928	-15.33	63.370	0.1	51	652	1129.3	1606	1322	1803.9	2257	1430	6
311	7	Nie	717	15.19579	16.21	14.4922	-16.17	0.99110	21.5410	-10.51	63.273	1.1	61	654	1129.4	1604	1335	1845.5	****	1426	7
312	8	Pon	718	15.23544	16.18	14.5322	-16.34	0.99085	22.3745	-5.43	62.981	2.1	70	656	1129.5	1602	1346	1926.1	009	1422	8
313	9	Wto	719	15.27510	16.13	14.5723	-16.51	0.99060	23.2108	-0.19	62.517	3.1	78	658	1129.5	1600	1356	2006.8	120	1418	9
314	10	Śro	720	15.31475	16.08	15.0125	-17.08	0.99036	0.0519	5.12	61.919	4.1	86	700	1129.6	1559	1407	2048.7	233	1415	10
315	11	Czw	721	15.35441	16.02	15.0528	-17.25	0.99012	0.5119	10.38	61.235	5.1	92	702	1129.7	1557	1420	2133.1	348	1411	11
316	12	Pią	722	15.39406	15.55	15.0931	-17.42	0.98988	1.4009	15.45	60.518	6.1	97	704	1129.8	1555	1435	2221.0	506	1407	12
317	13	Sob	723	15.43372	15.47	15.1335	-17.58	0.98965	2.3238	20.15	59.823	7.1	99	705	1130.0	1554	1455	2313.1	628	1403	13
318	14	Nie	724	15.47337	15.38	15.1741	-18.13	0.98942	3.2910	23.47	59.198	0.3	100	707	1130.1	1552	1524	*****	751	1359	14
319	15	Pon	725	15.51303	15.29	15.2147	-18.29	0.98920	4.2923	25.60	58.681	1.3	98	709	1130.3	1551	1605	009.8	910	1355	15
320	16	Wto	726	15.55269	15.19	15.2554	-18.44	0.98898	5.3157	26.37	58.295	2.3	93	711	1130.4	1549	1704	109.9	1018	1351	16
321	17	Śro	727	15.59234	15.07	15.3001	-18.59	0.98877	6.3449	25.30	58.046	3.3	87	713	1130.6	1548	1819	211.5	1110	1347	17
322	18	Czw	728	16.03200	14.55	15.3410	-19.13	0.98856	7.3600	22.44	57.927	4.3	78	715	1130.8	1547	1945	312.0	1147	1343	18
323	19	Pią	729	16.07165	14.43	15.3819	-19.27	0.98836	8.3414	18.36	57.921	5.3	68	716	1131.0	1545	2114	409.6	1212	1339	19
324	20	Sob	730	16.11131	14.29	15.4230	-19.41	0.98816	9.2913	13.24	58.009	6.3	57	718	1131.3	1544	2242	503.6	1231	1335	20
325	21	Nie	731	16.15096	14.14	15.4641	-19.55	0.98796	10.2130	7.32	58.173	0.4	45	720	1131.5	1543	****	554.3	1246	1331	21
326	22	Pon	732	16.19062	13.59	15.5053	-20.08	0.98777	11.1201	1.20	58.403	1.4	34	722	1131.8	1541	007	642.8	1300	1327	22
327	23	Wto	733	16.23028	13.43	15.5505	-20.20	0.98758	12.0153	-4.53	58.693	2.4	24	723	1132.0	1540	132	730.3	1312	1323	23
328	24	Śro	734	16.26593	13.26	15.5919	-20.33	0.98739	12.5212	-10.48	59.045	3.4	15	725	1132.3	1539	255	818.0	1326	1320	24
329	25	Czw	735	16.30559	13.08	16.0333	-20.45	0.98721	13.4351	-16.09	59.461	4.4	8	727	1132.6	1538	419	907.1	1342	1316	25
330	26	Pią	736	16.34524	12.50	16.0748	-20.56	0.98703	14.3723	-20.37	59.941	5.4	3	728	1132.9	1537	543	958.3	1403	1312	26
331	27	Sob	737	16.38490	12.30	16.1204	-21.07	0.98685	15.3251	-23.58	60.478	6.4	1	730	1133.2	1536	705	1051.6	1431	1308	27
332	28	Nie	738	16.42455	12.10	16.1621	-21.18	0.98667	16.2937	-25.59	61.056	0.3	0	732	1133.6	1535	820	1146.4	1510	1304	28
333	29	Pon	739	16.46421	11.50	16.2038	-21.28	0.98650	17.2632	-26.35	61.646	1.3	2	733	1133.9	1534	922	1241.4	1601	1300	29
334	30	Wto	740	16.50387	11.28	16.2456	-21.38	0.98633	18.2213	-25.48	62.213	2.3	5	735	1134.3	1534	1010	1335.0	1704	1256	30

Fazy Księżyca [Dm, h.mm]:      1kw 6, 9.00      Pełn 14, 4.26      3kw 21, 1.48      Nów 28, 4.24

# LISTOPAD 2027 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.46	18.13	4.54	15.53	8.52	16.60	9.59	17.31	2.03	14.59	15.55	5.14	17.20	9.47	15.16	3.30	13.56	21.19		
	14.427	-14.43	13.320	-6.21	15.862	-20.54	16.685	-23.07	11.437	4.76	1.504	6.46	4.493	21.72	0.307	0.41	20.570	-23.67	2.67080	1
3	4.49	18.10	4.55	15.49	8.58	16.58	9.59	17.28	1.57	14.52	15.47	5.05	17.12	9.39	15.08	3.22	13.48	21.11		
	14.558	-15.06	13.422	-6.65	16.034	-21.13	16.790	-23.27	11.459	4.63	1.495	6.41	4.488	21.71	0.305	0.39	20.571	-23.67	2.80223	3
5	4.52	18.06	4.58	15.45	9.04	16.57	9.59	17.25	1.51	14.45	15.39	4.57	17.04	9.31	15.00	3.14	13.40	21.04		
	14.690	-15.68	13.550	-7.34	16.208	-21.68	16.896	-23.46	11.480	4.50	1.485	6.36	4.483	21.70	0.302	0.37	20.572	-23.66	2.93365	5
7	4.56	18.03	5.04	15.41	9.11	16.56	9.59	17.22	1.45	14.37	15.31	4.48	16.56	9.22	14.52	3.06	13.32	20.56		
	14.823	-16.28	13.698	-8.20	16.382	-22.19	17.003	-23.63	11.501	4.38	1.476	6.31	4.478	21.69	0.300	0.36	20.573	-23.66	3.06507	7
9	4.59	18.01	5.11	15.38	9.17	16.55	9.58	17.20	1.39	14.30	15.23	4.39	16.48	9.14	14.44	2.58	13.25	20.48		
	14.956	-16.86	13.863	-9.20	16.558	-22.66	17.110	-23.79	11.521	4.25	1.468	6.26	4.472	21.67	0.297	0.34	20.575	-23.65	3.19649	9
11	5.02	17.58	5.20	15.35	9.23	16.55	9.58	17.17	1.33	14.23	15.15	4.31	16.39	9.06	14.36	2.50	13.17	20.40		
	15.091	-17.42	14.039	-10.28	16.735	-23.09	17.217	-23.93	11.541	4.13	1.459	6.22	4.467	21.66	0.295	0.33	20.576	-23.64	3.32790	11
13	5.05	17.55	5.30	15.31	9.28	16.55	9.58	17.15	1.27	14.15	15.06	4.22	16.31	8.58	14.29	2.41	13.09	20.33		
	15.227	-17.96	14.224	-11.41	16.913	-23.47	17.325	-24.05	11.561	4.01	1.451	6.18	4.461	21.65	0.293	0.32	20.578	-23.63	3.45932	13
15	5.08	17.53	5.40	15.28	9.34	16.55	9.57	17.13	1.21	14.08	14.58	4.14	16.23	8.49	14.21	2.33	13.01	20.25		
	15.363	-18.48	14.416	-12.57	17.092	-23.80	17.434	-24.16	11.580	3.89	1.443	6.13	4.456	21.64	0.291	0.31	20.580	-23.63	3.59074	15
17	5.11	17.51	5.51	15.25	9.39	16.56	9.56	17.11	1.15	14.01	14.50	4.05	16.15	8.41	14.13	2.25	12.53	20.17		
	15.500	-18.98	14.613	-13.73	17.272	-24.09	17.543	-24.25	11.599	3.78	1.435	6.09	4.450	21.63	0.289	0.30	20.582	-23.62	3.72217	17
19	5.14	17.49	6.02	15.23	9.44	16.57	9.56	17.09	1.09	13.53	14.42	3.57	16.07	8.33	14.05	2.17	12.45	20.10		
	15.639	-19.46	14.814	-14.87	17.453	-24.33	17.652	-24.33	11.617	3.67	1.427	6.06	4.444	21.61	0.287	0.28	20.584	-23.61	3.85359	19
21	5.17	17.47	6.13	15.20	9.48	16.58	9.55	17.07	1.02	13.46	14.34	3.48	15.59	8.24	13.57	2.09	12.38	20.02		
	15.778	-19.91	15.018	-15.99	17.634	-24.53	17.762	-24.38	11.635	3.56	1.420	6.02	4.438	21.60	0.285	0.27	20.586	-23.60	3.98501	21
23	5.20	17.45	6.24	15.18	9.52	16.60	9.54	17.05	0.56	13.39	14.26	3.40	15.51	8.16	13.49	2.01	12.30	19.54		
	15.918	-20.34	15.225	-17.07	17.815	-24.67	17.872	-24.42	11.652	3.46	1.414	5.99	4.432	21.59	0.284	0.27	20.588	-23.59	4.11643	23
25	5.22	17.43	6.35	15.16	9.56	17.02	9.53	17.04	0.50	13.31	14.18	3.31	15.43	8.08	13.41	1.53	12.22	19.47		
	16.059	-20.74	15.434	-18.10	17.997	-24.76	17.983	-24.44	11.669	3.36	1.407	5.96	4.426	21.57	0.282	0.26	20.590	-23.58	4.24785	25
27	5.25	17.42	6.47	15.15	9.59	17.05	9.52	17.03	0.43	13.24	14.10	3.23	15.35	7.59	13.33	1.45	12.14	19.39		
	16.201	-21.12	15.646	-19.08	18.179	-24.80	18.094	-24.45	11.685	3.26	1.401	5.93	4.420	21.56	0.281	0.25	20.593	-23.57	4.37927	27
29	5.28	17.41	6.58	15.13	10.02	17.08	9.50	17.02	0.37	13.16	14.02	3.14	15.26	7.51	13.25	1.37	12.06	19.31		
	16.344	-21.47	15.860	-20.00	18.361	-24.80	18.205	-24.43	11.701	3.17	1.395	5.90	4.414	21.55	0.280	0.24	20.596	-23.56	4.51069	29

# GRUDZIEŃ 2027

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →									Czas strefowy [hhmm.]									
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
335	1	Śro	741	16.54352	11.06	16.2914	-21.48	0.98616	19.1535	-23.45	62.716	3.3	11	736	1134.6	1533	1044	1425.9	1815	1252	1	
336	2	Czw	742	16.58318	10.43	16.3334	-21.57	0.98600	20.0603	-20.41	63.114	4.3	17	738	1135.0	1532	1108	1513.6	1928	1248	2	
337	3	Pią	743	17.02283	10.20	16.3754	-22.06	0.98584	20.5339	-16.46	63.367	5.3	25	739	1135.4	1531	1126	1558.2	2041	1244	3	
338	4	Sob	744	17.06249	9.56	16.4214	-22.14	0.98568	21.3853	-12.15	63.444	6.3	34	740	1135.8	1531	1140	1640.3	2153	1240	4	
339	5	Nie	745	17.10215	9.32	16.4635	-22.22	0.98553	22.2228	-7.17	63.325	7.3	43	742	1136.2	1530	1152	1720.9	2303	1236	5	
340	6	Pon	746	17.14180	9.07	16.5056	-22.29	0.98538	23.0521	-2.02	63.004	0.2	52	743	1136.6	1530	1202	1800.9	****	1232	6	
341	7	Wto	747	17.18146	8.41	16.5518	-22.36	0.98523	23.4833	3.22	62.491	1.2	62	744	1137.1	1529	1213	1841.5	014	1228	7	
342	8	Śro	748	17.22111	8.15	16.5941	-22.43	0.98509	0.3307	8.45	61.813	2.2	71	746	1137.5	1529	1225	1923.9	126	1224	8	
343	9	Czw	749	17.26077	7.49	17.0404	-22.49	0.98496	1.2009	13.55	61.012	3.2	80	747	1137.9	1529	1238	2009.5	242	1221	9	
344	10	Pią	750	17.30042	7.22	17.0827	-22.54	0.98483	2.1043	18.38	60.147	4.2	88	748	1138.4	1529	1256	2059.2	401	1217	10	
345	11	Sob	751	17.34008	6.55	17.1251	-22.60	0.98471	3.0535	22.33	59.283	5.2	94	749	1138.8	1528	1320	2154.0	523	1213	11	
346	12	Nie	752	17.37573	6.27	17.1715	-23.04	0.98459	4.0454	25.18	58.491	6.2	98	750	1139.3	1528	1356	2253.4	645	1209	12	
347	13	Pon	753	17.41539	5.59	17.2140	-23.09	0.98448	5.0747	26.33	57.837	7.2	100	751	1139.8	1528	1447	2356.0	800	1205	13	
348	14	Wto	754	17.45505	5.31	17.2605	-23.12	0.98437	6.1220	26.01	57.370	0.8	99	752	1140.2	1528	1558	*****	901	1201	14	
349	15	Śro	755	17.49471	5.02	17.3030	-23.16	0.98427	7.1606	23.41	57.119	1.8	96	753	1140.7	1528	1724	059.2	945	1157	15	
350	16	Czw	756	17.53436	4.34	17.3455	-23.19	0.98418	8.1708	19.47	57.087	2.8	90	754	1141.2	1528	1855	200.1	1015	1153	16	
351	17	Pią	757	17.57402	4.04	17.3921	-23.21	0.98409	9.1437	14.41	57.256	3.8	81	755	1141.7	1529	2026	257.3	1036	1149	17	
352	18	Sob	758	18.01367	3.35	17.4347	-23.23	0.98401	10.0842	8.49	57.587	4.8	71	755	1142.2	1529	2154	350.4	1053	1145	18	
353	19	Nie	759	18.05333	3.06	17.4813	-23.25	0.98393	11.0016	2.34	58.035	5.8	60	756	1142.7	1529	2320	440.4	1107	1141	19	
354	20	Pon	760	18.09298	2.36	17.5239	-23.26	0.98386	11.5027	-3.42	58.557	0.1	49	757	1143.1	1530	****	528.5	1120	1137	20	
355	21	Wto	761	18.13264	2.06	17.5706	-23.26	0.98380	12.4022	-9.40	59.114	1.1	38	757	1143.6	1530	044	616.0	1133	1133	21	
356	22	Śro	762	18.17229	1.36	18.0132	-23.26	0.98374	13.3105	-15.05	59.680	2.1	28	758	1144.1	1530	207	704.0	1148	1129	22	
357	23	Czw	763	18.21195	1.06	18.0558	-23.26	0.98368	14.2318	-19.42	60.240	3.1	19	758	1144.6	1531	329	753.6	1207	1125	23	
358	24	Pią	764	18.25160	0.37	18.1025	-23.25	0.98363	15.1721	-23.16	60.785	4.1	11	759	1145.1	1532	451	845.3	1232	1122	24	
359	25	Sob	765	18.29126	0.07	18.1451	-23.24	0.98358	16.1256	-25.35	61.312	5.1	6	759	1145.6	1532	607	938.7	1306	1118	25	
360	26	Nie	766	18.33092	-0.23	18.1918	-23.22	0.98353	17.0911	-26.34	61.816	6.1	2	759	1146.1	1533	713	1032.9	1352	1114	26	
361	27	Pon	767	18.37057	-0.53	18.2344	-23.19	0.98349	18.0454	-26.09	62.292	7.1	0	800	1146.6	1534	805	1126.7	1451	1110	27	
362	28	Wto	768	18.41023	-1.22	18.2810	-23.17	0.98346	18.5851	-24.28	62.726	0.6	0	800	1147.1	1535	844	1218.6	1559	1106	28	
363	29	Śro	769	18.44589	-1.52	18.3236	-23.14	0.98342	19.5013	-21.40	63.099	1.6	2	800	1147.6	1536	911	1307.4	1712	1102	29	
364	30	Czw	770	18.48554	-2.21	18.3702	-23.10	0.98339	20.3845	-17.58	63.386	2.6	6	800	1148.1	1537	931	1353.3	1826	1058	30	
365	31	Pią	771	18.52520	-2.50	18.4127	-23.06	0.98337	21.2442	-13.36	63.559	3.6	12	800	1148.6	1538	947	1436.3	1938	1054	31	

Fazy Księżyca [Dm, h.mm]: 1kw 6, 6.22 Pełn 13, 17.09 3kw 20, 10.11 Nów 27, 21.12

# GRUDZIEŃ 2027 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	17.40	7.09	15.13	10.05	17.11	9.49	17.01	0.31	13.09	13.54	3.06	15.18	7.43	13.17	1.29	11.59	19.24		
	16.487	-21.80	16.077	-20.86	18.542	-24.74	18.316	-24.40	11.716	3.08	1.390	5.88	4.408	21.53	0.279	0.24	20.598	-23.55	4.64211	1
3	5.32	17.39	7.19	15.12	10.07	17.15	9.47	16.60	0.24	13.01	13.46	2.58	15.10	7.34	13.09	1.21	11.51	19.16		
	16.632	-22.10	16.295	-21.66	18.724	-24.63	18.428	-24.35	11.730	2.99	1.385	5.86	4.403	21.52	0.278	0.23	20.601	-23.54	4.77354	3
5	5.35	17.39	7.30	15.12	10.09	17.19	9.45	16.59	0.17	12.54	13.38	2.50	15.02	7.26	13.02	1.14	11.43	19.08		
	16.776	-22.36	16.516	-22.38	18.905	-24.48	18.540	-24.28	11.744	2.91	1.380	5.84	4.397	21.51	0.277	0.23	20.604	-23.53	4.90496	5
7	5.37	17.38	7.40	15.13	10.10	17.24	9.44	16.59	0.11	12.47	13.30	2.41	14.54	7.18	12.54	1.06	11.35	19.01		
	16.922	-22.60	16.738	-23.03	19.085	-24.27	18.651	-24.19	11.758	2.83	1.376	5.82	4.391	21.49	0.276	0.23	20.607	-23.51	5.03638	7
9	5.39	17.38	7.50	15.14	10.11	17.29	9.42	16.58	0.04	12.39	13.22	2.33	14.46	7.09	12.46	0.58	11.28	18.53		
	17.068	-22.81	16.963	-23.60	19.265	-24.01	18.763	-24.09	11.771	2.76	1.373	5.81	4.385	21.48	0.276	0.23	20.610	-23.50	5.16779	9
11	5.41	17.38	7.60	15.16	10.12	17.34	9.39	16.58	23.53	12.31	13.14	2.25	14.38	7.01	12.38	0.50	11.20	18.46		
	17.214	-22.99	17.189	-24.09	19.443	-23.71	18.875	-23.96	11.783	2.69	1.369	5.80	4.379	21.47	0.276	0.23	20.613	-23.49	5.29921	11
13	5.42	17.38	8.09	15.19	10.12	17.39	9.37	16.58	23.47	12.24	13.06	2.17	14.30	6.53	12.30	0.42	11.12	18.38		
	17.361	-23.14	17.418	-24.50	19.621	-23.36	18.987	-23.82	11.794	2.62	1.366	5.79	4.373	21.46	0.275	0.23	20.617	-23.48	5.43064	13
15	5.44	17.38	8.17	15.22	10.11	17.45	9.35	16.58	23.40	12.16	12.58	2.09	14.21	6.45	12.22	0.34	11.04	18.31		
	17.508	-23.26	17.648	-24.82	19.797	-22.96	19.098	-23.66	11.805	2.56	1.364	5.79	4.367	21.44	0.275	0.23	20.620	-23.46	5.56206	15
17	5.45	17.39	8.25	15.26	10.11	17.51	9.32	16.58	23.33	12.09	12.50	2.01	14.13	6.36	12.14	0.26	10.57	18.23		
	17.656	-23.35	17.879	-25.05	19.973	-22.52	19.210	-23.48	11.815	2.50	1.362	5.79	4.362	21.43	0.275	0.23	20.624	-23.45	5.69349	17
19	5.47	17.40	8.32	15.31	10.10	17.57	9.30	16.59	23.26	12.01	12.42	1.53	14.05	6.28	12.06	0.18	10.49	18.16		
	17.804	-23.41	18.113	-25.19	20.146	-22.04	19.322	-23.29	11.825	2.45	1.361	5.79	4.356	21.42	0.275	0.23	20.627	-23.44	5.82491	19
21	5.48	17.40	8.39	15.37	10.08	18.03	9.27	16.59	23.19	11.54	12.34	1.45	13.57	6.20	11.59	0.11	10.41	18.08		
	17.952	-23.44	18.347	-25.24	20.319	-21.51	19.433	-23.07	11.834	2.40	1.359	5.79	4.351	21.40	0.276	0.23	20.631	-23.42	5.95633	21
23	5.49	17.41	8.44	15.44	10.07	18.10	9.24	16.59	23.11	11.46	12.26	1.37	13.49	6.11	11.51	0.03	10.33	18.00		
	18.100	-23.43	18.582	-25.19	20.490	-20.94	19.544	-22.84	11.842	2.36	1.359	5.80	4.346	21.39	0.276	0.24	20.635	-23.41	6.08774	23
25	5.50	17.43	8.49	15.51	10.05	18.16	9.21	17.00	23.04	11.38	12.18	1.29	13.41	6.03	11.43	23.51	10.26	17.53		
	18.248	-23.39	18.817	-25.04	20.660	-20.34	19.655	-22.59	11.849	2.32	1.359	5.81	4.340	21.38	0.277	0.24	20.638	-23.40	6.21917	25
27	5.50	17.44	8.54	15.59	10.03	18.23	9.18	17.01	22.57	11.31	12.10	1.22	13.33	5.55	11.35	23.43	10.18	17.45		
	18.396	-23.32	19.052	-24.79	20.827	-19.69	19.766	-22.33	11.856	2.29	1.359	5.82	4.335	21.37	0.278	0.25	20.642	-23.38	6.35059	27
29	5.51	17.46	8.57	16.08	10.00	18.29	9.14	17.02	22.50	11.23	12.02	1.14	13.25	5.47	11.27	23.35	10.10	17.38		
	18.543	-23.23	19.287	-24.44	20.994	-19.01	19.877	-22.04	11.862	2.26	1.360	5.83	4.330	21.36	0.278	0.26	20.646	-23.37	6.48201	29
31	5.51	17.47	8.60	16.18	9.58	18.36	9.11	17.02	22.42	11.16	11.54	1.06	13.17	5.38	11.19	23.28	10.02	17.30		
	18.691	-23.10	19.519	-23.98	21.159	-18.29	19.987	-21.75	11.867	2.24	1.361	5.85	4.326	21.35	0.280	0.27	20.650	-23.36	6.61344	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2027

Nowy Rok	Pią	1 styczeń	Trójcy Najświętszej	Nie	23 maj
Najświętszej Maryi Panny Rodzicielki	Pią	1 styczeń	Dzień Matki	Śro	26 maj
Objawienia Pańskiego (Trzech Króli)	Śro	6 styczeń	Boże Ciało	Czw	27 maj
Juliański Nowy Rok	Czw	14 styczeń	Dzień Dziecka	Wto	1 czerwiec
Dzień Babci	Czw	21 styczeń	Najświętszego Serca Pana Jezusa	Pią	4 czerwiec
Dzień Dziadka	Pią	22 styczeń	Dzień Dzięczynienia	Nie	6 czerwiec
Ofiarowania Pańskiego	Wto	2 luty	Dzień Ojca	Śro	23 czerwiec
Matki Boskiej Gromnicznej	Wto	2 luty	Noc Świętojańska	Śro	23 czerwiec
Tłusty czwartek	Czw	4 luty	Św. Piotra i Pawła	Wto	29 czerwiec
Środa Popielcowa	Śro	10 luty	Wniebowzięcia N.M.P.	Nie	15 sierpień
Walentynki	Nie	14 luty	Święto Wojska Polskiego	Nie	15 sierpień
Święto UMK	Pią	19 luty	Dzień Solidarności i Wolności	Wto	31 sierpień
Dzień Kobiet	Pon	8 marzec	Dzień Programisty	Pon	13 wrzesień
Niedziela Palmowa	Nie	21 marzec	Dożynki – Święto Plonów	Czw	23 wrzesień
Narodowy Dzień Życia	Śro	24 marzec	Dzień Papieski	Nie	10 październik
Niedziela Wielkanocna	Nie	28 marzec	Dzień Edukacji Narodowej	Czw	14 październik
Niedziela Miłosierdzia Bożego	Nie	4 kwiecień	Dzień Papieża Jana Pawła II	Sob	16 październik
Święto Pracy	Sob	1 maj	Wszystkich Świętych	Pon	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Nie	2 maj	Zaduszki	Wto	2 listopad
Najświętsza Maryja Królowa Polski	Pon	3 maj	Święto Niepodległości	Czw	11 listopad
Święto Konstytucji 3 Maja	Pon	3 maj	Pierwsza niedziela Adwentu	Nie	28 listopad
Wniebowstąpienia Pańskiego	Czw	6 maj	Niepokalane Poczęcie N.M.P.	Śro	8 grudzień
Dzień Polskiej Niezapominajki	Sob	15 maj	Boże Narodzenie	Sob	25 grudzień
Zesłania Ducha Świętego	Nie	16 maj	Sylwester	Pią	31 grudzień



# Kalendarz astronomiczny 2028

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!

*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2028 KWIECIEŃ 16**

Dla całego roku przyjęto: TDT – UT = 72 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 3.17**, Lato **VI 20, 21.02**, Jesień **IX 22, 12.45**, Zima **XII 21, 9.20**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **26 marca do 29 października 2028 r.**

### Oznaczenia:

Dr — dzień 2028 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2028

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)									Czas strefowy [hhmm.]									
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
1	1	Sob	772	18.56485	-3.18	18.4552	-23.01	0.98335	22.0840	-8.44	63.590	4.6	18	800	1149.1	1539	959	1517.3	2049	1050	1	
2	2	Nie	773	19.00451	-3.47	18.5017	-22.56	0.98333	22.5126	-3.35	63.455	5.6	26	800	1149.5	1540	1010	1557.1	2159	1046	2	
3	3	Pon	774	19.04417	-4.15	18.5442	-22.51	0.98332	23.3356	1.44	63.137	6.6	35	759	1150.0	1541	1020	1636.7	2309	1042	3	
4	4	Wto	775	19.08382	-4.42	18.5906	-22.45	0.98331	0.1711	7.02	62.632	7.6	44	759	1150.4	1542	1031	1717.5	****	1038	4	
5	5	Śro	776	19.12348	-5.09	19.0329	-22.38	0.98330	1.0215	12.12	61.950	0.4	54	759	1150.9	1543	1043	1800.4	021	1034	5	
6	6	Czw	777	19.16313	-5.36	19.0752	-22.31	0.98331	1.5013	16.59	61.118	1.4	64	758	1151.3	1545	1058	1846.9	137	1030	6	
7	7	Pią	778	19.20279	-6.02	19.1215	-22.24	0.98331	2.4204	21.09	60.182	2.4	73	758	1151.8	1546	1118	1937.8	256	1027	7	
8	8	Sob	779	19.24244	-6.28	19.1637	-22.16	0.98333	3.3825	24.21	59.203	3.4	82	757	1152.2	1547	1147	2033.9	417	1023	8	
9	9	Nie	780	19.28210	-6.53	19.2059	-22.08	0.98335	4.3909	26.15	58.258	4.4	90	757	1152.6	1549	1229	2134.5	535	1019	9	
10	10	Pon	781	19.32176	-7.18	19.2520	-21.59	0.98337	5.4303	26.30	57.428	5.4	96	756	1153.0	1550	1330	2237.8	643	1015	10	
11	11	Wto	782	19.36141	-7.42	19.2941	-21.50	0.98341	6.4758	24.56	56.789	6.4	99	756	1153.4	1552	1450	2341.1	736	1011	11	
12	12	Śro	783	19.40107	-8.05	19.3401	-21.41	0.98345	7.5133	21.35	56.401	0.3	100	755	1153.8	1553	1622	*****	812	1007	12	
13	13	Czw	784	19.44073	-8.28	19.3820	-21.31	0.98349	8.5213	16.46	56.296	1.3	98	754	1154.2	1555	1757	041.9	838	1003	13	
14	14	Pią	785	19.48038	-8.50	19.4239	-21.21	0.98354	9.4928	10.55	56.471	2.3	92	753	1154.6	1556	1930	138.9	858	959	14	
15	15	Sob	786	19.52004	-9.12	19.4657	-21.10	0.98360	10.4344	4.31	56.895	3.3	85	752	1154.9	1558	2100	232.2	913	955	15	
16	16	Nie	787	19.55569	-9.33	19.5115	-20.59	0.98367	11.3559	-2.01	57.510	4.3	75	751	1155.3	1600	2227	322.9	927	951	16	
17	17	Pon	788	19.59535	-9.53	19.5532	-20.47	0.98374	12.2718	-8.16	58.251	5.3	65	750	1155.6	1601	2353	412.1	940	947	17	
18	18	Wto	789	20.03500	-10.13	19.5948	-20.35	0.98381	13.1844	-13.57	59.049	6.3	54	749	1156.0	1603	****	501.1	955	943	18	
19	19	Śro	790	20.07466	-10.32	20.0403	-20.23	0.98389	14.1105	-18.49	59.849	0.6	43	748	1156.3	1605	117	550.8	1013	939	19	
20	20	Czw	791	20.11431	-10.50	20.0818	-20.10	0.98398	15.0448	-22.38	60.608	1.6	33	747	1156.6	1606	240	642.0	1036	935	20	
21	21	Pią	792	20.15397	-11.07	20.1232	-19.57	0.98407	15.5947	-25.13	61.297	2.6	23	746	1156.9	1608	357	734.7	1106	932	21	
22	22	Sob	793	20.19362	-11.24	20.1645	-19.44	0.98416	16.5527	-26.30	61.904	3.6	16	745	1157.1	1610	506	828.3	1148	928	22	
23	23	Nie	794	20.23328	-11.40	20.2058	-19.30	0.98426	17.5047	-26.25	62.423	4.6	9	744	1157.4	1612	603	921.7	1242	924	23	
24	24	Pon	795	20.27294	-11.55	20.2510	-19.16	0.98436	18.4443	-25.03	62.855	5.6	4	742	1157.7	1614	645	1013.7	1347	920	24	
25	25	Wto	796	20.31259	-12.10	20.2921	-19.01	0.98447	19.3625	-22.33	63.202	6.6	1	741	1157.9	1615	715	1103.2	1459	916	25	
26	26	Śro	797	20.35225	-12.23	20.3331	-18.46	0.98458	20.2530	-19.05	63.465	7.6	0	740	1158.1	1617	737	1149.8	1612	912	26	
27	27	Czw	798	20.39190	-12.36	20.3741	-18.31	0.98469	21.1204	-14.52	63.638	0.8	1	738	1158.4	1619	754	1233.8	1725	908	27	
28	28	Pią	799	20.43156	-12.48	20.4149	-18.15	0.98480	21.5633	-10.07	63.713	1.8	3	737	1158.6	1621	807	1315.4	1836	904	28	
29	29	Sob	800	20.47122	-12.60	20.4557	-17.59	0.98492	22.3936	-5.01	63.676	2.8	7	735	1158.7	1623	818	1355.5	1947	900	29	
30	30	Nie	801	20.51087	-13.10	20.5004	-17.43	0.98505	23.2201	0.15	63.510	3.8	12	734	1158.9	1625	829	1435.1	2057	856	30	
31	31	Pon	802	20.55053	-13.20	20.5410	-17.27	0.98517	0.0442	5.33	63.200	4.8	19	732	1159.1	1627	839	1515.0	2207	852	31	

Fazy Księżyca [Dm, h.mm]:      1kw 5, 2.40      Pełn 12, 5.03      3kw 18, 20.26      Nów 26, 16.12

# STYCZEŃ 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	5.51	17.48	9.00	16.23	9.56	18.39	9.09	17.03	22.38	11.12	11.50	1.02	13.13	5.34	11.15	23.24	9.59	17.27		
	18.764	-23.02	19.635	-23.71	21.240	-17.92	20.042	-21.59	11.870	2.23	1.362	5.86	4.323	21.34	0.280	0.27	20.652	-23.35	6.67915	1
3	5.51	17.50	9.02	16.33	9.53	18.46	9.06	17.04	22.31	11.04	11.42	0.55	13.05	5.26	11.08	23.16	9.51	17.19		
	18.912	-22.84	19.864	-23.11	21.403	-17.16	20.151	-21.27	11.874	2.21	1.364	5.88	4.319	21.33	0.281	0.28	20.656	-23.33	6.81056	3
5	5.51	17.52	9.02	16.44	9.50	18.53	9.02	17.05	22.23	10.56	11.34	0.47	12.57	5.18	10.60	23.08	9.43	17.12		
	19.058	-22.64	20.089	-22.40	21.563	-16.36	20.261	-20.93	11.877	2.20	1.366	5.91	4.314	21.32	0.283	0.29	20.661	-23.32	6.94198	5
7	5.51	17.54	9.01	16.55	9.46	18.60	8.58	17.06	22.16	10.48	11.27	0.40	12.49	5.10	10.52	23.01	9.35	17.04		
	19.204	-22.40	20.308	-21.59	21.722	-15.54	20.370	-20.57	11.880	2.19	1.369	5.93	4.310	21.31	0.284	0.30	20.665	-23.31	7.07340	7
9	5.50	17.57	8.60	17.06	9.43	19.06	8.54	17.07	22.08	10.41	11.19	0.32	12.41	5.02	10.44	22.53	9.28	16.57		
	19.350	-22.13	20.519	-20.70	21.880	-14.69	20.478	-20.20	11.881	2.19	1.372	5.96	4.306	21.30	0.286	0.32	20.669	-23.29	7.20483	9
11	5.49	17.59	8.58	17.17	9.39	19.13	8.50	17.08	22.00	10.33	11.11	0.25	12.32	4.53	10.36	22.45	9.20	16.49		
	19.495	-21.84	20.719	-19.74	22.036	-13.81	20.586	-19.81	11.882	2.20	1.376	6.00	4.302	21.29	0.288	0.33	20.673	-23.28	7.33625	11
13	5.48	18.01	8.54	17.27	9.35	19.20	8.46	17.10	21.52	10.25	11.03	0.17	12.24	4.45	10.28	22.38	9.12	16.42		
	19.639	-21.51	20.905	-18.72	22.190	-12.91	20.694	-19.41	11.883	2.20	1.380	6.03	4.299	21.28	0.290	0.34	20.678	-23.26	7.46767	13
15	5.47	18.04	8.49	17.36	9.31	19.26	8.42	17.11	21.44	10.17	10.55	0.10	12.16	4.37	10.21	22.30	9.05	16.34		
	19.783	-21.16	21.073	-17.67	22.343	-11.99	20.801	-19.00	11.882	2.22	1.385	6.07	4.295	21.28	0.292	0.36	20.682	-23.25	7.59909	15
17	5.46	18.07	8.44	17.43	9.27	19.33	8.38	17.12	21.36	10.09	10.48	0.03	12.08	4.29	10.13	22.22	8.57	16.27		
	19.925	-20.79	21.217	-16.61	22.494	-11.05	20.908	-18.57	11.881	2.24	1.390	6.11	4.292	21.27	0.294	0.37	20.686	-23.23	7.73051	17
19	5.45	18.09	8.36	17.49	9.23	19.39	8.33	17.14	21.28	10.02	10.40	23.51	12.00	4.21	10.05	22.15	8.49	16.19		
	20.068	-20.38	21.331	-15.60	22.644	-10.09	21.015	-18.13	11.878	2.26	1.395	6.15	4.289	21.26	0.296	0.39	20.691	-23.22	7.86193	19
21	5.43	18.12	8.27	17.51	9.18	19.46	8.29	17.15	21.20	9.54	10.32	23.44	11.52	4.13	9.57	22.07	8.41	16.12		
	20.209	-19.95	21.409	-14.68	22.793	-9.11	21.121	-17.68	11.876	2.29	1.401	6.20	4.286	21.26	0.299	0.41	20.695	-23.21	7.99335	21
23	5.41	18.15	8.17	17.50	9.14	19.52	8.24	17.17	21.12	9.46	10.24	23.37	11.44	4.05	9.49	21.59	8.34	16.04		
	20.349	-19.50	21.444	-13.90	22.941	-8.12	21.226	-17.21	11.872	2.32	1.408	6.24	4.283	21.25	0.301	0.42	20.700	-23.19	8.12477	23
25	5.39	18.18	8.05	17.44	9.09	19.59	8.20	17.18	21.03	9.38	10.17	23.30	11.37	3.57	9.42	21.52	8.26	15.57		
	20.489	-19.02	21.431	-13.34	23.087	-7.12	21.331	-16.73	11.867	2.36	1.414	6.29	4.281	21.24	0.304	0.44	20.704	-23.18	8.25620	25
27	5.37	18.21	7.52	17.35	9.05	20.05	8.15	17.19	20.55	9.30	10.09	23.23	11.29	3.49	9.34	21.44	8.18	15.49		
	20.628	-18.52	21.369	-13.02	23.233	-6.11	21.435	-16.24	11.862	2.41	1.421	6.34	4.279	21.24	0.307	0.46	20.709	-23.16	8.38762	27
29	5.35	18.25	7.37	17.21	8.60	20.11	8.10	17.21	20.46	9.22	10.01	23.15	11.21	3.41	9.26	21.37	8.11	15.42		
	20.766	-17.99	21.261	-12.96	23.377	-5.08	21.539	-15.73	11.856	2.46	1.429	6.40	4.277	21.24	0.310	0.48	20.713	-23.15	8.51904	29
31	5.32	18.28	7.22	17.03	8.55	20.17	8.05	17.22	20.38	9.14	9.53	23.08	11.13	3.33	9.18	21.29	8.03	15.34		
	20.903	-17.44	21.118	-13.16	23.520	-4.05	21.643	-15.22	11.849	2.51	1.437	6.45	4.275	21.23	0.313	0.50	20.717	-23.14	8.65046	31

# LUTY 2028

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2461																		
32	1	Wto	803	20.59018	-13.28	20.5815	-17.10	0.98530	0.4836	10.42	62.733	5.8	27	730	1159.2	1629	850	1556.3	2320	848	1
33	2	Śro	804	21.02584	-13.36	21.0220	-16.53	0.98544	1.3440	15.32	62.109	6.8	37	729	1159.4	1631	904	1640.3	****	844	2
34	3	Czw	805	21.06549	-13.43	21.0623	-16.35	0.98557	2.2352	19.49	61.336	7.8	47	727	1159.5	1633	921	1727.8	036	840	3
35	4	Pią	806	21.10515	-13.50	21.1026	-16.17	0.98572	3.1657	23.18	60.442	0.7	57	725	1159.6	1635	945	1819.8	154	836	4
36	5	Sob	807	21.14480	-13.55	21.1428	-15.59	0.98586	4.1410	25.40	59.470	1.7	67	724	1159.7	1636	1019	1916.3	311	833	5
37	6	Nie	808	21.18446	-13.60	21.1829	-15.41	0.98602	5.1503	26.37	58.482	2.7	77	722	1159.7	1638	1108	2016.6	423	829	6
38	7	Pon	809	21.22412	-14.03	21.2230	-15.23	0.98617	6.1812	25.53	57.556	3.7	86	720	1159.8	1640	1217	2118.8	522	825	7
39	8	Wto	810	21.26377	-14.06	21.2629	-15.04	0.98634	7.2140	23.22	56.775	4.7	93	718	1159.9	1642	1342	2220.3	606	821	8
40	9	Śro	811	21.30343	-14.09	21.3028	-14.45	0.98650	8.2337	19.14	56.217	5.7	98	716	1159.9	1644	1516	2319.6	637	817	9
41	10	Czw	812	21.34308	-14.10	21.3426	-14.25	0.98668	9.2301	13.46	55.944	6.7	100	714	1159.9	1646	1652	*****	659	813	10
42	11	Pią	813	21.38274	-14.11	21.3823	-14.06	0.98686	10.1945	7.26	55.985	0.8	99	712	1159.9	1648	1826	015.9	717	809	11
43	12	Sob	814	21.42239	-14.10	21.4220	-13.46	0.98704	11.1426	0.43	56.331	1.8	95	710	1159.9	1650	1958	109.4	732	805	12
44	13	Nie	815	21.46205	-14.10	21.4615	-13.26	0.98723	12.0757	-5.55	56.941	2.8	88	708	1159.9	1652	2128	201.1	746	801	13
45	14	Pon	816	21.50170	-14.08	21.5010	-13.06	0.98742	13.0114	-12.04	57.747	3.8	80	706	1159.9	1654	2256	252.2	801	757	14
46	15	Wto	817	21.54136	-14.06	21.5404	-12.45	0.98762	13.5506	-17.23	58.667	4.8	70	704	1159.8	1656	****	343.6	818	753	15
47	16	Śro	818	21.58101	-14.02	21.5758	-12.25	0.98783	14.4957	-21.39	59.624	5.8	59	702	1159.8	1658	022	436.0	840	749	16
48	17	Czw	819	22.02067	-13.59	22.0151	-12.04	0.98803	15.4545	-24.38	60.549	0.1	49	700	1159.7	1700	144	529.6	908	745	17
49	18	Pią	820	22.06033	-13.54	22.0543	-11.43	0.98824	16.4158	-26.16	61.391	1.1	39	658	1159.7	1702	258	623.8	947	741	18
50	19	Sob	821	22.09598	-13.49	22.0934	-11.22	0.98846	17.3741	-26.31	62.116	2.1	29	656	1159.6	1704	359	717.7	1037	737	19
51	20	Nie	822	22.13564	-13.43	22.1325	-11.00	0.98868	18.3156	-25.27	62.705	3.1	21	654	1159.5	1706	445	810.2	1139	734	20
52	21	Pon	823	22.17529	-13.37	22.1715	-10.39	0.98890	19.2358	-23.13	63.156	4.1	13	652	1159.4	1708	519	900.3	1248	730	21
53	22	Wto	824	22.21495	-13.30	22.2105	-10.17	0.98912	20.1326	-20.00	63.472	5.1	8	650	1159.2	1710	543	947.6	1401	726	22
54	23	Śro	825	22.25460	-13.22	22.2453	-9.55	0.98934	21.0025	-15.60	63.662	6.1	3	648	1159.1	1711	601	1032.1	1514	722	23
55	24	Czw	826	22.29426	-13.14	22.2842	-9.33	0.98957	21.4519	-11.24	63.740	7.1	1	645	1159.0	1713	616	1114.4	1625	718	24
56	25	Pią	827	22.33392	-13.05	22.3229	-9.11	0.98980	22.2843	-6.23	63.712	0.0	0	643	1158.8	1715	628	1155.0	1736	714	25
57	26	Sob	828	22.37357	-12.56	22.3616	-8.48	0.99003	23.1123	-1.08	63.585	1.0	1	641	1158.7	1717	638	1234.8	1846	710	26
58	27	Nie	829	22.41323	-12.46	22.4003	-8.26	0.99026	23.5405	4.10	63.358	2.0	4	639	1158.5	1719	649	1314.6	1957	706	27
59	28	Pon	830	22.45288	-12.35	22.4349	-8.03	0.99049	0.3742	9.22	63.028	3.0	8	637	1158.3	1721	700	1355.5	2109	702	28
60	29	Wto	831	22.49253	-12.24	22.4734	-7.40	0.99073	1.2303	14.16	62.589	4.0	14	634	1158.1	1723	712	1438.4	2223	658	29

Fazy Księżyca [Dm, h.mm]:      1kw 3, 20.10      Pełn 10, 16.04      3kw 17, 9.08      Nów 25, 11.37

# LUTY 2028 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	5.31	18.29	7.14	16.53	8.53	20.21	8.03	17.23	20.33	9.10	9.50	23.05	11.09	3.29	9.14	21.25	7.59	15.30		
	20.971	-17.16	21.039	-13.34	23.591	-3.53	21.694	-14.96	11.846	2.54	1.441	6.48	4.275	21.23	0.314	0.51	20.720	-23.13	8.71616	1
3	5.28	18.33	6.59	16.33	8.48	20.27	7.58	17.24	20.25	9.02	9.42	22.58	11.01	3.21	9.06	21.18	7.51	15.23		
	21.107	-16.59	20.873	-13.82	23.733	-2.49	21.797	-14.43	11.838	2.60	1.450	6.54	4.273	21.23	0.317	0.54	20.724	-23.12	8.84758	3
5	5.25	18.36	6.45	16.12	8.43	20.33	7.53	17.26	20.16	8.54	9.34	22.51	10.53	3.13	8.59	21.10	7.44	15.15		
	21.241	-15.99	20.715	-14.41	23.875	-1.45	21.900	-13.89	11.829	2.66	1.458	6.60	4.272	21.23	0.321	0.56	20.729	-23.10	8.97900	5
7	5.22	18.39	6.33	15.52	8.38	20.39	7.48	17.27	20.07	8.46	9.27	22.44	10.45	3.05	8.51	21.03	7.36	15.08		
	21.375	-15.38	20.580	-15.04	0.015	-0.40	22.001	-13.35	11.820	2.73	1.468	6.67	4.272	21.22	0.324	0.58	20.733	-23.09	9.11043	7
9	5.19	18.43	6.23	15.35	8.33	20.45	7.43	17.29	19.58	8.38	9.19	22.37	10.37	2.57	8.43	20.55	7.28	15.00		
	21.508	-14.75	20.477	-15.65	0.155	0.65	22.103	-12.79	11.810	2.80	1.477	6.73	4.271	21.22	0.327	0.60	20.737	-23.08	9.24185	9
11	5.16	18.46	6.14	15.19	8.27	20.51	7.38	17.30	19.50	8.30	9.11	22.30	10.29	2.49	8.35	20.48	7.21	14.53		
	21.640	-14.10	20.411	-16.21	0.294	1.69	22.204	-12.23	11.800	2.88	1.487	6.80	4.271	21.22	0.331	0.63	20.742	-23.06	9.37327	11
13	5.12	18.50	6.08	15.07	8.22	20.57	7.33	17.32	19.41	8.22	9.04	22.23	10.21	2.41	8.28	20.40	7.13	14.45		
	21.771	-13.43	20.382	-16.69	0.432	2.74	22.304	-11.65	11.788	2.96	1.497	6.87	4.271	21.22	0.335	0.65	20.746	-23.05	9.50469	13
15	5.09	18.53	6.03	14.57	8.17	21.03	7.28	17.33	19.32	8.14	8.56	22.16	10.13	2.33	8.20	20.33	7.05	14.38		
	21.901	-12.76	20.387	-17.09	0.570	3.78	22.404	-11.08	11.777	3.04	1.508	6.94	4.271	21.22	0.338	0.68	20.750	-23.04	9.63610	15
17	5.05	18.57	5.59	14.49	8.12	21.09	7.23	17.35	19.23	8.05	8.48	22.09	10.06	2.26	8.12	20.25	6.57	14.30		
	22.031	-12.06	20.423	-17.39	0.708	4.81	22.504	-10.49	11.764	3.13	1.519	7.01	4.271	21.23	0.342	0.70	20.754	-23.03	9.76752	17
19	5.01	19.00	5.56	14.44	8.07	21.15	7.17	17.36	19.13	7.57	8.41	22.03	9.58	2.18	8.04	20.18	6.50	14.23		
	22.159	-11.36	20.486	-17.59	0.845	5.84	22.603	-9.90	11.752	3.22	1.530	7.08	4.272	21.23	0.346	0.73	20.759	-23.02	9.89894	19
21	4.57	19.04	5.54	14.40	8.01	21.21	7.12	17.37	19.04	7.49	8.33	21.56	9.50	2.10	7.56	20.10	6.42	14.15		
	22.288	-10.64	20.572	-17.70	0.982	6.86	22.702	-9.30	11.738	3.31	1.542	7.16	4.273	21.23	0.350	0.76	20.763	-23.00	10.03036	21
23	4.53	19.08	5.53	14.39	7.56	21.27	7.07	17.39	18.55	7.41	8.26	21.49	9.42	2.02	7.49	20.03	6.34	14.08		
	22.415	-9.91	20.676	-17.71	1.119	7.87	22.800	-8.69	11.725	3.40	1.553	7.23	4.274	21.23	0.354	0.78	20.767	-22.99	10.16179	23
25	4.49	19.11	5.51	14.38	7.51	21.32	7.01	17.40	18.46	7.33	8.18	21.42	9.34	1.54	7.41	19.55	6.27	14.00		
	22.541	-9.18	20.797	-17.62	1.255	8.87	22.898	-8.08	11.710	3.50	1.566	7.31	4.276	21.24	0.358	0.81	20.771	-22.98	10.29320	25
27	4.44	19.15	5.50	14.40	7.46	21.38	6.56	17.41	18.37	7.24	8.11	21.36	9.27	1.47	7.33	19.48	6.19	13.53		
	22.667	-8.43	20.931	-17.44	1.391	9.85	22.996	-7.47	11.696	3.60	1.578	7.39	4.277	21.24	0.363	0.84	20.775	-22.97	10.42462	27
29	4.40	19.19	5.50	14.42	7.40	21.44	6.51	17.43	18.27	7.16	8.03	21.29	9.19	1.39	7.25	19.40	6.11	13.45		
	22.793	-7.67	21.077	-17.17	1.527	10.82	23.094	-6.85	11.681	3.70	1.591	7.47	4.279	21.25	0.367	0.87	20.779	-22.96	10.55604	29

# MARZEC 2028

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →											Czas strefowy [hhmm.]									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
61	1	Śro	832	22.53219	-12.12	22.5119	-7.18	0.99097	2.1058	18.39	62.036	5.0	22	632	1158.0	1725	728	1524.1	2339	654	1	
62	2	Czw	833	22.57185	-12.00	22.5504	-6.55	0.99121	3.0207	22.19	61.370	6.0	30	630	1157.7	1727	749	1613.5	****	650	2	
63	3	Pią	834	23.01150	-11.47	22.5848	-6.32	0.99145	3.5648	24.58	60.602	7.0	40	627	1157.5	1729	818	1706.9	055	646	3	
64	4	Sob	835	23.05116	-11.34	23.0231	-6.08	0.99169	4.5446	26.20	59.754	0.1	51	625	1157.3	1730	900	1803.7	207	642	4	
65	5	Nie	836	23.09081	-11.21	23.0614	-5.45	0.99194	5.5507	26.13	58.867	1.1	62	623	1157.1	1732	958	1902.9	310	639	5	
66	6	Pon	837	23.13047	-11.07	23.0957	-5.22	0.99219	6.5623	24.28	57.995	2.1	72	620	1156.9	1734	1113	2002.5	358	635	6	
67	7	Wto	838	23.17012	-10.52	23.1339	-4.59	0.99244	7.5703	21.07	57.209	3.1	82	618	1156.6	1736	1240	2101.0	434	631	7	
68	8	Śro	839	23.20578	-10.37	23.1720	-4.35	0.99269	8.5605	16.21	56.582	4.1	90	616	1156.4	1738	1412	2157.5	500	627	8	
69	9	Czw	840	23.24544	-10.22	23.2102	-4.12	0.99295	9.5310	10.29	56.185	5.1	96	613	1156.1	1740	1546	2251.8	519	623	9	
70	10	Pią	841	23.28509	-10.07	23.2443	-3.48	0.99321	10.4836	3.57	56.068	6.1	99	611	1155.9	1742	1719	2344.6	536	619	10	
71	11	Sob	842	23.32475	-9.51	23.2824	-3.25	0.99348	11.4307	-2.48	56.254	0.4	100	609	1155.6	1743	1851	*****	551	615	11	
72	12	Nie	843	23.36440	-9.35	23.3204	-3.01	0.99375	12.3735	-9.19	56.728	1.4	97	606	1155.3	1745	2022	036.9	605	611	12	
73	13	Pon	844	23.40405	-9.18	23.3544	-2.37	0.99402	13.3246	-15.10	57.444	2.4	92	604	1155.1	1747	2153	129.6	622	607	13	
74	14	Wto	845	23.44371	-9.02	23.3924	-2.14	0.99430	14.2905	-20.01	58.331	3.4	84	602	1154.8	1749	2320	223.4	642	603	14	
75	15	Śro	846	23.48336	-8.45	23.4304	-1.50	0.99457	15.2628	-23.35	59.308	4.4	75	559	1154.5	1751	****	318.5	708	559	15	
76	16	Czw	847	23.52302	-8.28	23.4643	-1.26	0.99485	16.2419	-25.43	60.295	5.4	65	557	1154.2	1753	040	414.4	744	555	16	
77	17	Pią	848	23.56268	-8.10	23.5022	-1.03	0.99514	17.2136	-26.24	61.220	6.4	55	554	1153.9	1754	148	510.2	831	551	17	
78	18	Sob	849	24.00233	-7.53	23.5401	-0.39	0.99542	18.1714	-25.41	62.031	0.5	45	552	1153.6	1756	241	604.3	930	547	18	
79	19	Nie	850	0.04199	-7.35	23.5740	-0.15	0.99570	19.1023	-23.45	62.691	1.5	36	550	1153.3	1758	320	656.0	1038	543	19	
80	20	Pon	851	0.08164	-7.18	0.0119	0.09	0.99599	20.0043	-20.47	63.181	2.5	27	547	1153.0	1800	347	744.5	1150	540	20	
81	21	Wto	852	0.12130	-6.60	0.0458	0.32	0.99628	20.4819	-16.59	63.498	3.5	19	545	1152.7	1802	408	830.0	1302	536	21	
82	22	Śro	853	0.16095	-6.42	0.0837	0.56	0.99656	21.3339	-12.33	63.650	4.5	12	542	1152.4	1804	423	912.8	1414	532	22	
83	23	Czw	854	0.20061	-6.24	0.1215	1.20	0.99685	22.1723	-7.40	63.653	5.5	7	540	1152.1	1805	436	953.9	1525	528	23	
84	24	Pią	855	0.24026	-6.06	0.1554	1.43	0.99713	23.0015	-2.30	63.528	6.5	3	538	1151.8	1807	447	1033.9	1635	524	24	
85	25	Sob	856	0.27592	-5.48	0.1932	2.07	0.99742	23.4306	2.47	63.296	7.5	0	535	1151.5	1809	458	1113.9	1746	520	25	
86	26	Nie	857	0.31557	-5.30	0.2311	2.30	0.99771	0.2644	8.01	62.977	0.3	0	533	1151.2	1811	509	1154.7	1858	516	26	
86	26	Nie	857	23.31459	-5.31	0.2302	2.29	0.99769	0.2453	7.48	62.992	0.2	0	633	1251.3	1911	609	1254.7	1958	616	26	
87	27	Pon	858	23.35424	-5.13	0.2640	2.53	0.99798	1.1004	12.49	62.601	1.2	1	630	1251.0	1913	621	1337.3	2111	612	27	
88	28	Wto	859	23.39390	-4.55	0.3019	3.16	0.99826	1.5735	17.22	62.147	2.2	5	628	1250.7	1914	636	1422.4	2227	608	28	
89	29	Śro	860	23.43355	-4.37	0.3358	3.40	0.99854	2.4802	21.14	61.634	3.2	10	626	1250.4	1916	656	1510.9	2344	604	29	
90	30	Czw	861	23.47321	-4.19	0.3736	4.03	0.99883	3.4142	24.09	61.064	4.2	17	623	1250.1	1918	722	1602.9	****	600	30	
91	31	Pią	862	23.51287	-4.01	0.4115	4.26	0.99911	4.3818	25.52	60.443	5.2	25	621	1249.8	1920	800	1658.1	057	556	31	

Fazy Księżyca [Dm, h.mm]:      1kw 4, 10.02      Pełn 11, 2.06      3kw 18, 0.23      Nów 26, 5.31      Nów 26, 6.31

# MARZEC 2028 (c.d.)

Świty, zmiernicy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.38	19.21	5.49	14.44	7.38	21.47	6.48	17.43	18.23	7.12	7.59	21.26	9.15	1.35	7.22	19.36	6.07	13.41		
	22.855	-7.29	21.153	-17.00	1.595	11.30	23.142	-6.54	11.674	3.75	1.597	7.51	4.280	21.25	0.369	0.88	20.781	-22.96	10.62174	1
3	4.33	19.24	5.48	14.48	7.33	21.53	6.42	17.45	18.13	7.04	7.52	21.19	9.07	1.27	7.14	19.29	5.60	13.34		
	22.980	-6.53	21.313	-16.58	1.731	12.25	23.239	-5.92	11.658	3.86	1.610	7.59	4.283	21.26	0.373	0.91	20.785	-22.95	10.75316	3
5	4.28	19.28	5.47	14.54	7.27	21.58	6.37	17.46	18.04	6.56	7.44	21.12	8.59	1.20	7.06	19.22	5.52	13.26		
	23.104	-5.75	21.479	-16.08	1.866	13.18	23.336	-5.29	11.643	3.96	1.623	7.67	4.285	21.26	0.378	0.94	20.789	-22.94	10.88459	5
7	4.23	19.32	5.46	14.60	7.22	22.04	6.31	17.47	17.55	6.47	7.37	21.06	8.52	1.12	6.58	19.14	5.44	13.19		
	23.227	-4.98	21.652	-15.49	2.001	14.09	23.432	-4.66	11.627	4.06	1.637	7.76	4.288	21.27	0.382	0.97	20.792	-22.93	11.01601	7
9	4.18	19.36	5.45	15.07	7.17	22.10	6.26	17.49	17.45	6.39	7.29	20.59	8.44	1.05	6.51	19.07	5.37	13.11		
	23.351	-4.20	21.831	-14.81	2.136	14.98	23.528	-4.03	11.611	4.17	1.650	7.84	4.291	21.28	0.387	1.00	20.796	-22.92	11.14743	9
11	4.13	19.40	5.43	15.14	7.12	22.15	6.20	17.50	17.36	6.31	7.22	20.53	8.36	0.57	6.43	18.59	5.29	13.03		
	23.473	-3.41	22.014	-14.04	2.271	15.84	23.624	-3.40	11.595	4.27	1.664	7.93	4.294	21.29	0.391	1.03	20.799	-22.92	11.27884	11
13	4.08	19.44	5.42	15.23	7.07	22.21	6.15	17.51	17.26	6.23	7.14	20.46	8.28	0.49	6.35	18.52	5.21	12.56		
	23.596	-2.62	22.201	-13.19	2.405	16.69	23.720	-2.77	11.579	4.38	1.678	8.01	4.298	21.30	0.396	1.05	20.803	-22.91	11.41026	13
15	4.03	19.48	5.40	15.32	7.01	22.26	6.09	17.52	17.17	6.14	7.07	20.40	8.21	0.42	6.27	18.44	5.13	12.48		
	23.718	-1.83	22.392	-12.26	2.539	17.51	23.815	-2.13	11.564	4.48	1.693	8.10	4.301	21.30	0.400	1.08	20.806	-22.90	11.54167	15
17	3.58	19.53	5.38	15.41	6.56	22.32	6.04	17.53	17.08	6.06	6.59	20.33	8.13	0.34	6.20	18.37	5.06	12.41		
	23.840	-1.04	22.587	-11.24	2.672	18.30	23.910	-1.50	11.548	4.58	1.707	8.19	4.305	21.31	0.405	1.11	20.810	-22.89	11.67309	17
19	3.52	19.57	5.36	15.51	6.51	22.37	5.58	17.55	16.58	5.58	6.52	20.27	8.05	0.27	6.12	18.30	4.58	12.33		
	23.961	-0.25	22.785	-10.14	2.805	19.07	0.005	-0.87	11.532	4.68	1.722	8.27	4.309	21.33	0.409	1.14	20.813	-22.89	11.80452	19
21	3.47	20.01	5.33	16.02	6.46	22.42	5.53	17.56	16.49	5.50	6.44	20.20	7.58	0.19	6.04	18.22	4.50	12.25		
	0.083	0.54	22.987	-8.96	2.937	19.81	0.100	-0.23	11.516	4.79	1.737	8.36	4.314	21.34	0.414	1.17	20.816	-22.88	11.93594	21
23	3.41	20.06	5.31	16.14	6.41	22.47	5.47	17.57	16.40	5.41	6.37	20.14	7.50	0.12	5.56	18.15	4.43	12.18		
	0.204	1.33	23.192	-7.71	3.069	20.52	0.195	0.40	11.501	4.88	1.752	8.45	4.318	21.35	0.419	1.20	20.819	-22.88	12.06735	23
25	3.36	20.10	5.28	16.25	6.36	22.52	5.42	17.58	16.30	5.33	6.29	20.07	7.42	0.04	5.49	18.07	4.35	12.10		
	0.326	2.11	23.400	-6.37	3.199	21.20	0.290	1.03	11.485	4.98	1.767	8.54	4.323	21.36	0.423	1.23	20.822	-22.87	12.19877	25
27	4.30	21.15	6.25	17.37	7.31	23.56	6.36	18.59	17.21	6.25	7.22	21.01	8.35	0.57	6.41	18.60	5.27	13.02		
	0.445	2.88	23.608	-4.99	3.326	21.84	0.382	1.65	11.471	5.07	1.782	8.63	4.328	21.37	0.428	1.26	20.824	-22.87	12.33019	27
29	4.24	21.20	6.22	17.50	7.26	0.05	6.30	19.00	17.12	6.17	7.14	20.54	8.27	0.49	6.33	18.52	5.19	12.55		
	0.566	3.66	23.823	-3.51	3.454	22.46	0.477	2.28	11.456	5.17	1.797	8.72	4.333	21.38	0.432	1.29	20.827	-22.87	12.46160	29
31	4.18	21.24	6.19	18.04	7.22	0.09	6.25	19.01	17.03	6.08	7.07	20.48	8.19	0.42	6.25	18.45	5.12	12.47		
	0.687	4.44	0.043	-1.96	3.580	23.04	0.571	2.90	11.442	5.25	1.813	8.81	4.338	21.40	0.437	1.32	20.830	-22.86	12.59302	31

# KWIECIEŃ 2028

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
92	1	Sob	863	23.55252	-3.43	0.4454	4.49	0.99939	5.3703	26.11	59.779	6.2	35	619	1249.5	1922	852	1755.4	202	552	1	
93	2	Nie	864	23.59218	-3.26	0.4833	5.12	0.99967	6.3637	24.59	59.090	7.2	46	616	1249.2	1923	959	1853.2	254	548	2	
94	3	Pon	865	0.03183	-3.08	0.5212	5.35	0.99995	7.3541	22.15	58.406	0.6	57	614	1248.9	1925	1119	1950.1	333	544	3	
95	4	Wto	866	0.07149	-2.51	0.5551	5.58	1.00023	8.3317	18.09	57.768	1.6	68	611	1248.6	1927	1246	2045.2	401	541	4	
96	5	Śro	867	0.11114	-2.33	0.5930	6.21	1.00051	9.2908	12.55	57.228	2.6	78	609	1248.3	1929	1416	2138.4	422	537	5	
97	6	Czw	868	0.15080	-2.16	1.0310	6.44	1.00080	10.2330	6.52	56.843	3.6	87	607	1248.0	1930	1546	2230.2	439	533	6	
98	7	Pią	869	0.19045	-1.59	1.0649	7.06	1.00108	11.1706	0.22	56.664	4.6	94	604	1247.7	1932	1716	2321.6	455	529	7	
99	8	Sob	870	0.23011	-1.43	1.1029	7.29	1.00136	12.1049	-6.10	56.726	5.6	98	602	1247.5	1934	1846	*****	509	525	8	
100	9	Nie	871	0.26576	-1.26	1.1409	7.51	1.00165	13.0531	-12.20	57.041	6.6	100	600	1247.2	1936	2017	013.5	525	521	9	
101	10	Pon	872	0.30542	-1.10	1.1750	8.13	1.00193	14.0147	-17.42	57.591	1.0	99	557	1246.9	1938	2147	107.0	544	517	10	
102	11	Wto	873	0.34507	-0.55	1.2131	8.35	1.00222	14.5945	-21.55	58.333	2.0	95	555	1246.7	1939	2313	202.4	607	513	11	
103	12	Śro	874	0.38473	-0.39	1.2512	8.57	1.00251	15.5852	-24.45	59.202	3.0	88	553	1246.4	1941	****	259.4	639	509	12	
104	13	Czw	875	0.42438	-0.24	1.2853	9.19	1.00280	16.5801	-26.03	60.126	4.0	81	550	1246.1	1943	029	356.9	722	505	13	
105	14	Pią	876	0.46404	-0.09	1.3235	9.40	1.00308	17.5549	-25.52	61.031	5.0	72	548	1245.9	1945	130	453.5	818	501	14	
106	15	Sob	877	0.50370	0.05	1.3617	10.02	1.00337	18.5107	-24.20	61.852	6.0	62	546	1245.7	1947	216	547.6	924	457	15	
107	16	Nie	878	0.54335	0.20	1.3959	10.23	1.00366	19.4315	-21.41	62.538	7.0	53	544	1245.4	1948	248	638.3	1036	453	16	
108	17	Pon	879	0.58301	0.33	1.4342	10.44	1.00394	20.3215	-18.07	63.052	0.7	43	541	1245.2	1950	311	725.4	1149	449	17	
109	18	Wto	880	1.02266	0.47	1.4725	11.05	1.00423	21.1831	-13.53	63.377	1.7	34	539	1245.0	1952	329	809.5	1302	446	18	
110	19	Śro	881	1.06232	0.59	1.5109	11.26	1.00451	22.0247	-9.09	63.510	2.7	25	537	1244.8	1954	342	851.2	1412	442	19	
111	20	Czw	882	1.10197	1.12	1.5453	11.46	1.00479	22.4552	-4.06	63.461	3.7	18	535	1244.5	1956	354	931.6	1522	438	20	
112	21	Pią	883	1.14163	1.24	1.5838	12.06	1.00507	23.2841	1.08	63.254	4.7	11	533	1244.3	1957	406	1011.5	1633	434	21	
113	22	Sob	884	1.18128	1.35	2.0223	12.27	1.00534	0.1207	6.22	62.917	5.7	6	530	1244.2	1959	417	1052.1	1744	430	22	
114	23	Nie	885	1.22094	1.46	2.0608	12.46	1.00562	0.5704	11.27	62.483	6.7	2	528	1244.0	2001	429	1134.1	1857	426	23	
115	24	Pon	886	1.26059	1.57	2.0954	13.06	1.00589	1.4421	16.08	61.986	7.7	0	526	1243.8	2003	443	1219.0	2013	422	24	
116	25	Wto	887	1.30025	2.07	2.1341	13.26	1.00615	2.3438	20.13	61.455	0.6	0	524	1243.6	2004	502	1306.9	2130	418	25	
117	26	Śro	888	1.33590	2.17	2.1728	13.45	1.00641	3.2812	23.24	60.914	1.6	3	522	1243.5	2006	526	1358.5	2246	414	26	
118	27	Czw	889	1.37556	2.26	2.2115	14.04	1.00667	4.2451	25.25	60.378	2.6	7	520	1243.3	2008	601	1453.5	2354	410	27	
119	28	Pią	890	1.41522	2.35	2.2503	14.23	1.00693	5.2339	26.02	59.859	3.6	14	518	1243.2	2010	649	1550.7	****	406	28	
120	29	Sob	891	1.45487	2.43	2.2851	14.41	1.00718	6.2313	25.08	59.362	4.6	22	516	1243.0	2012	752	1648.6	050	402	29	
121	30	Nie	892	1.49453	2.50	2.3240	14.60	1.00743	7.2205	22.45	58.891	5.6	31	514	1242.9	2013	909	1745.3	133	358	30	

Fazy Księżyca [Dm, h.mm]:    1kw 2, 21.15    Pełn 9, 12.27    3kw 16, 18.37    Nów 24, 21.47



# KWIECIEŃ 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	4.15	21.27	6.18	18.11	7.19	0.11	6.22	19.02	16.58	6.04	7.03	20.45	8.16	0.38	6.21	18.41	5.08	12.43		
	0.748	4.82	0.155	-1.16	3.643	23.33	0.618	3.21	11.435	5.30	1.820	8.85	4.341	21.40	0.439	1.34	20.831	-22.86	12.65873	1
3	4.09	21.32	6.15	18.25	7.14	0.15	6.17	19.03	16.49	5.56	6.56	20.38	8.08	0.31	6.14	18.34	5.00	12.35		
	0.870	5.59	0.382	0.49	3.767	23.86	0.713	3.83	11.421	5.38	1.836	8.94	4.347	21.42	0.444	1.37	20.833	-22.86	12.79016	3
5	4.03	21.37	6.12	18.41	7.10	0.18	6.11	19.04	16.40	5.48	6.48	20.32	8.00	0.23	6.06	18.26	4.52	12.28		
	0.992	6.35	0.614	2.19	3.888	24.37	0.807	4.45	11.408	5.46	1.852	9.03	4.352	21.43	0.449	1.40	20.836	-22.86	12.92157	5
7	3.56	21.42	6.09	18.56	7.05	0.21	6.06	19.05	16.31	5.40	6.41	20.25	7.53	0.16	5.58	18.19	4.45	12.20		
	1.114	7.10	0.852	3.95	4.008	24.84	0.901	5.06	11.395	5.54	1.868	9.12	4.358	21.45	0.453	1.42	20.838	-22.86	13.05299	7
9	3.50	21.48	6.06	19.13	7.01	0.24	6.00	19.06	16.22	5.31	6.34	20.19	7.45	0.08	5.50	18.12	4.37	12.12		
	1.236	7.85	1.095	5.75	4.124	25.28	0.996	5.67	11.383	5.62	1.883	9.21	4.365	21.46	0.458	1.45	20.840	-22.85	13.18441	9
11	3.44	21.53	6.03	19.30	6.56	0.27	5.55	19.07	16.13	5.23	6.26	20.13	7.37	23.57	5.43	18.04	4.29	12.04		
	1.358	8.58	1.344	7.58	4.237	25.68	1.090	6.27	11.371	5.69	1.899	9.30	4.371	21.48	0.462	1.48	20.842	-22.85	13.31582	11
13	3.37	21.59	5.60	19.47	6.51	0.28	5.49	19.08	16.04	5.15	6.19	20.06	7.30	23.50	5.35	17.57	4.21	11.57		
	1.481	9.31	1.597	9.41	4.347	26.05	1.185	6.87	11.360	5.75	1.915	9.39	4.377	21.49	0.467	1.51	20.844	-22.85	13.44724	13
15	3.30	22.05	5.57	20.05	6.47	0.30	5.44	19.10	15.55	5.07	6.11	19.60	7.22	23.42	5.27	17.49	4.14	11.49		
	1.605	10.03	1.856	11.24	4.452	26.38	1.279	7.47	11.349	5.82	1.932	9.48	4.384	21.51	0.471	1.54	20.845	-22.86	13.57867	15
17	3.23	22.11	5.54	20.24	6.42	0.31	5.38	19.11	15.46	4.59	6.04	19.53	7.15	23.35	5.20	17.42	4.06	11.41		
	1.728	10.73	2.118	13.03	4.554	26.68	1.374	8.05	11.339	5.87	1.948	9.57	4.391	21.52	0.476	1.57	20.847	-22.86	13.71009	17
19	3.16	22.17	5.52	20.42	6.38	0.31	5.33	19.12	15.38	4.51	5.57	19.47	7.07	23.28	5.12	17.34	3.58	11.33		
	1.852	11.43	2.381	14.76	4.650	26.94	1.468	8.63	11.330	5.93	1.964	9.66	4.397	21.54	0.480	1.59	20.849	-22.86	13.84151	19
21	3.09	22.24	5.49	20.60	6.33	0.31	5.27	19.13	15.29	4.43	5.49	19.41	6.60	23.20	5.04	17.27	3.50	11.26		
	1.977	12.11	2.644	16.40	4.741	27.16	1.563	9.21	11.321	5.98	1.980	9.75	4.404	21.56	0.484	1.62	20.850	-22.86	13.97292	21
23	3.02	22.30	5.47	21.18	6.29	0.30	5.22	19.14	15.20	4.34	5.42	19.34	6.52	23.13	4.56	17.19	3.42	11.18		
	2.102	12.77	2.904	17.93	4.826	27.36	1.658	9.78	11.313	6.02	1.996	9.84	4.412	21.57	0.489	1.65	20.851	-22.86	14.10434	23
25	2.54	22.37	5.45	21.34	6.24	0.28	5.17	19.15	15.12	4.26	5.34	19.28	6.44	23.06	4.49	17.12	3.35	11.10		
	2.228	13.43	3.157	19.31	4.905	27.51	1.753	10.34	11.305	6.06	2.012	9.92	4.419	21.59	0.493	1.67	20.852	-22.87	14.23576	25
27	2.46	22.45	5.43	21.50	6.19	0.26	5.11	19.16	15.03	4.18	5.27	19.21	6.37	22.58	4.41	17.04	3.27	11.02		
	2.354	14.07	3.402	20.54	4.977	27.63	1.848	10.89	11.299	6.10	2.028	10.01	4.426	21.61	0.497	1.70	20.853	-22.87	14.36718	27
29	2.38	22.53	5.42	22.03	6.14	0.23	5.06	19.17	14.55	4.10	5.20	19.15	6.29	22.51	4.33	16.57	3.19	10.54		
	2.481	14.69	3.636	21.61	5.041	27.72	1.943	11.43	11.293	6.13	2.045	10.10	4.434	21.62	0.501	1.73	20.854	-22.87	14.49860	29

# MAJ 2028

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
122	1	Pon	893	1.53418	2.57	2.3630	15.18	1.00768	8.1912	19.01	58.456	6.6	42	512	1242.8	2015	1033	1839.9	204	354	1
123	2	Wto	894	1.57384	3.04	2.4020	15.36	1.00793	9.1412	14.09	58.072	0.3	54	510	1242.7	2017	1159	1932.2	226	350	2
124	3	Śro	895	2.01349	3.10	2.4410	15.53	1.00817	10.0723	8.29	57.759	1.3	65	508	1242.6	2019	1326	2022.8	245	347	3
125	4	Czw	896	2.05315	3.16	2.4801	16.11	1.00841	10.5930	2.19	57.547	2.3	76	506	1242.5	2020	1452	2112.4	300	343	4
126	5	Pią	897	2.09280	3.21	2.5153	16.28	1.00865	11.5130	-4.00	57.467	3.3	85	504	1242.4	2022	1619	2202.4	314	339	5
127	6	Sob	898	2.13246	3.25	2.5545	16.44	1.00889	12.4424	-10.08	57.548	4.3	92	502	1242.3	2024	1747	2253.8	329	335	6
128	7	Nie	899	2.17211	3.29	2.5938	17.01	1.00913	13.3901	-15.41	57.805	5.3	97	500	1242.3	2025	1916	2347.4	346	331	7
129	8	Pon	900	2.21177	3.32	3.0331	17.17	1.00936	14.3546	-20.18	58.241	6.3	100	458	1242.2	2027	2043	*****	407	327	8
130	9	Wto	901	2.25143	3.35	3.0725	17.33	1.00960	15.3428	-23.40	58.836	0.6	100	457	1242.2	2029	2205	043.4	435	323	9
131	10	Śro	902	2.29108	3.37	3.1119	17.49	1.00983	16.3410	-25.34	59.551	1.6	97	455	1242.1	2031	2314	141.0	513	319	10
132	11	Czw	903	2.33074	3.39	3.1514	18.04	1.01006	17.3324	-25.56	60.336	2.6	92	453	1242.1	2032	****	238.9	604	315	11
133	12	Pią	904	2.37039	3.40	3.1910	18.19	1.01029	18.3038	-24.50	61.129	3.6	86	451	1242.1	2034	007	335.3	707	311	12
134	13	Sob	905	2.41005	3.40	3.2306	18.34	1.01052	19.2450	-22.30	61.870	4.6	78	450	1242.1	2036	045	428.5	818	307	13
135	14	Nie	906	2.44571	3.40	3.2702	18.48	1.01074	20.1537	-19.10	62.504	5.6	69	448	1242.1	2037	112	518.0	932	303	14
136	15	Pon	907	2.48536	3.39	3.3060	19.02	1.01097	21.0314	-15.06	62.986	6.6	60	446	1242.1	2039	132	603.9	1046	259	15
137	16	Wto	908	2.52502	3.38	3.3458	19.16	1.01119	21.4821	-10.29	63.285	7.6	50	445	1242.1	2040	148	646.8	1158	255	16
138	17	Śro	909	2.56467	3.36	3.3856	19.29	1.01140	22.3150	-5.31	63.385	1.0	41	443	1242.1	2042	201	727.7	1308	251	17
139	18	Czw	910	3.00433	3.34	3.4255	19.43	1.01161	23.1436	-0.22	63.286	2.0	32	442	1242.2	2043	212	807.7	1418	248	18
140	19	Pią	911	3.04398	3.31	3.4655	19.55	1.01182	23.5739	4.51	63.004	3.0	23	440	1242.2	2045	223	847.8	1528	244	19
141	20	Sob	912	3.08364	3.27	3.5055	20.08	1.01203	0.4157	9.57	62.565	4.0	16	439	1242.3	2047	235	929.1	1640	240	20
142	21	Nie	913	3.12329	3.23	3.5455	20.20	1.01223	1.2826	14.45	62.009	5.0	9	438	1242.4	2048	249	1012.7	1755	236	21
143	22	Pon	914	3.16295	3.18	3.5857	20.32	1.01242	2.1757	19.02	61.380	6.0	4	436	1242.4	2049	306	1059.5	1912	232	22
144	23	Wto	915	3.20261	3.13	4.0258	20.43	1.01261	3.1100	22.30	60.725	7.0	1	435	1242.5	2051	328	1150.3	2029	228	23
145	24	Śro	916	3.24226	3.07	4.0701	20.54	1.01280	4.0735	24.54	60.089	0.1	0	434	1242.6	2052	359	1245.0	2142	224	24
146	25	Czw	917	3.28192	3.01	4.1104	21.05	1.01298	5.0655	25.55	59.509	1.1	1	433	1242.7	2054	443	1342.7	2243	220	25
147	26	Pią	918	3.32157	2.54	4.1507	21.15	1.01315	6.0733	25.23	59.013	2.1	5	431	1242.8	2055	543	1441.7	2331	216	26
148	27	Sob	919	3.36123	2.47	4.1910	21.25	1.01332	7.0743	23.18	58.614	3.1	11	430	1243.0	2056	657	1540.0	****	212	27
149	28	Nie	920	3.40089	2.39	4.2315	21.35	1.01349	8.0601	19.47	58.316	4.1	19	429	1243.1	2058	820	1636.1	006	208	28
150	29	Pon	921	3.44054	2.31	4.2719	21.44	1.01365	9.0149	15.07	58.115	5.1	29	428	1243.2	2059	947	1729.3	031	204	29
151	30	Wto	922	3.48020	2.23	4.3124	21.53	1.01380	9.5514	9.37	58.003	6.1	40	427	1243.4	2100	1114	1820.0	051	200	30
152	31	Śro	923	3.51585	2.14	4.3530	22.01	1.01395	10.4658	3.36	57.974	0.1	51	426	1243.5	2101	1239	1909.1	107	156	31

Fazy Księżyca [Dm, h.mm]:      1kw 2, 4.26      Pełn 8, 21.49      3kw 16, 12.43      Nów 24, 10.16      1kw 31, 9.37

# MAJ 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		VENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST (0 <sup>h</sup> UT) Dm	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	2.30	23.01	5.40	22.15	6.09	0.19	5.01	19.18	14.47	4.02	5.12	19.09	6.22	22.44	4.25	16.49	3.11	10.46		
	2.608	15.30	3.857	22.51	5.096	27.77	2.039	11.97	11.288	6.15	2.061	10.18	4.441	21.64	0.505	1.75	20.855	-22.88	14.63002	1
3	2.21	23.10	5.39	22.26	6.04	0.14	4.55	19.19	14.39	3.54	5.05	19.02	6.14	22.37	4.18	16.42	3.04	10.39		
	2.736	15.89	4.062	23.25	5.143	27.78	2.134	12.50	11.283	6.17	2.077	10.27	4.449	21.66	0.509	1.77	20.855	-22.89	14.76144	3
5	2.11	23.19	5.38	22.34	5.59	0.08	4.50	19.19	14.30	3.46	4.57	18.56	6.07	22.29	4.10	16.34	2.56	10.31		
	2.865	16.46	4.251	23.83	5.179	27.76	2.230	13.02	11.280	6.19	2.093	10.35	4.457	21.67	0.513	1.80	20.856	-22.89	14.89286	5
7	2.01	23.30	5.37	22.39	5.53	23.57	4.45	19.20	14.22	3.38	4.50	18.49	5.59	22.22	4.02	16.27	2.48	10.23		
	2.994	17.02	4.420	24.25	5.206	27.69	2.326	13.53	11.277	6.20	2.109	10.44	4.465	21.69	0.517	1.82	20.856	-22.90	15.02427	7
9	1.50	23.41	5.36	22.43	5.47	23.49	4.40	19.21	14.14	3.30	4.43	18.43	5.52	22.15	3.54	16.19	2.40	10.15		
	3.124	17.55	4.570	24.53	5.221	27.59	2.422	14.03	11.274	6.21	2.125	10.52	4.473	21.71	0.521	1.85	20.856	-22.90	15.15569	9
11	1.37	23.56	5.34	22.44	5.41	23.40	4.35	19.22	14.06	3.22	4.35	18.36	5.44	22.08	3.46	16.12	2.32	10.07		
	3.254	18.07	4.699	24.67	5.225	27.44	2.518	14.52	11.273	6.21	2.141	10.60	4.481	21.73	0.525	1.87	20.856	-22.91	15.28712	11
13	1.20	0.28	5.33	22.42	5.35	23.30	4.30	19.23	13.58	3.14	4.28	18.30	5.37	22.00	3.39	16.04	2.25	9.59		
	3.385	18.56	4.805	24.68	5.218	27.24	2.615	15.00	11.272	6.21	2.156	10.68	4.489	21.75	0.528	1.89	20.856	-22.92	15.41854	13
15	*****	*****	5.31	22.39	5.28	23.18	4.25	19.24	13.51	3.07	4.21	18.24	5.29	21.53	3.31	15.57	2.17	9.51		
	3.517	19.04	4.890	24.57	5.198	27.00	2.712	15.47	11.272	6.20	2.172	10.77	4.497	21.76	0.532	1.91	20.856	-22.93	15.54996	15
17	*****	*****	5.28	22.32	5.21	23.06	4.20	19.25	13.43	2.59	4.13	18.17	5.22	21.46	3.23	15.49	2.09	9.43		
	3.649	19.49	4.950	24.34	5.167	26.71	2.809	15.93	11.273	6.19	2.188	10.84	4.505	21.78	0.535	1.93	20.856	-22.94	15.68138	17
19	*****	*****	5.25	22.24	5.14	22.52	4.15	19.25	13.35	2.51	4.06	18.11	5.14	21.39	3.15	15.42	2.01	9.35		
	3.782	19.92	4.988	24.01	5.125	26.37	2.906	16.38	11.275	6.17	2.203	10.92	4.513	21.80	0.539	1.95	20.855	-22.95	15.81280	19
21	*****	*****	5.22	22.14	5.06	22.38	4.10	19.26	13.28	2.43	3.58	18.04	5.07	21.31	3.08	15.34	1.53	9.27		
	3.915	20.33	5.002	23.59	5.072	25.97	3.003	16.82	11.277	6.15	2.218	11.00	4.521	21.82	0.542	1.97	20.855	-22.95	15.94422	21
23	*****	*****	5.18	22.01	4.58	22.22	4.05	19.27	13.20	2.35	3.51	17.58	4.59	21.24	2.60	15.27	1.45	9.19		
	4.050	20.72	4.994	23.08	5.009	25.52	3.101	17.24	11.280	6.12	2.234	11.08	4.530	21.83	0.545	1.99	20.854	-22.96	16.07564	23
25	*****	*****	5.12	21.47	4.51	22.06	4.01	19.28	13.13	2.27	3.44	17.51	4.52	21.17	2.52	15.19	1.38	9.11		
	4.184	21.08	4.966	22.49	4.938	25.03	3.198	17.66	11.284	6.09	2.249	11.15	4.538	21.85	0.548	2.01	20.853	-22.98	16.20706	25
27	*****	*****	5.07	21.32	4.43	21.49	3.56	19.28	13.05	2.19	3.36	17.44	4.44	21.10	2.44	15.11	1.30	9.03		
	4.320	21.42	4.920	21.85	4.861	24.48	3.296	18.06	11.288	6.05	2.264	11.22	4.546	21.87	0.551	2.02	20.852	-22.99	16.33848	27
29	*****	*****	5.00	21.15	4.35	21.31	3.51	19.29	12.58	2.12	3.29	17.38	4.37	21.02	2.37	15.04	1.22	8.55		
	4.455	21.73	4.860	21.16	4.778	23.90	3.395	18.45	11.293	6.01	2.279	11.30	4.555	21.89	0.554	2.04	20.851	-23.00	16.46991	29
31	*****	*****	4.53	20.58	4.27	21.13	3.47	19.29	12.51	2.04	3.21	17.31	4.29	20.55	2.29	14.56	1.14	8.47		
	4.592	22.02	4.791	20.47	4.693	23.28	3.493	18.83	11.299	5.97	2.293	11.37	4.563	21.91	0.556	2.06	20.850	-23.01	16.60133	31

# CZERWIEC 2028

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
153	1	Czw	924	3.55551	2.05	4.3935	22.09	1.01410	11.3760	-2.35	58.026	1.1	63	425	1243.7	2103	1404	1957.8	121	153	1
154	2	Pią	925	3.59516	1.55	4.4342	22.17	1.01425	12.2924	-8.38	58.161	2.1	73	425	1243.8	2104	1529	2047.3	135	149	2
155	3	Sob	926	4.03482	1.45	4.4748	22.24	1.01439	13.2208	-14.12	58.386	3.1	83	424	1244.0	2105	1655	2138.5	151	145	3
156	4	Nie	927	4.07447	1.35	4.5155	22.31	1.01452	14.1655	-18.60	58.708	4.1	90	423	1244.2	2106	1821	2232.3	210	141	4
157	5	Pon	928	4.11413	1.25	4.5602	22.37	1.01466	15.1354	-22.42	59.130	5.1	96	422	1244.3	2107	1943	2328.3	234	137	5
158	6	Wto	929	4.15379	1.14	5.0009	22.43	1.01479	16.1234	-25.03	59.645	6.1	99	422	1244.5	2108	2057	*****	307	133	6
159	7	Śro	930	4.19344	1.03	5.0417	22.49	1.01491	17.1143	-25.55	60.237	0.2	100	421	1244.7	2109	2157	025.6	352	129	7
160	8	Czw	931	4.23310	0.51	5.0825	22.54	1.01504	18.0946	-25.18	60.877	1.2	98	421	1244.9	2109	2241	122.6	450	125	8
161	9	Pią	932	4.27276	0.39	5.1233	22.59	1.01516	19.0522	-23.22	61.526	2.2	95	420	1245.1	2110	2312	217.4	559	121	9
162	10	Sob	933	4.31241	0.27	5.1642	23.04	1.01528	19.5745	-20.19	62.139	3.2	90	420	1245.3	2111	2335	308.9	713	117	10
163	11	Nie	934	4.35207	0.15	5.2051	23.08	1.01540	20.4650	-16.25	62.669	4.2	83	420	1245.5	2112	2352	356.8	828	113	11
164	12	Pon	935	4.39172	0.03	5.2460	23.12	1.01551	21.3304	-11.56	63.073	5.2	75	419	1245.7	2112	****	441.2	941	109	12
165	13	Wto	936	4.43138	-0.10	5.2909	23.15	1.01562	22.1711	-7.02	63.316	6.2	67	419	1245.9	2113	006	523.1	1052	105	13
166	14	Śro	937	4.47104	-0.22	5.3318	23.18	1.01572	23.0006	-1.56	63.371	7.2	57	419	1246.1	2114	019	603.4	1202	101	14
167	15	Czw	938	4.51069	-0.35	5.3727	23.20	1.01582	23.4248	3.15	63.228	0.2	48	419	1246.3	2114	030	643.2	1312	057	15
168	16	Pią	939	4.55034	-0.48	5.4137	23.22	1.01592	0.2616	8.21	62.888	1.2	38	419	1246.5	2115	041	723.6	1422	054	16
169	17	Sob	940	4.59000	-1.01	5.4546	23.24	1.01601	1.1132	13.14	62.372	2.2	29	419	1246.8	2115	054	805.7	1535	050	17
170	18	Nie	941	5.02566	-1.14	5.4956	23.25	1.01609	1.5931	17.40	61.713	3.2	20	419	1247.0	2115	109	850.7	1651	046	18
171	19	Pon	942	5.06531	-1.27	5.5406	23.26	1.01617	2.5100	21.25	60.958	4.2	13	419	1247.2	2116	129	939.4	1808	042	19
172	20	Wto	943	5.10497	-1.41	5.5815	23.26	1.01624	3.4620	24.13	60.163	5.2	7	419	1247.4	2116	155	1032.3	1923	038	20
173	21	Śro	944	5.14462	-1.54	6.0225	23.26	1.01631	4.4511	25.44	59.389	6.2	2	419	1247.6	2116	234	1129.3	2030	034	21
174	22	Czw	945	5.18428	-2.07	6.0635	23.26	1.01637	5.4620	25.44	58.696	7.2	0	419	1247.9	2116	327	1228.9	2125	030	22
175	23	Pią	946	5.22394	-2.20	6.1044	23.25	1.01643	6.4801	24.06	58.133	0.6	1	420	1248.1	2116	438	1329.0	2205	026	23
176	24	Sob	947	5.26359	-2.33	6.1454	23.24	1.01648	7.4824	20.55	57.735	1.6	4	420	1248.3	2116	600	1427.5	2234	022	24
177	25	Nie	948	5.30325	-2.46	6.1903	23.22	1.01652	8.4621	16.26	57.516	2.6	9	420	1248.5	2116	729	1523.3	2256	018	25
178	26	Pon	949	5.34291	-2.58	6.2313	23.20	1.01656	9.4136	10.59	57.471	3.6	17	421	1248.7	2116	858	1616.0	2314	014	26
179	27	Wto	950	5.38256	-3.11	6.2722	23.17	1.01659	10.3437	4.57	57.581	4.6	27	421	1248.9	2116	1026	1706.5	2329	010	27
180	28	Śro	951	5.42222	-3.23	6.3130	23.14	1.01662	11.2615	-1.18	57.817	5.6	38	422	1249.1	2116	1152	1755.6	2343	006	28
181	29	Czw	952	5.46187	-3.35	6.3539	23.11	1.01664	12.1736	-7.25	58.148	6.6	49	423	1249.3	2116	1317	1844.7	2358	002	29
182	30	Pią	953	5.50153	-3.47	6.3947	23.07	1.01666	13.0939	-13.05	58.547	0.9	60	423	1249.5	2115	1442	1934.9	0**	2355	30

Fazy Księżyca [Dm, h.mm]: Pełn 7, 8.09 3kw 15, 6.27 Now 22, 20.27 1kw 29, 14.10

## CZERWIEC 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT) Dm	
1	****	****	4.50	20.50	4.22	21.04	3.45	19.30	12.47	2.00	3.18	17.28	4.25	20.52	2.25	14.52	1.10	8.43		
	4.660	22.15	4.755	20.12	4.651	22.96	3.542	19.02	11.302	5.94	2.300	11.40	4.567	21.91	0.558	2.06	20.850	-23.01	16.66703	1
3	****	****	4.42	20.33	4.15	20.47	3.40	19.30	12.40	1.52	3.10	17.21	4.18	20.44	2.17	14.45	1.02	8.35		
	4.797	22.40	4.681	19.46	4.566	22.31	3.641	19.38	11.309	5.89	2.315	11.47	4.576	21.93	0.560	2.08	20.848	-23.03	16.79845	3
5	****	****	4.34	20.17	4.07	20.29	3.36	19.31	12.33	1.45	3.03	17.15	4.10	20.37	2.09	14.37	0.54	8.27		
	4.934	22.62	4.611	18.85	4.484	21.66	3.739	19.72	11.317	5.83	2.329	11.54	4.584	21.95	0.563	2.09	20.847	-23.04	16.92987	5
7	****	****	4.26	20.02	3.59	20.12	3.32	19.31	12.26	1.37	2.55	17.08	4.03	20.30	2.01	14.29	0.47	8.19		
	5.071	22.82	4.549	18.32	4.407	21.02	3.838	20.06	11.325	5.77	2.343	11.61	4.592	21.97	0.565	2.10	20.845	-23.05	17.06129	7
9	****	****	4.18	19.48	3.51	19.55	3.27	19.31	12.19	1.29	2.48	17.02	3.55	20.23	1.54	14.22	0.39	8.11		
	5.209	22.99	4.499	17.90	4.338	20.41	3.938	20.38	11.334	5.71	2.357	11.67	4.600	21.98	0.567	2.12	20.844	-23.07	17.19272	9
11	****	****	4.10	19.36	3.44	19.40	3.23	19.32	12.12	1.22	2.41	16.55	3.48	20.15	1.46	14.14	0.31	8.03		
	5.347	23.13	4.464	17.59	4.276	19.82	4.037	20.69	11.344	5.64	2.370	11.73	4.609	22.00	0.569	2.13	20.842	-23.08	17.32414	11
13	****	****	4.02	19.26	3.36	19.25	3.19	19.32	12.05	1.14	2.33	16.48	3.40	20.08	1.38	14.06	0.23	7.55		
	5.486	23.25	4.447	17.41	4.224	19.28	4.136	20.98	11.354	5.57	2.384	11.80	4.617	22.02	0.571	2.14	20.840	-23.09	17.45557	13
15	****	****	3.55	19.18	3.29	19.11	3.15	19.32	11.58	1.06	2.26	16.41	3.33	20.01	1.30	13.59	0.15	7.47		
	5.624	23.34	4.450	17.37	4.182	18.80	4.236	21.26	11.365	5.49	2.397	11.86	4.625	22.03	0.573	2.15	20.838	-23.11	17.58698	15
17	****	****	3.48	19.12	3.23	18.59	3.12	19.32	11.51	0.59	2.18	16.35	3.25	19.54	1.22	13.51	0.07	7.39		
	5.763	23.40	4.472	17.44	4.151	18.37	4.335	21.53	11.376	5.41	2.410	11.92	4.633	22.05	0.575	2.16	20.836	-23.12	17.71840	17
19	****	****	3.41	19.08	3.16	18.47	3.08	19.32	11.45	0.51	2.11	16.28	3.18	19.46	1.15	13.43	23.55	7.31		
	5.902	23.43	4.515	17.64	4.130	18.00	4.435	21.78	11.388	5.33	2.422	11.97	4.641	22.06	0.576	2.17	20.834	-23.13	17.84982	19
21	****	****	3.35	19.06	3.09	18.37	3.04	19.32	11.38	0.44	2.03	16.21	3.10	19.39	1.07	13.35	23.48	7.23		
	6.040	23.44	4.579	17.94	4.121	17.69	4.535	22.02	11.400	5.24	2.435	12.03	4.650	22.08	0.578	2.17	20.832	-23.15	17.98125	21
23	****	****	3.30	19.06	3.03	18.27	3.01	19.32	11.31	0.36	1.56	16.14	3.03	19.32	0.59	13.28	23.40	7.14		
	6.179	23.41	4.662	18.33	4.121	17.44	4.635	22.24	11.414	5.15	2.447	12.08	4.658	22.10	0.579	2.18	20.829	-23.16	18.11267	23
25	****	****	3.25	19.07	2.57	18.19	2.57	19.31	11.25	0.28	1.49	16.07	2.55	19.25	0.51	13.20	23.32	7.06		
	6.318	23.36	4.766	18.79	4.132	17.26	4.735	22.45	11.427	5.06	2.459	12.14	4.665	22.11	0.580	2.18	20.827	-23.18	18.24409	25
27	****	****	3.21	19.10	2.51	18.11	2.54	19.31	11.18	0.21	1.41	16.01	2.48	19.17	0.43	13.12	23.24	6.58		
	6.456	23.29	4.890	19.32	4.152	17.12	4.835	22.65	11.442	4.96	2.470	12.19	4.673	22.13	0.581	2.19	20.825	-23.19	18.37551	27
29	****	****	3.18	19.15	2.46	18.05	2.50	19.30	11.12	0.13	1.34	15.54	2.40	19.10	0.36	13.04	23.16	6.50		
	6.594	23.18	5.033	19.89	4.181	17.04	4.935	22.83	11.456	4.86	2.481	12.23	4.681	22.14	0.582	2.19	20.822	-23.21	18.50693	29

# LIPIEC 2028

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce				Księżyc				Gal.	
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
183	1	Sob	954	5.54118	-3.58	6.4355	23.03	1.01667	14.0313	-18.01	58.993	1.9	71	424	1249.7	2115	1606	2027.0	016	2351	1	
184	2	Nie	955	5.58084	-4.10	6.4803	22.59	1.01668	14.5843	-21.55	59.473	2.9	80	425	1249.9	2115	1729	2121.2	037	2347	2	
185	3	Pon	956	6.02049	-4.21	6.5211	22.54	1.01668	15.5558	-24.35	59.979	3.9	88	426	1250.1	2114	1845	2217.1	106	2343	3	
186	4	Wto	957	6.06015	-4.31	6.5618	22.48	1.01668	16.5406	-25.51	60.505	4.9	94	426	1250.3	2114	1948	2313.4	146	2339	4	
187	5	Śro	958	6.09581	-4.41	7.0025	22.43	1.01668	17.5149	-25.40	61.044	5.9	98	427	1250.4	2113	2038	*****	239	2335	5	
188	6	Czw	959	6.13546	-4.51	7.0431	22.37	1.01667	18.4746	-24.07	61.585	6.9	100	428	1250.6	2112	2113	008.5	343	2331	6	
189	7	Pią	960	6.17512	-5.01	7.0837	22.30	1.01666	19.4058	-21.23	62.108	0.7	100	429	1250.8	2112	2139	101.0	456	2327	7	
190	8	Sob	961	6.21478	-5.10	7.1243	22.23	1.01664	20.3104	-17.44	62.588	1.7	97	430	1250.9	2111	2158	150.2	611	2323	8	
191	9	Nie	962	6.25443	-5.19	7.1648	22.16	1.01663	21.1815	-13.23	62.996	2.7	93	431	1251.1	2110	2213	236.0	725	2319	9	
192	10	Pon	963	6.29409	-5.27	7.2053	22.08	1.01661	22.0305	-8.35	63.299	3.7	88	432	1251.2	2109	2226	318.9	837	2315	10	
193	11	Wto	964	6.33374	-5.35	7.2457	22.00	1.01658	22.4622	-3.31	63.466	4.7	81	434	1251.3	2108	2237	359.8	947	2311	11	
194	12	Śro	965	6.37340	-5.42	7.2901	21.52	1.01655	23.2858	1.39	63.468	5.7	73	435	1251.5	2107	2248	439.7	1057	2307	12	
195	13	Czw	966	6.41305	-5.49	7.3305	21.43	1.01652	0.1150	6.46	63.288	6.7	64	436	1251.6	2106	2300	519.5	1206	2303	13	
196	14	Pią	967	6.45271	-5.56	7.3708	21.34	1.01648	0.5556	11.41	62.917	7.7	54	437	1251.7	2105	2314	600.3	1317	2300	14	
197	15	Sob	968	6.49236	-6.02	7.4110	21.24	1.01644	1.4214	16.13	62.363	0.5	45	438	1251.8	2104	2331	643.3	1431	2256	15	
198	16	Nie	969	6.53202	-6.07	7.4513	21.14	1.01639	2.3135	20.11	61.647	1.5	35	440	1251.9	2103	2354	729.5	1546	2252	16	
199	17	Pon	970	6.57168	-6.12	7.4914	21.04	1.01634	3.2437	23.19	60.809	2.5	25	441	1252.0	2102	****	819.6	1701	2248	17	
200	18	Wto	971	7.01133	-6.17	7.5315	20.53	1.01628	4.2125	25.20	59.904	3.5	17	442	1252.0	2101	026	914.0	1812	2244	18	
201	19	Śro	972	7.05099	-6.21	7.5716	20.42	1.01622	5.2122	25.57	58.998	4.5	10	444	1252.1	2059	111	1012.0	1913	2240	19	
202	20	Czw	973	7.09064	-6.24	8.0116	20.31	1.01615	6.2304	24.58	58.164	5.5	4	445	1252.1	2058	214	1112.1	2000	2236	20	
203	21	Pią	974	7.13030	-6.27	8.0515	20.19	1.01608	7.2441	22.22	57.473	6.5	1	447	1252.2	2057	332	1212.1	2034	2232	21	
204	22	Sob	975	7.16596	-6.29	8.0914	20.07	1.01600	8.2442	18.16	56.983	0.3	0	448	1252.2	2055	500	1310.4	2059	2228	22	
205	23	Nie	976	7.20561	-6.31	8.1312	19.55	1.01591	9.2219	12.59	56.732	1.3	2	450	1252.3	2054	632	1406.0	2119	2224	23	
206	24	Pon	977	7.24527	-6.32	8.1710	19.42	1.01582	10.1736	6.56	56.727	2.3	7	451	1252.3	2052	803	1459.0	2135	2220	24	
207	25	Wto	978	7.28492	-6.33	8.2107	19.29	1.01572	11.1109	0.31	56.953	3.3	15	453	1252.3	2051	932	1550.2	2150	2216	25	
208	26	Śro	979	7.32458	-6.33	8.2503	19.16	1.01561	12.0353	-5.50	57.371	4.3	24	454	1252.3	2049	1100	1640.7	2205	2212	26	
209	27	Czw	980	7.36423	-6.32	8.2859	19.02	1.01550	12.5648	-11.46	57.927	5.3	35	456	1252.3	2048	1227	1731.5	2222	2208	27	
210	28	Pią	981	7.40389	-6.31	8.3255	18.48	1.01539	13.5040	-16.57	58.570	6.3	46	457	1252.3	2046	1353	1823.6	2243	2204	28	
211	29	Sob	982	7.44354	-6.29	8.3649	18.34	1.01527	14.4600	-21.08	59.249	0.7	58	459	1252.2	2044	1517	1917.4	2309	2201	29	
212	30	Nie	983	7.48320	-6.26	8.4043	18.19	1.01514	15.4244	-24.06	59.927	1.7	68	500	1252.2	2043	1635	2012.6	2345	2157	30	
213	31	Pon	984	7.52285	-6.23	8.4436	18.05	1.01502	16.4016	-25.41	60.579	2.7	77	502	1252.1	2041	1742	2108.3	****	2153	31	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 20.11    3kw 14, 22.57    Now 22, 5.02    1kw 28, 19.40

# LIPIEC 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	*****	*****	3.16	19.21	2.40	17.59	2.47	19.30	11.05	0.06	1.26	15.47	2.33	19.03	0.28	12.57	23.08	6.42		
	6.732	23.05	5.196	20.47	4.219	17.01	5.035	23.00	11.472	4.76	2.492	12.28	4.689	22.16	0.583	2.20	20.819	-23.22	18.63835	1
3	*****	*****	3.14	19.28	2.35	17.54	2.44	19.29	10.59	23.54	1.19	15.40	2.25	18.55	0.20	12.49	23.00	6.34		
	6.870	22.89	5.379	21.06	4.265	17.02	5.134	23.15	11.487	4.65	2.503	12.33	4.696	22.17	0.584	2.20	20.817	-23.24	18.76977	3
5	*****	*****	3.15	19.37	2.30	17.50	2.41	19.28	10.53	23.47	1.11	15.33	2.18	18.48	0.12	12.41	22.52	6.26		
	7.007	22.71	5.582	21.63	4.319	17.07	5.234	23.29	11.504	4.54	2.513	12.37	4.704	22.19	0.584	2.20	20.814	-23.26	18.90120	5
7	*****	*****	3.16	19.46	2.26	17.46	2.38	19.27	10.47	23.39	1.04	15.26	2.10	18.41	0.04	12.33	22.44	6.17		
	7.144	22.50	5.803	22.15	4.380	17.15	5.334	23.41	11.520	4.43	2.523	12.41	4.711	22.20	0.584	2.20	20.811	-23.27	19.03262	7
9	*****	*****	3.19	19.56	2.21	17.43	2.36	19.26	10.40	23.32	0.56	15.19	2.03	18.33	23.52	12.25	22.36	6.09		
	7.280	22.26	6.044	22.61	4.448	17.27	5.434	23.52	11.537	4.31	2.533	12.45	4.718	22.21	0.585	2.20	20.808	-23.29	19.16404	9
11	*****	*****	3.24	20.06	2.17	17.40	2.33	19.25	10.34	23.25	0.49	15.12	1.55	18.26	23.45	12.17	22.29	6.01		
	7.416	22.00	6.301	22.96	4.523	17.41	5.533	23.62	11.555	4.19	2.542	12.49	4.725	22.23	0.585	2.20	20.805	-23.30	19.29546	11
13	*****	*****	3.31	20.16	2.13	17.38	2.30	19.24	10.28	23.17	0.41	15.04	1.48	18.19	23.37	12.10	22.21	5.53		
	7.551	21.71	6.575	23.19	4.603	17.57	5.633	23.70	11.573	4.07	2.551	12.52	4.732	22.24	0.585	2.20	20.802	-23.32	19.42688	13
15	*****	*****	3.39	20.26	2.09	17.37	2.28	19.23	10.22	23.10	0.33	14.57	1.40	18.11	23.29	12.02	22.13	5.45		
	7.686	21.40	6.861	23.28	4.689	17.75	5.732	23.77	11.592	3.94	2.560	12.56	4.739	22.25	0.585	2.19	20.799	-23.33	19.55830	15
17	*****	*****	3.50	20.35	2.05	17.36	2.25	19.21	10.16	23.02	0.26	14.50	1.33	18.04	23.21	11.54	22.05	5.37		
	7.821	21.07	7.158	23.19	4.780	17.94	5.831	23.82	11.611	3.82	2.568	12.59	4.746	22.26	0.584	2.19	20.796	-23.35	19.68972	17
19	*****	*****	4.02	20.44	2.02	17.35	2.23	19.19	10.10	22.55	0.18	14.43	1.25	17.57	23.13	11.46	21.57	5.29		
	7.954	20.71	7.461	22.93	4.877	18.14	5.930	23.86	11.630	3.69	2.576	12.62	4.753	22.28	0.584	2.19	20.793	-23.37	19.82114	19
21	*****	*****	4.16	20.51	1.58	17.34	2.21	19.18	10.04	22.47	0.11	14.36	1.18	17.49	23.05	11.38	21.49	5.20		
	8.088	20.32	7.766	22.49	4.977	18.35	6.029	23.89	11.650	3.55	2.583	12.65	4.759	22.29	0.583	2.18	20.790	-23.38	19.95257	21
23	*****	*****	4.31	20.56	1.55	17.34	2.19	19.16	9.58	22.40	0.03	14.28	1.10	17.42	22.57	11.30	21.41	5.12		
	8.220	19.92	8.070	21.88	5.083	18.56	6.127	23.90	11.670	3.42	2.590	12.67	4.765	22.30	0.583	2.17	20.787	-23.40	20.08399	23
25	*****	*****	4.47	21.01	1.53	17.34	2.17	19.14	9.52	22.33	23.52	14.21	1.02	17.34	22.49	11.22	21.33	5.04		
	8.352	19.49	8.369	21.10	5.192	18.76	6.226	23.90	11.690	3.28	2.597	12.70	4.771	22.31	0.582	2.17	20.784	-23.41	20.21541	25
27	*****	*****	5.03	21.04	1.50	17.35	2.15	19.12	9.46	22.25	23.44	14.14	0.55	17.27	22.42	11.14	21.25	4.56		
	8.483	19.04	8.660	20.17	5.305	18.96	6.323	23.88	11.711	3.14	2.603	12.72	4.777	22.32	0.581	2.16	20.781	-23.43	20.34682	27
29	1.20	0.03	5.19	21.06	1.48	17.35	2.13	19.09	9.40	22.18	23.36	14.06	0.47	17.20	22.34	11.06	21.17	4.48		
	8.614	18.57	8.943	19.12	5.421	19.16	6.421	23.85	11.732	3.00	2.609	12.74	4.783	22.33	0.580	2.15	20.778	-23.44	20.47824	29
31	1.40	23.58	5.35	21.06	1.46	17.36	2.12	19.07	9.35	22.11	23.29	13.59	0.40	17.12	22.26	10.58	21.09	4.40		
	8.743	18.08	9.215	17.97	5.541	19.35	6.518	23.81	11.753	2.86	2.615	12.75	4.789	22.34	0.579	2.14	20.774	-23.46	20.60966	31

# SIERPIEŃ 2028

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2461																			
214	1	Wto	985	7.56251	-6.19	8.4829	17.49	1.01489	17.3732	-25.50	61.188	3.7	86	504	1252.1	2039	1836	2203.1	033	2149	1	
215	2	Śro	986	8.00217	-6.15	8.5221	17.34	1.01475	18.3319	-24.39	61.746	4.7	92	505	1252.0	2038	1915	2255.9	133	2145	2	
216	3	Czw	987	8.04182	-6.09	8.5613	17.18	1.01461	19.2643	-22.15	62.248	5.7	96	507	1251.9	2036	1943	2345.6	243	2141	3	
217	4	Pią	988	8.08148	-6.04	9.0004	17.02	1.01447	20.1715	-18.51	62.690	6.7	99	509	1251.8	2034	2004	*****	356	2137	4	
218	5	Sob	989	8.12114	-5.57	9.0354	16.46	1.01433	21.0459	-14.43	63.064	0.1	100	510	1251.7	2032	2020	032.3	510	2133	5	
219	6	Nie	990	8.16079	-5.51	9.0744	16.29	1.01418	21.5021	-10.02	63.358	1.1	99	512	1251.6	2030	2034	116.0	623	2129	6	
220	7	Pon	991	8.20045	-5.43	9.1133	16.13	1.01403	22.3400	-5.02	63.555	2.1	96	514	1251.5	2028	2046	157.5	734	2125	7	
221	8	Wto	992	8.24010	-5.35	9.1521	15.55	1.01388	23.1644	0.07	63.637	3.1	92	515	1251.3	2026	2057	237.7	844	2121	8	
222	9	Śro	993	8.27576	-5.26	9.1909	15.38	1.01373	23.5923	5.15	63.582	4.1	86	517	1251.2	2024	2108	317.4	953	2117	9	
223	10	Czw	994	8.31541	-5.17	9.2256	15.21	1.01357	0.4249	10.13	63.372	5.1	78	519	1251.0	2022	2121	357.6	1103	2113	10	
224	11	Pią	995	8.35507	-5.07	9.2643	15.03	1.01341	1.2755	14.50	62.995	6.1	70	520	1250.9	2020	2137	439.3	1215	2109	11	
225	12	Sob	996	8.39472	-4.57	9.3029	14.45	1.01324	2.1529	18.56	62.446	7.1	61	522	1250.7	2018	2157	523.5	1328	2105	12	
226	13	Nie	997	8.43438	-4.46	9.3415	14.26	1.01307	3.0611	22.17	61.735	8.1	51	524	1250.5	2016	2224	610.9	1442	2102	13	
227	14	Pon	998	8.47403	-4.35	9.3800	14.08	1.01290	4.0022	24.41	60.889	0.9	41	525	1250.3	2014	2302	702.1	1553	2058	14	
228	15	Wto	999	8.51369	-4.23	9.4145	13.49	1.01272	4.5749	25.49	59.948	1.9	31	527	1250.1	2012	2354	757.0	1657	2054	15	
229	16	Śro	000	8.55334	-4.11	9.4529	13.30	1.01254	5.5738	25.31	58.973	2.9	21	529	1249.9	2010	****	854.9	1750	2050	16	
230	17	Czw	001	8.59300	-3.58	9.4913	13.11	1.01236	6.5826	23.38	58.036	3.9	13	530	1249.7	2008	104	954.0	1829	2046	17	
231	18	Pią	002	9.03266	-3.45	9.5256	12.51	1.01217	7.5846	20.12	57.217	4.9	6	532	1249.5	2006	226	1052.8	1859	2042	18	
232	19	Sob	003	9.07231	-3.31	9.5639	12.32	1.01197	8.5735	15.24	56.594	5.9	2	534	1249.3	2003	357	1149.9	1921	2038	19	
233	20	Nie	004	9.11197	-3.16	10.0021	12.12	1.01177	9.5432	9.35	56.227	6.9	0	536	1249.0	2001	529	1244.9	1939	2034	20	
234	21	Pon	005	9.15162	-3.02	10.0403	11.52	1.01157	10.4956	3.09	56.150	1.0	1	537	1248.8	1959	701	1338.2	1955	2030	21	
235	22	Wto	006	9.19128	-2.46	10.0744	11.32	1.01136	11.4429	-3.26	56.363	2.0	6	539	1248.5	1957	833	1430.6	2011	2026	22	
236	23	Śro	007	9.23093	-2.31	10.1125	11.11	1.01115	12.3901	-9.45	56.834	3.0	13	541	1248.3	1955	1003	1523.1	2028	2022	23	
237	24	Czw	008	9.27059	-2.14	10.1505	10.51	1.01093	13.3418	-15.22	57.505	4.0	22	542	1248.0	1952	1133	1616.5	2048	2018	24	
238	25	Pią	009	9.31024	-1.58	10.1845	10.30	1.01071	14.3046	-19.60	58.308	5.0	32	544	1247.7	1950	1300	1711.3	2113	2014	25	
239	26	Sob	010	9.34590	-1.41	10.2225	10.09	1.01048	15.2824	-23.21	59.171	6.0	43	546	1247.4	1948	1422	1807.3	2146	2010	26	
240	27	Nie	011	9.38555	-1.24	10.2604	9.48	1.01025	16.2635	-25.19	60.031	0.3	54	548	1247.1	1945	1535	1903.6	2231	2007	27	
241	28	Pon	012	9.42521	-1.06	10.2943	9.27	1.01002	17.2420	-25.49	60.841	1.3	64	549	1246.8	1943	1633	1959.1	2327	2003	28	
242	29	Wto	013	9.46486	-0.48	10.3321	9.05	1.00978	18.2030	-24.56	61.567	2.3	74	551	1246.5	1941	1716	2052.5	****	1959	29	
243	30	Śro	014	9.50452	-0.29	10.3659	8.44	1.00955	19.1414	-22.50	62.191	3.3	82	553	1246.2	1939	1747	2142.9	034	1955	30	
244	31	Czw	015	9.54418	-0.10	10.4037	8.22	1.00931	20.0507	-19.42	62.707	4.3	89	554	1245.9	1936	1810	2230.1	146	1951	31	

Fazy Księżycyca [Dm, h.mm]: Pełn 5, 10.10 3kw 13, 13.45 Nów 20, 12.44 1kw 27, 3.36



# SIERPIEŃ 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	1.47	23.52	5.43	21.06	1.45	17.36	2.11	19.06	9.32	22.07	23.25	13.55	0.36	17.08	22.22	10.54	21.05	4.35		
	8.808	17.82	9.347	17.36	5.602	19.43	6.567	23.78	11.764	2.79	2.617	12.76	4.792	22.35	0.578	2.14	20.773	-23.46	20.67537	1
3	1.60	23.40	5.59	21.05	1.44	17.37	2.09	19.03	9.26	21.60	23.17	13.48	0.28	17.01	22.14	10.46	20.57	4.27		
	8.937	17.30	9.603	16.08	5.727	19.60	6.664	23.72	11.786	2.64	2.622	12.78	4.797	22.36	0.577	2.13	20.770	-23.48	20.80680	3
5	2.11	23.29	6.14	21.04	1.42	17.37	2.08	19.01	9.20	21.52	23.10	13.40	0.21	16.53	22.06	10.38	20.49	4.19		
	9.065	16.77	9.848	14.74	5.854	19.75	6.760	23.64	11.808	2.49	2.626	12.79	4.802	22.36	0.575	2.11	20.767	-23.49	20.93822	5
7	2.21	23.19	6.28	21.02	1.41	17.38	2.06	18.58	9.14	21.45	23.02	13.32	0.13	16.46	21.58	10.30	20.41	4.11		
	9.192	16.21	10.083	13.35	5.985	19.88	6.856	23.55	11.831	2.34	2.630	12.80	4.807	22.37	0.574	2.10	20.763	-23.51	21.06964	7
9	2.29	23.10	6.42	20.59	1.41	17.39	2.05	18.55	9.09	21.38	22.54	13.25	0.05	16.38	21.50	10.22	20.33	4.03		
	9.319	15.64	10.308	11.94	6.118	20.00	6.952	23.45	11.854	2.19	2.634	12.81	4.812	22.38	0.572	2.09	20.760	-23.52	21.20106	9
11	2.38	23.01	6.56	20.56	1.40	17.40	2.04	18.52	9.03	21.30	22.47	13.17	23.54	16.31	21.42	10.14	20.25	3.55		
	9.445	15.04	10.523	10.50	6.253	20.09	7.047	23.34	11.877	2.04	2.637	12.81	4.816	22.39	0.570	2.08	20.757	-23.53	21.33247	11
13	2.46	22.53	7.08	20.52	1.40	17.41	2.03	18.49	8.57	21.23	22.39	13.10	23.46	16.23	21.35	10.06	20.18	3.46		
	9.571	14.44	10.730	9.04	6.390	20.15	7.142	23.21	11.900	1.88	2.639	12.81	4.821	22.40	0.568	2.06	20.754	-23.55	21.46389	13
15	2.53	22.45	7.21	20.48	1.40	17.42	2.01	18.45	8.52	21.16	22.31	13.02	23.38	16.16	21.27	9.58	20.10	3.38		
	9.696	13.82	10.928	7.59	6.530	20.19	7.236	23.07	11.924	1.73	2.641	12.82	4.825	22.40	0.566	2.05	20.751	-23.56	21.59531	15
17	3.00	22.37	7.32	20.43	1.41	17.42	2.00	18.42	8.46	21.08	22.23	12.54	23.31	16.08	21.19	9.50	20.02	3.30		
	9.820	13.18	11.119	6.14	6.672	20.21	7.330	22.93	11.947	1.57	2.643	12.81	4.829	22.41	0.564	2.03	20.748	-23.57	21.72674	17
19	3.07	22.30	7.43	20.39	1.42	17.43	1.59	18.38	8.41	21.01	22.15	12.46	23.23	16.01	21.11	9.42	19.54	3.22		
	9.944	12.53	11.302	4.70	6.815	20.20	7.423	22.76	11.971	1.41	2.644	12.81	4.833	22.42	0.562	2.02	20.745	-23.58	21.85816	19
21	3.13	22.22	7.53	20.34	1.43	17.44	1.58	18.35	8.35	20.54	22.08	12.38	23.15	15.53	21.03	9.34	19.46	3.14		
	10.067	11.86	11.478	3.28	6.960	20.15	7.516	22.59	11.996	1.25	2.645	12.81	4.836	22.42	0.559	2.00	20.742	-23.60	21.98957	21
23	3.20	22.15	8.03	20.29	1.44	17.44	1.57	18.31	8.30	20.47	21.60	12.30	23.08	15.45	20.55	9.26	19.38	3.06		
	10.190	11.19	11.647	1.88	7.106	20.08	7.609	22.41	12.020	1.09	2.645	12.80	4.839	22.43	0.557	1.98	20.739	-23.61	22.12099	23
25	3.26	22.08	8.12	20.23	1.46	17.44	1.56	18.27	8.24	20.39	21.52	12.23	22.60	15.38	20.47	9.17	19.30	2.58		
	10.313	10.50	11.809	0.51	7.253	19.98	7.700	22.22	12.045	0.93	2.645	12.79	4.842	22.44	0.554	1.96	20.736	-23.62	22.25241	25
27	3.31	22.01	8.21	20.17	1.48	17.44	1.56	18.23	8.19	20.32	21.44	12.15	22.52	15.30	20.39	9.09	19.22	2.50		
	10.434	9.80	11.964	-0.82	7.402	19.84	7.792	22.01	12.070	0.76	2.644	12.78	4.845	22.44	0.552	1.95	20.733	-23.63	22.38383	27
29	3.37	21.55	8.28	20.12	1.50	17.44	1.55	18.19	8.13	20.25	21.36	12.07	22.44	15.22	20.31	9.01	19.14	2.41		
	10.556	9.09	12.112	-2.11	7.552	19.67	7.883	21.80	12.095	0.60	2.643	12.76	4.848	22.44	0.549	1.93	20.731	-23.64	22.51525	29
31	3.42	21.48	8.36	20.06	1.53	17.44	1.54	18.15	8.08	20.18	21.29	11.59	22.37	15.15	20.23	8.53	19.06	2.33		
	10.677	8.37	12.253	-3.36	7.702	19.47	7.973	21.57	12.120	0.43	2.642	12.75	4.850	22.45	0.546	1.91	20.728	-23.65	22.64667	31

# WRZESIEŃ 2028

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j	astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																			
245	1	Pią	016	9.58383	0.09	10.4415	8.01	1.00906	20.5312	-15.47	63.113	5.3	94	556	1245.6	1934	1828	2314.4	259	1947	1	
246	2	Sob	017	10.02349	0.28	10.4752	7.39	1.00882	21.3853	-11.16	63.414	6.3	98	558	1245.3	1932	1842	2356.4	412	1943	2	
247	3	Nie	018	10.06314	0.48	10.5129	7.17	1.00858	22.2250	-6.22	63.612	7.3	100	600	1244.9	1929	1854	*****	523	1939	3	
248	4	Pon	019	10.10280	1.08	10.5505	6.54	1.00833	23.0544	-1.17	63.708	0.4	100	601	1244.6	1927	1906	036.9	633	1935	4	
249	5	Wto	020	10.14245	1.28	10.5842	6.32	1.00808	23.4825	3.51	63.699	1.4	98	603	1244.3	1924	1918	116.8	742	1931	5	
250	6	Śro	021	10.18211	1.49	11.0218	6.10	1.00784	0.3139	8.51	63.579	2.4	95	605	1243.9	1922	1930	156.8	852	1927	6	
251	7	Czw	022	10.22176	2.09	11.0554	5.47	1.00759	1.1613	13.33	63.336	3.4	90	606	1243.6	1920	1945	237.9	1003	1923	7	
252	8	Pią	023	10.26142	2.30	11.0929	5.25	1.00734	2.0251	17.46	62.961	4.4	83	608	1243.2	1917	2003	321.0	1115	1919	8	
253	9	Sob	024	10.30107	2.51	11.1305	5.02	1.00708	2.5207	21.17	62.449	5.4	75	610	1242.9	1915	2027	406.8	1227	1915	9	
254	10	Nie	025	10.34073	3.12	11.1641	4.39	1.00683	3.4422	23.55	61.798	6.4	66	612	1242.6	1912	2100	455.8	1339	1911	10	
255	11	Pon	026	10.38038	3.33	11.2016	4.17	1.00658	4.3931	25.25	61.020	7.4	56	613	1242.2	1910	2145	548.0	1444	1908	11	
256	12	Wto	027	10.42004	3.54	11.2351	3.54	1.00632	5.3657	25.37	60.141	0.4	46	615	1241.8	1908	2245	643.1	1540	1904	12	
257	13	Śro	028	10.45570	4.15	11.2727	3.31	1.00606	6.3540	24.21	59.203	1.4	35	617	1241.5	1905	****	739.8	1624	1900	13	
258	14	Czw	029	10.49535	4.37	11.3102	3.08	1.00580	7.3429	21.37	58.264	2.4	25	618	1241.1	1903	000	837.0	1657	1856	14	
259	15	Pią	030	10.53501	4.58	11.3437	2.45	1.00554	8.3229	17.30	57.398	3.4	16	620	1240.8	1900	124	933.3	1722	1852	15	
260	16	Sob	031	10.57466	5.19	11.3812	2.21	1.00527	9.2914	12.13	56.683	4.4	8	622	1240.4	1858	253	1028.2	1742	1848	16	
261	17	Nie	032	11.01432	5.41	11.4147	1.58	1.00500	10.2453	6.06	56.193	5.4	3	624	1240.1	1856	425	1121.9	1759	1844	17	
262	18	Pon	033	11.05397	6.02	11.4523	1.35	1.00473	11.2000	-0.27	55.985	6.4	0	625	1239.7	1853	556	1214.9	1815	1840	18	
263	19	Wto	034	11.09363	6.23	11.4858	1.12	1.00445	12.1521	-6.59	56.084	0.6	1	627	1239.4	1851	728	1308.3	1832	1836	19	
264	20	Śro	035	11.13328	6.45	11.5233	0.48	1.00417	13.1140	-13.03	56.480	1.6	4	629	1239.0	1848	901	1402.7	1851	1832	20	
265	21	Czw	036	11.17294	7.06	11.5609	0.25	1.00389	14.0925	-18.13	57.130	2.6	10	630	1238.6	1846	1032	1458.8	1914	1828	21	
266	22	Pią	037	11.21259	7.27	11.5944	0.02	1.00361	15.0835	-22.10	57.967	3.6	18	632	1238.3	1843	1200	1556.4	1945	1824	22	
267	23	Sob	038	11.25225	7.48	12.0320	-0.22	1.00333	16.0829	-24.39	58.909	4.6	28	634	1237.9	1841	1319	1654.6	2027	1820	23	
268	24	Nie	039	11.29190	8.09	12.0655	-0.45	1.00304	17.0758	-25.36	59.878	5.6	38	636	1237.6	1839	1424	1752.1	2120	1816	24	
269	25	Pon	040	11.33156	8.30	12.1031	-1.08	1.00275	18.0544	-25.05	60.806	6.6	49	637	1237.3	1836	1514	1847.3	2225	1812	25	
270	26	Wto	041	11.37121	8.50	12.1407	-1.32	1.00246	19.0047	-23.16	61.639	0.9	59	639	1236.9	1834	1549	1939.3	2336	1809	26	
271	27	Śro	042	11.41087	9.10	12.1743	-1.55	1.00217	19.5240	-20.23	62.342	1.9	68	641	1236.6	1831	1615	2027.7	****	1805	27	
272	28	Czw	043	11.45053	9.31	12.2120	-2.18	1.00188	20.4127	-16.39	62.899	2.9	77	643	1236.2	1829	1634	2112.9	049	1801	28	
273	29	Pią	044	11.49018	9.51	12.2456	-2.42	1.00159	21.2736	-12.19	63.302	3.9	84	644	1235.9	1827	1650	2155.4	202	1757	29	
274	30	Sob	045	11.52584	10.10	12.2833	-3.05	1.00130	22.1149	-7.33	63.559	4.9	91	646	1235.6	1824	1703	2236.3	313	1753	30	

Fazy Księżyca [Dm, h.mm]: Pełn 4, 1.48      3kw 12, 2.46      Nów 18, 20.24      1kw 25, 15.10

# WRZESIEŃ 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	3.45	21.45	8.39	20.02	1.54	17.44	1.54	18.13	8.05	20.14	21.25	11.54	22.33	15.11	20.19	8.49	19.02	2.29		
	10.737	8.01	12.321	-3.96	7.778	19.36	8.018	21.46	12.132	0.35	2.641	12.74	4.851	22.45	0.545	1.90	20.727	-23.66	22.71238	1
3	3.50	21.38	8.45	19.56	1.57	17.43	1.53	18.09	7.59	20.07	21.17	11.46	22.25	15.03	20.11	8.41	18.54	2.21		
	10.858	7.28	12.450	-5.13	7.930	19.11	8.107	21.22	12.158	0.18	2.639	12.72	4.853	22.45	0.542	1.88	20.724	-23.66	22.84380	3
5	3.55	21.32	8.50	19.49	2.00	17.43	1.52	18.04	7.54	19.60	21.09	11.38	22.17	14.55	20.03	8.33	18.46	2.13		
	10.978	6.54	12.570	-6.22	8.082	18.83	8.196	20.97	12.183	0.01	2.636	12.70	4.855	22.46	0.539	1.86	20.721	-23.67	22.97521	5
7	4.00	21.26	8.55	19.43	2.04	17.42	1.51	17.60	7.48	19.52	21.01	11.30	22.09	14.48	19.55	8.25	18.38	2.05		
	11.098	5.79	12.681	-7.24	8.235	18.51	8.284	20.71	12.209	-0.15	2.633	12.68	4.857	22.46	0.536	1.84	20.719	-23.68	23.10663	7
9	4.05	21.20	8.58	19.36	2.07	17.41	1.51	17.55	7.43	19.45	20.53	11.22	22.02	14.40	19.48	8.16	18.30	1.57		
	11.218	5.04	12.780	-8.17	8.388	18.16	8.372	20.45	12.235	-0.32	2.629	12.65	4.858	22.46	0.533	1.82	20.717	-23.69	23.23804	9
11	4.10	21.14	8.60	19.28	2.11	17.39	1.50	17.51	7.38	19.38	20.45	11.14	21.54	14.32	19.40	8.08	18.22	1.49		
	11.338	4.28	12.867	-8.99	8.541	17.77	8.459	20.17	12.261	-0.49	2.625	12.63	4.859	22.46	0.530	1.80	20.714	-23.70	23.36947	11
13	4.14	21.08	9.00	19.21	2.15	17.38	1.49	17.46	7.32	19.31	20.37	11.05	21.46	14.24	19.32	8.00	18.14	1.41		
	11.457	3.51	12.939	-9.70	8.695	17.35	8.546	19.89	12.287	-0.66	2.621	12.60	4.860	22.47	0.527	1.78	20.712	-23.70	23.50089	13
15	4.19	21.02	8.59	19.13	2.19	17.36	1.48	17.41	7.27	19.24	20.29	10.57	21.38	14.17	19.24	7.52	18.06	1.33		
	11.577	2.74	12.994	-10.26	8.848	16.90	8.632	19.60	12.313	-0.83	2.616	12.57	4.860	22.47	0.523	1.75	20.710	-23.71	23.63231	15
17	4.23	20.56	8.55	19.05	2.24	17.35	1.48	17.37	7.21	19.16	20.21	10.49	21.30	14.09	19.16	7.44	17.58	1.25		
	11.697	1.97	13.029	-10.66	9.002	16.42	8.717	19.30	12.339	-1.00	2.611	12.54	4.861	22.47	0.520	1.73	20.708	-23.72	23.76373	17
19	4.28	20.50	8.49	18.57	2.28	17.33	1.47	17.32	7.16	19.09	20.13	10.40	21.22	14.01	19.08	7.36	17.51	1.17		
	11.816	1.20	13.043	-10.87	9.156	15.90	8.802	19.00	12.365	-1.17	2.605	12.50	4.861	22.47	0.517	1.71	20.706	-23.72	23.89514	19
21	4.32	20.45	8.41	18.49	2.33	17.31	1.46	17.27	7.11	19.02	20.05	10.32	21.15	13.53	18.60	7.27	17.43	1.09		
	11.936	0.42	13.031	-10.85	9.309	15.36	8.886	18.69	12.392	-1.34	2.599	12.47	4.861	22.47	0.514	1.69	20.705	-23.73	0.02656	21
23	4.36	20.39	8.29	18.40	2.38	17.28	1.46	17.22	7.05	18.55	19.57	10.23	21.07	13.45	18.52	7.19	17.35	1.01		
	12.055	-0.36	12.993	-10.58	9.462	14.78	8.970	18.37	12.418	-1.51	2.592	12.43	4.860	22.47	0.510	1.67	20.703	-23.73	0.15798	23
25	4.40	20.34	8.14	18.31	2.43	17.26	1.45	17.17	6.60	18.48	19.49	10.15	20.59	13.37	18.44	7.11	17.27	0.53		
	12.175	-1.14	12.928	-10.02	9.615	14.18	9.053	18.04	12.445	-1.69	2.586	12.39	4.860	22.47	0.507	1.64	20.701	-23.74	0.28940	25
27	4.44	20.28	7.56	18.23	2.48	17.24	1.44	17.12	6.55	18.40	19.41	10.06	20.51	13.29	18.36	7.03	17.19	0.45		
	12.295	-1.92	12.837	-9.18	9.768	13.54	9.135	17.71	12.471	-1.86	2.579	12.35	4.859	22.47	0.503	1.62	20.700	-23.74	0.42082	27
29	4.48	20.23	7.35	18.14	2.53	17.21	1.43	17.07	6.49	18.33	19.33	9.58	20.43	13.21	18.28	6.55	17.11	0.37		
	12.416	-2.70	12.725	-8.06	9.921	12.88	9.217	17.38	12.498	-2.03	2.571	12.31	4.857	22.46	0.500	1.60	20.699	-23.74	0.55224	29

# PAŹDZIERNIK 2028

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
275	1	Nie	046	11.56549	10.30	12.3210	-3.28	1.00101	22.5453	-2.32	63.679	5.9	95	648	1235.3	1822	1715	2316.2	423	1749	1
276	2	Pon	047	12.00515	10.49	12.3548	-3.51	1.00072	23.3737	2.34	63.678	6.9	99	650	1234.9	1819	1726	2356.2	532	1745	2
277	3	Wto	048	12.04480	11.08	12.3926	-4.15	1.00043	0.2049	7.35	63.569	7.9	100	651	1234.6	1817	1739	*****	642	1741	3
278	4	Śro	049	12.08446	11.26	12.4304	-4.38	1.00015	1.0514	12.21	63.363	0.7	100	653	1234.3	1815	1753	037.2	752	1737	4
279	5	Czw	050	12.12411	11.44	12.4642	-5.01	0.99986	1.5135	16.40	63.064	1.7	97	655	1234.0	1812	1810	119.8	904	1733	5
280	6	Pią	051	12.16377	12.02	12.5021	-5.24	0.99958	2.4022	20.21	62.676	2.7	93	657	1233.7	1810	1833	204.9	1016	1729	6
281	7	Sob	052	12.20342	12.19	12.5400	-5.47	0.99929	3.3151	23.11	62.197	3.7	87	658	1233.4	1808	1903	253.0	1128	1725	7
282	8	Nie	053	12.24308	12.36	12.5740	-6.10	0.99901	4.2556	24.56	61.626	4.7	80	700	1233.1	1805	1944	343.9	1235	1721	8
283	9	Pon	054	12.28273	12.52	13.0120	-6.32	0.99873	5.2201	25.27	60.967	5.7	71	702	1232.9	1803	2038	437.4	1333	1717	9
284	10	Wto	055	12.32239	13.08	13.0501	-6.55	0.99845	6.1910	24.36	60.231	6.7	61	704	1232.6	1801	2145	532.5	1420	1714	10
285	11	Śro	056	12.36205	13.24	13.0842	-7.18	0.99817	7.1619	22.22	59.438	7.7	51	706	1232.4	1758	2303	627.8	1455	1710	11
286	12	Czw	057	12.40170	13.39	13.1223	-7.40	0.99789	8.1241	18.48	58.627	0.9	40	707	1232.1	1756	****	722.4	1522	1706	12
287	13	Pią	058	12.44136	13.53	13.1606	-8.03	0.99761	9.0754	14.07	57.847	1.9	29	709	1231.9	1754	028	815.8	1544	1702	13
288	14	Sob	059	12.48101	14.07	13.1948	-8.25	0.99733	10.0209	8.30	57.162	2.9	19	711	1231.6	1751	155	908.1	1602	1658	14
289	15	Nie	060	12.52067	14.20	13.2332	-8.47	0.99706	10.5560	2.19	56.639	3.9	11	713	1231.4	1749	323	959.8	1618	1654	15
290	16	Pon	061	12.56032	14.33	13.2716	-9.09	0.99678	11.5015	-4.07	56.340	4.9	4	715	1231.2	1747	452	1051.9	1634	1650	16
291	17	Wto	062	12.59598	14.45	13.3100	-9.31	0.99650	12.4547	-10.20	56.310	5.9	1	716	1231.0	1745	623	1145.4	1652	1646	17
292	18	Śro	063	13.03563	14.56	13.3445	-9.53	0.99622	13.4314	-15.56	56.563	0.3	0	718	1230.8	1742	755	1240.9	1714	1642	18
293	19	Czw	064	13.07529	15.07	13.3831	-10.14	0.99594	14.4249	-20.28	57.084	1.3	2	720	1230.6	1740	927	1338.9	1742	1638	19
294	20	Pią	065	13.11494	15.18	13.4217	-10.36	0.99565	15.4358	-23.37	57.826	2.3	7	722	1230.5	1738	1052	1438.6	1819	1634	20
295	21	Sob	066	13.15460	15.27	13.4604	-10.57	0.99537	16.4527	-25.11	58.719	3.3	14	724	1230.3	1736	1206	1538.4	1909	1630	21
296	22	Nie	067	13.19425	15.36	13.4952	-11.18	0.99509	17.4539	-25.10	59.684	4.3	23	726	1230.1	1734	1304	1636.5	2011	1626	22
297	23	Pon	068	13.23391	15.44	13.5340	-11.39	0.99481	18.4308	-23.43	60.642	5.3	32	728	1230.0	1732	1347	1731.4	2122	1622	23
298	24	Wto	069	13.27357	15.52	13.5729	-12.00	0.99453	19.3706	-21.05	61.525	6.3	42	729	1229.9	1730	1417	1822.2	2236	1618	24
299	25	Śro	070	13.31322	15.59	14.0119	-12.21	0.99426	20.2729	-17.33	62.282	0.2	52	731	1229.8	1727	1439	1909.2	2350	1615	25
300	26	Czw	071	13.35288	16.05	14.0509	-12.41	0.99398	21.1443	-13.20	62.877	1.2	62	733	1229.7	1725	1455	1952.9	****	1611	26
301	27	Pią	072	13.39253	16.10	14.0900	-13.02	0.99370	21.5935	-8.41	63.291	2.2	71	735	1229.6	1723	1509	2034.4	102	1607	27
302	28	Sob	073	13.43219	16.15	14.1252	-13.22	0.99343	22.4257	-3.45	63.524	3.2	79	737	1229.5	1721	1522	2114.6	212	1603	28
303	29	Nie	074	13.47184	16.19	14.1645	-13.41	0.99316	23.2543	1.18	63.584	4.2	86	739	1229.4	1719	1534	2154.5	321	1559	29
303	29	Nie	074	14.47283	16.19	14.1655	-13.42	0.99315	23.2730	1.30	63.583	4.3	86	639	1129.4	1619	1434	2054.5	221	1459	29
304	30	Pon	075	14.51248	16.22	14.2048	-14.02	0.99288	0.1035	6.31	63.485	5.3	92	641	1129.4	1617	1446	2135.1	330	1455	30
305	31	Wto	076	14.55214	16.25	14.2442	-14.21	0.99262	0.5451	11.19	63.261	6.3	97	643	1129.3	1615	1500	2217.4	440	1451	31

Fazy Księżyca [Dm, h.mm]: Pełn 3, 18.25    3kw 11, 13.57    Now 18, 4.57    1kw 25, 6.53    1kw 25, 5.53

# PAŹDZIERNIK 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.52	20.18	7.13	18.06	2.58	17.18	1.43	17.01	6.44	18.26	19.25	9.49	20.35	13.13	18.20	6.46	17.03	0.29		
	12.536	-3.47	12.601	-6.72	10.073	12.20	9.298	17.04	12.524	-2.20	2.563	12.27	4.856	22.46	0.497	1.58	20.697	-23.75	0.68366	1
3	4.56	20.13	6.50	17.59	3.04	17.15	1.42	16.56	6.38	18.19	19.17	9.41	20.27	13.05	18.12	6.38	16.55	0.21		
	12.657	-4.24	12.477	-5.27	10.225	11.49	9.379	16.69	12.551	-2.37	2.555	12.22	4.854	22.46	0.493	1.56	20.696	-23.75	0.81507	3
5	4.60	20.08	6.27	17.52	3.09	17.12	1.41	16.51	6.33	18.12	19.09	9.32	20.19	12.57	18.04	6.30	16.47	0.13		
	12.778	-5.01	12.367	-3.84	10.376	10.75	9.459	16.34	12.577	-2.54	2.547	12.18	4.853	22.46	0.490	1.53	20.695	-23.75	0.94649	5
7	5.03	20.03	6.08	17.46	3.15	17.09	1.40	16.45	6.28	18.05	19.00	9.23	20.11	12.49	17.56	6.22	16.39	0.05		
	12.900	-5.78	12.283	-2.55	10.527	9.99	9.538	15.98	12.604	-2.71	2.538	12.13	4.850	22.45	0.486	1.51	20.694	-23.75	1.07791	7
9	5.07	19.58	5.52	17.41	3.20	17.06	1.39	16.40	6.22	17.57	18.52	9.15	20.03	12.41	17.48	6.14	16.31	23.53		
	13.022	-6.54	12.235	-1.53	10.678	9.21	9.617	15.62	12.630	-2.88	2.529	12.09	4.848	22.45	0.483	1.49	20.694	-23.75	1.20933	9
11	5.11	19.54	5.40	17.36	3.26	17.02	1.38	16.35	6.17	17.50	18.44	9.06	19.55	12.33	17.40	6.06	16.23	23.45		
	13.145	-7.29	12.228	-0.85	10.829	8.41	9.696	15.25	12.657	-3.04	2.520	12.04	4.846	22.45	0.480	1.47	20.693	-23.75	1.34075	11
13	5.14	19.49	5.32	17.32	3.32	16.59	1.37	16.29	6.12	17.43	18.36	8.57	19.47	12.25	17.32	5.57	16.16	23.37		
	13.268	-8.04	12.262	-0.54	10.979	7.59	9.773	14.88	12.683	-3.21	2.510	11.99	4.843	22.44	0.476	1.45	20.693	-23.75	1.47217	13
15	5.18	19.45	5.29	17.28	3.37	16.56	1.36	16.24	6.06	17.36	18.28	8.48	19.39	12.17	17.25	5.49	16.08	23.30		
	13.392	-8.78	12.335	-0.59	11.130	6.76	9.850	14.51	12.710	-3.38	2.501	11.94	4.840	22.44	0.473	1.43	20.692	-23.75	1.60359	15
17	5.21	19.40	5.29	17.25	3.43	16.52	1.35	16.18	6.01	17.29	18.20	8.40	19.31	12.09	17.17	5.41	15.60	23.22		
	13.517	-9.52	12.442	-0.97	11.280	5.90	9.927	14.14	12.736	-3.54	2.491	11.89	4.837	22.43	0.470	1.41	20.692	-23.75	1.73500	17
19	5.25	19.36	5.33	17.21	3.49	16.48	1.34	16.12	5.55	17.21	18.12	8.31	19.23	12.01	17.09	5.33	15.52	23.14		
	13.642	-10.24	12.576	-1.63	11.429	5.04	10.003	13.76	12.762	-3.71	2.481	11.84	4.833	22.43	0.467	1.39	20.692	-23.74	1.86642	19
21	5.28	19.32	5.39	17.18	3.55	16.45	1.33	16.07	5.50	17.14	18.03	8.22	19.15	11.53	17.01	5.25	15.44	23.06		
	13.768	-10.95	12.731	-2.51	11.579	4.16	10.078	13.38	12.788	-3.87	2.471	11.79	4.829	22.42	0.464	1.37	20.692	-23.74	1.99784	21
23	5.32	19.28	5.47	17.15	4.01	16.41	1.32	16.01	5.45	17.07	17.55	8.13	19.07	11.45	16.53	5.17	15.36	22.58		
	13.894	-11.66	12.903	-3.55	11.729	3.27	10.153	13.00	12.815	-4.04	2.461	11.74	4.826	22.41	0.460	1.35	20.692	-23.74	2.12926	23
25	5.35	19.24	5.56	17.12	4.07	16.37	1.31	15.55	5.39	16.60	17.47	8.05	18.59	11.36	16.45	5.08	15.28	22.50		
	14.022	-12.35	13.085	-4.72	11.878	2.36	10.227	12.61	12.841	-4.20	2.451	11.69	4.822	22.41	0.457	1.33	20.692	-23.74	2.26068	25
27	5.39	19.20	6.07	17.09	4.13	16.34	1.30	15.50	5.34	16.53	17.39	7.56	18.51	11.28	16.37	5.00	15.20	22.43		
	14.150	-13.03	13.276	-5.96	12.028	1.45	10.300	12.22	12.867	-4.36	2.440	11.64	4.817	22.40	0.455	1.31	20.693	-23.73	2.39210	27
29	5.42	19.17	6.18	17.05	4.19	16.30	1.28	15.44	5.28	16.46	17.31	7.47	18.43	11.20	16.29	4.52	15.13	22.35		
	14.279	-13.69	13.472	-7.26	12.178	0.54	10.373	11.84	12.892	-4.52	2.430	11.59	4.813	22.39	0.452	1.29	20.693	-23.73	2.52352	29
29	4.42	18.17	5.18	16.06	3.19	15.30	0.29	14.44	4.28	15.46	16.31	6.47	17.43	10.20	15.29	3.52	14.13	21.35		
	14.282	-13.70	13.476	-7.29	12.181	0.52	10.374	11.83	12.893	-4.52	2.430	11.58	4.813	22.39	0.452	1.29	20.693	-23.73	2.52352	29
31	4.45	18.13	5.29	16.02	3.25	15.26	0.27	14.38	4.23	15.38	16.22	6.38	17.35	10.12	15.21	3.44	14.05	21.27		
	14.412	-14.35	13.677	-8.61	12.331	-0.41	10.447	11.44	12.918	-4.68	2.419	11.53	4.808	22.39	0.449	1.27	20.694	-23.72	2.65493	31

# LISTOPAD 2028

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
306	1	Śro	077	14.59179	16.26	14.2837	-14.40	0.99236	1.4101	15.44	62.938	7.3	99	644	1129.3	1613	1517	2302.0	551	1447	1
307	2	Czw	078	15.03145	16.27	14.3233	-14.59	0.99210	2.2942	19.34	62.539	0.1	100	646	1129.3	1612	1538	2349.6	704	1443	2
308	3	Pią	079	15.07110	16.27	14.3629	-15.18	0.99185	3.2111	22.34	62.087	1.1	99	648	1129.3	1610	1606	*****	817	1439	3
309	4	Sob	080	15.11076	16.26	14.4027	-15.36	0.99160	4.1519	24.32	61.595	2.1	96	650	1129.3	1608	1644	040.3	926	1435	4
310	5	Nie	081	15.15042	16.24	14.4425	-15.54	0.99136	5.1127	25.16	61.073	3.1	91	652	1129.3	1606	1734	133.6	1028	1431	5
311	6	Pon	082	15.19007	16.22	14.4824	-16.12	0.99111	6.0832	24.38	60.525	4.1	84	654	1129.4	1604	1838	228.5	1118	1427	6
312	7	Wto	083	15.22573	16.18	14.5224	-16.30	0.99088	7.0522	22.39	59.955	5.1	75	656	1129.4	1602	1953	323.6	1156	1423	7
313	8	Śro	084	15.26538	16.14	14.5625	-16.47	0.99064	8.0104	19.23	59.372	6.1	66	658	1129.5	1601	2113	417.8	1225	1419	8
314	9	Czw	085	15.30504	16.09	15.0027	-17.04	0.99041	8.5514	15.01	58.788	7.1	55	659	1129.6	1559	2237	510.3	1248	1416	9
315	10	Pią	086	15.34470	16.03	15.0429	-17.21	0.99018	9.4803	9.47	58.227	0.6	44	701	1129.7	1557	****	601.2	1306	1412	10
316	11	Sob	087	15.38435	15.56	15.0833	-17.38	0.98995	10.4007	3.57	57.725	1.6	33	703	1129.8	1556	001	651.1	1322	1408	11
317	12	Nie	088	15.42401	15.49	15.1237	-17.54	0.98973	11.3220	-2.11	57.326	2.6	22	705	1129.9	1554	127	741.0	1338	1404	12
318	13	Pon	089	15.46366	15.40	15.1642	-18.10	0.98951	12.2540	-8.17	57.075	3.6	13	707	1130.1	1553	254	831.9	1355	1400	13
319	14	Wto	090	15.50332	15.31	15.2048	-18.25	0.98929	13.2102	-13.58	57.015	4.6	6	709	1130.2	1551	422	924.9	1414	1356	14
320	15	Śro	091	15.54297	15.20	15.2455	-18.40	0.98907	14.1858	-18.50	57.174	5.6	2	711	1130.4	1550	552	1020.7	1438	1352	15
321	16	Czw	092	15.58263	15.09	15.2902	-18.55	0.98885	15.1921	-22.29	57.558	6.6	0	712	1130.6	1548	721	1119.4	1511	1348	16
322	17	Pią	093	16.02228	14.57	15.3311	-19.10	0.98864	16.2115	-24.39	58.147	0.9	1	714	1130.8	1547	841	1219.7	1555	1344	17
323	18	Sob	094	16.06194	14.44	15.3720	-19.24	0.98843	17.2300	-25.12	58.898	1.9	5	716	1131.0	1546	948	1319.9	1652	1340	18
324	19	Nie	095	16.10159	14.31	15.4131	-19.38	0.98822	18.2246	-24.12	59.750	2.9	10	718	1131.2	1544	1039	1417.7	1802	1336	19
325	20	Pon	096	16.14125	14.16	15.4542	-19.51	0.98801	19.1913	-21.52	60.632	3.9	18	720	1131.5	1543	1114	1511.8	1917	1332	20
326	21	Wto	097	16.18091	14.01	15.4953	-20.05	0.98781	20.1150	-18.31	61.475	4.9	26	721	1131.7	1542	1140	1601.5	2032	1328	21
327	22	Śro	098	16.22056	13.45	15.5406	-20.17	0.98761	21.0050	-14.24	62.216	5.9	35	723	1132.0	1541	1200	1647.4	2146	1324	22
328	23	Czw	099	16.26022	13.28	15.5819	-20.30	0.98741	21.4654	-9.48	62.808	6.9	45	725	1132.3	1539	1215	1730.2	2258	1321	23
329	24	Pią	100	16.29588	13.11	16.0233	-20.42	0.98721	22.3056	-4.54	63.217	0.4	54	726	1132.6	1538	1228	1811.1	****	1317	24
330	25	Sob	101	16.33553	12.52	16.0648	-20.53	0.98702	23.1355	0.07	63.426	1.4	64	728	1132.9	1537	1240	1851.1	007	1313	25
331	26	Nie	102	16.37519	12.33	16.1104	-21.05	0.98683	23.5649	5.08	63.436	2.4	72	730	1133.2	1536	1253	1931.3	116	1309	26
332	27	Pon	103	16.41484	12.14	16.1520	-21.16	0.98665	0.4034	9.59	63.262	3.4	80	731	1133.5	1535	1306	2012.8	226	1305	27
333	28	Wto	104	16.45450	11.53	16.1937	-21.26	0.98647	1.2604	14.30	62.930	4.4	87	733	1133.9	1535	1321	2056.4	336	1301	28
334	29	Śro	105	16.49415	11.32	16.2354	-21.36	0.98630	2.1403	18.30	62.477	5.4	93	734	1134.2	1534	1341	2143.1	449	1257	29
335	30	Czw	106	16.53381	11.11	16.2813	-21.46	0.98614	3.0500	21.46	61.943	6.4	97	736	1134.6	1533	1406	2233.1	602	1253	30

Fazy Księżyca [Dm, h.mm]: Pełn 2, 10.17 3kw 9, 22.26 Now 16, 14.18 1kw 24, 1.15

# LISTOPAD 2028 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST Zach ( $0^h$ UT) Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch		
1	4.47	18.12	5.35	16.01	3.28	15.24	0.27	14.35	4.20	15.35	16.18	6.34	17.31	10.08	15.17	3.40	14.01	21.23	
	14.477	-14.67	13.778	-9.28	12.406	-0.87	10.483	11.25	12.931	-4.76	2.414	11.51	4.806	22.38	0.447	1.27	20.695	-23.72	2.72064 1
3	4.50	18.08	5.47	15.58	3.34	15.20	0.25	14.29	4.14	15.28	16.10	6.25	17.23	9.60	15.09	3.32	13.53	21.15	
	14.608	-15.30	13.982	-10.60	12.557	-1.80	10.554	10.86	12.957	-4.91	2.404	11.46	4.801	22.37	0.445	1.25	20.695	-23.71	2.85206 3
5	4.54	18.05	5.59	15.55	3.40	15.17	0.24	14.23	4.09	15.20	16.02	6.16	17.15	9.51	15.01	3.24	13.45	21.08	
	14.740	-15.91	14.188	-11.90	12.707	-2.73	10.625	10.47	12.982	-5.07	2.393	11.41	4.796	22.37	0.442	1.23	20.697	-23.71	2.98349 5
7	4.57	18.02	6.11	15.52	3.46	15.13	0.22	14.18	4.03	15.13	15.54	6.08	17.06	9.43	14.53	3.16	13.37	20.60	
	14.873	-16.50	14.395	-13.18	12.859	-3.65	10.695	10.08	13.007	-5.22	2.383	11.36	4.791	22.36	0.440	1.22	20.698	-23.70	3.11491 7
9	4.60	17.59	6.23	15.49	3.52	15.09	0.21	14.12	3.58	15.06	15.46	5.59	16.58	9.35	14.45	3.08	13.29	20.52	
	15.007	-17.07	14.604	-14.42	13.010	-4.58	10.764	9.69	13.032	-5.37	2.373	11.31	4.786	22.35	0.437	1.20	20.699	-23.69	3.24633 9
11	5.03	17.57	6.35	15.47	3.59	15.05	0.19	14.06	3.52	14.59	15.37	5.50	16.50	9.27	14.37	2.59	13.22	20.44	
	15.142	-17.63	14.813	-15.61	13.163	-5.51	10.833	9.30	13.057	-5.52	2.363	11.26	4.781	22.34	0.435	1.19	20.700	-23.68	3.37775 11
13	5.06	17.54	6.46	15.44	4.05	15.02	0.18	13.60	3.47	14.52	15.29	5.41	16.42	9.18	14.29	2.51	13.14	20.37	
	15.278	-18.16	15.024	-16.76	13.316	-6.43	10.902	8.91	13.081	-5.67	2.353	11.22	4.775	22.33	0.433	1.18	20.702	-23.68	3.50917 13
15	5.09	17.52	6.58	15.42	4.11	14.58	0.16	13.54	3.41	14.45	15.21	5.33	16.34	9.10	14.21	2.43	13.06	20.29	
	15.415	-18.67	15.235	-17.85	13.469	-7.34	10.969	8.52	13.105	-5.82	2.343	11.17	4.770	22.32	0.430	1.16	20.704	-23.67	3.64058 15
17	5.12	17.50	7.10	15.41	4.17	14.54	0.14	13.48	3.35	14.37	15.13	5.24	16.26	9.02	14.14	2.35	12.58	20.21	
	15.553	-19.16	15.449	-18.88	13.624	-8.24	11.036	8.13	13.129	-5.96	2.333	11.13	4.764	22.31	0.428	1.15	20.705	-23.66	3.77200 17
19	5.15	17.48	7.21	15.39	4.24	14.51	0.13	13.42	3.30	14.30	15.05	5.15	16.18	8.54	14.06	2.27	12.50	20.14	
	15.692	-19.63	15.663	-19.85	13.779	-9.14	11.103	7.75	13.153	-6.10	2.324	11.08	4.758	22.30	0.427	1.14	20.707	-23.65	3.90343 19
21	5.18	17.46	7.32	15.38	4.30	14.48	0.11	13.36	3.24	14.23	14.56	5.07	16.10	8.45	13.58	2.19	12.42	20.06	
	15.831	-20.08	15.879	-20.76	13.935	-10.02	11.168	7.37	13.177	-6.24	2.315	11.04	4.752	22.29	0.425	1.13	20.709	-23.64	4.03485 21
23	5.21	17.44	7.43	15.37	4.37	14.44	0.09	13.30	3.18	14.16	14.48	4.58	16.01	8.37	13.50	2.11	12.35	19.58	
	15.972	-20.50	16.097	-21.60	14.093	-10.88	11.233	6.99	13.200	-6.38	2.306	11.00	4.747	22.28	0.423	1.12	20.712	-23.63	4.16627 23
25	5.23	17.43	7.54	15.37	4.43	14.41	0.07	13.24	3.13	14.08	14.40	4.49	15.53	8.29	13.42	2.03	12.27	19.51	
	16.113	-20.89	16.316	-22.36	14.251	-11.74	11.298	6.61	13.223	-6.51	2.297	10.96	4.741	22.27	0.422	1.11	20.714	-23.62	4.29769 25
27	5.26	17.42	8.05	15.37	4.50	14.38	0.05	13.17	3.07	14.01	14.32	4.41	15.45	8.20	13.34	1.55	12.19	19.43	
	16.256	-21.26	16.538	-23.05	14.410	-12.57	11.361	6.24	13.245	-6.65	2.288	10.93	4.735	22.26	0.420	1.11	20.716	-23.61	4.42911 27
29	5.28	17.41	8.15	15.38	4.56	14.35	0.03	13.11	3.01	13.54	14.24	4.32	15.37	8.12	13.26	1.47	12.11	19.35	
	16.398	-21.60	16.760	-23.67	14.571	-13.39	11.424	5.87	13.268	-6.78	2.280	10.89	4.729	22.25	0.419	1.10	20.719	-23.60	4.56053 29

# GRUDZIEŃ 2028

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
336	1	Pią	107	16.57346	10.48	16.3232	-21.55	0.98597	3.5860	24.03	61.368	7.4	100	737	1134.9	1532	1441	2326.3	713	1249	1	
337	2	Sob	108	17.01312	10.25	16.3651	-22.04	0.98582	4.5530	25.08	60.790	0.4	100	739	1135.3	1532	1528	*****	819	1245	2	
338	3	Nie	109	17.05278	10.02	16.4111	-22.12	0.98567	5.5325	24.50	60.238	1.4	98	740	1135.7	1531	1629	021.7	914	1241	3	
339	4	Pon	110	17.09243	9.37	16.4532	-22.20	0.98552	6.5122	23.08	59.732	2.4	94	742	1136.1	1530	1742	118.0	956	1237	4	
340	5	Wto	111	17.13209	9.13	16.4953	-22.27	0.98538	7.4807	20.05	59.282	3.4	87	743	1136.5	1530	1902	213.5	1029	1233	5	
341	6	Śro	112	17.17175	8.47	16.5415	-22.35	0.98525	8.4301	15.55	58.892	4.4	79	744	1137.0	1530	2025	307.2	1053	1229	6	
342	7	Czw	113	17.21140	8.21	16.5838	-22.41	0.98512	9.3602	10.51	58.559	5.4	70	745	1137.4	1529	2149	358.6	1112	1225	7	
343	8	Pią	114	17.25106	7.55	17.0301	-22.47	0.98500	10.2738	5.11	58.282	6.4	59	747	1137.8	1529	2313	448.3	1129	1222	8	
344	9	Sob	115	17.29071	7.28	17.0724	-22.53	0.98488	11.1843	-0.47	58.066	0.2	47	748	1138.3	1529	****	537.1	1144	1218	9	
345	10	Nie	116	17.33037	7.01	17.1148	-22.58	0.98477	12.1016	-6.45	57.920	1.2	36	749	1138.7	1528	037	626.1	1200	1214	10	
346	11	Pon	117	17.37002	6.33	17.1612	-23.03	0.98466	13.0319	-12.23	57.862	2.2	25	750	1139.2	1528	202	716.5	1217	1210	11	
347	12	Wto	118	17.40568	6.05	17.2037	-23.08	0.98455	13.5838	-17.22	57.914	3.2	16	751	1139.7	1528	328	809.3	1239	1206	12	
348	13	Śro	119	17.44533	5.37	17.2502	-23.12	0.98445	14.5636	-21.21	58.095	4.2	9	752	1140.1	1528	455	905.1	1306	1202	13	
349	14	Czw	120	17.48499	5.08	17.2927	-23.15	0.98435	15.5648	-24.01	58.419	5.2	3	753	1140.6	1528	617	1003.4	1344	1158	14	
350	15	Pią	121	17.52464	4.39	17.3352	-23.18	0.98425	16.5801	-25.09	58.886	6.2	0	754	1141.1	1528	730	1103.0	1435	1154	15	
351	16	Sob	122	17.56430	4.10	17.3818	-23.21	0.98416	17.5832	-24.44	59.479	0.4	0	755	1141.6	1529	828	1202.0	1539	1150	16	
352	17	Nie	123	18.00396	3.41	17.4244	-23.23	0.98407	18.5641	-22.53	60.164	1.4	2	755	1142.1	1529	910	1258.2	1653	1146	17	
353	18	Pon	124	18.04361	3.11	17.4710	-23.24	0.98399	19.5124	-19.51	60.896	2.4	6	756	1142.6	1529	940	1350.6	1810	1142	18	
354	19	Wto	125	18.08327	2.41	17.5137	-23.25	0.98391	20.4226	-15.55	61.619	3.4	12	757	1143.1	1529	1003	1438.9	1926	1138	19	
355	20	Śro	126	18.12293	2.11	17.5603	-23.26	0.98383	21.3012	-11.24	62.277	4.4	19	757	1143.6	1530	1020	1523.7	2040	1134	20	
356	21	Czw	127	18.16258	1.42	18.0029	-23.26	0.98376	22.1525	-6.31	62.818	5.4	28	758	1144.1	1530	1034	1605.9	2151	1130	21	
357	22	Pią	128	18.20224	1.12	18.0456	-23.26	0.98369	22.5901	-1.29	63.198	6.4	36	758	1144.6	1531	1047	1646.5	2300	1126	22	
358	23	Sob	129	18.24189	0.42	18.0922	-23.25	0.98363	23.4159	3.33	63.387	7.4	46	759	1145.0	1531	1059	1726.6	****	1123	23	
359	24	Nie	130	18.28155	0.12	18.1349	-23.24	0.98357	0.2517	8.27	63.370	0.6	55	759	1145.5	1532	1112	1807.3	009	1119	24	
360	25	Pon	131	18.32120	-0.18	18.1815	-23.22	0.98351	1.0951	13.04	63.148	1.6	65	759	1146.0	1533	1126	1849.6	119	1115	25	
361	26	Wto	132	18.36086	-0.47	18.2241	-23.20	0.98346	1.5632	17.14	62.738	2.6	73	800	1146.5	1534	1143	1934.5	230	1111	26	
362	27	Śro	133	18.40051	-1.17	18.2707	-23.17	0.98342	2.4604	20.45	62.173	3.6	82	800	1147.0	1534	1206	2022.7	342	1107	27	
363	28	Czw	134	18.44017	-1.46	18.3133	-23.14	0.98338	3.3849	23.24	61.498	4.6	89	800	1147.5	1535	1236	2114.5	455	1103	28	
364	29	Pią	135	18.47583	-2.15	18.3558	-23.11	0.98335	4.3437	24.55	60.765	5.6	94	800	1148.0	1536	1317	2209.4	603	1059	29	
365	30	Sob	136	18.51548	-2.44	18.4024	-23.07	0.98333	5.3241	25.07	60.032	6.6	98	800	1148.5	1537	1413	2306.3	704	1055	30	
366	31	Nie	137	18.55514	-3.12	18.4449	-23.02	0.98331	6.3142	23.51	59.354	7.6	100	800	1149.0	1538	1523	*****	752	1051	31	

Fazy Księżyca [Dm, h.mm]: Pełn 2, 2.40      3kw 9, 6.39      Nów 16, 3.06      1kw 23, 22.45      Pełn 31, 17.48



# GRUDZIEŃ 2028 (c.d.)

Świty, zmierychy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	5.31	17.40	8.25	15.39	5.03	14.32	23.57	13.05	2.55	13.47	14.16	4.24	15.29	8.04	13.18	1.39	12.03	19.28		
	16.542	-21.91	16.985	-24.20	14.732	-14.18	11.486	5.50	13.290	-6.90	2.272	10.86	4.723	22.24	0.418	1.09	20.721	-23.59	4.69195	1
3	5.33	17.39	8.34	15.42	5.09	14.29	23.55	12.59	2.49	13.39	14.08	4.15	15.21	7.55	13.10	1.31	11.56	19.20		
	16.686	-22.20	17.211	-24.65	14.895	-14.95	11.548	5.14	13.311	-7.03	2.265	10.83	4.717	22.23	0.417	1.09	20.724	-23.57	4.82337	3
5	5.35	17.38	8.42	15.44	5.16	14.27	23.52	12.53	2.43	13.32	13.59	4.07	15.13	7.47	13.02	1.23	11.48	19.13		
	16.832	-22.46	17.438	-25.02	15.059	-15.70	11.608	4.78	13.333	-7.15	2.258	10.80	4.711	22.22	0.416	1.08	20.727	-23.56	4.95480	5
7	5.37	17.38	8.50	15.48	5.22	14.24	23.50	12.47	2.37	13.25	13.51	3.58	15.04	7.39	12.54	1.15	11.40	19.05		
	16.977	-22.69	17.666	-25.29	15.225	-16.42	11.668	4.42	13.353	-7.27	2.251	10.77	4.704	22.21	0.415	1.08	20.730	-23.55	5.08622	7
9	5.39	17.38	8.58	15.52	5.28	14.22	23.48	12.40	2.31	13.18	13.43	3.50	14.56	7.31	12.47	1.08	11.32	18.57		
	17.123	-22.89	17.895	-25.47	15.392	-17.12	11.728	4.07	13.374	-7.39	2.244	10.75	4.698	22.20	0.414	1.08	20.733	-23.54	5.21764	9
11	5.41	17.38	9.04	15.57	5.35	14.20	23.45	12.34	2.25	13.10	13.35	3.42	14.48	7.22	12.39	0.60	11.24	18.50		
	17.270	-23.05	18.123	-25.56	15.560	-17.78	11.786	3.72	13.394	-7.50	2.238	10.72	4.692	22.19	0.414	1.08	20.736	-23.52	5.34906	11
13	5.43	17.38	9.10	16.03	5.41	14.18	23.42	12.28	2.19	13.03	13.27	3.33	14.40	7.14	12.31	0.52	11.17	18.42		
	17.417	-23.19	18.352	-25.55	15.729	-18.42	11.843	3.39	13.414	-7.61	2.233	10.70	4.687	22.17	0.414	1.08	20.739	-23.51	5.48048	13
15	5.45	17.39	9.15	16.10	5.48	14.17	23.40	12.22	2.13	12.56	13.19	3.25	14.32	7.06	12.23	0.44	11.09	18.35		
	17.565	-23.30	18.579	-25.45	15.900	-19.02	11.900	3.05	13.433	-7.72	2.228	10.69	4.681	22.16	0.413	1.08	20.743	-23.50	5.61190	15
17	5.46	17.39	9.19	16.17	5.54	14.15	23.37	12.15	2.07	12.48	13.11	3.17	14.24	6.57	12.15	0.36	11.01	18.27		
	17.712	-23.38	18.804	-25.24	16.072	-19.58	11.956	2.72	13.452	-7.83	2.223	10.67	4.675	22.15	0.413	1.08	20.746	-23.48	5.74332	17
19	5.47	17.40	9.22	16.25	5.60	14.14	23.34	12.09	2.01	12.41	13.03	3.09	14.16	6.49	12.07	0.28	10.53	18.20		
	17.860	-23.42	19.026	-24.93	16.245	-20.11	12.010	2.40	13.470	-7.93	2.218	10.66	4.669	22.14	0.413	1.08	20.750	-23.47	5.87475	19
21	5.48	17.41	9.24	16.33	6.06	14.13	23.31	12.03	1.54	12.34	12.55	3.00	14.07	6.41	11.59	0.20	10.46	18.12		
	18.008	-23.44	19.242	-24.53	16.420	-20.60	12.064	2.09	13.488	-8.03	2.214	10.65	4.663	22.13	0.414	1.08	20.753	-23.46	6.00617	21
23	5.49	17.42	9.24	16.42	6.12	14.13	23.28	11.56	1.48	12.26	12.47	2.52	13.59	6.33	11.51	0.13	10.38	18.05		
	18.156	-23.42	19.451	-24.03	16.595	-21.06	12.117	1.78	13.505	-8.12	2.211	10.64	4.658	22.12	0.414	1.09	20.757	-23.44	6.13759	23
25	5.50	17.43	9.24	16.50	6.17	14.13	23.25	11.50	1.42	12.19	12.39	2.44	13.51	6.24	11.44	0.05	10.30	17.57		
	18.304	-23.37	19.651	-23.44	16.772	-21.47	12.168	1.48	13.522	-8.21	2.208	10.63	4.652	22.11	0.414	1.09	20.761	-23.43	6.26900	25
27	5.51	17.45	9.22	16.59	6.23	14.13	23.22	11.44	1.35	12.12	12.31	2.36	13.43	6.16	11.36	23.53	10.22	17.49		
	18.452	-23.29	19.837	-22.78	16.950	-21.84	12.219	1.19	13.538	-8.30	2.205	10.63	4.647	22.10	0.415	1.10	20.764	-23.41	6.40042	27
29	5.51	17.46	9.19	17.06	6.28	14.13	23.18	11.37	1.29	12.04	12.23	2.28	13.35	6.08	11.28	23.45	10.15	17.42		
	18.600	-23.18	20.005	-22.05	17.128	-22.17	12.268	0.90	13.554	-8.38	2.203	10.63	4.642	22.09	0.416	1.10	20.768	-23.40	6.53185	29
31	5.51	17.48	9.14	17.13	6.33	14.14	23.15	11.31	1.22	11.57	12.15	2.20	13.27	5.60	11.20	23.37	10.07	17.34		
	18.747	-23.04	20.151	-21.29	17.308	-22.45	12.316	0.63	13.569	-8.47	2.202	10.63	4.637	22.08	0.417	1.11	20.772	-23.38	6.66327	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2028

Nowy Rok	Sob	1 styczeń	Dzień Dziecka	Czw	1 czerwiec
Najświętszej Maryi Panny Rodzicielki	Sob	1 styczeń	Zesłania Ducha Świętego	Nie	4 czerwiec
Objawienia Pańskiego (Trzech Króli)	Czw	6 styczeń	Dzień Dziękczynienia	Nie	4 czerwiec
Juliański Nowy Rok	Pią	14 styczeń	Trójcy Najświętszej	Nie	11 czerwiec
Dzień Babci	Pią	21 styczeń	Boże Ciało	Czw	15 czerwiec
Dzień Dziadka	Sob	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	23 czerwiec
Ofiarowania Pańskiego	Śro	2 luty	Dzień Ojca	Pią	23 czerwiec
Matki Boskiej Gromnicznej	Śro	2 luty	Noc Świętojańska	Pią	23 czerwiec
Walentynki	Pon	14 luty	Św. Piotra i Pawła	Czw	29 czerwiec
Święto UMK	Sob	19 luty	Wniebowzięcia N.M.P.	Wto	15 sierpień
Tłusty czwartek	Czw	24 luty	Święto Wojska Polskiego	Wto	15 sierpień
Środa Popielcowa	Śro	1 marzec	Dzień Solidarności i Wolności	Czw	31 sierpień
Dzień Kobiet	Śro	8 marzec	Dzień Programisty	Śro	13 wrzesień
Narodowy Dzień Życia	Pią	24 marzec	Dożynki – Święto Plonów	Sob	23 wrzesień
Niedziela Palmowa	Nie	9 kwiecień	Dzień Edukacji Narodowej	Sob	14 październik
Niedziela Wielkanocna	Nie	16 kwiecień	Dzień Papieski	Nie	15 październik
Niedziela Miłosierdzia Bożego	Nie	23 kwiecień	Dzień Papieża Jana Pawła II	Pon	16 październik
Święto Pracy	Pon	1 maj	Wszystkich Świętych	Śro	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Wto	2 maj	Zaduszki	Czw	2 listopad
Najświętsza Maryja Królowa Polski	Śro	3 maj	Święto Niepodległości	Sob	11 listopad
Święto Konstytucji 3 Maja	Śro	3 maj	Pierwsza niedziela Adwentu	Nie	3 grudzień
Dzień Polskiej Niezapominajki	Pon	15 maj	Niepokalane Poczęcie N.M.P.	Pią	8 grudzień
Wniebowstąpienia Pańskiego	Czw	25 maj	Boże Narodzenie	Pon	25 grudzień
Dzień Matki	Pią	26 maj	Sylwester	Nie	31 grudzień

# Kalendarz astronomiczny 2029

## PIWKNICE, CA UMK

Wspólrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2'', Księżyc 10'', Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżycy i paralaksy horyzontalnej Księżycy. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!

*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2029 KWIECIEŃ 1**

Dla całego roku przyjęto: TDT – UT = 73 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 9.02**, Lato **VI 21, 2.48**, Jesień **IX 22, 18.38**, Zima **XII 21, 15.14**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **25 marca do 28 października 2029 r.**

### Oznaczenia:

Dr — dzień 2029 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżycy)

$\delta$  — deklinacja (Słońca lub Księżycy)

R — odległość (Słońca lub Księżycy)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżycy

Wsch — wschód (Słońca, Księżycy lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżycy lub planety)

# STYCZEŃ 2029

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
1	1	Pon	138	18.59480	-3.40	18.4913	-22.57	0.98330	7.3012	21.10	58.775	0.8	99	800	1149.4	1539	1643	003.5	829	1047	1	
2	2	Wto	139	19.03445	-4.08	18.5338	-22.52	0.98329	8.2707	17.12	58.329	1.8	96	759	1149.9	1541	1808	059.4	857	1043	2	
3	3	Śro	140	19.07411	-4.36	18.5802	-22.46	0.98329	9.2159	12.13	58.029	2.8	91	759	1150.3	1542	1934	153.1	918	1039	3	
4	4	Czw	141	19.11376	-5.03	19.0226	-22.40	0.98330	10.1502	6.33	57.872	3.8	83	759	1150.8	1543	2059	244.7	936	1035	4	
5	5	Pią	142	19.15342	-5.30	19.0649	-22.33	0.98331	11.0656	0.33	57.845	4.8	73	759	1151.2	1544	2224	334.7	952	1031	5	
6	6	Sob	143	19.19307	-5.56	19.1112	-22.26	0.98333	11.5836	-5.29	57.926	5.8	63	758	1151.7	1546	2349	424.0	1007	1028	6	
7	7	Nie	144	19.23273	-6.22	19.1534	-22.18	0.98336	12.5100	-11.12	58.093	6.8	51	758	1152.1	1547	****	513.8	1024	1024	7	
8	8	Pon	145	19.27238	-6.47	19.1956	-22.10	0.98339	13.4500	-16.17	58.328	0.9	40	757	1152.5	1548	114	605.1	1044	1020	8	
9	9	Wto	146	19.31204	-7.12	19.2418	-22.01	0.98342	14.4108	-20.27	58.622	1.9	29	756	1152.9	1550	239	658.7	1109	1016	9	
10	10	Śro	147	19.35170	-7.36	19.2838	-21.52	0.98346	15.3920	-23.25	58.969	2.9	20	756	1153.4	1551	402	754.8	1141	1012	10	
11	11	Czw	148	19.39135	-8.00	19.3259	-21.43	0.98351	16.3854	-24.59	59.373	3.9	12	755	1153.7	1553	516	852.5	1226	1008	11	
12	12	Pią	149	19.43101	-8.23	19.3718	-21.33	0.98355	17.3829	-25.04	59.833	4.9	6	754	1154.1	1554	619	950.4	1324	1004	12	
13	13	Sob	150	19.47066	-8.46	19.4138	-21.23	0.98360	18.3636	-23.42	60.347	5.9	2	754	1154.5	1556	706	1046.9	1433	1000	13	
14	14	Nie	151	19.51032	-9.08	19.4556	-21.12	0.98366	19.3202	-21.04	60.903	6.9	0	753	1154.9	1558	740	1140.3	1548	956	14	
15	15	Pon	152	19.54598	-9.29	19.5014	-21.01	0.98372	20.2413	-17.26	61.482	0.7	1	752	1155.2	1559	806	1230.3	1705	952	15	
16	16	Wto	153	19.58563	-9.50	19.5431	-20.50	0.98378	21.1314	-13.06	62.052	1.7	3	751	1155.6	1601	825	1316.7	1820	948	16	
17	17	Śro	154	20.02529	-10.10	19.5847	-20.38	0.98385	21.5934	-8.17	62.576	2.7	7	750	1155.9	1603	840	1400.2	1933	944	17	
18	18	Czw	155	20.06494	-10.29	20.0303	-20.26	0.98392	22.4358	-3.15	63.013	3.7	13	749	1156.2	1604	854	1441.7	2044	940	18	
19	19	Pią	156	20.10460	-10.47	20.0718	-20.13	0.98399	23.2719	1.50	63.324	4.7	20	748	1156.5	1606	906	1522.1	2153	936	19	
20	20	Sob	157	20.14425	-11.05	20.1132	-20.00	0.98407	0.1030	6.48	63.471	5.7	28	746	1156.8	1608	919	1602.5	2302	932	20	
21	21	Nie	158	20.18391	-11.22	20.1546	-19.47	0.98415	0.5424	11.31	63.431	6.7	37	745	1157.1	1610	932	1643.8	****	929	21	
22	22	Pon	159	20.22356	-11.38	20.1958	-19.33	0.98423	1.3953	15.49	63.190	7.7	47	744	1157.4	1611	948	1727.1	012	925	22	
23	23	Wto	160	20.26322	-11.53	20.2410	-19.19	0.98433	2.2742	19.32	62.749	0.6	56	743	1157.6	1613	1007	1813.0	123	921	23	
24	24	Śro	161	20.30288	-12.08	20.2821	-19.04	0.98442	3.1824	22.29	62.127	1.6	66	741	1157.9	1615	1033	1902.3	234	917	24	
25	25	Czw	162	20.34253	-12.21	20.3232	-18.50	0.98452	4.1211	24.26	61.360	2.6	75	740	1158.1	1617	1108	1954.9	344	913	25	
26	26	Pią	163	20.38219	-12.34	20.3641	-18.35	0.98463	5.0843	25.11	60.499	3.6	83	738	1158.3	1619	1156	2050.3	448	909	26	
27	27	Sob	164	20.42184	-12.46	20.4050	-18.19	0.98474	6.0706	24.33	59.607	4.6	90	737	1158.5	1621	1259	2147.3	542	905	27	
28	28	Nie	165	20.46150	-12.58	20.4458	-18.03	0.98486	7.0603	22.27	58.756	5.6	96	735	1158.7	1623	1415	2244.3	624	901	28	
29	29	Pon	166	20.50116	-13.08	20.4905	-17.47	0.98499	8.0421	18.57	58.016	6.6	99	734	1158.9	1624	1539	2340.2	656	857	29	
30	30	Wto	167	20.54081	-13.18	20.5311	-17.31	0.98512	9.0112	14.15	57.448	0.2	100	732	1159.0	1626	1707	****	721	853	30	
31	31	Śro	168	20.58047	-13.26	20.5716	-17.14	0.98525	9.5625	8.40	57.092	1.2	98	731	1159.2	1628	1836	034.2	741	849	31	

Fazy Księżyca [Dm, h.mm]: Pełn 0, 17.48 3kw 7, 14.26 Nów 14, 18.24 1kw 22, 20.23 Pełn 30, 7.04

# STYCZEŃ 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.49	9.12	17.15	6.35	14.15	23.13	11.28	1.19	11.53	12.11	2.16	13.23	5.55	11.16	23.34	10.03	17.31		
	18.820	-22.95	20.214	-20.90	17.398	-22.58	12.340	0.49	13.576	-8.50	2.201	10.63	4.634	22.08	0.417	1.12	20.774	-23.38	6.72898	1
3	5.51	17.51	9.04	17.19	6.40	14.16	23.09	11.21	1.12	11.46	12.03	2.08	13.15	5.47	11.08	23.26	9.55	17.23		
	18.967	-22.77	20.314	-20.13	17.578	-22.79	12.386	0.23	13.591	-8.58	2.200	10.64	4.629	22.07	0.418	1.12	20.778	-23.36	6.86041	3
5	5.51	17.53	8.55	17.19	6.44	14.18	23.05	11.15	1.06	11.38	11.55	2.00	13.07	5.39	11.00	23.18	9.48	17.16		
	19.114	-22.55	20.374	-19.40	17.759	-22.96	12.431	-0.02	13.604	-8.65	2.200	10.64	4.625	22.06	0.420	1.13	20.782	-23.35	6.99183	5
7	5.50	17.55	8.44	17.16	6.48	14.20	23.01	11.08	0.59	11.31	11.47	1.53	12.59	5.31	10.53	23.10	9.40	17.08		
	19.259	-22.30	20.386	-18.76	17.941	-23.09	12.475	-0.27	13.617	-8.72	2.200	10.65	4.620	22.05	0.421	1.15	20.787	-23.33	7.12324	7
9	5.50	17.57	8.30	17.09	6.51	14.22	22.57	11.01	0.52	11.23	11.39	1.45	12.51	5.23	10.45	23.03	9.32	17.01		
	19.405	-22.02	20.346	-18.26	18.123	-23.16	12.517	-0.50	13.630	-8.78	2.200	10.67	4.616	22.04	0.423	1.16	20.791	-23.32	7.25466	9
11	5.49	17.60	8.15	16.58	6.55	14.25	22.53	10.55	0.46	11.16	11.31	1.37	12.43	5.14	10.37	22.55	9.24	16.53		
	19.550	-21.72	20.253	-17.92	18.304	-23.19	12.558	-0.72	13.642	-8.84	2.201	10.68	4.611	22.03	0.424	1.17	20.795	-23.30	7.38608	11
13	5.48	18.02	7.57	16.43	6.57	14.28	22.49	10.48	0.39	11.08	11.23	1.30	12.34	5.06	10.29	22.47	9.17	16.46		
	19.694	-21.38	20.112	-17.76	18.486	-23.18	12.597	-0.94	13.653	-8.90	2.202	10.70	4.607	22.03	0.426	1.18	20.799	-23.29	7.51751	13
15	5.47	18.05	7.39	16.25	7.00	14.32	22.44	10.42	0.32	11.01	11.15	1.22	12.26	4.58	10.21	22.40	9.09	16.38		
	19.837	-21.02	19.940	-17.76	18.668	-23.11	12.634	-1.14	13.663	-8.95	2.204	10.72	4.603	22.02	0.428	1.20	20.804	-23.27	7.64893	15
17	5.46	18.08	7.21	16.05	7.02	14.35	22.39	10.35	0.25	10.53	11.08	1.14	12.18	4.50	10.13	22.32	9.01	16.31		
	19.980	-20.63	19.756	-17.90	18.850	-23.00	12.670	-1.32	13.673	-9.00	2.207	10.75	4.600	22.01	0.430	1.21	20.808	-23.26	7.78035	17
19	5.44	18.11	7.05	15.45	7.04	14.40	22.34	10.28	0.18	10.46	10.60	1.07	12.10	4.42	10.06	22.24	8.54	16.23		
	20.122	-20.22	19.582	-18.14	19.031	-22.84	12.704	-1.50	13.682	-9.04	2.210	10.77	4.596	22.01	0.433	1.23	20.812	-23.24	7.91177	19
21	5.42	18.13	6.50	15.26	7.05	14.44	22.29	10.21	0.10	10.38	10.52	0.59	12.02	4.34	9.58	22.17	8.46	16.16		
	20.263	-19.78	19.436	-18.45	19.212	-22.63	12.736	-1.66	13.690	-9.08	2.213	10.80	4.593	22.00	0.435	1.24	20.817	-23.23	8.04319	21
23	5.40	18.16	6.38	15.10	7.06	14.49	22.24	10.14	0.03	10.31	10.44	0.52	11.54	4.26	9.50	22.09	8.38	16.08		
	20.403	-19.32	19.328	-18.78	19.392	-22.38	12.766	-1.81	13.698	-9.12	2.217	10.83	4.590	21.99	0.437	1.26	20.821	-23.21	8.17461	23
25	5.38	18.20	6.28	14.56	7.07	14.54	22.19	10.07	23.52	10.23	10.36	0.44	11.46	4.18	9.42	22.01	8.30	16.01		
	20.542	-18.83	19.264	-19.13	19.572	-22.08	12.794	-1.95	13.705	-9.15	2.221	10.86	4.587	21.99	0.440	1.28	20.825	-23.20	8.30603	25
27	5.36	18.23	6.21	14.44	7.08	14.59	22.13	10.00	23.45	10.15	10.29	0.37	11.38	4.10	9.34	21.54	8.23	15.53		
	20.680	-18.32	19.241	-19.46	19.750	-21.74	12.820	-2.07	13.711	-9.17	2.226	10.90	4.585	21.98	0.443	1.30	20.830	-23.18	8.43745	27
29	5.34	18.26	6.16	14.35	7.08	15.05	22.07	9.53	23.37	10.08	10.21	0.30	11.30	4.01	9.27	21.46	8.15	15.46		
	20.818	-17.79	19.256	-19.77	19.928	-21.35	12.843	-2.18	13.716	-9.19	2.231	10.93	4.583	21.98	0.446	1.32	20.834	-23.17	8.56888	29
31	5.31	18.29	6.13	14.29	7.07	15.10	22.01	9.46	23.30	10.00	10.13	0.22	11.22	3.53	9.19	21.39	8.07	15.38		
	20.954	-17.23	19.305	-20.05	20.104	-20.92	12.864	-2.27	13.721	-9.21	2.237	10.97	4.580	21.98	0.448	1.34	20.839	-23.15	8.70029	31

# LUTY 2029

Piwnice, CA UMK			←———— Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) —————→										..... Czas strefowy [hhmm.] .....								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
32	1	Czw	169	21.02012	-13.34	21.0121	-16.57	0.98540	10.5022	2.33	56.966	2.2	93	729	1159.3	1630	2004	126.5	758	845	1
33	2	Pią	170	21.05578	-13.42	21.0524	-16.39	0.98554	11.4345	-3.42	57.060	3.2	86	727	1159.4	1632	2131	217.9	814	841	2
34	3	Sob	171	21.09543	-13.48	21.0927	-16.22	0.98570	12.3724	-9.41	57.343	4.2	77	726	1159.5	1634	2259	309.2	831	837	3
35	4	Nie	172	21.13509	-13.54	21.1329	-16.04	0.98586	13.3207	-15.04	57.771	5.2	66	724	1159.6	1636	****	401.3	850	834	4
36	5	Pon	173	21.17474	-13.58	21.1731	-15.46	0.98602	14.2824	-19.32	58.296	6.2	55	722	1159.7	1638	026	455.0	914	830	5
37	6	Wto	174	21.21440	-14.02	21.2131	-15.27	0.98619	15.2615	-22.47	58.873	0.5	44	720	1159.8	1640	150	550.6	944	826	6
38	7	Śro	175	21.25406	-14.06	21.2531	-15.08	0.98636	16.2509	-24.41	59.469	1.5	33	719	1159.8	1642	307	647.6	1024	822	7
39	8	Czw	176	21.29371	-14.08	21.2930	-14.49	0.98653	17.2402	-25.07	60.059	2.5	24	717	1159.9	1644	413	744.8	1117	818	8
40	9	Pią	177	21.33337	-14.10	21.3329	-14.30	0.98671	18.2137	-24.08	60.632	3.5	15	715	1159.9	1646	504	840.8	1222	814	9
41	10	Sob	178	21.37302	-14.11	21.3726	-14.11	0.98689	19.1651	-21.53	61.180	4.5	9	713	1159.9	1648	542	934.3	1334	810	10
42	11	Nie	179	21.41268	-14.11	21.4123	-13.51	0.98708	20.0911	-18.35	61.700	5.5	4	711	1159.9	1650	610	1024.7	1449	806	11
43	12	Pon	180	21.45233	-14.10	21.4519	-13.31	0.98727	20.5834	-14.30	62.188	6.5	1	709	1159.9	1652	631	1111.8	1604	802	12
44	13	Wto	181	21.49199	-14.09	21.4914	-13.11	0.98746	21.4523	-9.52	62.634	0.0	0	707	1159.9	1654	647	1156.0	1717	758	13
45	14	Śro	182	21.53164	-14.07	21.5308	-12.50	0.98765	22.3015	-4.55	63.023	1.0	1	705	1159.9	1656	701	1238.1	1828	754	14
46	15	Czw	183	21.57130	-14.04	21.5702	-12.30	0.98784	23.1356	0.09	63.335	2.0	4	703	1159.8	1658	714	1318.9	1938	750	15
47	16	Pią	184	22.01096	-14.01	22.0055	-12.09	0.98804	23.5712	5.10	63.545	3.0	8	701	1159.8	1659	727	1359.4	2047	746	16
48	17	Sob	185	22.05061	-13.56	22.0448	-11.48	0.98824	0.4052	9.58	63.625	4.0	14	659	1159.7	1701	740	1440.3	2157	742	17
49	18	Nie	186	22.09027	-13.51	22.0839	-11.27	0.98844	1.2540	14.23	63.551	5.0	21	657	1159.6	1703	755	1522.5	2307	738	18
50	19	Pon	187	22.12592	-13.46	22.1230	-11.05	0.98865	2.1218	18.16	63.301	6.0	30	655	1159.5	1705	813	1606.9	****	735	19
51	20	Wto	188	22.16558	-13.40	22.1620	-10.44	0.98885	3.0118	21.26	62.868	7.0	39	652	1159.4	1707	835	1654.0	017	731	20
52	21	Śro	189	22.20523	-13.33	22.2010	-10.22	0.98906	3.5259	23.43	62.253	8.0	48	650	1159.3	1709	906	1744.0	126	727	21
53	22	Czw	190	22.24489	-13.25	22.2359	-10.00	0.98928	4.4714	24.54	61.476	0.8	58	648	1159.2	1711	947	1836.7	231	723	22
54	23	Pią	191	22.28454	-13.17	22.2747	-9.38	0.98950	5.4332	24.50	60.573	1.8	68	646	1159.0	1713	1041	1931.5	329	719	23
55	24	Sob	192	22.32420	-13.08	22.3135	-9.16	0.98972	6.4100	23.23	59.599	2.8	77	644	1158.9	1715	1148	2027.3	416	715	24
56	25	Nie	193	22.36386	-12.58	22.3522	-8.54	0.98994	7.3839	20.34	58.624	3.8	86	642	1158.7	1717	1307	2122.9	452	711	25
57	26	Pon	194	22.40351	-12.48	22.3908	-8.31	0.99017	8.3541	16.27	57.726	4.8	93	639	1158.6	1719	1432	2217.6	520	707	26
58	27	Wto	195	22.44316	-12.38	22.4254	-8.09	0.99041	9.3144	11.15	56.988	5.8	98	637	1158.4	1721	1601	2311.3	542	703	27
59	28	Śro	196	22.48282	-12.26	22.4640	-7.46	0.99065	10.2657	5.17	56.478	6.8	100	635	1158.2	1722	1731	*****	601	659	28

Fazy Księżyca [Dm, h.mm]:      3kw 5, 22.52      Now 13, 11.31      1kw 21, 16.10      Pełn 28, 18.10

# LUTY 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	5.30	18.31	6.12	14.26	7.07	15.13	21.58	9.43	23.26	9.56	10.09	0.19	11.18	3.49	9.15	21.35	8.03	15.34		
	21.022	-16.95	19.340	-20.17	20.192	-20.69	12.874	-2.31	13.723	-9.22	2.240	10.99	4.579	21.97	0.450	1.35	20.841	-23.15	8.76600	1
3	5.27	18.34	6.11	14.22	7.06	15.19	21.51	9.36	23.18	9.48	10.01	0.11	11.11	3.41	9.07	21.27	7.56	15.27		
	21.158	-16.36	19.428	-20.37	20.367	-20.20	12.892	-2.38	13.726	-9.23	2.246	11.04	4.578	21.97	0.453	1.37	20.845	-23.13	8.89742	3
5	5.24	18.37	6.11	14.20	7.05	15.25	21.45	9.28	23.11	9.41	9.54	0.04	11.03	3.33	8.59	21.20	7.48	15.19		
	21.292	-15.76	19.538	-20.50	20.541	-19.67	12.907	-2.44	13.729	-9.23	2.253	11.08	4.576	21.97	0.456	1.39	20.849	-23.12	9.02884	5
7	5.21	18.41	6.11	14.19	7.04	15.32	21.38	9.21	23.03	9.33	9.46	23.53	10.55	3.26	8.52	21.12	7.40	15.12		
	21.425	-15.14	19.665	-20.57	20.713	-19.10	12.919	-2.48	13.730	-9.24	2.260	11.13	4.575	21.97	0.460	1.41	20.854	-23.11	9.16026	7
9	5.18	18.44	6.12	14.20	7.02	15.38	21.31	9.14	22.55	9.25	9.38	23.46	10.47	3.18	8.44	21.05	7.33	15.04		
	21.558	-14.50	19.806	-20.57	20.885	-18.49	12.929	-2.50	13.731	-9.23	2.267	11.18	4.574	21.96	0.463	1.44	20.858	-23.09	9.29168	9
11	5.14	18.47	6.12	14.21	7.00	15.45	21.23	9.06	22.47	9.17	9.31	23.39	10.39	3.10	8.36	20.57	7.25	14.57		
	21.690	-13.85	19.960	-20.49	21.054	-17.85	12.935	-2.50	13.732	-9.23	2.275	11.23	4.573	21.96	0.467	1.46	20.863	-23.08	9.42310	11
13	5.11	18.51	6.13	14.25	6.58	15.51	21.15	8.59	22.39	9.10	9.23	23.32	10.31	3.02	8.28	20.50	7.17	14.49		
	21.821	-13.18	20.124	-20.34	21.223	-17.17	12.939	-2.49	13.731	-9.21	2.284	11.28	4.573	21.96	0.470	1.49	20.867	-23.07	9.55452	13
15	5.07	18.54	6.14	14.29	6.56	15.58	21.07	8.51	22.31	9.02	9.15	23.25	10.23	2.54	8.20	20.42	7.09	14.42		
	21.951	-12.49	20.296	-20.10	21.390	-16.46	12.940	-2.46	13.730	-9.20	2.292	11.33	4.573	21.96	0.474	1.51	20.871	-23.05	9.68594	15
17	5.03	18.58	6.15	14.34	6.53	16.04	20.59	8.43	22.23	8.54	9.08	23.18	10.15	2.46	8.13	20.35	7.02	14.34		
	22.080	-11.80	20.474	-19.78	21.556	-15.73	12.937	-2.41	13.727	-9.18	2.302	11.39	4.573	21.96	0.478	1.53	20.875	-23.04	9.81736	17
19	4.59	19.02	6.15	14.39	6.51	16.11	20.51	8.35	22.15	8.46	9.00	23.11	10.07	2.38	8.05	20.27	6.54	14.27		
	22.208	-11.09	20.659	-19.37	21.721	-14.96	12.932	-2.34	13.724	-9.15	2.311	11.44	4.573	21.96	0.481	1.56	20.879	-23.03	9.94877	19
21	4.55	19.05	6.15	14.46	6.48	16.18	20.42	8.27	22.07	8.38	8.52	23.04	9.60	2.30	7.57	20.20	6.46	14.19		
	22.336	-10.37	20.848	-18.88	21.885	-14.16	12.923	-2.26	13.721	-9.12	2.321	11.50	4.573	21.97	0.485	1.59	20.884	-23.02	10.08019	21
23	4.51	19.09	6.15	14.54	6.45	16.24	20.33	8.19	21.58	8.30	8.45	22.57	9.52	2.23	7.49	20.12	6.39	14.12		
	22.463	-9.63	21.042	-18.31	22.047	-13.34	12.911	-2.15	13.716	-9.09	2.331	11.56	4.574	21.97	0.489	1.61	20.888	-23.01	10.21161	23
25	4.47	19.13	6.15	15.02	6.42	16.31	20.23	8.11	21.50	8.22	8.37	22.50	9.44	2.15	7.42	20.05	6.31	14.04		
	22.589	-8.89	21.239	-17.65	22.208	-12.49	12.896	-2.03	13.711	-9.05	2.342	11.63	4.575	21.97	0.493	1.64	20.892	-22.99	10.34304	25
27	4.43	19.16	6.14	15.11	6.39	16.38	20.14	8.03	21.42	8.14	8.30	22.43	9.36	2.07	7.34	19.57	6.23	13.57		
	22.715	-8.14	21.439	-16.90	22.367	-11.63	12.877	-1.90	13.705	-9.01	2.353	11.69	4.576	21.97	0.498	1.67	20.896	-22.98	10.47445	27

# MARZEC 2029

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →										Czas strefowy [hhmm.]										
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
60	1	Czw	197	22.52247	-12.15	22.5025	-7.23	0.99089	11.2149	-1.03	56.242	0.7	99	633	1158.0	1724	1901	004.2	619	655	1	
61	2	Pią	198	22.56213	-12.03	22.5409	-7.00	0.99113	12.1704	-7.21	56.295	1.7	95	630	1157.8	1726	2032	057.1	636	651	2	
62	3	Sob	199	23.00179	-11.50	22.5753	-6.37	0.99139	13.1323	-13.10	56.619	2.7	89	628	1157.6	1728	2202	150.8	655	647	3	
63	4	Nie	200	23.04144	-11.37	23.0136	-6.14	0.99164	14.1111	-18.06	57.167	3.7	80	626	1157.4	1730	2331	246.1	718	643	4	
64	5	Pon	201	23.08109	-11.23	23.0519	-5.51	0.99190	15.1028	-21.50	57.875	4.7	70	623	1157.1	1732	****	343.1	746	639	5	
65	6	Wto	202	23.12075	-11.09	23.0902	-5.28	0.99216	16.1035	-24.08	58.674	5.7	60	621	1156.9	1734	053	441.4	824	636	6	
66	7	Śro	203	23.16041	-10.55	23.1244	-5.04	0.99242	17.1026	-24.56	59.501	0.1	49	619	1156.7	1736	205	539.8	914	632	7	
67	8	Czw	204	23.20006	-10.41	23.1626	-4.41	0.99268	18.0843	-24.17	60.303	1.1	38	616	1156.4	1737	301	636.8	1015	628	8	
68	9	Pią	205	23.23572	-10.26	23.2008	-4.17	0.99295	19.0425	-22.20	61.045	2.1	28	614	1156.2	1739	343	731.1	1125	624	9	
69	10	Sob	206	23.27537	-10.10	23.2349	-3.54	0.99322	19.5703	-19.18	61.706	3.1	20	612	1155.9	1741	413	822.0	1239	620	10	
70	11	Nie	207	23.31503	-9.55	23.2730	-3.30	0.99349	20.4637	-15.28	62.276	4.1	12	609	1155.7	1743	436	909.6	1353	616	11	
71	12	Pon	208	23.35468	-9.39	23.3111	-3.07	0.99376	21.3334	-11.02	62.751	5.1	7	607	1155.4	1745	454	954.2	1506	612	12	
72	13	Wto	209	23.39434	-9.22	23.3451	-2.43	0.99403	22.1833	-6.13	63.134	6.1	3	605	1155.1	1747	509	1036.5	1617	608	13	
73	14	Śro	210	23.43400	-9.06	23.3831	-2.19	0.99430	23.0217	-1.14	63.426	7.1	0	602	1154.8	1749	522	1117.5	1726	604	14	
74	15	Czw	211	23.47365	-8.49	23.4211	-1.56	0.99458	23.4532	3.45	63.625	0.3	0	600	1154.6	1750	535	1157.9	1836	600	15	
75	16	Pią	212	23.51330	-8.32	23.4550	-1.32	0.99485	0.2905	8.35	63.726	1.3	1	557	1154.3	1752	548	1238.6	1945	556	16	
76	17	Sob	213	23.55296	-8.15	23.4930	-1.08	0.99512	1.1335	13.05	63.719	2.3	5	555	1154.0	1754	603	1320.5	2054	552	17	
77	18	Nie	214	23.59261	-7.58	23.5309	-0.45	0.99539	1.5941	17.06	63.590	3.3	9	553	1153.7	1756	620	1404.0	2204	548	18	
78	19	Pon	215	0.03227	-7.40	23.5648	-0.21	0.99567	2.4750	20.26	63.323	4.3	16	550	1153.4	1758	641	1449.9	2313	544	19	
79	20	Wto	216	0.07192	-7.23	0.0027	0.03	0.99594	3.3816	22.56	62.908	5.3	23	548	1153.1	1759	708	1538.2	****	541	20	
80	21	Śro	217	0.11158	-7.05	0.0406	0.27	0.99621	4.3056	24.25	62.339	6.3	32	545	1152.8	1801	745	1629.0	019	537	21	
81	22	Czw	218	0.15124	-6.47	0.0744	0.50	0.99649	5.2523	24.44	61.621	7.3	41	543	1152.5	1803	832	1721.7	118	533	22	
82	23	Pią	219	0.19089	-6.29	0.1123	1.14	0.99676	6.2056	23.48	60.773	0.1	51	541	1152.2	1805	933	1815.4	208	529	23	
83	24	Sob	220	0.23055	-6.11	0.1501	1.38	0.99704	7.1647	21.34	59.831	1.1	62	538	1151.9	1807	1044	1909.2	247	525	24	
84	25	Nie	221	0.27020	-5.53	0.1840	2.01	0.99732	8.1220	18.05	58.850	2.1	72	536	1151.6	1808	1204	2002.5	318	521	25	
84	25	Nie	221	23.26522	-5.53	0.1831	2.00	0.99731	8.1002	18.15	58.890	2.1	72	636	1251.6	1909	1304	2102.5	418	621	25	
85	26	Pon	222	23.30487	-5.35	0.2209	2.24	0.99759	9.0459	13.41	57.936	3.1	81	633	1251.3	1910	1428	2155.2	442	617	26	
86	27	Wto	223	23.34453	-5.17	0.2547	2.47	0.99787	9.5928	8.13	57.088	4.1	89	631	1251.0	1912	1555	2247.4	503	613	27	
87	28	Śro	224	23.38418	-4.59	0.2926	3.11	0.99815	10.5355	2.09	56.428	5.1	96	629	1250.7	1914	1724	2340.0	521	609	28	
88	29	Czw	225	23.42384	-4.41	0.3304	3.34	0.99844	11.4903	-4.11	56.026	6.1	99	626	1250.4	1916	1855	****	538	605	29	
89	30	Pią	226	23.46349	-4.23	0.3643	3.57	0.99872	12.4536	-10.18	55.925	0.3	100	624	1250.1	1917	2027	033.8	557	601	30	
90	31	Sob	227	23.50315	-4.05	0.4021	4.21	0.99901	13.4408	-15.47	56.137	1.3	97	621	1249.8	1919	2159	129.5	618	557	31	

Fazy Księżyca [Dm, h.mm]: Pełn 0, 18.10 3kw 7, 8.52 Nów 15, 5.19 1kw 23, 8.33 1kw 23, 9.33 Pełn 30, 4.26



# MARZEC 2029 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.38	19.20	6.14	15.20	6.35	16.44	20.04	7.55	21.33	8.06	8.22	22.37	9.28	1.59	7.26	19.50	6.16	13.49		
	22.840	-7.39	21.642	-16.08	22.526	-10.74	12.856	-1.74	13.698	-8.96	2.364	11.75	4.578	21.98	0.502	1.70	20.900	-22.97	10.60587	1
3	4.33	19.24	6.12	15.30	6.32	16.51	19.53	7.46	21.24	7.58	8.15	22.30	9.21	1.52	7.18	19.42	6.08	13.42		
	22.965	-6.62	21.847	-15.16	22.684	-9.83	12.831	-1.57	13.690	-8.91	2.376	11.82	4.580	21.98	0.506	1.72	20.904	-22.96	10.73729	3
5	4.29	19.28	6.11	15.41	6.28	16.58	19.43	7.38	21.16	7.50	8.07	22.23	9.13	1.44	7.11	19.35	6.00	13.34		
	23.089	-5.85	22.055	-14.16	22.840	-8.90	12.803	-1.38	13.682	-8.86	2.388	11.89	4.582	21.98	0.510	1.75	20.907	-22.95	10.86870	5
7	4.24	19.32	6.09	15.52	6.24	17.04	19.32	7.29	21.07	7.42	7.60	22.16	9.05	1.36	7.03	19.27	5.52	13.27		
	23.212	-5.07	22.265	-13.08	22.996	-7.96	12.772	-1.18	13.673	-8.80	2.400	11.96	4.584	21.99	0.515	1.78	20.911	-22.94	11.00012	7
9	4.19	19.36	6.07	16.03	6.20	17.11	19.21	7.20	20.58	7.34	7.52	22.10	8.57	1.28	6.55	19.20	5.45	13.19		
	23.335	-4.29	22.477	-11.91	23.151	-7.01	12.738	-0.96	13.663	-8.74	2.412	12.03	4.587	22.00	0.519	1.81	20.915	-22.94	11.13155	9
11	4.14	19.40	6.05	16.15	6.17	17.18	19.10	7.11	20.49	7.26	7.45	22.03	8.49	1.21	6.47	19.12	5.37	13.11		
	23.458	-3.51	22.691	-10.66	23.306	-6.04	12.701	-0.73	13.653	-8.67	2.425	12.10	4.589	22.00	0.524	1.84	20.918	-22.93	11.26297	11
13	4.09	19.44	6.03	16.28	6.13	17.24	18.58	7.02	20.40	7.17	7.37	21.56	8.42	1.13	6.40	19.05	5.29	13.04		
	23.581	-2.72	22.908	-9.33	23.459	-5.06	12.662	-0.49	13.642	-8.61	2.438	12.17	4.592	22.01	0.528	1.87	20.922	-22.92	11.39438	13
15	4.04	19.48	6.00	16.41	6.09	17.31	18.47	6.53	20.32	7.09	7.30	21.50	8.34	1.06	6.32	18.58	5.22	12.56		
	23.703	-1.93	23.128	-7.92	23.612	-4.07	12.620	-0.24	13.631	-8.53	2.452	12.24	4.595	22.01	0.533	1.90	20.925	-22.91	11.52580	15
17	3.58	19.52	5.58	16.55	6.05	17.37	18.35	6.44	20.23	7.01	7.22	21.43	8.26	0.58	6.24	18.50	5.14	12.49		
	23.825	-1.14	23.350	-6.42	23.765	-3.08	12.577	0.02	13.619	-8.46	2.465	12.31	4.599	22.02	0.537	1.93	20.929	-22.91	11.65722	17
19	3.53	19.56	5.55	17.09	6.00	17.44	18.23	6.35	20.13	6.53	7.15	21.36	8.19	0.50	6.16	18.43	5.06	12.41		
	23.947	-0.35	23.576	-4.86	23.917	-2.08	12.531	0.28	13.606	-8.38	2.479	12.39	4.603	22.03	0.542	1.96	20.932	-22.90	11.78863	19
21	3.48	20.01	5.52	17.23	5.56	17.50	18.11	6.26	20.04	6.45	7.07	21.30	8.11	0.43	6.09	18.35	4.58	12.33		
	0.068	0.44	23.804	-3.21	0.069	-1.07	12.485	0.55	13.593	-8.30	2.493	12.46	4.607	22.04	0.546	1.99	20.935	-22.89	11.92005	21
23	3.42	20.05	5.49	17.38	5.52	17.57	17.58	6.17	19.55	6.37	6.60	21.23	8.03	0.35	6.01	18.28	4.51	12.26		
	0.190	1.23	0.036	-1.50	0.221	-0.07	12.437	0.82	13.579	-8.22	2.507	12.54	4.611	22.05	0.551	2.01	20.938	-22.89	12.05147	23
25	3.36	20.10	5.46	17.54	5.48	18.04	17.46	6.07	19.46	6.28	6.52	21.17	7.56	0.28	5.53	18.20	4.43	12.18		
	0.311	2.02	0.272	0.27	0.372	0.94	12.388	1.08	13.565	-8.13	2.522	12.61	4.615	22.05	0.556	2.04	20.941	-22.88	12.18289	25
25	4.36	21.10	6.46	18.54	6.48	19.03	18.46	7.07	20.46	7.28	7.52	22.17	8.56	1.28	6.53	19.20	5.43	13.18		
	0.309	2.00	0.267	0.23	0.369	0.92	12.389	1.08	13.566	-8.13	2.522	12.61	4.615	22.05	0.556	2.04	20.941	-22.88	12.18289	25
27	4.31	21.14	6.42	19.10	6.44	19.10	18.34	6.58	20.37	7.20	7.45	22.10	8.48	1.20	6.45	19.13	5.35	13.10		
	0.430	2.79	0.506	2.05	0.521	1.93	12.340	1.34	13.551	-8.05	2.536	12.69	4.619	22.06	0.560	2.07	20.944	-22.88	12.31431	27
29	4.25	21.19	6.39	19.26	6.40	19.16	18.22	6.49	20.28	7.12	7.37	22.04	8.40	1.13	6.38	19.06	5.28	13.03		
	0.551	3.57	0.748	3.91	0.672	2.94	12.291	1.60	13.536	-7.96	2.551	12.77	4.624	22.07	0.565	2.10	20.947	-22.87	12.44573	29
31	4.19	21.24	6.36	19.43	6.35	19.23	18.10	6.39	20.18	7.04	7.30	21.57	8.33	1.05	6.30	18.58	5.20	12.55		
	0.673	4.34	0.992	5.79	0.824	3.94	12.243	1.85	13.521	-7.87	2.566	12.84	4.629	22.08	0.569	2.13	20.949	-22.87	12.57714	31

# KWIECIEŃ 2029

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]											
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
91	1	Nie	228	23.54280	-3.47	0.4360	4.44	0.99930	14.4443	-20.11	56.634	2.3	92	619	1249.5	1921	2328	227.6	645	553	1	
92	2	Pon	229	23.58246	-3.29	0.4739	5.07	0.99959	15.4646	-23.10	57.360	3.3	84	617	1249.2	1923	****	327.7	720	549	2	
93	3	Wto	230	0.02211	-3.11	0.5118	5.30	0.99988	16.4857	-24.34	58.240	4.3	75	614	1248.9	1925	047	428.5	807	545	3	
94	4	Śro	231	0.06177	-2.54	0.5457	5.53	1.00018	17.4940	-24.23	59.194	5.3	65	612	1248.6	1926	152	528.2	906	542	4	
95	5	Czw	232	0.10142	-2.37	0.5836	6.15	1.00047	18.4734	-22.47	60.147	6.3	54	610	1248.4	1928	240	625.2	1015	538	5	
96	6	Pią	233	0.14108	-2.20	1.0216	6.38	1.00076	19.4157	-20.02	61.040	0.6	44	607	1248.1	1930	315	718.2	1129	534	6	
97	7	Sob	234	0.18074	-2.03	1.0555	7.01	1.00106	20.3246	-16.23	61.829	1.6	34	605	1247.8	1932	341	807.3	1244	530	7	
98	8	Nie	235	0.22039	-1.46	1.0935	7.23	1.00135	21.2029	-12.08	62.488	2.6	25	603	1247.5	1934	400	852.9	1357	526	8	
99	9	Pon	236	0.26005	-1.30	1.1315	7.45	1.00164	22.0552	-7.27	63.006	3.6	17	600	1247.2	1935	416	935.8	1508	522	9	
100	10	Wto	237	0.29570	-1.14	1.1656	8.08	1.00193	22.4943	-2.34	63.383	4.6	11	558	1247.0	1937	430	1017.0	1617	518	10	
101	11	Śro	238	0.33536	-0.58	1.2037	8.30	1.00222	23.3255	2.23	63.625	5.6	5	556	1246.7	1939	443	1057.4	1726	514	11	
102	12	Czw	239	0.37501	-0.43	1.2418	8.52	1.00250	0.1616	7.13	63.743	6.6	2	553	1246.5	1941	456	1137.8	1835	510	12	
103	13	Pią	240	0.41467	-0.27	1.2759	9.13	1.00279	1.0029	11.47	63.749	7.6	0	551	1246.2	1943	511	1219.4	1944	506	13	
104	14	Sob	241	0.45432	-0.13	1.3141	9.35	1.00307	1.4612	15.55	63.649	0.5	0	549	1246.0	1944	527	1302.4	2054	502	14	
105	15	Nie	242	0.49398	0.02	1.3523	9.56	1.00335	2.3354	19.26	63.447	1.5	2	546	1245.7	1946	547	1347.7	2203	458	15	
106	16	Pon	243	0.53363	0.16	1.3906	10.18	1.00363	3.2349	22.09	63.143	2.5	6	544	1245.5	1948	613	1435.4	2310	454	16	
107	17	Wto	244	0.57329	0.30	1.4248	10.39	1.00390	4.1549	23.54	62.734	3.5	11	542	1245.3	1950	646	1525.3	****	450	17	
108	18	Śro	245	1.01294	0.43	1.4632	10.60	1.00417	5.0929	24.32	62.216	4.5	18	540	1245.0	1952	730	1617.0	011	446	18	
109	19	Czw	246	1.05260	0.56	1.5015	11.21	1.00444	6.0403	23.58	61.588	5.5	26	537	1244.8	1953	826	1709.6	103	443	19	
110	20	Pią	247	1.09226	1.08	1.5359	11.41	1.00471	6.5845	22.09	60.859	6.5	35	535	1244.6	1955	932	1802.1	145	439	20	
111	21	Sob	248	1.13191	1.21	1.5744	12.01	1.00498	7.5256	19.10	60.045	7.5	46	533	1244.4	1957	1047	1854.0	218	435	21	
112	22	Nie	249	1.17157	1.32	2.0128	12.22	1.00524	8.4620	15.06	59.179	0.6	56	531	1244.2	1959	1206	1944.9	244	431	22	
113	23	Pon	250	1.21122	1.44	2.0514	12.42	1.00551	9.3905	10.07	58.310	1.6	67	529	1244.0	2000	1329	2035.3	305	427	23	
114	24	Wto	251	1.25088	1.55	2.0859	13.01	1.00577	10.3143	4.28	57.498	2.6	78	527	1243.8	2002	1453	2125.9	323	423	24	
115	25	Śro	252	1.29053	2.05	2.1246	13.21	1.00603	11.2458	-1.34	56.817	3.6	87	524	1243.7	2004	1620	2217.5	341	419	25	
116	26	Czw	253	1.33019	2.15	2.1632	13.40	1.00630	12.1946	-7.39	56.336	4.6	94	522	1243.5	2006	1750	2311.2	358	415	26	
117	27	Pią	254	1.36584	2.24	2.2019	13.59	1.00656	13.1653	-13.22	56.114	5.6	98	520	1243.3	2008	1922	****	418	411	27	
118	28	Sob	255	1.40550	2.33	2.2407	14.18	1.00682	14.1646	-18.16	56.184	6.6	100	518	1243.2	2009	2053	007.9	442	407	28	
119	29	Nie	256	1.44515	2.42	2.2755	14.37	1.00708	15.1910	-21.55	56.547	1.0	99	516	1243.1	2011	2219	107.7	513	403	29	
120	30	Pon	257	1.48481	2.49	2.3144	14.55	1.00734	16.2256	-24.00	57.170	2.0	94	514	1242.9	2013	2333	209.6	555	359	30	

Fazy Księżyca [Dm, h.mm]:      3kw 5, 21.52      Now 13, 23.40      1kw 21, 21.50      Pełn 28, 12.37

# KWIECIEŃ 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	4.16	21.26	6.34	19.52	6.33	19.26	18.04	6.34	20.14	6.59	7.26	21.54	8.29	1.01	6.26	18.54	5.16	12.51		
	0.733	4.73	1.115	6.73	0.900	4.44	12.219	1.98	13.514	-7.82	2.574	12.88	4.632	22.09	0.572	2.15	20.951	-22.87	12.64285	1
3	4.10	21.31	6.30	20.09	6.29	19.33	17.52	6.25	20.04	6.51	7.19	21.47	8.21	0.54	6.18	18.47	5.08	12.43		
	0.855	5.50	1.362	8.61	1.052	5.43	12.171	2.21	13.498	-7.73	2.589	12.96	4.637	22.10	0.576	2.18	20.953	-22.87	12.77427	3
5	4.03	21.36	6.27	20.26	6.25	19.40	17.40	6.15	19.55	6.43	7.11	21.41	8.14	0.47	6.11	18.40	5.00	12.36		
	0.977	6.26	1.607	10.45	1.205	6.42	12.125	2.44	13.483	-7.64	2.605	13.04	4.642	22.11	0.581	2.21	20.956	-22.86	12.90569	5
7	3.57	21.42	6.23	20.43	6.21	19.46	17.28	6.06	19.46	6.35	7.04	21.34	8.06	0.39	6.03	18.32	4.53	12.28		
	1.099	7.01	1.849	12.22	1.358	7.39	12.080	2.65	13.467	-7.54	2.621	13.12	4.648	22.12	0.586	2.24	20.958	-22.86	13.03711	7
9	3.51	21.47	6.19	20.59	6.17	19.53	17.17	5.57	19.37	6.26	6.57	21.28	7.58	0.32	5.55	18.25	4.45	12.20		
	1.221	7.76	2.085	13.90	1.511	8.36	12.038	2.84	13.451	-7.45	2.637	13.20	4.654	22.13	0.590	2.26	20.960	-22.86	13.16853	9
11	3.44	21.52	6.16	21.14	6.13	19.60	17.06	5.47	19.27	6.18	6.49	21.22	7.51	0.24	5.47	18.17	4.37	12.13		
	1.344	8.49	2.312	15.45	1.666	9.31	11.997	3.02	13.435	-7.35	2.653	13.27	4.660	22.14	0.595	2.29	20.962	-22.86	13.29995	11
13	3.38	21.58	6.12	21.28	6.09	20.06	16.55	5.38	19.18	6.10	6.42	21.15	7.43	0.17	5.40	18.10	4.29	12.05		
	1.466	9.22	2.527	16.86	1.821	10.25	11.959	3.18	13.419	-7.26	2.669	13.35	4.666	22.16	0.599	2.32	20.964	-22.86	13.43136	13
15	3.31	22.04	6.08	21.41	6.05	20.13	16.44	5.29	19.09	6.01	6.35	21.09	7.36	0.09	5.32	18.02	4.22	11.57		
	1.590	9.94	2.728	18.10	1.977	11.18	11.923	3.32	13.403	-7.16	2.685	13.43	4.672	22.17	0.604	2.35	20.966	-22.86	13.56278	15
17	3.24	22.10	6.04	21.51	6.02	20.20	16.33	5.20	18.59	5.53	6.27	21.02	7.28	0.02	5.24	17.55	4.14	11.49		
	1.713	10.65	2.912	19.17	2.133	12.08	11.890	3.44	13.387	-7.07	2.701	13.51	4.679	22.18	0.608	2.38	20.967	-22.86	13.69420	17
19	3.17	22.16	5.60	21.59	5.58	20.27	16.23	5.10	18.50	5.45	6.20	20.56	7.20	23.51	5.16	17.48	4.06	11.42		
	1.838	11.34	3.077	20.07	2.291	12.97	11.860	3.53	13.371	-6.98	2.718	13.59	4.685	22.19	0.613	2.41	20.969	-22.86	13.82562	19
21	3.10	22.23	5.55	22.05	5.54	20.33	16.13	5.01	18.41	5.36	6.12	20.49	7.13	23.43	5.09	17.40	3.58	11.34		
	1.962	12.02	3.221	20.79	2.450	13.83	11.833	3.61	13.355	-6.89	2.734	13.67	4.692	22.21	0.617	2.43	20.971	-22.86	13.95704	21
23	3.03	22.29	5.51	22.08	5.51	20.40	16.04	4.52	18.31	5.28	6.05	20.43	7.05	23.36	5.01	17.33	3.51	11.26		
	2.087	12.69	3.342	21.32	2.610	14.67	11.809	3.67	13.340	-6.80	2.751	13.75	4.699	22.22	0.622	2.46	20.972	-22.87	14.08846	23
25	2.55	22.36	5.46	22.09	5.48	20.47	15.55	4.44	18.22	5.20	5.58	20.37	6.58	23.29	4.53	17.25	3.43	11.18		
	2.213	13.35	3.440	21.68	2.770	15.49	11.789	3.71	13.324	-6.71	2.767	13.82	4.706	22.23	0.626	2.49	20.973	-22.87	14.21988	25
27	2.47	22.44	5.41	22.07	5.45	20.54	15.46	4.35	18.13	5.11	5.50	20.30	6.50	23.21	4.45	17.18	3.35	11.10		
	2.339	13.99	3.513	21.86	2.932	16.28	11.772	3.72	13.310	-6.62	2.784	13.90	4.713	22.25	0.630	2.51	20.974	-22.87	14.35129	27
29	2.39	22.52	5.36	22.02	5.42	21.01	15.37	4.26	18.04	5.03	5.43	20.24	6.43	23.14	4.38	17.10	3.27	11.02		
	2.465	14.61	3.561	21.86	3.096	17.05	11.758	3.72	13.295	-6.54	2.801	13.98	4.721	22.26	0.634	2.54	20.975	-22.88	14.48271	29

# MAJ 2029

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
121	1	Wto	258	1.52446	2.57	2.3533	15.13	1.00759	17.2612	-24.26	57.992	3.0	88	512	1242.8	2015	****	312.0	650	355	1	
122	2	Śro	259	1.56412	3.04	2.3923	15.31	1.00785	18.2706	-23.17	58.937	4.0	79	510	1242.7	2016	030	412.3	758	351	2	
123	3	Czw	260	2.00378	3.10	2.4313	15.49	1.00811	19.2421	-20.48	59.923	5.0	70	508	1242.6	2018	112	509.0	913	348	3	
124	4	Pią	261	2.04343	3.15	2.4704	16.06	1.00836	20.1733	-17.19	60.877	6.0	60	506	1242.5	2020	142	601.1	1029	344	4	
125	5	Sob	262	2.08309	3.20	2.5056	16.23	1.00861	21.0703	-13.09	61.737	0.0	50	504	1242.4	2022	204	649.0	1145	340	5	
126	6	Nie	263	2.12274	3.25	2.5448	16.40	1.00886	21.5336	-8.32	62.459	1.0	40	502	1242.3	2023	222	733.5	1257	336	6	
127	7	Pon	264	2.16240	3.29	2.5840	16.57	1.00911	22.3806	-3.40	63.018	2.0	31	501	1242.3	2025	237	815.5	1407	332	7	
128	8	Wto	265	2.20205	3.32	3.0234	17.13	1.00935	23.2132	1.15	63.403	3.0	22	459	1242.2	2027	250	856.2	1516	328	8	
129	9	Śro	266	2.24171	3.35	3.0627	17.29	1.00959	0.0449	6.06	63.617	4.0	15	457	1242.2	2028	303	936.6	1625	324	9	
130	10	Czw	267	2.28136	3.37	3.1022	17.45	1.00983	0.4846	10.43	63.673	5.0	9	455	1242.1	2030	317	1017.7	1734	320	10	
131	11	Pią	268	2.32102	3.39	3.1417	18.00	1.01006	1.3407	14.56	63.589	6.0	4	454	1242.1	2032	333	1100.2	1843	316	11	
132	12	Sob	269	2.36067	3.40	3.1812	18.15	1.01029	2.2127	18.36	63.387	7.0	1	452	1242.1	2033	352	1144.9	1953	312	12	
133	13	Nie	270	2.40033	3.40	3.2208	18.30	1.01051	3.1105	21.31	63.088	8.0	0	450	1242.1	2035	416	1232.1	2101	308	13	
134	14	Pon	271	2.43599	3.40	3.2605	18.45	1.01073	4.0259	23.30	62.709	0.8	1	448	1242.1	2037	447	1321.8	2204	304	14	
135	15	Wto	272	2.47564	3.39	3.3002	18.59	1.01094	4.5641	24.23	62.262	1.8	3	447	1242.1	2038	529	1413.5	2259	300	15	
136	16	Śro	273	2.51530	3.38	3.3400	19.13	1.01115	5.5123	24.04	61.756	2.8	8	445	1242.1	2040	621	1506.1	2345	256	16	
137	17	Czw	274	2.55495	3.36	3.3759	19.26	1.01136	6.4608	22.31	61.196	3.8	14	444	1242.1	2042	725	1558.7	****	252	17	
138	18	Pią	275	2.59461	3.34	3.4158	19.39	1.01156	7.4010	19.47	60.586	4.8	22	442	1242.2	2043	837	1650.4	020	249	18	
139	19	Sob	276	3.03427	3.31	3.4557	19.52	1.01176	8.3304	15.60	59.935	5.8	31	441	1242.2	2045	954	1740.8	047	245	19	
140	20	Nie	277	3.07392	3.27	3.4957	20.05	1.01195	9.2451	11.20	59.257	6.8	42	439	1242.3	2046	1114	1830.1	110	241	20	
141	21	Pon	278	3.11358	3.23	3.5358	20.17	1.01214	10.1601	6.00	58.579	0.2	53	438	1242.4	2048	1235	1918.9	128	237	21	
142	22	Wto	279	3.15323	3.19	3.5759	20.29	1.01233	11.0719	0.15	57.936	1.2	64	437	1242.4	2049	1358	2008.1	145	233	22	
143	23	Śro	280	3.19289	3.14	4.0200	20.40	1.01251	11.5943	-5.38	57.378	2.2	75	435	1242.5	2051	1523	2058.9	202	229	23	
144	24	Czw	281	3.23254	3.09	4.0602	20.51	1.01269	12.5411	-11.19	56.956	3.2	84	434	1242.6	2052	1651	2152.4	220	225	24	
145	25	Pią	282	3.27220	3.03	4.1005	21.02	1.01287	13.5128	-16.25	56.724	4.2	92	433	1242.7	2053	1820	2249.2	241	221	25	
146	26	Sob	283	3.31185	2.56	4.1407	21.12	1.01305	14.5153	-20.32	56.720	5.2	97	432	1242.8	2055	1948	2349.4	308	217	26	
147	27	Nie	284	3.35151	2.49	4.1811	21.23	1.01322	15.5449	-23.16	56.964	6.2	100	431	1242.9	2056	2109	****	344	213	27	
148	28	Pon	285	3.39117	2.42	4.2215	21.32	1.01339	16.5845	-24.23	57.446	0.6	99	430	1243.0	2057	2215	051.8	432	209	28	
149	29	Wto	286	3.43082	2.34	4.2619	21.41	1.01356	18.0139	-23.50	58.132	1.6	96	428	1243.2	2059	2304	154.0	535	205	29	
150	30	Śro	287	3.47048	2.26	4.3024	21.50	1.01372	19.0139	-21.49	58.965	2.6	91	428	1243.3	2100	2340	253.8	649	201	30	
151	31	Czw	288	3.51013	2.17	4.3429	21.59	1.01389	19.5744	-18.36	59.873	3.6	84	427	1243.5	2101	****	349.5	807	157	31	

Fazy Księżyca [Dm, h.mm]:      3kw 5, 11.48      Nów 13, 15.42      1kw 21, 6.16      Pełn 27, 20.38

# MAJ 2029 (c.d.)

Świty, zmierny astronomyczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	2.31	22.60	5.31	21.54	5.39	21.07	15.28	4.17	17.54	4.55	5.36	20.18	6.35	23.07	4.30	17.03	3.20	10.55		
	2.593	15.22	3.584	21.69	3.260	17.78	11.747	3.69	13.281	-6.46	2.818	14.06	4.728	22.28	0.639	2.56	20.976	-22.88	14.61413	1
3	2.22	23.08	5.26	21.44	5.36	21.14	15.20	4.09	17.45	4.47	5.29	20.11	6.28	22.59	4.22	16.55	3.12	10.47		
	2.720	15.82	3.584	21.36	3.426	18.49	11.740	3.65	13.267	-6.38	2.835	14.13	4.736	22.29	0.643	2.59	20.977	-22.89	14.74556	3
5	2.12	23.18	5.20	21.31	5.34	21.21	15.13	4.00	17.36	4.38	5.21	20.05	6.20	22.52	4.14	16.48	3.04	10.39		
	2.849	16.39	3.562	20.87	3.593	19.16	11.735	3.58	13.253	-6.30	2.852	14.21	4.743	22.30	0.647	2.61	20.977	-22.89	14.87698	5
7	2.02	23.28	5.14	21.16	5.32	21.27	15.05	3.52	17.27	4.30	5.14	19.58	6.13	22.45	4.07	16.40	2.56	10.31		
	2.978	16.95	3.522	20.25	3.761	19.80	11.734	3.50	13.240	-6.23	2.868	14.29	4.751	22.32	0.651	2.64	20.978	-22.90	15.00840	7
9	1.51	23.40	5.08	20.60	5.30	21.34	14.58	3.44	17.18	4.22	5.07	19.52	6.05	22.38	3.59	16.33	2.48	10.23		
	3.108	17.49	3.466	19.51	3.930	20.40	11.736	3.40	13.228	-6.16	2.885	14.36	4.759	22.33	0.655	2.66	20.978	-22.91	15.13981	9
11	1.38	23.54	5.02	20.43	5.28	21.40	14.51	3.35	17.09	4.14	4.59	19.46	5.58	22.30	3.51	16.25	2.41	10.15		
	3.238	18.00	3.401	18.69	4.101	20.97	11.740	3.28	13.216	-6.09	2.902	14.44	4.767	22.35	0.658	2.68	20.978	-22.91	15.27123	11
13	1.22	0.24	4.56	20.25	5.27	21.47	14.44	3.27	17.00	4.05	4.52	19.39	5.50	22.23	3.43	16.18	2.33	10.07		
	3.369	18.50	3.331	17.83	4.272	21.50	11.748	3.14	13.204	-6.03	2.919	14.51	4.775	22.36	0.662	2.71	20.978	-22.92	15.40265	13
15	*****	*****	4.49	20.07	5.25	21.53	14.38	3.19	16.52	3.57	4.45	19.33	5.43	22.16	3.36	16.10	2.25	9.59		
	3.501	18.98	3.261	16.96	4.445	21.99	11.759	2.99	13.193	-5.97	2.936	14.58	4.783	22.37	0.666	2.73	20.978	-22.93	15.53407	15
17	*****	*****	4.43	19.50	5.25	21.59	14.32	3.11	16.43	3.49	4.37	19.26	5.35	22.08	3.28	16.03	2.17	9.51		
	3.633	19.44	3.197	16.13	4.619	22.43	11.772	2.82	13.183	-5.92	2.953	14.66	4.791	22.39	0.669	2.75	20.978	-22.94	15.66550	17
19	*****	*****	4.36	19.34	5.24	22.04	14.26	3.03	16.34	3.41	4.30	19.20	5.28	22.01	3.20	15.55	2.09	9.43		
	3.766	19.87	3.143	15.39	4.794	22.84	11.788	2.64	13.173	-5.87	2.970	14.73	4.799	22.40	0.673	2.77	20.978	-22.95	15.79692	19
21	*****	*****	4.30	19.20	5.24	22.10	14.20	2.56	16.25	3.33	4.23	19.13	5.20	21.54	3.12	15.48	2.02	9.36		
	3.899	20.28	3.103	14.75	4.970	23.20	11.807	2.44	13.164	-5.82	2.986	14.80	4.807	22.42	0.676	2.79	20.977	-22.96	15.92834	21
23	*****	*****	4.24	19.08	5.24	22.15	14.15	2.48	16.17	3.25	4.15	19.07	5.13	21.47	3.04	15.40	1.54	9.28		
	4.033	20.67	3.078	14.25	5.146	23.52	11.828	2.22	13.156	-5.78	3.003	14.87	4.816	22.43	0.679	2.81	20.977	-22.97	16.05975	23
25	*****	*****	4.18	18.57	5.25	22.20	14.09	2.40	16.08	3.17	4.08	19.01	5.05	21.39	2.57	15.32	1.46	9.20		
	4.168	21.04	3.070	13.89	5.324	23.79	11.852	1.99	13.148	-5.74	3.019	14.94	4.824	22.45	0.682	2.83	20.976	-22.98	16.19117	25
27	*****	*****	4.12	18.49	5.26	22.24	14.04	2.33	15.60	3.08	4.01	18.54	4.58	21.32	2.49	15.25	1.38	9.12		
	4.303	21.38	3.081	13.68	5.501	24.01	11.878	1.75	13.141	-5.70	3.036	15.01	4.833	22.46	0.686	2.85	20.975	-22.99	16.32259	27
29	*****	*****	4.06	18.42	5.27	22.29	13.60	2.25	15.51	3.00	3.54	18.48	4.50	21.25	2.41	15.17	1.30	9.04		
	4.439	21.69	3.110	13.63	5.680	24.19	11.906	1.50	13.135	-5.67	3.052	15.08	4.841	22.48	0.688	2.86	20.974	-23.00	16.45402	29
31	*****	*****	4.00	18.38	5.29	22.33	13.55	2.18	15.43	2.52	3.46	18.41	4.43	21.18	2.33	15.10	1.22	8.56		
	4.575	21.98	3.157	13.72	5.858	24.33	11.936	1.23	13.130	-5.65	3.069	15.14	4.849	22.49	0.691	2.88	20.973	-23.01	16.58544	31

# CZERWIEC 2029

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)											Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc		Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
152	1	Pią	289	3.54579	2.08	4.3835	22.07	1.01405	20.4945	-14.32	60.784	4.6	75	426	1243.6	2102	006	440.6	925	153	1	
153	2	Sob	290	3.58545	1.59	4.4241	22.15	1.01420	21.3816	-9.56	61.630	5.6	66	425	1243.8	2103	026	527.6	1041	150	2	
154	3	Nie	291	4.02510	1.49	4.4647	22.22	1.01436	22.2408	-5.03	62.357	6.6	56	424	1243.9	2104	042	611.4	1153	146	3	
155	4	Pon	292	4.06476	1.39	4.5054	22.29	1.01450	23.0821	-0.05	62.922	0.4	46	423	1244.1	2106	057	653.1	1303	142	4	
156	5	Wto	293	4.10441	1.28	4.5501	22.36	1.01465	23.5155	4.49	63.303	1.4	37	423	1244.3	2107	110	733.9	1412	138	5	
157	6	Śro	294	4.14407	1.17	4.5909	22.42	1.01479	0.3545	9.31	63.491	2.4	28	422	1244.5	2107	124	814.8	1521	134	6	
158	7	Czw	295	4.18372	1.06	5.0316	22.48	1.01493	1.2041	13.51	63.493	3.4	20	421	1244.6	2108	139	856.8	1631	130	7	
159	8	Pią	296	4.22338	0.54	5.0725	22.53	1.01506	2.0726	17.41	63.328	4.4	13	421	1244.8	2109	157	940.7	1740	126	8	
160	9	Sob	297	4.26303	0.43	5.1133	22.58	1.01518	2.5629	20.48	63.022	5.4	7	420	1245.0	2110	219	1027.1	1849	122	9	
161	10	Nie	298	4.30269	0.30	5.1542	23.03	1.01530	3.4760	23.04	62.609	6.4	3	420	1245.2	2111	247	1116.1	1955	118	10	
162	11	Pon	299	4.34235	0.18	5.1950	23.07	1.01541	4.4140	24.15	62.121	7.4	1	420	1245.4	2112	325	1207.6	2054	114	11	
163	12	Wto	300	4.38200	0.06	5.2359	23.11	1.01552	5.3646	24.15	61.590	0.3	0	419	1245.7	2112	414	1300.7	2143	110	12	
164	13	Śro	301	4.42166	-0.07	5.2809	23.14	1.01562	6.3217	22.58	61.042	1.3	2	419	1245.9	2113	515	1354.1	2222	106	13	
165	14	Czw	302	4.46132	-0.20	5.3218	23.17	1.01572	7.2713	20.29	60.497	2.3	5	419	1246.1	2114	626	1446.9	2252	102	14	
166	15	Pią	303	4.50097	-0.33	5.3627	23.20	1.01581	8.2054	16.53	59.968	3.3	11	419	1246.3	2114	743	1538.2	2315	058	15	
167	16	Sob	304	4.54063	-0.46	5.4037	23.22	1.01589	9.1310	12.22	59.461	4.3	19	419	1246.5	2115	903	1628.0	2335	055	16	
168	17	Nie	305	4.58028	-0.59	5.4447	23.23	1.01597	10.0417	7.11	58.983	5.3	28	419	1246.7	2115	1024	1716.6	2352	051	17	
169	18	Pon	306	5.01594	-1.12	5.4856	23.25	1.01605	10.5455	1.34	58.541	6.3	39	419	1246.9	2115	1145	1804.9	****	047	18	
170	19	Wto	307	5.05559	-1.25	5.5306	23.26	1.01612	11.4559	-4.12	58.147	0.0	50	419	1247.2	2116	1307	1853.9	008	043	19	
171	20	Śro	308	5.09525	-1.38	5.5715	23.26	1.01618	12.3827	-9.50	57.821	1.0	62	419	1247.4	2116	1431	1944.7	025	039	20	
172	21	Czw	309	5.13490	-1.51	6.0125	23.26	1.01624	13.3313	-14.59	57.589	2.0	73	419	1247.6	2116	1558	2038.4	045	035	21	
173	22	Pią	310	5.17456	-2.04	6.0535	23.26	1.01630	14.3052	-19.19	57.481	3.0	82	419	1247.8	2116	1724	2135.5	108	031	22	
174	23	Sob	311	5.21422	-2.17	6.0944	23.25	1.01635	15.3122	-22.28	57.525	4.0	90	420	1248.0	2116	1846	2235.4	139	027	23	
175	24	Nie	312	5.25387	-2.30	6.1353	23.24	1.01640	16.3349	-24.10	57.742	5.0	96	420	1248.2	2116	1958	2336.8	220	023	24	
176	25	Pon	313	5.29353	-2.42	6.1803	23.22	1.01645	17.3632	-24.15	58.135	6.0	99	420	1248.4	2116	2054	*****	316	019	25	
177	26	Wto	314	5.33319	-2.55	6.2212	23.20	1.01649	18.3736	-22.47	58.691	0.3	100	421	1248.7	2116	2136	037.4	424	015	26	
178	27	Śro	315	5.37284	-3.07	6.2621	23.18	1.01653	19.3533	-19.59	59.378	1.3	98	421	1248.9	2116	2206	135.2	541	011	27	
179	28	Czw	316	5.41250	-3.19	6.3029	23.15	1.01657	20.2944	-16.11	60.148	2.3	94	422	1249.1	2116	2229	228.9	701	007	28	
180	29	Pią	317	5.45215	-3.31	6.3438	23.12	1.01660	21.2016	-11.41	60.941	3.3	88	422	1249.3	2116	2247	318.5	819	003	29	
181	30	Sob	318	5.49181	-3.43	6.3846	23.08	1.01663	22.0748	-6.48	61.698	4.3	80	423	1249.5	2115	2302	404.4	934	2356	30	

Fazy Księżyca [Dm, h.mm]:      3kw 4, 3.19      Nów 12, 5.51      1kw 19, 11.54      Pełn 26, 5.22

# CZERWIEC 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	*****	*****	3.57	18.36	5.30	22.34	13.53	2.14	15.39	2.48	3.43	18.38	4.39	21.14	2.29	15.06	1.19	8.52		
	4.643	22.12	3.187	13.82	5.948	24.37	11.952	1.10	13.127	-5.64	3.077	15.17	4.854	22.50	0.693	2.89	20.973	-23.02	16.65115	1
3	*****	*****	3.52	18.35	5.32	22.38	13.48	2.06	15.31	2.40	3.35	18.31	4.32	21.07	2.22	14.58	1.11	8.44		
	4.780	22.37	3.261	14.12	6.126	24.43	11.985	0.81	13.123	-5.62	3.093	15.24	4.862	22.51	0.695	2.90	20.972	-23.03	16.78257	3
5	*****	*****	3.47	18.35	5.35	22.41	13.44	1.59	15.23	2.32	3.28	18.25	4.24	20.60	2.14	14.51	1.03	8.35		
	4.917	22.60	3.351	14.54	6.305	24.45	12.020	0.52	13.119	-5.61	3.109	15.30	4.870	22.53	0.698	2.92	20.970	-23.04	16.91399	5
7	*****	*****	3.43	18.36	5.38	22.43	13.40	1.52	15.14	2.24	3.21	18.18	4.17	20.52	2.06	14.43	0.55	8.27		
	5.055	22.80	3.459	15.06	6.484	24.41	12.057	0.22	13.116	-5.60	3.125	15.37	4.879	22.54	0.700	2.93	20.969	-23.05	17.04541	7
9	*****	*****	3.38	18.40	5.41	22.45	13.36	1.45	15.06	2.16	3.13	18.12	4.09	20.45	1.58	14.35	0.47	8.19		
	5.192	22.97	3.582	15.67	6.662	24.33	12.096	-0.10	13.114	-5.59	3.141	15.43	4.887	22.55	0.703	2.94	20.967	-23.07	17.17683	9
11	*****	*****	3.34	18.45	5.45	22.47	13.33	1.38	14.58	2.08	3.06	18.05	4.02	20.38	1.51	14.28	0.39	8.11		
	5.331	23.11	3.721	16.36	6.840	24.20	12.136	-0.42	13.112	-5.59	3.156	15.49	4.896	22.57	0.705	2.96	20.966	-23.08	17.30825	11
13	*****	*****	3.31	18.51	5.50	22.48	13.29	1.30	14.51	2.00	2.59	17.59	3.54	20.31	1.43	14.20	0.31	8.03		
	5.469	23.23	3.876	17.10	7.018	24.02	12.179	-0.76	13.111	-5.60	3.172	15.55	4.904	22.58	0.707	2.97	20.964	-23.09	17.43968	13
15	*****	*****	3.28	18.58	5.54	22.49	13.26	1.23	14.43	1.52	2.51	17.52	3.47	20.23	1.35	14.12	0.24	7.55		
	5.608	23.33	4.046	17.90	7.195	23.80	12.222	-1.10	13.111	-5.61	3.187	15.61	4.913	22.59	0.709	2.98	20.962	-23.11	17.57110	15
17	*****	*****	3.26	19.07	5.59	22.50	13.22	1.16	14.35	1.45	2.44	17.46	3.39	20.16	1.27	14.05	0.16	7.47		
	5.746	23.39	4.233	18.73	7.371	23.53	12.268	-1.45	13.112	-5.62	3.202	15.67	4.921	22.61	0.711	2.99	20.960	-23.12	17.70252	17
19	*****	*****	3.25	19.17	6.04	22.50	13.19	1.09	14.27	1.37	2.37	17.39	3.32	20.09	1.19	13.57	0.08	7.39		
	5.885	23.43	4.436	19.56	7.546	23.21	12.315	-1.81	13.113	-5.64	3.217	15.72	4.929	22.62	0.713	3.00	20.958	-23.14	17.83394	19
21	*****	*****	3.24	19.28	6.09	22.50	13.16	1.02	14.20	1.29	2.29	17.32	3.24	20.01	1.11	13.49	23.56	7.31		
	6.024	23.44	4.655	20.39	7.720	22.85	12.363	-2.17	13.116	-5.66	3.231	15.78	4.938	22.63	0.714	3.01	20.956	-23.15	17.96536	21
23	*****	*****	3.25	19.40	6.15	22.49	13.13	0.56	14.12	1.21	2.22	17.26	3.17	19.54	1.04	13.41	23.48	7.23		
	6.162	23.42	4.890	21.20	7.893	22.45	12.413	-2.55	13.119	-5.69	3.246	15.83	4.946	22.65	0.716	3.01	20.954	-23.17	18.09678	23
25	*****	*****	3.26	19.53	6.21	22.48	13.10	0.49	14.05	1.13	2.15	17.19	3.10	19.47	0.56	13.34	23.40	7.15		
	6.301	23.37	5.142	21.95	8.065	22.00	12.464	-2.93	13.122	-5.72	3.260	15.88	4.954	22.66	0.717	3.02	20.952	-23.18	18.22820	25
27	*****	*****	3.29	20.06	6.27	22.47	13.08	0.42	13.57	1.05	2.07	17.12	3.02	19.40	0.48	13.26	23.32	7.07		
	6.439	23.30	5.410	22.62	8.235	21.51	12.516	-3.31	13.127	-5.76	3.274	15.93	4.962	22.67	0.718	3.03	20.949	-23.20	18.35963	27
29	*****	*****	3.34	20.20	6.33	22.45	13.05	0.35	13.50	0.58	2.00	17.06	2.55	19.32	0.40	13.18	23.24	6.58		
	6.577	23.20	5.692	23.19	8.404	20.99	12.570	-3.71	13.132	-5.80	3.288	15.98	4.970	22.68	0.719	3.03	20.947	-23.21	18.49105	29

# LIPIEC 2029

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Nie	319	5.53147	-3.55	6.4254	23.04	1.01665	22.5312	-1.45	62.362	5.3	72	424	1249.7	2115	2316	447.7	1047	2352	1
183	2	Pon	320	5.57112	-4.06	6.4702	22.60	1.01668	23.3726	3.15	62.885	6.3	63	425	1249.8	2115	2330	529.4	1157	2348	2
184	3	Wto	321	6.01078	-4.17	6.5110	22.55	1.01669	0.2126	8.04	63.232	7.3	53	425	1250.0	2114	2345	610.6	1306	2344	3
185	4	Śro	322	6.05043	-4.28	6.5517	22.50	1.01670	1.0606	12.32	63.384	0.7	44	426	1250.2	2114	****	652.3	1416	2340	4
186	5	Czw	323	6.09009	-4.38	6.5924	22.44	1.01671	1.5211	16.32	63.336	1.7	34	427	1250.4	2113	001	735.3	1525	2336	5
187	6	Pią	324	6.12574	-4.48	7.0331	22.38	1.01671	2.4019	19.54	63.098	2.7	26	428	1250.6	2112	021	820.5	1634	2332	6
188	7	Sob	325	6.16540	-4.58	7.0737	22.32	1.01671	3.3053	22.27	62.695	3.7	18	429	1250.7	2112	047	908.4	1742	2328	7
189	8	Nie	326	6.20505	-5.07	7.1143	22.25	1.01670	4.2351	23.60	62.163	4.7	11	430	1250.9	2111	121	958.9	1843	2324	8
190	9	Pon	327	6.24471	-5.16	7.1549	22.18	1.01668	5.1844	24.23	61.545	5.7	5	431	1251.0	2110	205	1051.6	1937	2320	9
191	10	Wto	328	6.28437	-5.25	7.1954	22.10	1.01666	6.1439	23.31	60.889	6.7	2	432	1251.2	2109	302	1145.4	2020	2316	10
192	11	Śro	329	6.32402	-5.33	7.2358	22.02	1.01663	7.1034	21.22	60.239	7.7	0	433	1251.3	2109	410	1239.4	2054	2312	11
193	12	Czw	330	6.36368	-5.41	7.2803	21.54	1.01660	8.0535	18.02	59.638	0.8	1	435	1251.4	2108	527	1332.3	2120	2308	12
194	13	Pią	331	6.40333	-5.48	7.3206	21.45	1.01656	8.5915	13.40	59.114	1.8	4	436	1251.5	2107	647	1423.6	2141	2304	13
195	14	Sob	332	6.44299	-5.55	7.3610	21.36	1.01652	9.5136	8.33	58.686	2.8	9	437	1251.7	2106	810	1513.6	2200	2300	14
196	15	Nie	333	6.48265	-6.01	7.4012	21.26	1.01646	10.4305	2.56	58.361	3.8	16	438	1251.8	2104	932	1602.7	2216	2257	15
197	16	Pon	334	6.52230	-6.07	7.4415	21.17	1.01641	11.3426	-2.53	58.136	4.8	26	439	1251.9	2103	1055	1651.8	2233	2253	16
198	17	Wto	335	6.56196	-6.12	7.4816	21.06	1.01634	12.2633	-8.34	58.005	5.8	37	441	1251.9	2102	1219	1741.9	2251	2249	17
199	18	Śro	336	7.00161	-6.16	7.5217	20.56	1.01628	13.2018	-13.48	57.959	6.8	48	442	1252.0	2101	1343	1834.1	2313	2245	18
200	19	Czw	337	7.04127	-6.20	7.5618	20.45	1.01620	14.1619	-18.18	57.995	0.8	59	444	1252.1	2100	1508	1928.9	2340	2241	19
201	20	Pią	338	7.08092	-6.24	8.0018	20.34	1.01613	15.1449	-21.43	58.114	1.8	70	445	1252.1	2058	1630	2026.4	****	2237	20
202	21	Sob	339	7.12058	-6.27	8.0417	20.22	1.01605	16.1518	-23.48	58.322	2.8	80	446	1252.2	2057	1744	2125.8	017	2233	21
203	22	Nie	340	7.16023	-6.29	8.0816	20.10	1.01596	17.1636	-24.23	58.624	3.8	88	448	1252.2	2056	1846	2225.4	105	2229	22
204	23	Pon	341	7.19589	-6.31	8.1215	19.58	1.01587	18.1705	-23.26	59.024	4.8	95	449	1252.3	2054	1932	2323.3	207	2225	23
205	24	Wto	342	7.23555	-6.32	8.1612	19.45	1.01578	19.1518	-21.08	59.520	5.8	98	451	1252.3	2053	2007	*****	320	2221	24
206	25	Śro	343	7.27520	-6.32	8.2009	19.32	1.01569	20.1022	-17.41	60.097	6.8	100	452	1252.3	2051	2032	018.1	438	2217	25
207	26	Czw	344	7.31486	-6.32	8.2406	19.19	1.01559	21.0206	-13.26	60.729	0.8	99	454	1252.3	2050	2052	109.2	557	2213	26
208	27	Pią	345	7.35451	-6.31	8.2802	19.06	1.01549	21.5050	-8.39	61.380	1.8	96	455	1252.3	2048	2108	156.7	713	2209	27
209	28	Sob	346	7.39417	-6.30	8.3157	18.52	1.01538	22.3716	-3.37	62.006	2.8	91	457	1252.2	2047	2123	241.4	827	2205	28
210	29	Nie	347	7.43383	-6.28	8.3551	18.38	1.01528	23.2215	1.27	62.561	3.8	85	458	1252.2	2045	2137	324.1	939	2202	29
211	30	Pon	348	7.47348	-6.26	8.3946	18.23	1.01516	0.0637	6.23	63.000	4.8	78	500	1252.2	2043	2151	405.8	1049	2158	30
212	31	Wto	349	7.51313	-6.23	8.4339	18.08	1.01505	0.5112	11.00	63.286	5.8	69	502	1252.1	2041	2207	447.5	1159	2154	31

Fazy Księżyca [Dm, h.mm]:      3kw 3, 19.58      Nów 11, 17.51      1kw 18, 16.14      Pełn 25, 15.36



# LIPIEC 2029 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	
1	****	****	3.40	20.33	6.39	22.43	13.03	0.29	13.43	0.50	1.53	16.59	2.47	19.25	0.32	13.10	23.17	6.50		
	6.715	23.07	5.988	23.64	8.572	20.42	12.625	-4.10	13.137	-5.85	3.302	16.03	4.978	22.69	0.720	3.04	20.944	-23.23	18.62247	1
3	****	****	3.48	20.46	6.45	22.41	13.00	0.22	13.36	0.42	1.45	16.52	2.40	19.18	0.25	13.02	23.09	6.42		
	6.853	22.91	6.294	23.92	8.738	19.82	12.681	-4.51	13.144	-5.90	3.315	16.08	4.986	22.71	0.721	3.04	20.942	-23.24	18.75389	3
5	****	****	3.58	20.57	6.52	22.39	12.58	0.15	13.28	0.34	1.38	16.45	2.32	19.10	0.17	12.55	23.01	6.34		
	6.990	22.73	6.607	24.04	8.903	19.18	12.738	-4.91	13.151	-5.95	3.328	16.12	4.994	22.72	0.722	3.04	20.939	-23.26	18.88530	5
7	****	****	4.10	21.08	6.58	22.36	12.56	0.09	13.21	0.27	1.31	16.38	2.25	19.03	0.09	12.47	22.53	6.26		
	7.127	22.53	6.923	23.98	9.066	18.51	12.797	-5.33	13.159	-6.01	3.341	16.17	5.001	22.73	0.723	3.04	20.936	-23.28	19.01673	7
9	****	****	4.23	21.17	7.05	22.33	12.54	0.02	13.14	0.19	1.23	16.32	2.17	18.56	23.57	12.39	22.45	6.18		
	7.263	22.29	7.239	23.73	9.228	17.80	12.856	-5.74	13.167	-6.07	3.353	16.21	5.009	22.74	0.723	3.04	20.934	-23.29	19.14815	9
11	****	****	4.37	21.24	7.11	22.30	12.52	23.52	13.07	0.11	1.16	16.25	2.10	18.48	23.49	12.31	22.37	6.10		
	7.400	22.03	7.551	23.30	9.389	17.06	12.917	-6.17	13.177	-6.13	3.365	16.25	5.016	22.75	0.723	3.04	20.931	-23.31	19.27957	11
13	****	****	4.52	21.30	7.18	22.27	12.50	23.45	13.00	0.04	1.08	16.18	2.02	18.41	23.41	12.23	22.29	6.01		
	7.535	21.75	7.856	22.70	9.548	16.30	12.979	-6.59	13.186	-6.20	3.377	16.29	5.024	22.76	0.723	3.04	20.928	-23.32	19.41099	13
15	****	****	5.08	21.34	7.24	22.24	12.48	23.39	12.54	23.52	1.01	16.11	1.55	18.34	23.34	12.15	22.21	5.53		
	7.670	21.44	8.151	21.95	9.705	15.50	13.041	-7.02	13.197	-6.27	3.389	16.33	5.031	22.77	0.723	3.04	20.925	-23.34	19.54241	15
17	****	****	5.23	21.37	7.31	22.20	12.47	23.32	12.47	23.44	0.54	16.04	1.47	18.26	23.26	12.08	22.13	5.45		
	7.805	21.11	8.436	21.07	9.861	14.68	13.105	-7.45	13.208	-6.35	3.400	16.36	5.038	22.78	0.723	3.04	20.922	-23.36	19.67383	17
19	****	****	5.39	21.38	7.37	22.16	12.45	23.26	12.40	23.37	0.46	15.57	1.40	18.19	23.18	11.60	22.05	5.37		
	7.938	20.75	8.709	20.07	10.016	13.84	13.170	-7.89	13.220	-6.43	3.411	16.40	5.045	22.79	0.723	3.03	20.919	-23.37	19.80525	19
21	****	****	5.54	21.39	7.44	22.12	12.43	23.20	12.33	23.29	0.39	15.50	1.32	18.12	23.10	11.52	21.57	5.29		
	8.072	20.37	8.971	18.99	10.169	12.97	13.236	-8.32	13.232	-6.51	3.421	16.43	5.052	22.80	0.723	3.03	20.916	-23.39	19.93667	21
23	****	****	6.09	21.38	7.50	22.08	12.42	23.13	12.27	23.22	0.31	15.43	1.25	18.04	23.02	11.44	21.49	5.21		
	8.204	19.97	9.220	17.82	10.322	12.08	13.303	-8.76	13.245	-6.60	3.431	16.46	5.059	22.81	0.722	3.02	20.913	-23.40	20.06809	23
25	****	****	6.23	21.36	7.57	22.04	12.41	23.07	12.20	23.14	0.24	15.36	1.17	17.57	22.54	11.36	21.42	5.12		
	8.336	19.54	9.458	16.60	10.472	11.17	13.371	-9.20	13.258	-6.69	3.441	16.49	5.065	22.82	0.722	3.02	20.910	-23.42	20.19952	25
27	****	****	6.37	21.34	8.03	22.00	12.39	23.01	12.14	23.07	0.16	15.29	1.09	17.49	22.46	11.28	21.34	5.04		
	8.467	19.09	9.684	15.32	10.622	10.24	13.440	-9.64	13.272	-6.78	3.450	16.52	5.072	22.83	0.721	3.01	20.907	-23.44	20.33094	27
29	1.16	0.04	6.50	21.31	8.09	21.56	12.38	22.55	12.07	22.59	0.09	15.21	1.02	17.42	22.38	11.20	21.26	4.56		
	8.598	18.63	9.900	14.02	10.770	9.29	13.509	-10.08	13.287	-6.88	3.460	16.55	5.078	22.84	0.720	3.00	20.904	-23.45	20.46236	29
31	1.38	-0.08	7.02	21.28	8.16	21.51	12.37	22.49	12.01	22.52	0.01	15.14	0.54	17.35	22.31	11.12	21.18	4.48		
	8.727	18.14	10.105	12.68	10.918	8.33	13.580	-10.53	13.302	-6.98	3.468	16.57	5.084	22.85	0.719	2.99	20.900	-23.47	20.59377	31

# SIERPIEŃ 2029

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT) →							Czas strefowy [hhmm.]										
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
213	1	Śro	350	7.55279	-6.19	8.4732	17.53	1.01493	1.3648	15.11	63.390	6.8	60	503	1252.1	2040	2226	530.0	1309	2150	1
214	2	Czw	351	7.59244	-6.15	8.5124	17.38	1.01481	2.2402	18.45	63.295	7.8	51	505	1252.0	2038	2249	614.1	1418	2146	2
215	3	Pią	352	8.03210	-6.10	8.5516	17.22	1.01468	3.1324	21.35	63.002	0.9	41	507	1251.9	2036	2318	700.5	1525	2142	3
216	4	Sob	353	8.07176	-6.04	8.5907	17.06	1.01455	4.0503	23.29	62.525	1.9	32	508	1251.8	2034	2358	749.3	1629	2138	4
217	5	Nie	354	8.11141	-5.58	9.0258	16.50	1.01442	4.5848	24.19	61.894	2.9	23	510	1251.7	2032	0**	840.6	1726	2134	5
218	6	Pon	355	8.15107	-5.52	9.0648	16.33	1.01427	5.5403	23.56	61.153	3.9	15	511	1251.6	2031	048	933.7	1814	2130	6
219	7	Wto	356	8.19073	-5.45	9.1037	16.17	1.01413	6.4957	22.16	60.357	4.9	8	513	1251.5	2029	151	1027.6	1852	2126	7
220	8	Śro	357	8.23038	-5.37	9.1426	15.60	1.01398	7.4537	19.22	59.567	5.9	3	515	1251.4	2027	305	1121.2	1921	2122	8
221	9	Czw	358	8.27004	-5.29	9.1814	15.42	1.01382	8.4027	15.20	58.843	6.9	1	516	1251.2	2025	424	1214.0	1945	2118	9
222	10	Pią	359	8.30569	-5.20	9.2202	15.25	1.01366	9.3414	10.22	58.238	0.3	0	518	1251.1	2023	548	1305.6	2005	2114	10
223	11	Sob	360	8.34535	-5.10	9.2549	15.07	1.01349	10.2712	4.47	57.793	1.3	2	520	1250.9	2021	712	1356.3	2023	2110	11
224	12	Nie	361	8.38500	-5.00	9.2935	14.49	1.01332	11.1953	-1.07	57.528	2.3	7	522	1250.7	2019	837	1446.8	2040	2106	12
225	13	Pon	362	8.42466	-4.49	9.3321	14.31	1.01314	12.1301	-6.60	57.442	3.3	15	523	1250.6	2017	1002	1537.8	2059	2103	13
226	14	Wto	363	8.46431	-4.38	9.3706	14.12	1.01296	13.0723	-12.28	57.519	4.3	24	525	1250.4	2015	1129	1630.4	2119	2059	14
227	15	Śro	364	8.50397	-4.27	9.4051	13.53	1.01277	14.0332	-17.13	57.731	5.3	34	527	1250.2	2013	1255	1725.0	2145	2055	15
228	16	Czw	365	8.54362	-4.14	9.4436	13.35	1.01258	15.0142	-20.55	58.048	6.3	46	528	1250.0	2010	1418	1821.8	2219	2051	16
229	17	Pią	366	8.58328	-4.01	9.4819	13.15	1.01238	16.0130	-23.19	58.438	0.6	57	530	1249.8	2008	1535	1920.3	2303	2047	17
230	18	Sob	367	9.02293	-3.48	9.5203	12.56	1.01219	17.0157	-24.15	58.880	1.6	68	532	1249.5	2006	1639	2019.0	****	2043	18
231	19	Nie	368	9.06259	-3.34	9.5545	12.36	1.01198	18.0143	-23.43	59.357	2.6	78	533	1249.3	2004	1730	2116.4	000	2039	19
232	20	Pon	369	9.10225	-3.20	9.5927	12.17	1.01178	18.5931	-21.49	59.860	3.6	86	535	1249.1	2002	1807	2211.2	108	2035	20
233	21	Wto	370	9.14190	-3.05	10.0309	11.57	1.01157	19.5430	-18.45	60.384	4.6	93	537	1248.8	2000	1835	2302.7	223	2031	21
234	22	Śro	371	9.18156	-2.50	10.0650	11.37	1.01136	20.4627	-14.48	60.922	5.6	97	539	1248.6	1957	1857	2350.9	340	2027	22
235	23	Czw	372	9.22121	-2.34	10.1031	11.16	1.01115	21.3535	-10.15	61.464	6.6	100	540	1248.3	1955	1915	*****	456	2023	23
236	24	Pią	373	9.26087	-2.18	10.1412	10.56	1.01094	22.2228	-5.20	61.993	0.3	100	542	1248.0	1953	1930	036.2	610	2019	24
237	25	Sob	374	9.30052	-2.01	10.1752	10.35	1.01072	23.0750	-0.17	62.487	1.3	98	544	1247.8	1951	1944	119.5	723	2015	25
238	26	Nie	375	9.34018	-1.44	10.2131	10.14	1.01050	23.5227	4.41	62.918	2.3	95	545	1247.5	1948	1959	201.6	833	2011	26
239	27	Pon	376	9.37583	-1.27	10.2510	9.53	1.01029	0.3704	9.25	63.251	3.3	90	547	1247.2	1946	2014	243.4	943	2007	27
240	28	Wto	377	9.41549	-1.09	10.2849	9.32	1.01006	1.2223	13.44	63.457	4.3	83	549	1246.9	1944	2032	325.6	1053	2004	28
241	29	Śro	378	9.45514	-0.51	10.3228	9.11	1.00984	2.0860	17.30	63.505	5.3	75	551	1246.6	1941	2053	409.1	1202	2000	29
242	30	Czw	379	9.49480	-0.33	10.3606	8.49	1.00962	2.5722	20.34	63.373	6.3	67	552	1246.3	1939	2119	454.3	1310	1956	30
243	31	Pią	380	9.53445	-0.14	10.3943	8.28	1.00939	3.4743	22.46	63.051	7.3	57	554	1246.0	1937	2154	541.7	1415	1952	31

Fazy Księżycyca [Dm, h.mm]:      3kw 2, 13.15      Nów 10, 3.56      1kw 16, 20.55      Pełn 24, 3.51

# SIERPIEŃ 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	1.45	23.53	7.08	21.26	8.19	21.49	12.36	22.46	11.58	22.48	23.54	15.11	0.51	17.31	22.27	11.08	21.14	4.44		
	8.792	17.89	10.203	12.01	10.991	7.85	13.616	-10.75	13.310	-7.03	3.472	16.58	5.087	22.85	0.718	2.99	20.899	-23.47	20.65948	1
3	1.58	23.41	7.19	21.21	8.25	21.45	12.35	22.40	11.51	22.40	23.46	15.03	0.43	17.23	22.19	11.00	21.06	4.36		
	8.921	17.37	10.394	10.67	11.137	6.87	13.688	-11.19	13.326	-7.13	3.480	16.61	5.093	22.86	0.717	2.98	20.896	-23.49	20.79090	3
5	2.09	23.30	7.30	21.17	8.31	21.40	12.34	22.34	11.45	22.33	23.39	14.56	0.35	17.16	22.11	10.52	20.58	4.28		
	9.049	16.83	10.575	9.32	11.282	5.87	13.761	-11.63	13.342	-7.24	3.488	16.63	5.099	22.87	0.716	2.97	20.893	-23.50	20.92232	5
7	2.19	23.20	7.40	21.12	8.38	21.35	12.34	22.28	11.39	22.26	23.31	14.49	0.28	17.08	22.03	10.44	20.50	4.19		
	9.177	16.28	10.747	7.98	11.427	4.87	13.835	-12.07	13.359	-7.35	3.495	16.65	5.104	22.87	0.714	2.96	20.889	-23.52	21.05375	7
9	2.28	23.11	7.49	21.06	8.44	21.31	12.33	22.22	11.32	22.18	23.23	14.41	0.20	17.01	21.55	10.36	20.42	4.11		
	9.304	15.71	10.910	6.66	11.570	3.86	13.910	-12.51	13.377	-7.46	3.502	16.66	5.109	22.88	0.713	2.95	20.886	-23.53	21.18517	9
11	2.37	23.02	7.58	21.01	8.50	21.26	12.32	22.16	11.26	22.11	23.16	14.34	0.13	16.53	21.47	10.28	20.34	4.03		
	9.430	15.12	11.064	5.36	11.713	2.84	13.986	-12.95	13.395	-7.57	3.509	16.68	5.114	22.89	0.711	2.94	20.883	-23.55	21.31659	11
13	2.45	22.54	8.05	20.54	8.56	21.21	12.31	22.10	11.20	22.03	23.08	14.27	0.05	16.46	21.39	10.20	20.26	3.55		
	9.556	14.51	11.209	4.10	11.856	1.82	14.062	-13.39	13.413	-7.69	3.515	16.70	5.119	22.89	0.709	2.92	20.880	-23.56	21.44800	13
15	2.52	22.46	8.12	20.48	9.02	21.16	12.31	22.04	11.14	21.56	23.01	14.19	23.53	16.38	21.31	10.12	20.18	3.47		
	9.681	13.89	11.344	2.87	11.998	0.79	14.140	-13.83	13.432	-7.81	3.520	16.71	5.124	22.90	0.707	2.91	20.877	-23.57	21.57942	15
17	2.59	22.38	8.18	20.42	9.08	21.11	12.30	21.58	11.08	21.49	22.53	14.12	23.46	16.31	21.23	10.04	20.10	3.39		
	9.805	13.26	11.470	1.70	12.139	-0.24	14.219	-14.26	13.451	-7.93	3.525	16.72	5.128	22.91	0.705	2.89	20.874	-23.59	21.71084	17
19	3.06	22.31	8.23	20.35	9.14	21.06	12.29	21.53	11.02	21.41	22.45	14.04	23.38	16.23	21.16	9.56	20.02	3.30		
	9.929	12.61	11.586	0.58	12.281	-1.27	14.298	-14.69	13.471	-8.05	3.530	16.73	5.133	22.91	0.703	2.88	20.871	-23.60	21.84226	19
21	3.13	22.23	8.27	20.27	9.20	21.02	12.29	21.47	10.56	21.34	22.38	13.57	23.30	16.16	21.08	9.48	19.54	3.22		
	10.053	11.95	11.690	-0.47	12.422	-2.30	14.379	-15.12	13.491	-8.18	3.534	16.74	5.137	22.92	0.701	2.86	20.868	-23.61	21.97368	21
23	3.19	22.16	8.30	20.20	9.26	20.57	12.29	21.42	10.50	21.26	22.30	13.49	23.23	16.08	20.60	9.40	19.46	3.14		
	10.175	11.27	11.782	-1.44	12.563	-3.33	14.460	-15.54	13.512	-8.30	3.538	16.74	5.141	22.92	0.699	2.85	20.865	-23.62	22.10510	23
25	3.25	22.09	8.31	20.12	9.33	20.52	12.28	21.36	10.44	21.19	22.22	13.41	23.15	16.01	20.52	9.31	19.38	3.06		
	10.298	10.58	11.860	-2.31	12.704	-4.35	14.543	-15.96	13.532	-8.43	3.541	16.75	5.144	22.93	0.696	2.83	20.862	-23.64	22.23652	25
27	3.31	22.02	8.31	20.04	9.39	20.47	12.28	21.31	10.38	21.12	22.15	13.34	23.07	15.53	20.44	9.23	19.30	2.58		
	10.420	9.89	11.923	-3.07	12.845	-5.37	14.626	-16.37	13.554	-8.56	3.544	16.75	5.148	22.93	0.694	2.81	20.859	-23.65	22.36794	27
29	3.36	21.56	8.29	19.56	9.45	20.42	12.28	21.25	10.33	21.05	22.07	13.26	22.60	15.45	20.36	9.15	19.23	2.50		
	10.541	9.18	11.970	-3.69	12.986	-6.39	14.710	-16.78	13.576	-8.69	3.546	16.75	5.151	22.94	0.691	2.79	20.856	-23.66	22.49935	29
31	3.42	21.49	8.26	19.47	9.51	20.37	12.27	21.20	10.27	20.57	21.59	13.18	22.52	15.38	20.28	9.07	19.15	2.42		
	10.662	8.46	11.997	-4.15	13.127	-7.39	14.795	-17.18	13.598	-8.83	3.548	16.75	5.154	22.94	0.688	2.78	20.854	-23.67	22.63077	31

# WRZESIEŃ 2029

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
244	1	Sob	381	9.57411	0.05	10.4321	8.06	1.00916	4.3959	23.57	62.541	0.2	48	556	1245.7	1934	2239	631.2	1514	1948	1
245	2	Nie	382	10.01377	0.24	10.4658	7.44	1.00893	5.3347	24.01	61.860	1.2	38	557	1245.3	1932	2335	722.5	1605	1944	2
246	3	Pon	383	10.05342	0.44	10.5035	7.22	1.00869	6.2831	22.53	61.043	2.2	29	559	1245.0	1930	****	815.0	1646	1940	3
247	4	Wto	384	10.09308	1.04	10.5412	6.60	1.00845	7.2330	20.31	60.142	3.2	20	601	1244.7	1927	042	908.0	1719	1936	4
248	5	Śro	385	10.13273	1.24	10.5749	6.38	1.00821	8.1809	16.60	59.219	4.2	12	603	1244.4	1925	158	1000.6	1745	1932	5
249	6	Czw	386	10.17239	1.44	11.0125	6.15	1.00796	9.1216	12.27	58.349	5.2	6	604	1244.0	1923	319	1052.6	1807	1928	6
250	7	Pią	387	10.21204	2.04	11.0501	5.53	1.00771	10.0555	7.05	57.604	6.2	2	606	1243.7	1920	443	1144.1	1827	1924	7
251	8	Sob	388	10.25170	2.25	11.0837	5.30	1.00746	10.5932	1.13	57.050	7.2	0	608	1243.3	1918	609	1235.5	1845	1920	8
252	9	Nie	389	10.29135	2.46	11.1213	5.08	1.00720	11.5346	-4.48	56.729	1.0	1	609	1243.0	1915	736	1327.7	1903	1916	9
253	10	Pon	390	10.33101	3.06	11.1549	4.45	1.00694	12.4917	-10.34	56.661	2.0	6	611	1242.6	1913	905	1421.3	1924	1912	10
254	11	Wto	391	10.37066	3.28	11.1924	4.22	1.00667	13.4637	-15.42	56.834	3.0	12	613	1242.3	1911	1034	1517.0	1949	1909	11
255	12	Śro	392	10.41032	3.49	11.2260	3.59	1.00641	14.4554	-19.49	57.214	4.0	21	615	1241.9	1908	1201	1614.9	2021	1905	12
256	13	Czw	393	10.44597	4.10	11.2635	3.36	1.00614	15.4642	-22.37	57.751	5.0	32	616	1241.6	1906	1322	1714.3	2102	1901	13
257	14	Pią	394	10.48563	4.31	11.3010	3.13	1.00586	16.4759	-23.56	58.388	6.0	43	618	1241.2	1903	1432	1813.9	2156	1857	14
258	15	Sob	395	10.52528	4.53	11.3345	2.50	1.00559	17.4822	-23.44	59.074	0.4	54	620	1240.9	1901	1527	1912.1	2301	1853	15
259	16	Nie	396	10.56494	5.14	11.3720	2.27	1.00531	18.4634	-22.09	59.765	1.4	65	621	1240.5	1859	1608	2007.5	****	1849	16
260	17	Pon	397	11.00459	5.36	11.4056	2.04	1.00503	19.4148	-19.23	60.433	2.4	74	623	1240.2	1856	1639	2059.5	013	1845	17
261	18	Wto	398	11.04425	5.57	11.4431	1.41	1.00476	20.3351	-15.42	61.058	3.4	83	625	1239.8	1854	1702	2148.0	129	1841	18
262	19	Śro	399	11.08391	6.18	11.4806	1.17	1.00448	21.2302	-11.22	61.631	4.4	90	627	1239.4	1851	1721	2233.6	244	1837	19
263	20	Czw	400	11.12356	6.40	11.5141	0.54	1.00419	22.0955	-6.38	62.147	5.4	95	628	1239.1	1849	1737	2317.0	358	1833	20
264	21	Pią	401	11.16322	7.01	11.5516	0.31	1.00391	22.5516	-1.42	62.603	6.4	98	630	1238.7	1846	1752	2359.1	510	1829	21
265	22	Sob	402	11.20287	7.22	11.5851	0.07	1.00363	23.3950	3.15	62.992	7.4	100	632	1238.4	1844	1806	*****	620	1825	22
266	23	Nie	403	11.24253	7.44	12.0227	-0.16	1.00335	0.2420	8.00	63.305	0.7	100	633	1238.0	1842	1821	040.8	730	1821	23
267	24	Pon	404	11.28218	8.05	12.0602	-0.39	1.00307	1.0926	12.25	63.529	1.7	97	635	1237.7	1839	1838	122.8	839	1817	24
268	25	Wto	405	11.32184	8.26	12.0938	-1.03	1.00280	1.5541	16.19	63.644	2.7	93	637	1237.3	1837	1858	205.8	949	1813	25
269	26	Śro	406	11.36149	8.46	12.1314	-1.26	1.00252	2.4329	19.34	63.630	3.7	88	639	1237.0	1834	1923	250.4	1057	1810	26
270	27	Czw	407	11.40115	9.07	12.1650	-1.49	1.00224	3.3301	21.59	63.467	4.7	81	640	1236.6	1832	1955	336.8	1202	1806	27
271	28	Pią	408	11.44080	9.27	12.2026	-2.13	1.00196	4.2413	23.27	63.140	5.7	73	642	1236.3	1830	2035	425.1	1303	1802	28
272	29	Sob	409	11.48046	9.47	12.2403	-2.36	1.00168	5.1644	23.52	62.642	6.7	64	644	1236.0	1827	2126	515.0	1356	1758	29
273	30	Nie	410	11.52011	10.07	12.2740	-2.59	1.00140	6.1004	23.09	61.977	7.7	55	646	1235.6	1825	2227	605.9	1440	1754	30

Fazy Księżyca [Dm, h.mm]:      3kw 1, 6.33      Now 8, 12.44      1kw 15, 3.29      Pełn 22, 18.29      3kw 30, 22.57

# WRZESIEŃ 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE			MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)		
1	3.44	21.46	8.23	19.42	9.54	20.35	12.27	21.17	10.24	20.54	21.55	13.14	22.48	15.34	20.24	9.03	19.11	2.38			
	10.723	8.10	12.003	-4.32	13.197	-7.89	14.838	-17.38	13.609	-8.90	3.548	16.75	5.155	22.94	0.687	2.77	20.852	-23.67	22.69648	1	
3	3.50	21.39	8.16	19.33	9.60	20.30	12.27	21.12	10.18	20.46	21.47	13.07	22.40	15.26	20.16	8.55	19.03	2.30			
	10.843	7.37	11.999	-4.50	13.339	-8.89	14.925	-17.78	13.631	-9.03	3.549	16.74	5.158	22.95	0.684	2.75	20.850	-23.68	22.82790	3	
5	3.55	21.33	8.06	19.24	10.06	20.25	12.27	21.07	10.12	20.39	21.40	12.59	22.33	15.18	20.08	8.47	18.55	2.21			
	10.964	6.63	11.972	-4.47	13.481	-9.87	15.012	-18.17	13.654	-9.17	3.550	16.74	5.160	22.95	0.681	2.73	20.847	-23.69	22.95932	5	
7	3.60	21.27	7.54	19.15	10.12	20.20	12.27	21.02	10.07	20.32	21.32	12.51	22.25	15.11	20.00	8.39	18.47	2.13			
	11.084	5.88	11.921	-4.19	13.623	-10.84	15.101	-18.55	13.678	-9.31	3.550	16.73	5.162	22.95	0.678	2.71	20.845	-23.70	23.09074	7	
9	4.05	21.20	7.39	19.05	10.18	20.15	12.27	20.57	10.01	20.25	21.24	12.43	22.17	15.03	19.52	8.30	18.39	2.05			
	11.204	5.13	11.847	-3.65	13.766	-11.79	15.190	-18.92	13.701	-9.45	3.550	16.72	5.164	22.95	0.675	2.69	20.842	-23.71	23.22216	9	
11	4.09	21.14	7.21	18.56	10.24	20.11	12.27	20.52	9.55	20.17	21.16	12.35	22.09	14.55	19.44	8.22	18.31	1.57			
	11.323	4.37	11.753	-2.86	13.909	-12.73	15.280	-19.29	13.725	-9.59	3.549	16.71	5.166	22.96	0.672	2.67	20.840	-23.72	23.35357	11	
13	4.14	21.08	7.01	18.47	10.30	20.06	12.27	20.47	9.50	20.10	21.08	12.27	22.02	14.47	19.36	8.14	18.23	1.49			
	11.443	3.60	11.645	-1.83	14.053	-13.65	15.371	-19.65	13.749	-9.73	3.547	16.70	5.167	22.96	0.669	2.65	20.838	-23.72	23.48499	13	
15	4.18	21.03	6.40	18.39	10.36	20.01	12.27	20.43	9.44	20.03	21.00	12.19	21.54	14.40	19.29	8.06	18.15	1.41			
	11.563	2.84	11.530	-0.63	14.198	-14.55	15.463	-20.00	13.774	-9.87	3.546	16.69	5.168	22.96	0.666	2.63	20.836	-23.73	23.61641	15	
17	4.23	20.57	6.19	18.31	10.43	19.57	12.27	20.38	9.39	19.56	20.53	12.11	21.46	14.32	19.21	7.58	18.07	1.33			
	11.682	2.06	11.420	0.67	14.343	-15.43	15.556	-20.34	13.799	-10.02	3.543	16.67	5.169	22.96	0.663	2.60	20.833	-23.74	23.74783	17	
19	4.27	20.51	5.58	18.24	10.49	19.53	12.27	20.33	9.33	19.49	20.45	12.03	21.38	14.24	19.13	7.50	17.59	1.25			
	11.802	1.29	11.325	1.94	14.489	-16.29	15.650	-20.67	13.824	-10.16	3.540	16.66	5.170	22.96	0.659	2.58	20.831	-23.74	23.87925	19	
21	4.31	20.45	5.40	18.19	10.55	19.48	12.27	20.29	9.27	19.42	20.37	11.54	21.30	14.16	19.05	7.41	17.51	1.17			
	11.921	0.51	11.256	3.10	14.635	-17.13	15.745	-21.00	13.849	-10.30	3.537	16.64	5.170	22.96	0.656	2.56	20.830	-23.75	0.01067	21	
23	4.36	20.40	5.25	18.14	11.01	19.44	12.27	20.25	9.22	19.34	20.29	11.46	21.22	14.08	18.57	7.33	17.43	1.09			
	12.041	-0.27	11.221	4.05	14.782	-17.94	15.841	-21.31	13.875	-10.45	3.533	16.62	5.170	22.96	0.653	2.54	20.828	-23.75	0.14208	23	
25	4.40	20.34	5.14	18.10	11.07	19.40	12.27	20.20	9.16	19.27	20.21	11.38	21.14	14.00	18.49	7.25	17.35	1.01			
	12.161	-1.04	11.224	4.72	14.930	-18.73	15.937	-21.61	13.900	-10.60	3.529	16.60	5.170	22.96	0.649	2.52	20.826	-23.76	0.27350	25	
27	4.44	20.29	5.06	18.06	11.13	19.36	12.27	20.16	9.11	19.20	20.13	11.30	21.07	13.53	18.41	7.17	17.27	0.53			
	12.281	-1.82	11.266	5.07	15.079	-19.49	16.034	-21.90	13.926	-10.74	3.525	16.58	5.170	22.96	0.646	2.50	20.825	-23.76	0.40492	27	
29	4.48	20.24	5.03	18.03	11.19	19.32	12.27	20.12	9.05	19.13	20.05	11.21	20.59	13.45	18.33	7.09	17.19	0.45			
	12.401	-2.60	11.346	5.09	15.228	-20.22	16.133	-22.18	13.953	-10.89	3.519	16.55	5.169	22.96	0.643	2.47	20.823	-23.77	0.53634	29	

# PAŹDZIERNIK 2029

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]							
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$R_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2462																					
274	1	Pon	411	11.55577	10.26	12.3117	-3.23	1.00112	7.0338	21.16	61.164	0.5	45	647	1235.3	1822	2337	657.3	1516	1750	1
275	2	Wto	412	11.59542	10.45	12.3454	-3.46	1.00084	7.5659	18.16	60.240	1.5	34	649	1235.0	1820	****	748.5	1544	1746	2
276	3	Śro	413	12.03508	11.04	12.3832	-4.09	1.00056	8.4958	14.14	59.260	2.5	25	651	1234.7	1818	053	839.4	1608	1742	3
277	4	Czw	414	12.07474	11.22	12.4210	-4.32	1.00028	9.4243	9.20	58.293	3.5	16	653	1234.4	1815	214	929.9	1628	1738	4
278	5	Pią	415	12.11439	11.40	12.4549	-4.55	0.99999	10.3541	3.46	57.418	4.5	8	654	1234.1	1813	337	1020.6	1647	1734	5
279	6	Sob	416	12.15405	11.58	12.4928	-5.18	0.99971	11.2931	-2.09	56.718	5.5	3	656	1233.8	1810	503	1112.2	1705	1730	6
280	7	Nie	417	12.19370	12.15	12.5307	-5.41	0.99942	12.2458	-8.05	56.260	6.5	0	658	1233.5	1808	631	1205.6	1725	1726	7
281	8	Pon	418	12.23335	12.32	12.5647	-6.04	0.99914	13.2241	-13.35	56.089	0.6	1	700	1233.2	1806	801	1301.5	1749	1722	8
282	9	Wto	419	12.27301	12.48	13.0027	-6.27	0.99885	14.2255	-18.13	56.218	1.6	4	701	1232.9	1803	932	1400.3	1818	1718	9
283	10	Śro	420	12.31266	13.04	13.0407	-6.50	0.99856	15.2517	-21.36	56.624	2.6	10	703	1232.7	1801	1059	1501.4	1857	1714	10
284	11	Czw	421	12.35232	13.20	13.0748	-7.12	0.99827	16.2838	-23.27	57.256	3.6	18	705	1232.4	1759	1217	1603.3	1948	1711	11
285	12	Pią	422	12.39198	13.35	13.1130	-7.35	0.99798	17.3116	-23.41	58.043	4.6	28	707	1232.2	1757	1319	1704.1	2051	1707	12
286	13	Sob	423	12.43163	13.49	13.1512	-7.57	0.99769	18.3134	-22.25	58.912	5.6	39	709	1231.9	1754	1406	1802.0	2203	1703	13
287	14	Nie	424	12.47129	14.03	13.1855	-8.19	0.99740	19.2829	-19.54	59.795	6.6	49	711	1231.7	1752	1441	1855.9	2319	1659	14
288	15	Pon	425	12.51094	14.17	13.2238	-8.42	0.99711	20.2143	-16.24	60.636	1.0	60	712	1231.5	1750	1507	1945.8	****	1655	15
289	16	Wto	426	12.55060	14.30	13.2621	-9.04	0.99682	21.1136	-12.13	61.398	2.0	70	714	1231.3	1747	1527	2032.2	035	1651	16
290	17	Śro	427	12.59025	14.42	13.3006	-9.26	0.99653	21.5850	-7.36	62.058	3.0	79	716	1231.0	1745	1544	2116.0	149	1647	17
291	18	Czw	428	13.02591	14.54	13.3350	-9.47	0.99624	22.4413	-2.46	62.605	4.0	86	718	1230.9	1743	1559	2158.2	301	1643	18
292	19	Pią	429	13.06556	15.05	13.3736	-10.09	0.99596	23.2838	2.06	63.038	5.0	92	720	1230.7	1741	1614	2239.6	411	1639	19
293	20	Sob	430	13.10522	15.15	13.4122	-10.31	0.99567	0.1252	6.51	63.362	6.0	96	722	1230.5	1739	1629	2321.2	520	1635	20
294	21	Nie	431	13.14487	15.25	13.4509	-10.52	0.99539	0.5739	11.18	63.581	7.0	99	723	1230.3	1736	1645	****	629	1631	21
295	22	Pon	432	13.18453	15.35	13.4856	-11.13	0.99511	1.4334	15.18	63.700	0.0	100	725	1230.2	1734	1704	003.8	738	1627	22
296	23	Wto	433	13.22418	15.43	13.5244	-11.34	0.99484	2.3101	18.42	63.717	1.0	99	727	1230.0	1732	1728	047.9	846	1623	23
297	24	Śro	434	13.26384	15.51	13.5633	-11.55	0.99457	3.2012	21.18	63.628	2.0	96	729	1229.9	1730	1757	133.7	953	1619	24
298	25	Czw	435	13.30350	15.58	14.0022	-12.16	0.99430	4.1059	22.60	63.425	3.0	92	731	1229.8	1728	1834	221.5	1055	1616	25
299	26	Pią	436	13.34315	16.05	14.0412	-12.36	0.99403	5.0300	23.40	63.097	4.0	86	733	1229.7	1726	1922	310.8	1150	1612	26
300	27	Sob	437	13.38281	16.10	14.0803	-12.56	0.99377	5.5539	23.13	62.636	5.0	79	735	1229.6	1724	2019	401.0	1237	1608	27
301	28	Nie	438	13.42246	16.15	14.1155	-13.17	0.99351	6.4818	21.40	62.037	6.0	70	736	1229.5	1722	2125	451.5	1315	1604	28
301	28	Nie	438	14.42345	16.15	14.1204	-13.17	0.99350	6.5029	21.35	62.009	6.1	70	636	1129.5	1622	2025	351.5	1215	1504	28
302	29	Pon	439	14.46311	16.19	14.1557	-13.37	0.99324	7.4240	18.55	61.274	7.1	60	638	1129.4	1620	2136	441.6	1245	1500	29
303	30	Wto	440	14.50276	16.23	14.1950	-13.57	0.99298	8.3413	15.17	60.427	8.1	50	640	1129.4	1618	2252	531.0	1309	1456	30
304	31	Śro	441	14.54242	16.25	14.2344	-14.16	0.99273	9.2517	10.48	59.504	1.0	40	642	1129.3	1616	****	619.8	1330	1452	31

Fazy Księżyca [Dm, h.mm]:      3kw 0, 22.57      Nów 7, 21.15      1kw 14, 13.09      Pełn 22, 11.28      Pełn 22, 10.28      3kw 30, 12.32

# PAŹDZIERNIK 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.52	20.19	5.04	18.01	11.25	19.28	12.27	20.08	9.00	19.06	19.57	11.13	20.51	13.37	18.25	7.01	17.12	0.37		
	12.521	-3.38	11.459	4.80	15.378	-20.92	16.232	-22.44	13.979	-11.04	3.514	16.53	5.169	22.96	0.639	2.45	20.822	-23.77	0.66776	1
3	4.55	20.14	5.07	17.58	11.31	19.25	12.27	20.05	8.55	18.59	19.49	11.05	20.43	13.29	18.17	6.52	17.04	0.29		
	12.642	-4.15	11.601	4.23	15.528	-21.59	16.332	-22.70	14.006	-11.18	3.508	16.50	5.167	22.96	0.636	2.43	20.821	-23.77	0.79918	3
5	4.59	20.09	5.14	17.56	11.37	19.21	12.27	20.01	8.49	18.52	19.41	10.56	20.35	13.21	18.09	6.44	16.56	0.21		
	12.764	-4.92	11.765	3.41	15.679	-22.23	16.432	-22.94	14.033	-11.33	3.502	16.47	5.166	22.96	0.632	2.41	20.820	-23.77	0.93060	5
7	5.03	20.04	5.22	17.53	11.42	19.18	12.27	19.58	8.44	18.45	19.32	10.48	20.27	13.13	18.01	6.36	16.48	0.13		
	12.885	-5.69	11.946	2.39	15.830	-22.83	16.534	-23.17	14.060	-11.48	3.495	16.44	5.165	22.96	0.629	2.39	20.819	-23.77	1.06201	7
9	5.07	19.59	5.32	17.51	11.48	19.15	12.27	19.54	8.38	18.38	19.24	10.39	20.19	13.05	17.53	6.28	16.40	0.05		
	13.007	-6.45	12.138	1.22	15.982	-23.40	16.636	-23.38	14.087	-11.63	3.488	16.41	5.163	22.96	0.626	2.36	20.818	-23.77	1.19343	9
11	5.10	19.54	5.43	17.48	11.53	19.12	12.27	19.51	8.33	18.30	19.16	10.31	20.11	12.57	17.45	6.20	16.32	23.54		
	13.130	-7.20	12.338	-0.07	16.134	-23.93	16.739	-23.58	14.114	-11.77	3.480	16.38	5.161	22.96	0.622	2.34	20.817	-23.77	1.32485	11
13	5.14	19.50	5.55	17.45	11.58	19.10	12.26	19.48	8.28	18.23	19.08	10.22	20.03	12.49	17.37	6.11	16.24	23.46		
	13.253	-7.95	12.543	-1.43	16.286	-24.43	16.843	-23.77	14.142	-11.92	3.472	16.35	5.158	22.95	0.619	2.32	20.816	-23.77	1.45627	13
15	5.17	19.45	6.07	17.42	12.03	19.07	12.26	19.45	8.22	18.16	18.60	10.14	19.55	12.41	17.29	6.03	16.16	23.38		
	13.377	-8.69	12.751	-2.85	16.438	-24.89	16.947	-23.94	14.169	-12.07	3.464	16.31	5.156	22.95	0.616	2.30	20.816	-23.77	1.58769	15
17	5.21	19.41	6.19	17.39	12.08	19.05	12.26	19.42	8.17	18.09	18.52	10.05	19.47	12.33	17.21	5.55	16.08	23.30		
	13.502	-9.43	12.960	-4.30	16.590	-25.31	17.052	-24.09	14.197	-12.22	3.455	16.28	5.153	22.95	0.612	2.28	20.816	-23.77	1.71911	17
19	5.25	19.37	6.32	17.36	12.12	19.03	12.25	19.40	8.12	18.02	18.44	9.56	19.39	12.25	17.13	5.47	16.00	23.22		
	13.627	-10.15	13.169	-5.75	16.742	-25.69	17.158	-24.23	14.225	-12.36	3.447	16.24	5.150	22.94	0.609	2.26	20.815	-23.77	1.85053	19
21	5.28	19.33	6.44	17.33	12.16	19.01	12.25	19.37	8.06	17.55	18.35	9.48	19.31	12.17	17.05	5.39	15.53	23.14		
	13.752	-10.87	13.379	-7.20	16.893	-26.03	17.264	-24.36	14.253	-12.51	3.437	16.21	5.147	22.94	0.606	2.24	20.815	-23.77	1.98194	21
23	5.31	19.28	6.57	17.29	12.20	18.60	12.24	19.35	8.01	17.48	18.27	9.39	19.23	12.09	16.58	5.31	15.45	23.06		
	13.879	-11.57	13.588	-8.63	17.044	-26.33	17.371	-24.47	14.281	-12.65	3.428	16.17	5.144	22.94	0.603	2.22	20.815	-23.76	2.11336	23
25	5.35	19.25	7.09	17.26	12.23	18.59	12.23	19.33	7.56	17.41	18.19	9.30	19.15	12.00	16.50	5.22	15.37	22.59		
	14.006	-12.26	13.796	-10.04	17.193	-26.59	17.478	-24.56	14.309	-12.80	3.418	16.13	5.140	22.93	0.600	2.20	20.815	-23.76	2.24478	25
27	5.38	19.21	7.21	17.23	12.26	18.58	12.22	19.31	7.50	17.34	18.11	9.22	19.07	11.52	16.42	5.14	15.29	22.51		
	14.134	-12.94	14.004	-11.40	17.342	-26.81	17.586	-24.64	14.337	-12.94	3.408	16.09	5.136	22.93	0.597	2.18	20.816	-23.76	2.37620	27
29	4.42	18.17	6.34	16.20	11.29	17.57	11.22	18.29	6.45	16.27	17.03	8.13	17.59	10.44	15.34	4.06	14.21	21.43		
	14.266	-13.62	14.216	-12.76	17.492	-27.00	17.697	-24.70	14.366	-13.09	3.398	16.05	5.132	22.92	0.593	2.16	20.816	-23.75	2.50762	29
31	4.45	18.14	6.46	16.17	11.31	17.57	11.21	18.27	6.40	16.20	16.54	8.04	17.51	10.36	15.26	3.58	14.13	21.35		
	14.396	-14.27	14.424	-14.04	17.637	-27.14	17.806	-24.74	14.394	-13.23	3.388	16.02	5.128	22.92	0.591	2.14	20.817	-23.75	2.63904	31

# LISTOPAD 2029

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
305	1	Czw	442	14.58207	16.27	14.2739	-14.36	0.99247	10.1624	5.38	58.558	2.0	29	644	1129.3	1614	011	708.5	1349	1448	1
306	2	Pią	443	15.02173	16.28	14.3135	-14.55	0.99222	11.0817	0.01	57.657	3.0	19	646	1129.3	1612	133	757.9	1407	1444	2
307	3	Sob	444	15.06138	16.28	14.3531	-15.13	0.99197	12.0149	-5.46	56.880	4.0	11	648	1129.3	1610	257	848.9	1426	1440	3
308	4	Nie	445	15.10104	16.27	14.3929	-15.32	0.99172	12.5752	-11.23	56.305	5.0	5	650	1129.3	1608	425	942.7	1447	1436	4
309	5	Pon	446	15.14069	16.25	14.4327	-15.50	0.99147	13.5701	-16.22	55.997	6.0	1	651	1129.3	1606	555	1039.8	1513	1432	5
310	6	Wto	447	15.18035	16.23	14.4726	-16.08	0.99123	14.5919	-20.18	55.995	0.3	0	653	1129.4	1605	725	1140.6	1548	1428	6
311	7	Śro	448	15.22000	16.19	14.5126	-16.26	0.99098	16.0352	-22.48	56.302	1.3	2	655	1129.4	1603	850	1243.8	1634	1424	7
312	8	Czw	449	15.25566	16.15	14.5527	-16.43	0.99074	17.0852	-23.37	56.885	2.3	8	657	1129.5	1601	1002	1347.5	1733	1420	8
313	9	Pią	450	15.29531	16.10	14.5928	-17.00	0.99049	18.1211	-22.48	57.682	3.3	15	659	1129.6	1559	1058	1449.1	1845	1417	9
314	10	Sob	451	15.33497	16.04	15.0331	-17.17	0.99025	19.1209	-20.32	58.613	4.3	24	701	1129.7	1558	1139	1546.8	2002	1413	10
315	11	Nie	452	15.37463	15.58	15.0734	-17.34	0.99001	20.0759	-17.11	59.596	5.3	34	703	1129.8	1556	1209	1639.9	2121	1409	11
316	12	Pon	453	15.41428	15.50	15.1138	-17.50	0.98978	20.5951	-13.03	60.555	6.3	44	705	1129.9	1555	1231	1728.6	2237	1405	12
317	13	Wto	454	15.45394	15.42	15.1543	-18.06	0.98954	21.4823	-8.27	61.431	0.4	54	706	1130.1	1553	1250	1813.9	2350	1401	13
318	14	Śro	455	15.49359	15.33	15.1948	-18.21	0.98931	22.3431	-3.37	62.183	1.4	64	708	1130.2	1552	1306	1856.9	****	1357	14
319	15	Czw	456	15.53325	15.23	15.2355	-18.37	0.98908	23.1913	1.15	62.785	2.4	73	710	1130.4	1550	1320	1938.6	101	1353	15
320	16	Pią	457	15.57290	15.12	15.2802	-18.52	0.98886	0.0326	5.60	63.229	3.4	81	712	1130.5	1549	1335	2020.0	211	1349	16
321	17	Sob	458	16.01256	15.00	15.3211	-19.06	0.98864	0.4757	10.29	63.519	4.4	88	714	1130.7	1547	1351	2102.1	319	1345	17
322	18	Nie	459	16.05221	14.48	15.3619	-19.21	0.98843	1.3331	14.33	63.666	5.4	94	716	1130.9	1546	1410	2145.5	428	1341	18
323	19	Pon	460	16.09187	14.35	15.4029	-19.35	0.98821	2.2038	18.03	63.686	6.4	97	717	1131.2	1545	1432	2230.8	536	1337	19
324	20	Wto	461	16.13153	14.21	15.4440	-19.48	0.98801	3.0933	20.48	63.595	7.4	100	719	1131.4	1543	1459	2318.2	643	1333	20
325	21	Śro	462	16.17118	14.06	15.4851	-20.01	0.98781	4.0016	22.41	63.406	0.3	100	721	1131.7	1542	1534	*****	747	1329	21
326	22	Czw	463	16.21084	13.50	15.5304	-20.14	0.98761	4.5221	23.32	63.129	1.3	98	723	1131.9	1541	1619	007.3	845	1325	22
327	23	Pią	464	16.25049	13.33	15.5717	-20.27	0.98742	5.4509	23.18	62.768	2.3	95	724	1132.2	1540	1713	057.6	935	1321	23
328	24	Sob	465	16.29015	13.16	16.0130	-20.39	0.98723	6.3756	21.56	62.323	3.3	90	726	1132.5	1539	1817	148.3	1015	1318	24
329	25	Nie	466	16.32581	12.58	16.0545	-20.51	0.98705	7.3003	19.31	61.793	4.3	84	728	1132.8	1538	1926	238.5	1047	1314	25
330	26	Pon	467	16.36546	12.39	16.1000	-21.02	0.98688	8.2110	16.08	61.177	5.3	76	729	1133.1	1537	2040	327.6	1113	1310	26
331	27	Wto	468	16.40512	12.20	16.1416	-21.13	0.98670	9.1122	11.56	60.483	6.3	66	731	1133.4	1536	2156	415.7	1135	1306	27
332	28	Śro	469	16.44477	11.60	16.1833	-21.23	0.98654	10.0103	7.05	59.725	7.3	56	732	1133.8	1535	2314	503.1	1153	1302	28
333	29	Czw	470	16.48443	11.39	16.2251	-21.34	0.98637	10.5055	1.46	58.932	0.5	45	734	1134.1	1534	****	550.4	1211	1258	29
334	30	Pią	471	16.52408	11.17	16.2709	-21.43	0.98621	11.4153	-3.47	58.149	1.5	34	735	1134.5	1533	034	638.6	1228	1254	30

Fazy Księżyca [Dm, h.mm]:      Now 6, 5.24      1kw 13, 1.35      Pełn 21, 5.03      3kw 29, 0.48



# LISTOPAD 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.47	18.12	6.52	16.16	11.32	17.57	11.20	18.26	6.37	16.17	16.50	7.60	17.47	10.32	15.22	3.54	14.09	21.31		
	14.461	-14.59	14.528	-14.67	17.709	-27.19	17.860	-24.75	14.409	-13.30	3.383	16.00	5.126	22.92	0.589	2.13	20.817	-23.74	2.70475	1
3	4.50	18.09	7.04	16.13	11.33	17.57	11.19	18.25	6.32	16.10	16.42	7.51	17.39	10.24	15.14	3.46	14.01	21.23		
	14.592	-15.22	14.736	-15.87	17.852	-27.27	17.970	-24.77	14.437	-13.44	3.372	15.96	5.121	22.91	0.586	2.12	20.818	-23.74	2.83617	3
5	4.53	18.06	7.16	16.10	11.34	17.57	11.18	18.24	6.26	16.03	16.34	7.42	17.31	10.16	15.06	3.38	13.53	21.16		
	14.724	-15.83	14.945	-17.03	17.992	-27.31	18.079	-24.76	14.465	-13.58	3.361	15.92	5.117	22.91	0.584	2.10	20.819	-23.73	2.96758	5
7	4.56	18.03	7.27	16.08	11.34	17.57	11.16	18.23	6.21	15.56	16.26	7.34	17.22	10.07	14.58	3.30	13.46	21.08		
	14.857	-16.43	15.155	-18.12	18.130	-27.32	18.189	-24.74	14.494	-13.72	3.351	15.87	5.112	22.90	0.581	2.09	20.820	-23.72	3.09900	7
9	4.60	17.60	7.39	16.06	11.34	17.58	11.15	18.22	6.16	15.49	16.17	7.25	17.14	9.59	14.50	3.22	13.38	21.00		
	14.991	-17.00	15.365	-19.16	18.265	-27.28	18.300	-24.71	14.522	-13.86	3.340	15.83	5.107	22.89	0.578	2.07	20.821	-23.72	3.23043	9
11	5.03	17.57	7.50	16.04	11.34	17.58	11.13	18.21	6.10	15.42	16.09	7.16	17.06	9.51	14.42	3.13	13.30	20.52		
	15.126	-17.56	15.576	-20.13	18.396	-27.21	18.410	-24.65	14.551	-14.00	3.329	15.79	5.102	22.89	0.576	2.06	20.822	-23.71	3.36185	11
13	5.06	17.55	8.01	16.03	11.33	17.59	11.11	18.20	6.05	15.35	16.01	7.07	16.58	9.43	14.34	3.05	13.22	20.45		
	15.262	-18.10	15.789	-21.04	18.524	-27.11	18.521	-24.58	14.579	-14.13	3.318	15.75	5.096	22.88	0.574	2.04	20.824	-23.70	3.49327	13
15	5.09	17.52	8.12	16.02	11.31	17.60	11.09	18.20	5.59	15.28	15.52	6.58	16.50	9.35	14.26	2.57	13.14	20.37		
	15.399	-18.61	16.002	-21.87	18.648	-26.97	18.632	-24.49	14.608	-14.27	3.307	15.71	5.091	22.87	0.571	2.03	20.825	-23.69	3.62469	15
17	5.12	17.50	8.23	16.01	11.29	18.01	11.07	18.19	5.54	15.21	15.44	6.50	16.42	9.26	14.18	2.49	13.06	20.29		
	15.536	-19.11	16.217	-22.64	18.768	-26.80	18.743	-24.38	14.636	-14.40	3.296	15.67	5.086	22.87	0.569	2.02	20.827	-23.68	3.75611	17
19	5.15	17.48	8.33	16.01	11.26	18.01	11.05	18.19	5.49	15.14	15.36	6.41	16.34	9.18	14.10	2.41	12.59	20.22		
	15.675	-19.58	16.433	-23.33	18.883	-26.60	18.854	-24.25	14.664	-14.53	3.285	15.63	5.080	22.86	0.567	2.00	20.828	-23.67	3.88752	19
21	5.18	17.46	8.43	16.02	11.23	18.02	11.03	18.19	5.43	15.07	15.28	6.32	16.25	9.10	14.02	2.33	12.51	20.14		
	15.814	-20.02	16.650	-23.94	18.992	-26.37	18.965	-24.10	14.692	-14.67	3.274	15.60	5.074	22.85	0.565	1.99	20.830	-23.66	4.01894	21
23	5.20	17.45	8.52	16.03	11.19	18.03	11.00	18.19	5.38	14.60	15.19	6.23	16.17	9.02	13.55	2.25	12.43	20.06		
	15.955	-20.45	16.868	-24.47	19.096	-26.11	19.076	-23.94	14.721	-14.79	3.264	15.56	5.069	22.85	0.563	1.98	20.832	-23.65	4.15037	23
25	5.23	17.43	9.01	16.04	11.14	18.03	10.57	18.19	5.32	14.53	15.11	6.15	16.09	8.53	13.47	2.17	12.35	19.59		
	16.096	-20.84	17.086	-24.92	19.194	-25.83	19.187	-23.76	14.749	-14.92	3.253	15.52	5.063	22.84	0.562	1.97	20.835	-23.64	4.28179	25
27	5.26	17.42	9.09	16.07	11.09	18.03	10.55	18.20	5.27	14.46	15.03	6.06	16.01	8.45	13.39	2.09	12.27	19.51		
	16.238	-21.21	17.304	-25.28	19.286	-25.52	19.298	-23.56	14.777	-15.05	3.243	15.48	5.057	22.83	0.560	1.96	20.837	-23.63	4.41321	27
29	5.28	17.41	9.16	16.10	11.04	18.03	10.52	18.20	5.22	14.39	14.55	5.57	15.53	8.37	13.31	2.01	12.19	19.43		
	16.381	-21.56	17.521	-25.55	19.371	-25.20	19.409	-23.34	14.804	-15.17	3.232	15.45	5.051	22.82	0.559	1.96	20.839	-23.62	4.54463	29

# GRUDZIEŃ 2029

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
335	1	Sob	472	16.56374	10.55	16.3128	-21.53	0.98606	12.3455	-9.16	57.432	2.5	23	737	1134.8	1532	156	728.9	1248	1250	1	
336	2	Nie	473	17.00340	10.32	16.3547	-22.02	0.98591	13.3057	-14.23	56.848	3.5	14	738	1135.2	1532	322	822.4	1311	1246	2	
337	3	Pon	474	17.04305	10.08	16.4008	-22.10	0.98576	14.3029	-18.42	56.463	4.5	7	740	1135.6	1531	450	919.7	1340	1242	3	
338	4	Wto	475	17.08270	9.44	16.4428	-22.18	0.98561	15.3322	-21.50	56.329	5.5	2	741	1136.0	1531	617	1020.8	1419	1238	4	
339	5	Śro	476	17.12236	9.19	16.4850	-22.26	0.98547	16.3822	-23.25	56.476	6.5	0	743	1136.4	1530	736	1124.5	1511	1234	5	
340	6	Czw	477	17.16202	8.54	16.5312	-22.33	0.98533	17.4327	-23.19	56.900	0.8	1	744	1136.9	1530	841	1228.3	1618	1230	6	
341	7	Pią	478	17.20167	8.28	16.5734	-22.40	0.98519	18.4623	-21.36	57.566	1.8	5	745	1137.3	1529	931	1329.7	1735	1226	7	
342	8	Sob	479	17.24133	8.01	17.0157	-22.46	0.98506	19.4537	-18.34	58.412	2.8	11	746	1137.7	1529	1007	1426.9	1856	1223	8	
343	9	Nie	480	17.28099	7.35	17.0620	-22.52	0.98493	20.4038	-14.35	59.361	3.8	19	747	1138.2	1529	1033	1519.3	2016	1219	9	
344	10	Pon	481	17.32064	7.07	17.1044	-22.57	0.98480	21.3146	-9.59	60.332	4.8	28	749	1138.6	1528	1054	1607.5	2133	1215	10	
345	11	Wto	482	17.36030	6.40	17.1508	-23.02	0.98468	22.1949	-5.05	61.252	5.8	37	750	1139.1	1528	1111	1652.5	2247	1211	11	
346	12	Śro	483	17.39595	6.12	17.1933	-23.07	0.98456	23.0545	-0.07	62.059	6.8	47	751	1139.5	1528	1127	1735.4	2358	1207	12	
347	13	Czw	484	17.43561	5.44	17.2358	-23.11	0.98444	23.5035	4.44	62.712	0.7	57	752	1140.0	1528	1142	1817.3	0**	1203	13	
348	14	Pią	485	17.47526	5.15	17.2823	-23.14	0.98433	0.3515	9.20	63.186	1.7	66	753	1140.5	1528	1157	1859.4	107	1159	14	
349	15	Sob	486	17.51492	4.46	17.3248	-23.17	0.98423	1.2033	13.31	63.473	2.7	75	754	1141.0	1528	1215	1942.3	216	1155	15	
350	16	Nie	487	17.55457	4.17	17.3714	-23.20	0.98413	2.0710	17.11	63.578	3.7	83	754	1141.5	1528	1235	2026.9	325	1151	16	
351	17	Pon	488	17.59423	3.48	17.4139	-23.22	0.98403	2.5533	20.09	63.521	4.7	89	755	1141.9	1529	1301	2113.5	432	1147	17	
352	18	Wto	489	18.03389	3.19	17.4605	-23.24	0.98395	3.4550	22.17	63.325	5.7	94	756	1142.4	1529	1333	2202.1	538	1143	18	
353	19	Śro	490	18.07354	2.49	17.5031	-23.25	0.98387	4.3748	23.25	63.019	6.7	98	756	1142.9	1529	1414	2252.4	638	1139	19	
354	20	Czw	491	18.11320	2.19	17.5458	-23.26	0.98379	5.3053	23.28	62.632	7.7	100	757	1143.4	1530	1506	2343.6	731	1135	20	
355	21	Pią	492	18.15285	1.50	17.5924	-23.26	0.98372	6.2418	22.23	62.188	0.5	100	758	1143.9	1530	1607	*****	815	1131	21	
356	22	Sob	493	18.19251	1.20	18.0350	-23.26	0.98366	7.1715	20.12	61.706	1.5	98	758	1144.4	1531	1716	034.7	850	1127	22	
357	23	Nie	494	18.23217	0.50	18.0816	-23.25	0.98360	8.0910	16.60	61.198	2.5	94	759	1144.9	1531	1830	124.9	918	1124	23	
358	24	Pon	495	18.27182	0.21	18.1243	-23.24	0.98355	8.5954	12.56	60.672	3.5	88	759	1145.4	1532	1946	213.7	941	1120	24	
359	25	Wto	496	18.31148	-0.09	18.1709	-23.23	0.98351	9.4940	8.13	60.130	4.5	80	759	1145.9	1533	2103	301.4	1000	1116	25	
360	26	Śro	497	18.35114	-0.39	18.2135	-23.21	0.98347	10.3901	3.02	59.576	5.5	71	759	1146.4	1533	2221	348.4	1018	1112	26	
361	27	Czw	498	18.39079	-1.08	18.2601	-23.18	0.98344	11.2845	-2.22	59.019	6.5	61	800	1146.9	1534	2340	435.4	1035	1108	27	
362	28	Pią	499	18.43044	-1.38	18.3027	-23.15	0.98341	12.1946	-7.46	58.476	0.0	49	800	1147.4	1535	****	523.6	1053	1104	28	
363	29	Sob	500	18.47010	-2.07	18.3453	-23.12	0.98339	13.1302	-12.51	57.974	1.0	38	800	1147.9	1536	102	614.0	1113	1100	29	
364	30	Nie	501	18.50576	-2.36	18.3918	-23.08	0.98337	14.0917	-17.19	57.550	2.0	27	800	1148.3	1537	226	707.5	1139	1056	30	
365	31	Pon	502	18.54541	-3.04	18.4344	-23.03	0.98336	15.0851	-20.48	57.249	3.0	18	800	1148.8	1538	350	804.7	1211	1052	31	

Fazy Księżyca [Dm, h.mm]:      Now 5, 15.52      1kw 12, 18.49      Pełn 20, 23.47      3kw 28, 10.49

# GRUDZIEŃ 2029 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.31	17.40	9.23	16.13	10.58	18.03	10.49	18.20	5.16	14.32	14.46	5.49	15.45	8.28	13.23	1.53	12.12	19.36		
	16.524	-21.88	17.736	-25.72	19.448	-24.86	19.519	-23.11	14.832	-15.30	3.222	15.41	5.045	22.82	0.557	1.95	20.842	-23.61	4.67605	1
3	5.33	17.39	9.28	16.17	10.51	18.02	10.46	18.21	5.11	14.25	14.38	5.40	15.37	8.20	13.15	1.45	12.04	19.28		
	16.669	-22.17	17.949	-25.81	19.517	-24.50	19.630	-22.85	14.860	-15.42	3.212	15.38	5.039	22.81	0.556	1.94	20.844	-23.60	4.80747	3
5	5.35	17.38	9.33	16.22	10.44	18.00	10.42	18.22	5.05	14.18	14.30	5.31	15.28	8.12	13.07	1.37	11.56	19.21		
	16.814	-22.43	18.157	-25.80	19.578	-24.12	19.740	-22.58	14.887	-15.54	3.203	15.35	5.033	22.80	0.555	1.94	20.847	-23.58	4.93889	5
7	5.37	17.38	9.36	16.27	10.37	17.59	10.39	18.23	4.60	14.11	14.22	5.23	15.20	8.04	12.59	1.29	11.48	19.13		
	16.959	-22.66	18.359	-25.69	19.630	-23.74	19.850	-22.30	14.914	-15.65	3.193	15.31	5.026	22.79	0.554	1.93	20.850	-23.57	5.07031	7
9	5.39	17.38	9.38	16.32	10.28	17.56	10.35	18.23	4.54	14.04	14.13	5.14	15.12	7.55	12.51	1.21	11.41	19.05		
	17.106	-22.86	18.552	-25.49	19.672	-23.34	19.959	-22.00	14.941	-15.77	3.184	15.28	5.020	22.78	0.553	1.93	20.853	-23.56	5.20174	9
11	5.41	17.38	9.39	16.38	10.19	17.53	10.32	18.24	4.49	13.57	14.05	5.06	15.04	7.47	12.43	1.13	11.33	18.58		
	17.252	-23.03	18.733	-25.20	19.703	-22.94	20.069	-21.68	14.968	-15.88	3.176	15.26	5.014	22.77	0.553	1.93	20.856	-23.54	5.33316	11
13	5.43	17.38	9.38	16.43	10.10	17.50	10.28	18.25	4.43	13.50	13.57	4.57	14.56	7.39	12.36	1.06	11.25	18.50		
	17.399	-23.18	18.898	-24.83	19.724	-22.54	20.178	-21.34	14.995	-15.99	3.167	15.23	5.008	22.77	0.552	1.93	20.859	-23.53	5.46458	13
15	5.44	17.38	9.35	16.47	9.59	17.45	10.24	18.27	4.37	13.43	13.49	4.48	14.48	7.30	12.28	0.58	11.17	18.43		
	17.547	-23.29	19.042	-24.38	19.734	-22.13	20.286	-20.99	15.021	-16.10	3.159	15.20	5.002	22.76	0.552	1.92	20.862	-23.52	5.59599	15
17	5.46	17.39	9.30	16.50	9.48	17.40	10.20	18.28	4.32	13.36	13.41	4.40	14.39	7.22	12.20	0.50	11.09	18.35		
	17.694	-23.37	19.159	-23.88	19.732	-21.72	20.395	-20.62	15.047	-16.21	3.151	15.18	4.996	22.75	0.552	1.92	20.865	-23.50	5.72742	17
19	5.47	17.40	9.23	16.51	9.37	17.35	10.16	18.29	4.26	13.30	13.32	4.32	14.31	7.14	12.12	0.42	11.02	18.28		
	17.842	-23.42	19.240	-23.34	19.718	-21.31	20.503	-20.24	15.073	-16.32	3.144	15.16	4.990	22.74	0.551	1.93	20.869	-23.49	5.85884	19
21	5.48	17.41	9.13	16.50	9.25	17.28	10.12	18.30	4.20	13.23	13.24	4.23	14.23	7.06	12.04	0.34	10.54	18.20		
	17.990	-23.43	19.279	-22.78	19.692	-20.91	20.610	-19.85	15.098	-16.42	3.137	15.14	4.984	22.73	0.552	1.93	20.872	-23.47	5.99026	21
23	5.49	17.42	9.01	16.45	9.12	17.21	10.08	18.31	4.15	13.16	13.16	4.15	14.15	6.57	11.56	0.26	10.46	18.12		
	18.138	-23.42	19.268	-22.23	19.654	-20.51	20.717	-19.44	15.124	-16.52	3.130	15.12	4.978	22.72	0.552	1.93	20.876	-23.46	6.12169	23
25	5.50	17.43	8.45	16.37	8.58	17.13	10.04	18.33	4.09	13.09	13.08	4.06	14.07	6.49	11.48	0.18	10.38	18.05		
	18.286	-23.38	19.202	-21.71	19.605	-20.11	20.823	-19.01	15.149	-16.62	3.124	15.10	4.973	22.72	0.552	1.93	20.879	-23.44	6.25311	25
27	5.50	17.44	8.27	16.25	8.44	17.04	9.59	18.34	4.03	13.02	12.60	3.58	13.59	6.41	11.40	0.11	10.31	17.57		
	18.434	-23.30	19.081	-21.25	19.546	-19.73	20.930	-18.57	15.173	-16.72	3.118	15.09	4.967	22.71	0.553	1.94	20.883	-23.43	6.38452	27
29	5.51	17.46	8.06	16.10	8.30	16.54	9.55	18.36	3.57	12.55	12.52	3.50	13.50	6.32	11.33	0.03	10.23	17.50		
	18.581	-23.19	18.916	-20.85	19.477	-19.35	21.035	-18.12	15.198	-16.81	3.113	15.07	4.961	22.70	0.553	1.94	20.887	-23.41	6.51594	29
31	5.51	17.48	7.45	15.53	8.15	16.44	9.50	18.37	3.51	12.48	12.44	3.42	13.42	6.24	11.25	23.51	10.15	17.42		
	18.729	-23.05	18.725	-20.53	19.400	-18.99	21.140	-17.66	15.222	-16.90	3.108	15.06	4.956	22.69	0.554	1.95	20.891	-23.40	6.64736	31

## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2029

Nowy Rok	Pon	1 styczeń	Dzień Matki	Sob	26 maj
Najświętszej Maryi Panny Rodzicielki	Pon	1 styczeń	Trójcy Najświętszej	Nie	27 maj
Objawienia Pańskiego (Trzech Króli)	Sob	6 styczeń	Boże Ciało	Czw	31 maj
Juliański Nowy Rok	Nie	14 styczeń	Dzień Dziecka	Pią	1 czerwiec
Dzień Babci	Nie	21 styczeń	Dzień Dziękczynienia	Nie	3 czerwiec
Dzień Dziadka	Pon	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	8 czerwiec
Ofiarowania Pańskiego	Pią	2 luty	Dzień Ojca	Sob	23 czerwiec
Matki Boskiej Gromnicznej	Pią	2 luty	Noc Świętojańska	Sob	23 czerwiec
Tłusty czwartek	Czw	8 luty	Św. Piotra i Pawła	Pią	29 czerwiec
Środa Popielcowa	Śro	14 luty	Wniebowzięcia N.M.P.	Śro	15 sierpień
Walentynki	Śro	14 luty	Święto Wojska Polskiego	Śro	15 sierpień
Święto UMK	Pon	19 luty	Dzień Solidarności i Wolności	Pią	31 sierpień
Dzień Kobiet	Czw	8 marzec	Dzień Programisty	Czw	13 wrzesień
Narodowy Dzień Życia	Sob	24 marzec	Dożynki – Święto Plonów	Nie	23 wrzesień
Niedziela Palmowa	Nie	25 marzec	Dzień Papieski	Nie	14 październik
Niedziela Wielkanocna	Nie	1 kwiecień	Dzień Edukacji Narodowej	Nie	14 październik
Niedziela Miłosierdzia Bożego	Nie	8 kwiecień	Dzień Papieża Jana Pawła II	Wto	16 październik
Święto Pracy	Wto	1 maj	Wszystkich Świętych	Czw	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Śro	2 maj	Zaduszki	Pią	2 listopad
Najświętsza Maryja Królowa Polski	Czw	3 maj	Święto Niepodległości	Nie	11 listopad
Święto Konstytucji 3 Maja	Czw	3 maj	Pierwsza niedziela Adwentu	Nie	2 grudzień
Wniebowstąpienia Pańskiego	Czw	10 maj	Niepokalane Poczęcie N.M.P.	Sob	8 grudzień
Dzień Polskiej Niezapominajki	Wto	15 maj	Boże Narodzenie	Wto	25 grudzień
Zesłania Ducha Świętego	Nie	20 maj	Sylwester	Pon	31 grudzień

# Kalendarz astronomiczny 2030

## PIWNICE, CA UMK

Współrzędne geograficzne: 18.5641°E 53.0955°N, Nr strefy czasowej ( $> 0$ , gdy na wschód) = 1 (CSE)

Kalendarz jest gregoriańskim i jest oparty na efemerydach Układu Słonecznego obliczanych z dokładnością 1' (Słońce 2", Księżyc 10", Pluton 15'). Czas gwiazdowy ma dokładność około 0.1 s. Wschody i zachody obliczono z uwzględnieniem horyzontalnej refrakcji astronomicznej (34'), rozciągłości Słońca lub Księżyca i paralaksy horyzontalnej Księżyca. Dla dat odległych o więcej niż ok. 300 lat od roku 1950 dokładności położenia planet są gorsze niż 1'!

*(Kalendarz ten opracowano [KMB] w Katedrze Radioastronomii CA UMK, Toruń—Piwnice. Oblicz. dnia 9.09.2020 r.)*

Data Wielkanocy: **2030 KWIECIEŃ 21**

Dla całego roku przyjęto: TDT – UT = 73 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 14.52**, Lato **VI 21, 8.31**, Jesień **IX 23, 0.27**, Zima **XII 21, 21.09**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje od **31 marca do 27 października 2030 r.**

### Oznaczenia:

Dr — dzień 2030 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12<sup>h</sup> UT

(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

$\Delta\alpha$  — różnica czasu (czas słoneczny prawdziwy minus średni)

$\alpha$  — rektascensja (Słońca lub Księżyca)

$\delta$  — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

$\rho_{\oplus}$  — promień Ziemi

Faza  $\leftarrow$  dni po kwadrze i % oświetlonej części tarczy Księżyca

Wsch — wschód (Słońca, Księżyca lub planety)

Gór — górowanie czyli tranzyt (Gal. = centrum Galaktyki)

Zach — zachód (Słońca, Księżyca lub planety)

# STYCZEŃ 2030

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
1	1	Wto	503	18.58507	-3.33	18.4809	-22.58	0.98335	16.1115	-22.58	57.114	4.0	10	800	1149.3	1539	511	905.3	1256	1048	1	
2	2	Śro	504	19.02472	-4.01	18.5233	-22.53	0.98334	17.1508	-23.34	57.180	5.0	4	759	1149.8	1540	622	1007.7	1354	1044	2	
3	3	Czw	505	19.06438	-4.29	18.5658	-22.47	0.98334	18.1830	-22.34	57.464	6.0	1	759	1150.2	1541	719	1109.8	1505	1040	3	
4	4	Pią	506	19.10404	-4.56	19.0122	-22.41	0.98334	19.1931	-20.05	57.960	0.3	0	759	1150.7	1543	801	1209.2	1625	1036	4	
5	5	Sob	507	19.14369	-5.23	19.0545	-22.34	0.98335	20.1700	-16.27	58.636	1.3	2	759	1151.1	1544	832	1304.8	1748	1032	5	
6	6	Nie	508	19.18335	-5.50	19.1008	-22.27	0.98336	21.1043	-11.60	59.439	2.3	7	758	1151.6	1545	856	1356.1	1908	1029	6	
7	7	Pon	509	19.22301	-6.16	19.1431	-22.20	0.98337	22.0104	-7.05	60.304	3.3	13	758	1152.0	1547	916	1443.7	2025	1025	7	
8	8	Wto	510	19.26266	-6.41	19.1853	-22.12	0.98339	22.4851	-2.00	61.160	4.3	21	757	1152.4	1548	932	1528.7	2139	1021	8	
9	9	Śro	511	19.30231	-7.06	19.2315	-22.03	0.98341	23.3459	3.01	61.941	5.3	30	757	1152.9	1549	948	1611.9	2251	1017	9	
10	10	Czw	512	19.34197	-7.31	19.2736	-21.55	0.98343	0.2023	7.47	62.593	6.3	39	756	1153.3	1551	1004	1654.6	****	1013	10	
11	11	Pią	513	19.38163	-7.55	19.3156	-21.45	0.98346	1.0554	12.10	63.074	7.3	49	755	1153.7	1552	1020	1737.5	001	1009	11	
12	12	Sob	514	19.42128	-8.18	19.3616	-21.36	0.98350	1.5216	16.02	63.359	0.9	58	755	1154.0	1554	1040	1821.6	110	1005	12	
13	13	Nie	515	19.46094	-8.41	19.4035	-21.25	0.98354	2.4004	19.14	63.442	1.9	67	754	1154.4	1556	1103	1907.3	218	1001	13	
14	14	Pon	516	19.50059	-9.03	19.4454	-21.15	0.98359	3.2936	21.39	63.330	2.9	76	753	1154.8	1557	1132	1955.0	324	957	14	
15	15	Wto	517	19.54025	-9.24	19.4911	-21.04	0.98364	4.2054	23.08	63.045	3.9	83	752	1155.1	1559	1209	2044.5	427	953	15	
16	16	Śro	518	19.57590	-9.44	19.5328	-20.53	0.98370	5.1339	23.33	62.621	4.9	90	751	1155.5	1600	1257	2135.5	523	949	16	
17	17	Czw	519	20.01556	-10.04	19.5745	-20.41	0.98376	6.0712	22.51	62.098	5.9	95	750	1155.8	1602	1354	2227.0	611	945	17	
18	18	Pią	520	20.05522	-10.23	20.0201	-20.29	0.98383	7.0048	21.00	61.519	6.9	98	749	1156.1	1604	1501	2318.2	650	941	18	
19	19	Sob	521	20.09487	-10.42	20.0616	-20.16	0.98391	7.5348	18.05	60.924	7.9	100	748	1156.4	1606	1615	*****	721	937	19	
20	20	Nie	522	20.13453	-10.60	20.1030	-20.03	0.98399	8.4548	14.12	60.349	0.8	99	747	1156.7	1607	1731	008.5	746	933	20	
21	21	Pon	523	20.17418	-11.17	20.1443	-19.50	0.98408	9.3648	9.34	59.820	1.8	96	745	1157.0	1609	1849	057.6	807	930	21	
22	22	Wto	524	20.21384	-11.33	20.1856	-19.36	0.98417	10.2708	4.25	59.353	2.8	91	744	1157.3	1611	2008	145.8	826	926	22	
23	23	Śro	525	20.25349	-11.48	20.2308	-19.22	0.98427	11.1724	-1.01	58.954	3.8	84	743	1157.6	1613	2128	233.6	843	922	23	
24	24	Czw	526	20.29315	-12.03	20.2719	-19.08	0.98438	12.0823	-6.28	58.622	4.8	75	742	1157.8	1615	2249	321.9	901	918	24	
25	25	Pią	527	20.33281	-12.17	20.3130	-18.53	0.98449	13.0054	-11.37	58.353	5.8	65	740	1158.0	1616	****	411.5	921	914	25	
26	26	Sob	528	20.37246	-12.30	20.3540	-18.38	0.98461	13.5539	-16.12	58.146	6.8	53	739	1158.2	1618	012	503.3	944	910	26	
27	27	Nie	529	20.41212	-12.42	20.3949	-18.23	0.98473	14.5303	-19.53	58.006	0.7	42	737	1158.5	1620	135	558.1	1013	906	27	
28	28	Pon	530	20.45177	-12.54	20.4357	-18.07	0.98486	15.5258	-22.23	57.942	1.7	31	736	1158.6	1622	255	655.7	1051	902	28	
29	29	Wto	531	20.49143	-13.05	20.4804	-17.51	0.98499	16.5433	-23.28	57.973	2.7	21	734	1158.8	1624	407	755.5	1142	858	29	
30	30	Śro	532	20.53108	-13.15	20.5211	-17.35	0.98512	17.5621	-23.02	58.116	3.7	13	733	1159.0	1626	508	855.9	1246	854	30	
31	31	Czw	533	20.57074	-13.24	20.5616	-17.18	0.98526	18.5648	-21.09	58.387	4.7	6	731	1159.1	1628	555	954.9	1401	850	31	

Fazy Księżyca [Dm, h.mm]:      Now 4, 3.49      1kw 11, 15.06      Pełn 19, 16.54      3kw 26, 19.14

# STYCZEŃ 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.51	17.49	7.34	15.45	8.07	16.39	9.48	18.38	3.48	12.44	12.40	3.38	13.38	6.20	11.21	23.47	10.11	17.39		
	18.802	-22.97	18.627	-20.40	19.359	-18.81	21.193	-17.42	15.234	-16.95	3.105	15.06	4.953	22.69	0.554	1.95	20.893	-23.39	6.71307	1
3	5.51	17.51	7.14	15.27	7.52	16.28	9.43	18.39	3.43	12.37	12.32	3.29	13.30	6.12	11.13	23.39	10.03	17.31		
	18.949	-22.79	18.443	-20.22	19.274	-18.46	21.297	-16.94	15.257	-17.04	3.101	15.05	4.948	22.68	0.555	1.96	20.897	-23.38	6.84450	3
5	5.51	17.53	6.56	15.10	7.37	16.17	9.39	18.41	3.37	12.30	12.24	3.21	13.22	6.04	11.05	23.32	9.56	17.24		
	19.096	-22.57	18.290	-20.14	19.186	-18.14	21.401	-16.45	15.280	-17.12	3.097	15.04	4.943	22.67	0.556	1.97	20.901	-23.36	6.97592	5
7	5.51	17.55	6.42	14.56	7.22	16.06	9.34	18.42	3.31	12.23	12.16	3.13	13.14	5.55	10.57	23.24	9.48	17.16		
	19.242	-22.33	18.181	-20.16	19.097	-17.84	21.505	-15.94	15.303	-17.21	3.094	15.04	4.938	22.67	0.558	1.98	20.905	-23.34	7.10734	7
9	5.50	17.57	6.31	14.43	7.07	15.55	9.29	18.43	3.25	12.16	12.08	3.05	13.06	5.47	10.49	23.16	9.40	17.09		
	19.387	-22.06	18.118	-20.28	19.011	-17.56	21.608	-15.43	15.325	-17.29	3.091	15.04	4.933	22.66	0.559	1.99	20.909	-23.33	7.23876	9
11	5.49	17.60	6.24	14.33	6.53	15.44	9.24	18.45	3.19	12.09	11.60	2.57	12.58	5.39	10.42	23.08	9.32	17.01		
	19.532	-21.75	18.102	-20.48	18.928	-17.31	21.710	-14.90	15.346	-17.37	3.089	15.04	4.928	22.65	0.561	2.00	20.913	-23.31	7.37018	11
13	5.48	18.02	6.19	14.25	6.39	15.32	9.19	18.46	3.12	12.02	11.52	2.49	12.50	5.31	10.34	23.01	9.25	16.54		
	19.676	-21.42	18.126	-20.73	18.852	-17.09	21.812	-14.36	15.368	-17.44	3.087	15.04	4.924	22.65	0.562	2.02	20.917	-23.30	7.50160	13
15	5.47	18.05	6.17	14.19	6.26	15.22	9.14	18.48	3.06	11.55	11.44	2.41	12.42	5.23	10.26	22.53	9.17	16.46		
	19.820	-21.07	18.185	-21.01	18.783	-16.91	21.914	-13.82	15.388	-17.52	3.086	15.04	4.920	22.64	0.564	2.03	20.921	-23.28	7.63302	15
17	5.46	18.07	6.16	14.14	6.13	15.11	9.09	18.49	3.00	11.48	11.36	2.33	12.34	5.14	10.18	22.45	9.09	16.39		
	19.962	-20.68	18.272	-21.30	18.724	-16.76	22.015	-13.27	15.409	-17.59	3.085	15.05	4.915	22.63	0.566	2.04	20.925	-23.27	7.76445	17
19	5.44	18.10	6.17	14.11	6.02	15.01	9.04	18.51	2.54	11.40	11.28	2.26	12.25	5.06	10.10	22.38	9.02	16.31		
	20.104	-20.27	18.383	-21.58	18.676	-16.65	22.115	-12.70	15.429	-17.66	3.084	15.06	4.911	22.63	0.568	2.06	20.930	-23.25	7.89587	19
21	5.43	18.13	6.19	14.09	5.51	14.52	8.59	18.52	2.48	11.33	11.20	2.18	12.17	4.58	10.03	22.30	8.54	16.24		
	20.245	-19.83	18.514	-21.83	18.638	-16.57	22.215	-12.13	15.448	-17.73	3.085	15.07	4.908	22.62	0.570	2.07	20.934	-23.23	8.02729	21
23	5.41	18.16	6.21	14.09	5.41	14.42	8.54	18.53	2.41	11.26	11.12	2.10	12.09	4.50	9.55	22.22	8.46	16.16		
	20.386	-19.37	18.660	-22.03	18.613	-16.52	22.315	-11.55	15.466	-17.79	3.085	15.08	4.904	22.62	0.573	2.09	20.938	-23.22	8.15871	23
25	5.39	18.19	6.24	14.09	5.33	14.34	8.48	18.55	2.35	11.19	11.04	2.02	12.01	4.42	9.47	22.15	8.38	16.09		
	20.525	-18.89	18.820	-22.18	18.599	-16.50	22.414	-10.97	15.485	-17.85	3.086	15.10	4.901	22.61	0.575	2.11	20.943	-23.20	8.29012	25
27	5.36	18.22	6.27	14.11	5.25	14.26	8.43	18.56	2.28	11.12	10.56	1.55	11.53	4.34	9.39	22.07	8.31	16.01		
	20.663	-18.38	18.990	-22.27	18.596	-16.51	22.513	-10.38	15.502	-17.91	3.088	15.11	4.898	22.61	0.578	2.12	20.947	-23.19	8.42154	27
29	5.34	18.25	6.30	14.13	5.18	14.18	8.38	18.58	2.22	11.05	10.48	1.47	11.45	4.26	9.31	21.60	8.23	15.54		
	20.801	-17.85	19.168	-22.30	18.605	-16.54	22.612	-9.78	15.519	-17.97	3.090	15.13	4.895	22.60	0.580	2.14	20.951	-23.17	8.55296	29
31	5.31	18.29	6.33	14.17	5.11	14.11	8.32	18.59	2.15	10.57	10.40	1.39	11.37	4.18	9.23	21.52	8.15	15.46		
	20.938	-17.30	19.354	-22.25	18.625	-16.58	22.710	-9.18	15.535	-18.02	3.093	15.16	4.892	22.60	0.583	2.16	20.956	-23.16	8.68439	31

# LUTY 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
32	1	Pią	534	21.01040	-13.32	21.0021	-17.01	0.98540	19.5440	-18.00	58.794	5.7	2	729	1159.3	1630	631	1051.1	1521	846	1	
33	2	Sob	535	21.05005	-13.40	21.0425	-16.44	0.98554	20.4923	-13.55	59.326	6.7	0	728	1159.4	1632	658	1143.9	1641	842	2	
34	3	Nie	536	21.08571	-13.47	21.0829	-16.26	0.98569	21.4103	-9.11	59.962	0.8	1	726	1159.5	1634	719	1233.2	1800	838	3	
35	4	Pon	537	21.12536	-13.53	21.1231	-16.08	0.98584	22.3011	-4.08	60.660	1.8	4	724	1159.6	1636	737	1319.8	1916	835	4	
36	5	Wto	538	21.16502	-13.58	21.1633	-15.50	0.98599	23.1729	0.58	61.373	2.8	9	723	1159.7	1638	754	1404.4	2030	831	5	
37	6	Śro	539	21.20467	-14.02	21.2034	-15.32	0.98615	0.0347	5.54	62.045	3.8	15	721	1159.8	1639	810	1448.0	2141	827	6	
38	7	Czw	540	21.24433	-14.05	21.2434	-15.13	0.98631	0.4950	10.30	62.624	4.8	23	719	1159.8	1641	826	1531.4	2252	823	7	
39	8	Pią	541	21.28398	-14.08	21.2833	-14.54	0.98647	1.3619	14.35	63.061	5.8	31	717	1159.9	1643	845	1615.3	****	819	8	
40	9	Sob	542	21.32364	-14.10	21.3231	-14.35	0.98664	2.2349	18.03	63.321	6.8	40	715	1159.9	1645	906	1700.5	001	815	9	
41	10	Nie	543	21.36329	-14.11	21.3629	-14.15	0.98681	3.1243	20.45	63.383	7.8	50	713	1159.9	1647	933	1747.3	108	811	10	
42	11	Pon	544	21.40295	-14.11	21.4026	-13.56	0.98698	4.0308	22.33	63.238	1.0	59	711	1159.9	1649	1006	1835.7	212	807	11	
43	12	Wto	545	21.44261	-14.11	21.4422	-13.36	0.98716	4.5458	23.22	62.896	2.0	68	709	1159.9	1651	1049	1925.6	311	803	12	
44	13	Śro	546	21.48226	-14.10	21.4817	-13.16	0.98734	5.4748	23.06	62.383	3.0	77	707	1159.9	1653	1141	2016.5	402	759	13	
45	14	Czw	547	21.52192	-14.08	21.5212	-12.55	0.98753	6.4104	21.42	61.738	4.0	85	705	1159.9	1655	1244	2107.6	445	755	14	
46	15	Pią	548	21.56157	-14.05	21.5606	-12.35	0.98772	7.3414	19.12	61.011	5.0	91	703	1159.8	1657	1354	2158.3	520	751	15	
47	16	Sob	549	22.00123	-14.01	21.5959	-12.14	0.98791	8.2653	15.41	60.259	6.0	96	701	1159.8	1659	1509	2248.4	548	747	16	
48	17	Nie	550	22.04088	-13.57	22.0351	-11.53	0.98812	9.1852	11.18	59.539	7.0	99	659	1159.7	1701	1628	2337.9	611	743	17	
49	18	Pon	551	22.08054	-13.52	22.0743	-11.32	0.98832	10.1024	6.15	58.903	0.2	100	657	1159.6	1703	1748	*****	631	739	18	
50	19	Wto	552	22.12019	-13.47	22.1134	-11.10	0.98853	11.0155	0.47	58.392	1.2	98	655	1159.5	1705	1910	027.0	649	736	19	
51	20	Śro	553	22.15585	-13.40	22.1524	-10.49	0.98875	11.5402	-4.48	58.030	2.2	94	653	1159.4	1707	2033	116.5	708	732	20	
52	21	Czw	554	22.19551	-13.33	22.1914	-10.27	0.98897	12.4726	-10.10	57.823	3.2	87	651	1159.3	1709	2157	207.0	727	728	21	
53	22	Pią	555	22.23516	-13.26	22.2303	-10.05	0.98919	13.4243	-14.59	57.761	4.2	78	649	1159.2	1711	2321	259.4	750	724	22	
54	23	Sob	556	22.27481	-13.18	22.2651	-9.43	0.98942	14.4011	-18.56	57.824	5.2	68	646	1159.0	1712	****	354.1	818	720	23	
55	24	Nie	557	22.31447	-13.09	22.3039	-9.21	0.98966	15.3942	-21.43	57.987	6.2	57	644	1158.9	1714	043	451.3	853	716	24	
56	25	Pon	558	22.35412	-12.60	22.3426	-8.59	0.98989	16.4029	-23.08	58.229	0.4	46	642	1158.7	1716	158	550.2	940	712	25	
57	26	Wto	559	22.39378	-12.50	22.3813	-8.37	0.99013	17.4119	-23.05	58.531	1.4	35	640	1158.6	1718	302	649.6	1039	708	26	
58	27	Śro	560	22.43344	-12.40	22.4159	-8.14	0.99037	18.4053	-21.37	58.886	2.4	25	638	1158.4	1720	352	747.8	1148	704	27	
59	28	Czw	561	22.47309	-12.29	22.4545	-7.51	0.99061	19.3807	-18.54	59.289	3.4	16	635	1158.2	1722	431	843.6	1304	700	28	

Fazy Księżyca [Dm, h.mm]:      Nów 2, 17.07      1kw 10, 12.49      Pełn 18, 7.20      3kw 25, 2.58



# LUTY 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	5.30	18.30	6.34	14.19	5.08	14.08	8.30	18.60	2.12	10.54	10.36	1.36	11.33	4.14	9.20	21.48	8.11	15.42		
	21.006	-17.02	19.450	-22.20	18.638	-16.61	22.759	-8.87	15.543	-18.05	3.094	15.17	4.891	22.60	0.584	2.17	20.958	-23.15	8.75010	1
3	5.27	18.33	6.37	14.24	5.03	14.02	8.24	19.01	2.05	10.46	10.29	1.28	11.25	4.06	9.12	21.41	8.04	15.35		
	21.141	-16.43	19.644	-22.03	18.673	-16.68	22.856	-8.26	15.559	-18.10	3.098	15.19	4.889	22.59	0.587	2.19	20.962	-23.14	8.88152	3
5	5.24	18.37	6.39	14.30	4.58	13.56	8.19	19.02	1.59	10.39	10.21	1.21	11.17	3.58	9.04	21.33	7.56	15.27		
	21.276	-15.83	19.844	-21.79	18.718	-16.76	22.953	-7.65	15.573	-18.14	3.102	15.22	4.887	22.59	0.591	2.21	20.967	-23.12	9.01294	5
7	5.21	18.40	6.41	14.37	4.54	13.51	8.13	19.04	1.52	10.32	10.13	1.13	11.09	3.50	8.56	21.26	7.48	15.20		
	21.409	-15.21	20.047	-21.46	18.771	-16.84	23.050	-7.03	15.588	-18.19	3.106	15.24	4.885	22.59	0.594	2.24	20.971	-23.11	9.14435	7
9	5.18	18.44	6.43	14.44	4.50	13.46	8.08	19.05	1.45	10.25	10.05	1.06	11.02	3.42	8.48	21.18	7.41	15.12		
	21.542	-14.58	20.253	-21.05	18.832	-16.92	23.146	-6.40	15.601	-18.23	3.111	15.27	4.883	22.59	0.597	2.26	20.975	-23.09	9.27577	9
11	5.15	18.47	6.44	14.52	4.47	13.42	8.02	19.06	1.38	10.17	9.58	0.58	10.54	3.34	8.41	21.10	7.33	15.05		
	21.674	-13.93	20.462	-20.55	18.901	-17.01	23.243	-5.78	15.613	-18.27	3.116	15.31	4.882	22.58	0.600	2.28	20.980	-23.08	9.40719	11
13	5.11	18.51	6.45	15.01	4.44	13.38	7.57	19.07	1.31	10.10	9.50	0.51	10.46	3.26	8.33	21.03	7.25	14.57		
	21.805	-13.26	20.674	-19.97	18.977	-17.08	23.338	-5.15	15.625	-18.30	3.122	15.34	4.881	22.58	0.604	2.30	20.984	-23.07	9.53861	13
15	5.08	18.54	6.45	15.10	4.42	13.35	7.51	19.09	1.25	10.02	9.42	0.44	10.38	3.18	8.25	20.55	7.17	14.50		
	21.935	-12.58	20.887	-19.30	19.060	-17.15	23.434	-4.52	15.637	-18.34	3.128	15.37	4.880	22.58	0.607	2.33	20.988	-23.05	9.67003	15
17	5.04	18.58	6.45	15.20	4.40	13.32	7.46	19.10	1.17	9.55	9.34	0.37	10.30	3.10	8.17	20.48	7.10	14.42		
	22.064	-11.88	21.102	-18.54	19.149	-17.20	23.529	-3.89	15.647	-18.37	3.135	15.41	4.880	22.58	0.611	2.35	20.992	-23.04	9.80145	17
19	4.60	19.01	6.45	15.31	4.38	13.30	7.40	19.11	1.10	9.48	9.27	0.29	10.22	3.02	8.10	20.40	7.02	14.35		
	22.193	-11.17	21.319	-17.69	19.243	-17.24	23.624	-3.25	15.657	-18.39	3.142	15.45	4.879	22.58	0.615	2.38	20.996	-23.03	9.93287	19
21	4.56	19.05	6.44	15.42	4.36	13.27	7.35	19.12	1.03	9.40	9.19	0.22	10.14	2.54	8.02	20.33	6.54	14.27		
	22.320	-10.45	21.537	-16.76	19.343	-17.26	23.719	-2.62	15.666	-18.42	3.149	15.49	4.879	22.58	0.619	2.40	21.001	-23.02	10.06428	21
23	4.52	19.08	6.43	15.54	4.34	13.26	7.29	19.14	0.56	9.32	9.11	0.15	10.06	2.46	7.54	20.25	6.47	14.20		
	22.448	-9.72	21.757	-15.73	19.447	-17.26	23.813	-1.98	15.674	-18.44	3.157	15.53	4.879	22.58	0.623	2.43	21.005	-23.00	10.19570	23
25	4.47	19.12	6.41	16.06	4.33	13.25	7.23	19.15	0.49	9.25	9.04	0.08	9.58	2.39	7.46	20.18	6.39	14.12		
	22.574	-8.98	21.978	-14.62	19.556	-17.23	23.908	-1.35	15.681	-18.46	3.166	15.57	4.880	22.58	0.627	2.46	21.009	-22.99	10.32712	25
27	4.43	19.16	6.40	16.18	4.31	13.24	7.18	19.16	0.41	9.17	8.56	23.57	9.51	2.31	7.38	20.10	6.31	14.05		
	22.700	-8.23	22.201	-13.41	19.669	-17.19	0.002	-0.71	15.687	-18.48	3.175	15.62	4.881	22.58	0.631	2.48	21.013	-22.98	10.45854	27

# MARZEC 2030

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 <sup>h</sup> UT) →											..... Czas strefowy [hhmm.] .....									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.					
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
60	1	Pią	562	22.51275	-12.17	22.4930	-7.29	0.99086	20.3232	-15.12	59.739	4.4	9	633	1158.0	1724	500	936.2	1423	656	1	
61	2	Sob	563	22.55240	-12.06	22.5315	-7.06	0.99111	21.2410	-10.47	60.236	5.4	4	631	1157.8	1726	523	1025.8	1540	652	2	
62	3	Nie	564	22.59206	-11.53	22.5659	-6.43	0.99135	22.1328	-5.55	60.772	6.4	1	629	1157.6	1728	542	1112.7	1656	648	3	
63	4	Pon	565	23.03171	-11.40	23.0043	-6.20	0.99160	23.0103	-0.54	61.333	0.2	0	626	1157.4	1730	559	1157.8	1810	644	4	
64	5	Wto	566	23.07137	-11.27	23.0426	-5.56	0.99185	23.4739	4.04	61.892	1.2	1	624	1157.2	1731	616	1241.7	1923	640	5	
65	6	Śro	567	23.11102	-11.13	23.0809	-5.33	0.99210	0.3356	8.47	62.418	2.2	5	622	1157.0	1733	632	1325.3	2034	637	6	
66	7	Czw	568	23.15068	-10.59	23.1151	-5.10	0.99236	1.2032	13.03	62.874	3.2	10	619	1156.7	1735	650	1409.3	2144	633	7	
67	8	Pią	569	23.19033	-10.45	23.1533	-4.47	0.99261	2.0756	16.44	63.220	4.2	16	617	1156.5	1737	711	1454.3	2252	629	8	
68	9	Sob	570	23.22599	-10.30	23.1915	-4.23	0.99287	2.5629	19.42	63.421	5.2	24	615	1156.2	1739	735	1540.5	2357	625	9	
69	10	Nie	571	23.26564	-10.15	23.2256	-3.60	0.99312	3.4619	21.48	63.447	6.2	32	612	1156.0	1741	806	1628.1	****	621	10	
70	11	Pon	572	23.30530	-9.59	23.2637	-3.36	0.99338	4.3718	22.56	63.279	7.2	41	610	1155.7	1743	844	1717.0	058	617	11	
71	12	Wto	573	23.34496	-9.43	23.3018	-3.12	0.99364	5.2910	23.03	62.914	0.1	51	608	1155.5	1744	932	1806.7	152	613	12	
72	13	Śro	574	23.38461	-9.27	23.3358	-2.49	0.99390	6.2129	22.06	62.361	1.1	60	605	1155.2	1746	1029	1856.8	238	609	13	
73	14	Czw	575	23.42427	-9.10	23.3738	-2.25	0.99416	7.1349	20.04	61.648	2.1	70	603	1154.9	1748	1134	1946.8	315	605	14	
74	15	Pią	576	23.46392	-8.54	23.4118	-2.01	0.99443	8.0553	17.01	60.819	3.1	79	600	1154.6	1750	1246	2036.4	346	601	15	
75	16	Sob	577	23.50358	-8.37	23.4458	-1.38	0.99470	8.5735	13.03	59.931	4.1	87	558	1154.4	1752	1402	2125.7	411	557	16	
76	17	Nie	578	23.54323	-8.19	23.4837	-1.14	0.99497	9.4907	8.19	59.052	5.1	93	556	1154.1	1754	1521	2215.0	432	553	17	
77	18	Pon	579	23.58289	-8.02	23.5216	-0.50	0.99524	10.4055	3.01	58.255	6.1	98	553	1153.8	1755	1643	2304.8	452	549	18	
78	19	Wto	580	0.02254	-7.44	23.5555	-0.27	0.99552	11.3334	-2.35	57.606	7.1	100	551	1153.5	1757	1806	2355.9	511	545	19	
79	20	Śro	581	0.06220	-7.27	23.5934	-0.03	0.99580	12.2744	-8.08	57.155	0.7	99	548	1153.2	1759	1932	*****	531	542	20	
80	21	Czw	582	0.10185	-7.09	0.0312	0.21	0.99608	13.2359	-13.17	56.933	1.7	96	546	1152.9	1801	2059	049.1	553	538	21	
81	22	Pią	583	0.14151	-6.51	0.0651	0.45	0.99636	14.2237	-17.38	56.941	2.7	90	544	1152.6	1803	2225	144.8	620	534	22	
82	23	Sob	584	0.18116	-6.33	0.1030	1.08	0.99665	15.2324	-20.51	57.158	3.7	81	541	1152.3	1804	2345	243.1	654	530	23	
83	24	Nie	585	0.22082	-6.15	0.1408	1.32	0.99694	16.2526	-22.39	57.544	4.7	72	539	1152.0	1806	****	343.3	738	526	24	
84	25	Pon	586	0.26047	-5.57	0.1746	1.55	0.99723	17.2722	-22.57	58.052	5.7	61	536	1151.7	1808	054	443.9	834	522	25	
85	26	Wto	587	0.30013	-5.39	0.2125	2.19	0.99752	18.2743	-21.48	58.632	0.0	49	534	1151.4	1810	149	543.2	941	518	26	
86	27	Śro	588	0.33578	-5.20	0.2503	2.42	0.99781	19.2523	-19.22	59.245	1.0	39	532	1151.1	1812	231	639.8	1055	514	27	
87	28	Czw	589	0.37544	-5.02	0.2842	3.06	0.99810	20.1956	-15.56	59.859	2.0	28	529	1150.8	1813	303	732.9	1212	510	28	
88	29	Pią	590	0.41510	-4.44	0.3220	3.29	0.99839	21.1130	-11.45	60.457	3.0	19	527	1150.5	1815	327	822.7	1329	506	29	
89	30	Sob	591	0.45475	-4.26	0.3559	3.53	0.99868	22.0034	-7.07	61.026	4.0	12	524	1150.2	1817	348	909.6	1444	502	30	
90	31	Nie	592	0.49441	-4.09	0.3938	4.16	0.99898	22.4751	-2.14	61.563	5.0	6	522	1149.9	1819	405	954.4	1557	458	31	
90	31	Nie	592	23.49342	-4.09	0.3929	4.15	0.99896	22.4555	-2.26	61.541	5.0	6	622	1249.9	1919	505	1054.4	1657	558	31	

Fazy Księżyca [Dm, h.mm]:      Nów 4, 7.35      1kw 12, 9.48      Pełn 19, 18.56      3kw 26, 10.51      3kw 26, 11.51

# MARZEC 2030 (c.d.)

Świty, zmierny astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST ( $0^h$ UT) Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	
1	4.39	19.20	6.38	16.31	4.30	13.23	7.12	19.17	0.34	9.10	8.49	23.50	9.43	2.23	7.31	20.03	6.23	13.57	
	22.825	-7.48	22.425	-12.12	19.786	-17.12	0.096	-0.08	15.693	-18.49	3.184	15.67	4.882	22.59	0.635	2.51	21.017	-22.97	10.58996 1
3	4.34	19.24	6.36	16.45	4.29	13.23	7.07	19.18	0.26	9.02	8.41	23.43	9.35	2.15	7.23	19.56	6.16	13.50	
	22.950	-6.71	22.650	-10.74	19.905	-17.02	0.190	0.56	15.698	-18.50	3.194	15.71	4.883	22.59	0.639	2.54	21.021	-22.96	10.72138 3
5	4.29	19.27	6.33	16.59	4.27	13.24	7.01	19.19	0.19	8.54	8.33	23.36	9.27	2.07	7.15	19.48	6.08	13.42	
	23.074	-5.94	22.877	-9.28	20.028	-16.89	0.284	1.19	15.702	-18.51	3.204	15.76	4.884	22.59	0.643	2.56	21.024	-22.95	10.85280 5
7	4.25	19.31	6.30	17.13	4.26	13.24	6.55	19.20	0.11	8.47	8.26	23.29	9.19	1.60	7.07	19.41	6.00	13.35	
	23.198	-5.17	23.106	-7.73	20.153	-16.74	0.378	1.82	15.705	-18.52	3.214	15.81	4.886	22.59	0.648	2.59	21.028	-22.94	10.98421 7
9	4.20	19.35	6.28	17.28	4.25	13.25	6.50	19.21	0.03	8.39	8.18	23.22	9.12	1.52	6.60	19.33	5.53	13.27	
	23.321	-4.38	23.337	-6.10	20.281	-16.55	0.471	2.45	15.707	-18.52	3.225	15.86	4.888	22.60	0.652	2.62	21.032	-22.93	11.11563 9
11	4.15	19.39	6.24	17.43	4.23	13.26	6.44	19.22	23.52	8.31	8.11	23.15	9.04	1.44	6.52	19.26	5.45	13.19	
	23.444	-3.60	23.570	-4.40	20.411	-16.34	0.565	3.07	15.709	-18.52	3.236	15.91	4.890	22.60	0.656	2.65	21.036	-22.92	11.24705 11
13	4.10	19.43	6.21	17.59	4.22	13.28	6.39	19.24	23.44	8.23	8.03	23.09	8.56	1.37	6.44	19.18	5.37	13.12	
	23.566	-2.81	23.803	-2.64	20.542	-16.09	0.658	3.69	15.709	-18.52	3.248	15.97	4.893	22.61	0.661	2.68	21.039	-22.91	11.37847 13
15	4.04	19.47	6.18	18.15	4.20	13.30	6.33	19.25	23.36	8.16	7.56	23.02	8.48	1.29	6.36	19.11	5.29	13.04	
	23.688	-2.02	0.038	-0.82	20.676	-15.82	0.752	4.31	15.709	-18.51	3.259	16.02	4.895	22.61	0.665	2.71	21.043	-22.90	11.50989 15
17	3.59	19.52	6.14	18.31	4.18	13.32	6.27	19.26	23.28	8.08	7.48	22.55	8.41	1.21	6.29	19.03	5.22	12.57	
	23.810	-1.23	0.273	1.04	20.811	-15.51	0.845	4.93	15.708	-18.50	3.272	16.08	4.898	22.61	0.670	2.74	21.046	-22.90	11.64131 17
19	3.54	19.56	6.10	18.47	4.17	13.34	6.22	19.27	23.20	7.60	7.41	22.48	8.33	1.14	6.21	18.56	5.14	12.49	
	23.932	-0.44	0.506	2.92	20.947	-15.17	0.939	5.54	15.706	-18.49	3.284	16.13	4.902	22.62	0.674	2.77	21.049	-22.89	11.77273 19
21	3.48	20.00	6.06	19.03	4.15	13.37	6.16	19.28	23.12	7.52	7.33	22.42	8.25	1.06	6.13	18.49	5.06	12.41	
	0.053	0.35	0.737	4.79	21.084	-14.80	1.032	6.14	15.703	-18.48	3.297	16.19	4.905	22.63	0.679	2.79	21.052	-22.88	11.90414 21
23	3.43	20.05	6.02	19.18	4.13	13.39	6.11	19.29	23.04	7.44	7.26	22.35	8.18	0.58	6.05	18.41	4.59	12.34	
	0.175	1.14	0.962	6.63	21.222	-14.40	1.126	6.74	15.699	-18.46	3.310	16.25	4.909	22.63	0.684	2.82	21.056	-22.88	12.03556 23
25	3.37	20.09	5.57	19.33	4.11	13.43	6.05	19.30	22.55	7.36	7.19	22.28	8.10	0.51	5.58	18.34	4.51	12.26	
	0.296	1.92	1.179	8.41	21.361	-13.97	1.220	7.34	15.695	-18.44	3.323	16.31	4.913	22.64	0.688	2.85	21.059	-22.87	12.16698 25
27	3.31	20.14	5.52	19.47	4.08	13.46	5.60	19.31	22.47	7.28	7.11	22.21	8.02	0.43	5.50	18.26	4.43	12.18	
	0.418	2.71	1.385	10.08	21.501	-13.51	1.313	7.93	15.689	-18.42	3.337	16.36	4.917	22.64	0.693	2.88	21.062	-22.87	12.29840 27
29	3.25	20.18	5.47	19.60	4.06	13.49	5.54	19.32	22.39	7.20	7.04	22.15	7.55	0.36	5.42	18.19	4.35	12.11	
	0.539	3.49	1.576	11.62	21.641	-13.02	1.407	8.51	15.683	-18.40	3.351	16.42	4.921	22.65	0.698	2.91	21.064	-22.86	12.42982 29
31	3.19	20.23	5.41	20.10	4.04	13.53	5.49	19.33	22.30	7.12	6.56	22.08	7.47	0.28	5.34	18.11	4.28	12.03	
	0.660	4.27	1.750	13.00	21.782	-12.51	1.501	9.09	15.676	-18.37	3.365	16.48	4.926	22.66	0.702	2.94	21.067	-22.86	12.56124 31
31	4.19	21.23	6.41	21.10	5.04	14.52	6.49	20.32	23.30	8.12	7.56	23.08	8.47	1.28	6.34	19.11	5.28	13.03	
	0.658	4.25	1.747	12.98	21.779	-12.52	1.499	9.07	15.676	-18.37	3.365	16.48	4.926	22.66	0.702	2.94	21.067	-22.86	12.56124 31

# KWIECIEŃ 2030

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)							Czas strefowy [hhmm.]										
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
91	1	Pon	593	23.53308	-3.52	0.4307	4.38	0.99925	23.3213	2.27	62.042	6.0	2	620	1249.6	1921	522	1138.1	1809	554	1
92	2	Wto	594	23.57273	-3.34	0.4646	5.01	0.99954	0.1812	7.11	62.499	7.0	0	617	1249.3	1922	538	1221.5	1919	550	2
93	3	Śro	595	0.01238	-3.16	0.5025	5.24	0.99983	1.0429	11.33	62.902	0.5	0	615	1249.0	1924	556	1305.1	2029	546	3
94	4	Czw	596	0.05204	-2.59	0.5405	5.47	1.00011	1.5134	15.25	63.233	1.5	2	613	1248.7	1926	616	1349.6	2138	543	4
95	5	Pią	597	0.09169	-2.42	0.5744	6.10	1.00040	2.3946	18.36	63.471	2.5	6	610	1248.4	1928	639	1435.4	2244	539	5
96	6	Sob	598	0.13135	-2.25	1.0123	6.33	1.00068	3.2912	20.58	63.591	3.5	11	608	1248.2	1930	708	1522.5	2347	535	6
97	7	Nie	599	0.17101	-2.08	1.0503	6.55	1.00096	4.1943	22.26	63.570	4.5	17	605	1247.9	1931	743	1610.8	****	531	7
98	8	Pon	600	0.21066	-1.51	1.0843	7.18	1.00124	5.1059	22.53	63.386	5.5	25	603	1247.6	1933	827	1659.8	043	527	8
99	9	Wto	601	0.25032	-1.35	1.1223	7.40	1.00152	6.0234	22.19	63.025	6.5	34	601	1247.3	1935	920	1749.1	131	523	9
100	10	Śro	602	0.28597	-1.19	1.1604	8.02	1.00180	6.5401	20.42	62.485	7.5	43	558	1247.1	1937	1021	1838.1	212	519	10
101	11	Czw	603	0.32563	-1.03	1.1945	8.24	1.00208	7.4504	18.07	61.778	0.3	53	556	1246.8	1939	1128	1926.7	244	515	11
102	12	Pią	604	0.36528	-0.47	1.2325	8.46	1.00236	8.3539	14.36	60.931	1.3	63	554	1246.5	1940	1240	2014.8	311	511	12
103	13	Sob	605	0.40494	-0.32	1.2707	9.08	1.00263	9.2600	10.19	59.991	2.3	73	552	1246.3	1942	1356	2102.8	333	507	13
104	14	Nie	606	0.44459	-0.17	1.3048	9.30	1.00291	10.1636	5.23	59.018	3.3	82	549	1246.0	1944	1514	2151.3	353	503	14
105	15	Pon	607	0.48425	-0.02	1.3430	9.51	1.00319	11.0805	0.01	58.089	4.3	90	547	1245.8	1946	1635	2241.1	412	459	15
106	16	Wto	608	0.52390	0.12	1.3812	10.13	1.00347	12.0115	-5.32	57.282	5.3	96	545	1245.5	1948	1759	2333.2	432	455	16
107	17	Śro	609	0.56356	0.26	1.4155	10.34	1.00374	12.5651	-10.54	56.673	6.3	99	542	1245.3	1949	1927	*****	453	451	17
108	18	Czw	610	1.00321	0.39	1.4538	10.55	1.00402	13.5524	-15.41	56.319	0.3	100	540	1245.1	1951	2055	028.3	518	447	18
109	19	Pią	611	1.04287	0.53	1.4921	11.16	1.00430	14.5654	-19.30	56.249	1.3	98	538	1244.9	1953	2221	126.9	549	444	19
110	20	Sob	612	1.08252	1.05	1.5305	11.36	1.00458	16.0034	-21.56	56.460	2.3	92	536	1244.7	1955	2337	228.3	630	440	20
111	21	Nie	613	1.12218	1.18	1.5649	11.57	1.00486	17.0451	-22.49	56.918	3.3	85	534	1244.5	1956	****	331.3	724	436	21
112	22	Pon	614	1.16184	1.29	2.0034	12.17	1.00513	18.0752	-22.07	57.565	4.3	75	531	1244.3	1958	040	433.6	829	432	22
113	23	Wto	615	1.20149	1.41	2.0419	12.37	1.00541	19.0802	-20.00	58.334	5.3	65	529	1244.1	2000	128	533.1	944	428	23
114	24	Śro	616	1.24115	1.52	2.0805	12.57	1.00569	20.0435	-16.47	59.158	6.3	54	527	1243.9	2002	204	628.7	1102	424	24
115	25	Czw	617	1.28080	2.02	2.1151	13.16	1.00596	20.5730	-12.45	59.980	0.6	43	525	1243.7	2004	232	720.2	1219	420	25
116	26	Pią	618	1.32046	2.12	2.1538	13.36	1.00623	21.4720	-8.13	60.756	1.6	33	523	1243.5	2005	253	808.1	1335	416	26
117	27	Sob	619	1.36011	2.22	2.1925	13.55	1.00650	22.3454	-3.25	61.457	2.6	24	521	1243.4	2007	312	853.4	1448	412	27
118	28	Nie	620	1.39577	2.30	2.2312	14.14	1.00677	23.2105	1.25	62.068	3.6	16	519	1243.2	2009	329	937.0	1559	408	28
119	29	Pon	621	1.43542	2.39	2.2701	14.32	1.00703	0.0642	6.07	62.582	4.6	9	517	1243.1	2011	345	1020.0	1709	404	29
120	30	Wto	622	1.47508	2.47	2.3049	14.51	1.00729	0.5231	10.31	63.000	5.6	4	515	1243.0	2012	402	1103.0	1819	400	30

Fazy Księżyca [Dm, h.mm]:      Nów 3, 0.02      1kw 11, 4.57      Pełn 18, 5.20      3kw 24, 20.39

# KWIECIEŃ 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE			MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)		
1	4.16	21.26	6.38	21.14	5.02	14.54	6.46	20.33	23.26	8.07	7.53	23.05	8.43	1.24	6.31	19.08	5.24	12.59			
	0.719	4.64	1.826	13.60	21.850	-12.25	1.546	9.36	15.672	-18.35	3.372	16.51	4.928	22.66	0.704	2.96	21.068	-22.85	12.62694	1	
3	4.10	21.31	6.32	21.22	4.60	14.58	6.41	20.34	23.17	7.59	7.45	22.58	8.35	1.17	6.23	19.00	5.16	12.52			
	0.840	5.40	1.968	14.72	21.991	-11.69	1.640	9.93	15.664	-18.32	3.387	16.57	4.933	22.67	0.709	2.99	21.071	-22.85	12.75836	3	
5	4.04	21.36	6.26	21.27	4.57	15.02	6.35	20.35	23.09	7.51	7.38	22.52	8.28	1.09	6.15	18.53	5.08	12.44			
	0.962	6.17	2.086	15.62	22.132	-11.11	1.734	10.49	15.655	-18.29	3.402	16.64	4.938	22.68	0.714	3.02	21.073	-22.85	12.88977	5	
7	3.58	21.41	6.19	21.29	4.54	15.06	6.30	20.36	23.00	7.43	7.31	22.45	8.20	1.02	6.07	18.45	5.01	12.36			
	1.084	6.92	2.179	16.31	22.274	-10.50	1.828	11.04	15.645	-18.26	3.417	16.70	4.943	22.69	0.718	3.04	21.076	-22.85	13.02119	7	
9	3.52	21.46	6.12	21.28	4.51	15.10	6.24	20.37	22.51	7.35	7.23	22.39	8.13	0.55	5.60	18.38	4.53	12.28			
	1.206	7.67	2.244	16.78	22.415	-9.86	1.923	11.58	15.635	-18.22	3.432	16.76	4.949	22.69	0.723	3.07	21.078	-22.84	13.15262	9	
11	3.45	21.52	6.05	21.23	4.48	15.15	6.19	20.38	22.43	7.26	7.16	22.32	8.05	0.47	5.52	18.30	4.45	12.21			
	1.329	8.41	2.282	17.01	22.557	-9.21	2.018	12.12	15.624	-18.18	3.448	16.82	4.954	22.70	0.728	3.10	21.080	-22.84	13.28404	11	
13	3.39	21.57	5.58	21.16	4.45	15.19	6.14	20.39	22.34	7.18	7.09	22.25	7.57	0.40	5.44	18.23	4.37	12.13			
	1.452	9.14	2.292	17.01	22.699	-8.53	2.112	12.64	15.612	-18.14	3.464	16.88	4.960	22.71	0.732	3.13	21.082	-22.84	13.41545	13	
15	3.32	22.03	5.50	21.06	4.42	15.23	6.09	20.39	22.25	7.10	7.01	22.19	7.50	0.32	5.36	18.16	4.30	12.05			
	1.575	9.85	2.278	16.79	22.841	-7.83	2.207	13.16	15.600	-18.09	3.480	16.95	4.966	22.72	0.737	3.16	21.084	-22.84	13.54687	15	
17	3.25	22.09	5.43	20.53	4.38	15.28	6.03	20.40	22.16	7.01	6.54	22.12	7.42	0.25	5.29	18.08	4.22	11.57			
	1.699	10.56	2.241	16.34	22.982	-7.11	2.302	13.67	15.587	-18.04	3.496	17.01	4.972	22.73	0.741	3.19	21.086	-22.84	13.67829	17	
19	3.18	22.15	5.36	20.38	4.35	15.33	5.58	20.41	22.07	6.53	6.47	22.06	7.35	0.17	5.21	18.01	4.14	11.50			
	1.823	11.26	2.186	15.70	23.124	-6.37	2.398	14.17	15.573	-18.00	3.512	17.07	4.978	22.74	0.746	3.22	21.088	-22.84	13.80970	19	
21	3.11	22.22	5.29	20.21	4.32	15.37	5.53	20.42	21.58	6.45	6.39	21.59	7.27	0.10	5.13	17.53	4.06	11.42			
	1.947	11.94	2.118	14.90	23.266	-5.62	2.493	14.66	15.559	-17.95	3.528	17.13	4.985	22.75	0.750	3.24	21.089	-22.85	13.94112	21	
23	3.03	22.29	5.22	20.03	4.28	15.42	5.48	20.43	21.49	6.36	6.32	21.53	7.20	0.03	5.05	17.46	3.59	11.34			
	2.072	12.61	2.044	13.98	23.408	-4.85	2.589	15.14	15.544	-17.89	3.545	17.20	4.992	22.76	0.755	3.27	21.091	-22.85	14.07255	23	
25	2.56	22.36	5.16	19.45	4.25	15.47	5.43	20.44	21.40	6.28	6.25	21.47	7.12	23.51	4.58	17.38	3.51	11.26			
	2.198	13.27	1.968	13.00	23.550	-4.06	2.685	15.61	15.529	-17.84	3.562	17.26	4.998	22.77	0.759	3.30	21.092	-22.85	14.20397	25	
27	2.48	22.43	5.10	19.27	4.21	15.52	5.38	20.44	21.31	6.19	6.18	21.40	7.05	23.44	4.50	17.31	3.43	11.19			
	2.324	13.91	1.897	12.01	23.692	-3.26	2.781	16.07	15.514	-17.78	3.579	17.32	5.005	22.78	0.763	3.32	21.093	-22.85	14.33539	27	
29	2.40	22.51	5.04	19.10	4.17	15.57	5.33	20.45	21.21	6.11	6.10	21.34	6.57	23.37	4.42	17.23	3.35	11.11			
	2.450	14.54	1.836	11.06	23.834	-2.45	2.877	16.52	15.498	-17.73	3.596	17.38	5.013	22.79	0.768	3.35	21.094	-22.86	14.46680	29	

# MAJ 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
121	1	Śro	623	1.51473	2.54	2.3439	15.09	1.00755	1.3905	14.28	63.323	6.6	1	513	1242.8	2014	421	1146.9	1927	356	1
122	2	Czw	624	1.55439	3.01	2.3829	15.27	1.00781	2.2650	17.47	63.551	7.6	0	511	1242.7	2016	443	1232.1	2034	352	2
123	3	Pią	625	1.59404	3.07	2.4219	15.45	1.00806	3.1554	20.21	63.682	0.8	1	509	1242.6	2018	510	1318.8	2138	349	3
124	4	Sob	626	2.03370	3.12	2.4610	16.02	1.00830	4.0610	22.02	63.707	1.8	3	507	1242.5	2019	543	1406.7	2236	345	4
125	5	Nie	627	2.07336	3.17	2.5001	16.19	1.00855	4.5716	22.44	63.617	2.8	7	505	1242.5	2021	624	1455.5	2327	341	5
126	6	Pon	628	2.11301	3.22	2.5353	16.36	1.00879	5.4839	22.25	63.397	3.8	13	503	1242.4	2023	714	1544.6	****	337	6
127	7	Wto	629	2.15267	3.26	2.5746	16.53	1.00902	6.3949	21.05	63.036	4.8	19	501	1242.3	2025	812	1633.3	010	333	7
128	8	Śro	630	2.19232	3.29	3.0139	17.09	1.00925	7.3020	18.47	62.526	5.8	28	459	1242.3	2026	917	1721.3	044	329	8
129	9	Czw	631	2.23198	3.32	3.0533	17.25	1.00948	8.2006	15.36	61.868	6.8	37	457	1242.2	2028	1026	1808.4	113	325	9
130	10	Pią	632	2.27164	3.35	3.0927	17.41	1.00971	9.0916	11.38	61.076	7.8	47	456	1242.2	2030	1138	1855.0	136	321	10
131	11	Sob	633	2.31129	3.36	3.1322	17.57	1.00993	9.5818	7.03	60.178	0.7	57	454	1242.1	2031	1253	1941.7	156	317	11
132	12	Nie	634	2.35095	3.38	3.1717	18.12	1.01015	10.4753	1.59	59.220	1.7	68	452	1242.1	2033	1410	2029.2	215	313	12
133	13	Pon	635	2.39060	3.38	3.2113	18.27	1.01037	11.3851	-3.21	58.264	2.7	78	451	1242.1	2035	1530	2118.6	234	309	13
134	14	Wto	636	2.43026	3.38	3.2509	18.41	1.01059	12.3207	-8.40	57.387	3.7	87	449	1242.1	2036	1653	2211.0	253	305	14
135	15	Śro	637	2.46591	3.38	3.2906	18.55	1.01080	13.2831	-13.40	56.669	4.7	94	447	1242.1	2038	1820	2307.1	316	301	15
136	16	Czw	638	2.50557	3.37	3.3304	19.09	1.01102	14.2831	-17.55	56.182	5.7	98	446	1242.1	2040	1948	*****	343	257	16
137	17	Pią	639	2.54522	3.36	3.3702	19.23	1.01123	15.3152	-20.60	55.980	6.7	100	444	1242.2	2041	2111	007.3	419	253	17
138	18	Sob	640	2.58488	3.33	3.4101	19.36	1.01144	16.3719	-22.35	56.085	0.9	99	443	1242.2	2043	2223	110.7	507	250	18
139	19	Nie	641	3.02453	3.31	3.4460	19.49	1.01164	17.4249	-22.29	56.483	1.9	94	441	1242.2	2044	2319	215.3	609	246	19
140	20	Pon	642	3.06419	3.28	3.4860	20.02	1.01185	18.4613	-20.49	57.130	2.9	88	440	1242.3	2046	****	318.4	722	242	20
141	21	Wto	643	3.10385	3.24	3.5260	20.14	1.01205	19.4602	-17.50	57.956	3.9	79	438	1242.4	2047	002	418.0	842	238	21
142	22	Śro	644	3.14350	3.19	3.5701	20.26	1.01225	20.4146	-13.54	58.883	4.9	69	437	1242.4	2049	033	513.0	1003	234	22
143	23	Czw	645	3.18316	3.15	4.0102	20.37	1.01245	21.3345	-9.22	59.834	5.9	58	436	1242.5	2050	058	603.7	1122	230	23
144	24	Pią	646	3.22281	3.09	4.0504	20.49	1.01264	22.2245	-4.33	60.745	0.2	48	434	1242.6	2052	118	650.9	1237	226	24
145	25	Sob	647	3.26247	3.03	4.0907	20.60	1.01283	23.0945	0.21	61.566	1.2	38	433	1242.7	2053	135	735.6	1350	222	25
146	26	Nie	648	3.30212	2.57	4.1310	21.10	1.01302	23.5540	5.06	62.267	2.2	28	432	1242.8	2054	152	819.0	1500	218	26
147	27	Pon	649	3.34178	2.50	4.1713	21.20	1.01320	0.4123	9.35	62.829	3.2	20	431	1242.9	2056	209	902.0	1610	214	27
148	28	Wto	650	3.38143	2.43	4.2117	21.30	1.01338	1.2736	13.37	63.249	4.2	13	430	1243.0	2057	227	945.4	1718	210	28
149	29	Śro	651	3.42109	2.35	4.2521	21.39	1.01355	2.1453	17.04	63.532	5.2	7	429	1243.2	2058	248	1030.0	1826	206	29
150	30	Czw	652	3.46075	2.26	4.2926	21.48	1.01371	3.0329	19.49	63.688	6.2	3	428	1243.3	2100	313	1116.0	1930	202	30
151	31	Pią	653	3.50040	2.18	4.3332	21.57	1.01388	3.5327	21.42	63.726	7.2	1	427	1243.5	2101	344	1203.6	2031	158	31

Fazy Księżyca [Dm, h.mm]:      Now 2, 16.12      1kw 10, 19.12      Pełn 17, 13.19      3kw 24, 6.57

# MAJ 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE			MERCURY			WENUS			MARS			JOWISZ			SATURN			URAN			NEPTUN			PLUTON			ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm			
1	2.32	22.59	4.58	18.54	4.13	16.02	5.28	20.46	21.12	6.03	6.03	21.27	6.50	23.29	4.34	17.16	3.28	11.03											
	2.577	15.15	1.789	10.21	23.976	-1.63	2.974	16.96	15.481	-17.67	3.613	17.45	5.020	22.80	0.772	3.38	21.095	-22.86	14.59822	1									
3	2.23	23.07	4.52	18.41	4.10	16.07	5.23	20.47	21.03	5.54	5.56	21.21	6.42	23.22	4.27	17.08	3.20	10.55											
	2.705	15.75	1.759	9.49	0.118	-0.80	3.071	17.38	15.465	-17.61	3.630	17.51	5.027	22.81	0.776	3.40	21.096	-22.87	14.72964	3									
5	2.14	23.17	4.47	18.29	4.06	16.12	5.18	20.47	20.54	5.46	5.49	21.14	6.35	23.14	4.19	17.01	3.12	10.47											
	2.834	16.32	1.746	8.92	0.261	0.03	3.168	17.80	15.448	-17.55	3.647	17.57	5.035	22.82	0.780	3.43	21.097	-22.87	14.86106	5									
7	2.04	23.27	4.41	18.19	4.02	16.17	5.14	20.48	20.44	5.37	5.41	21.08	6.27	23.07	4.11	16.54	3.04	10.39											
	2.963	16.88	1.752	8.51	0.403	0.87	3.265	18.20	15.431	-17.49	3.665	17.63	5.042	22.83	0.784	3.45	21.097	-22.88	14.99248	7									
9	1.53	23.38	4.36	18.11	3.58	16.22	5.09	20.48	20.35	5.29	5.34	21.02	6.20	22.60	4.03	16.46	2.56	10.31											
	3.092	17.42	1.776	8.27	0.546	1.72	3.363	18.59	15.414	-17.43	3.682	17.69	5.050	22.84	0.788	3.47	21.098	-22.89	15.12390	9									
11	1.40	23.52	4.31	18.05	3.54	16.27	5.05	20.49	20.26	5.20	5.27	20.55	6.12	22.53	3.56	16.39	2.49	10.23											
	3.223	17.94	1.817	8.20	0.689	2.57	3.460	18.97	15.397	-17.37	3.699	17.75	5.058	22.85	0.792	3.50	21.098	-22.89	15.25532	11									
13	1.25	0.20	4.27	18.02	3.51	16.33	5.00	20.49	20.17	5.12	5.20	20.49	6.05	22.45	3.48	16.31	2.41	10.16											
	3.354	18.44	1.876	8.28	0.833	3.42	3.558	19.34	15.379	-17.31	3.717	17.81	5.066	22.86	0.796	3.52	21.098	-22.90	15.38674	13									
15	****	****	4.22	17.59	3.47	16.38	4.56	20.50	20.07	5.03	5.13	20.42	5.57	22.38	3.40	16.23	2.33	10.08											
	3.485	18.92	1.951	8.51	0.977	4.27	3.656	19.69	15.362	-17.25	3.735	17.87	5.074	22.88	0.800	3.54	21.098	-22.91	15.51816	15									
17	****	****	4.17	17.59	3.43	16.43	4.51	20.50	19.58	4.55	5.05	20.36	5.50	22.31	3.32	16.16	2.25	9.60											
	3.617	19.38	2.041	8.88	1.121	5.13	3.754	20.03	15.345	-17.19	3.752	17.93	5.082	22.89	0.803	3.56	21.098	-22.92	15.64958	17									
19	****	****	4.13	18.00	3.39	16.49	4.47	20.51	19.49	4.46	4.58	20.29	5.42	22.23	3.25	16.08	2.17	9.52											
	3.750	19.82	2.145	9.38	1.266	5.97	3.853	20.36	15.328	-17.12	3.770	17.99	5.090	22.90	0.807	3.59	21.098	-22.93	15.78100	19									
21	****	****	4.09	18.03	3.35	16.54	4.43	20.51	19.39	4.38	4.51	20.23	5.35	22.16	3.17	16.01	2.10	9.44											
	3.883	20.23	2.263	9.99	1.412	6.82	3.952	20.68	15.311	-17.06	3.788	18.05	5.098	22.91	0.810	3.61	21.098	-22.93	15.91242	21									
23	****	****	4.05	18.07	3.32	16.60	4.39	20.51	19.30	4.29	4.44	20.17	5.27	22.09	3.09	15.53	2.02	9.36											
	4.017	20.62	2.394	10.71	1.559	7.66	4.050	20.98	15.294	-17.00	3.805	18.11	5.106	22.92	0.814	3.63	21.098	-22.94	16.04384	23									
25	****	****	4.01	18.12	3.28	17.05	4.35	20.51	19.21	4.21	4.37	20.10	5.20	22.01	3.01	15.46	1.54	9.28											
	4.152	20.99	2.537	11.51	1.706	8.49	4.149	21.27	15.278	-16.94	3.823	18.16	5.114	22.93	0.817	3.65	21.097	-22.95	16.17526	25									
27	****	****	3.57	18.19	3.24	17.11	4.31	20.51	19.12	4.12	4.29	20.04	5.12	21.54	2.54	15.38	1.46	9.20											
	4.287	21.34	2.693	12.39	1.854	9.31	4.248	21.54	15.261	-16.89	3.841	18.22	5.123	22.94	0.820	3.66	21.096	-22.97	16.30668	27									
29	****	****	3.54	18.27	3.21	17.17	4.27	20.51	19.03	4.04	4.22	19.57	5.05	21.47	2.46	15.31	1.38	9.12											
	4.423	21.65	2.861	13.34	2.003	10.13	4.348	21.80	15.245	-16.83	3.858	18.28	5.131	22.95	0.823	3.68	21.096	-22.98	16.43810	29									
31	****	****	3.51	18.36	3.17	17.22	4.23	20.51	18.53	3.55	4.15	19.51	4.58	21.40	2.38	15.23	1.30	9.04											
	4.559	21.95	3.042	14.34	2.152	10.93	4.447	22.05	15.230	-16.77	3.876	18.33	5.140	22.96	0.826	3.70	21.095	-22.99	16.56952	31									

# CZERWIEC 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
152	1	Sob	654	3.54006	2.08	4.3737	22.05	1.01403	4.4426	22.39	63.656	0.2	0	426	1243.6	2102	423	1252.2	2124	154	1
153	2	Nie	655	3.57571	1.59	4.4143	22.13	1.01418	5.3557	22.34	63.484	1.2	1	425	1243.8	2103	510	1341.4	2209	151	2
154	3	Pon	656	4.01537	1.49	4.4550	22.20	1.01433	6.2720	21.28	63.211	2.2	4	424	1243.9	2104	606	1430.4	2246	147	3
155	4	Wto	657	4.05503	1.39	4.4957	22.28	1.01447	7.1804	19.23	62.834	3.2	9	424	1244.1	2105	709	1518.7	2316	143	4
156	5	Śro	658	4.09468	1.28	4.5404	22.34	1.01461	8.0751	16.24	62.351	4.2	15	423	1244.3	2106	816	1605.8	2341	139	5
157	6	Czw	659	4.13434	1.17	4.5811	22.40	1.01474	8.5642	12.40	61.760	5.2	23	422	1244.5	2107	927	1652.0	****	135	6
158	7	Pią	660	4.17399	1.06	5.0219	22.46	1.01486	9.4456	8.17	61.067	6.2	32	422	1244.6	2108	1039	1737.7	002	131	7
159	8	Sob	661	4.21365	0.55	5.0627	22.52	1.01498	10.3310	3.27	60.285	7.2	42	421	1244.8	2109	1154	1823.5	021	127	8
160	9	Nie	662	4.25330	0.43	5.1035	22.57	1.01510	11.2210	-1.40	59.442	0.3	53	421	1245.0	2110	1310	1910.4	038	123	9
161	10	Pon	663	4.29296	0.31	5.1444	23.02	1.01521	12.1254	-6.51	58.581	1.3	64	420	1245.2	2111	1429	1959.6	057	119	10
162	11	Wto	664	4.33262	0.19	5.1852	23.06	1.01532	13.0618	-11.50	57.758	2.3	74	420	1245.4	2111	1552	2052.0	117	115	11
163	12	Śro	665	4.37227	0.07	5.2301	23.10	1.01543	14.0309	-16.17	57.042	3.3	84	419	1245.6	2112	1716	2148.5	141	111	12
164	13	Czw	666	4.41193	-0.06	5.2710	23.13	1.01553	15.0346	-19.50	56.504	4.3	92	419	1245.8	2113	1840	2249.2	211	107	13
165	14	Pią	667	4.45158	-0.18	5.3119	23.16	1.01563	16.0740	-22.04	56.205	5.3	97	419	1246.1	2113	1958	2352.9	252	103	14
166	15	Sob	668	4.49124	-0.31	5.3529	23.19	1.01572	17.1318	-22.44	56.186	6.3	100	419	1246.3	2114	2103	*****	346	059	15
167	16	Nie	669	4.53090	-0.44	5.3938	23.21	1.01581	18.1830	-21.44	56.459	0.6	99	419	1246.5	2114	2153	057.5	454	056	16
168	17	Pon	670	4.57055	-0.57	5.4347	23.23	1.01590	19.2112	-19.14	57.001	1.6	96	419	1246.7	2115	2231	200.1	613	052	17
169	18	Wto	671	5.01021	-1.10	5.4757	23.24	1.01599	20.2009	-15.33	57.760	2.6	90	419	1246.9	2115	2259	259.0	737	048	18
170	19	Śro	672	5.04586	-1.23	5.5206	23.25	1.01607	21.1507	-11.04	58.664	3.6	82	419	1247.1	2116	2321	353.4	859	044	19
171	20	Czw	673	5.08552	-1.36	5.5616	23.26	1.01615	22.0636	-6.11	59.634	4.6	73	419	1247.3	2116	2341	443.7	1019	040	20
172	21	Pią	674	5.12517	-1.49	6.0026	23.26	1.01622	22.5525	-1.09	60.592	5.6	63	419	1247.6	2116	2358	530.7	1134	036	21
173	22	Sob	675	5.16483	-2.02	6.0435	23.26	1.01629	23.4233	3.45	61.475	6.6	53	419	1247.8	2116	0**	615.6	1247	032	22
174	23	Nie	676	5.20449	-2.15	6.0845	23.25	1.01636	0.2856	8.23	62.234	0.7	43	420	1248.0	2116	015	659.4	1358	028	23
175	24	Pon	677	5.24414	-2.28	6.1254	23.24	1.01642	1.1521	12.36	62.837	1.7	34	420	1248.2	2116	033	743.1	1508	024	24
176	25	Wto	678	5.28380	-2.40	6.1704	23.23	1.01648	2.0229	16.14	63.271	2.7	25	420	1248.4	2116	053	827.5	1616	020	25
177	26	Śro	679	5.32345	-2.53	6.2113	23.21	1.01653	2.5045	19.10	63.533	3.7	17	421	1248.6	2116	117	913.0	1722	016	26
178	27	Czw	680	5.36311	-3.06	6.2522	23.18	1.01657	3.4020	21.18	63.633	4.7	11	421	1248.8	2116	146	900.0	1824	012	27
179	28	Pią	681	5.40276	-3.18	6.2931	23.16	1.01661	4.3106	22.30	63.590	5.7	6	422	1249.0	2116	221	1048.3	1919	008	28
180	29	Sob	682	5.44242	-3.30	6.3340	23.13	1.01665	5.2238	22.42	63.423	6.7	2	422	1249.3	2116	306	1137.4	2008	004	29
181	30	Nie	683	5.48208	-3.42	6.3748	23.09	1.01667	6.1421	21.51	63.153	7.7	0	423	1249.5	2116	359	1227.1	2048	000	30

Fazy Księżyca [Dm, h.mm]:      Nów 1, 8.21      1kw 9, 5.36      Pełn 15, 20.41      3kw 22, 19.20      Nów 30, 23.34



## CZERWIEC 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT)	Dm
1	****	****	3.49	18.41	3.16	17.25	4.21	20.51	18.49	3.51	4.11	19.48	4.54	21.36	2.34	15.19	1.27	8.60		
	4.627	22.09	3.137	14.86	2.227	11.33	4.497	22.17	15.222	-16.75	3.885	18.36	5.144	22.97	0.828	3.71	21.094	-22.99	16.63523	1
3	****	****	3.47	18.51	3.12	17.31	4.18	20.51	18.40	3.43	4.04	19.41	4.46	21.29	2.26	15.12	1.19	8.52		
	4.764	22.34	3.337	15.92	2.379	12.11	4.596	22.39	15.207	-16.69	3.902	18.41	5.152	22.98	0.831	3.72	21.093	-23.01	16.76665	3
5	****	****	3.45	19.03	3.09	17.37	4.14	20.51	18.31	3.34	3.57	19.35	4.39	21.21	2.19	15.04	1.11	8.44		
	4.901	22.57	3.551	17.01	2.531	12.87	4.696	22.61	15.192	-16.64	3.920	18.46	5.161	22.99	0.833	3.74	21.092	-23.02	16.89808	5
7	****	****	3.43	19.16	3.06	17.42	4.11	20.50	18.22	3.26	3.50	19.28	4.32	21.14	2.11	14.56	1.03	8.36		
	5.039	22.77	3.778	18.09	2.684	13.62	4.795	22.80	15.178	-16.59	3.937	18.52	5.170	23.00	0.836	3.75	21.091	-23.03	17.02950	7
9	****	****	3.43	19.30	3.03	17.48	4.07	20.50	18.13	3.17	3.43	19.22	4.24	21.07	2.03	14.49	0.55	8.28		
	5.176	22.95	4.019	19.17	2.838	14.35	4.895	22.99	15.165	-16.55	3.954	18.57	5.178	23.01	0.839	3.77	21.089	-23.05	17.16092	9
11	****	****	3.43	19.44	2.60	17.54	4.04	20.49	18.04	3.09	3.36	19.15	4.17	20.60	1.55	14.41	0.47	8.20		
	5.315	23.10	4.275	20.22	2.994	15.06	4.995	23.16	15.152	-16.50	3.972	18.62	5.187	23.02	0.841	3.78	21.088	-23.06	17.29233	11
13	****	****	3.44	19.60	2.57	17.60	4.01	20.49	17.55	3.01	3.28	19.09	4.09	20.52	1.47	14.33	0.40	8.12		
	5.453	23.22	4.545	21.21	3.151	15.75	5.095	23.31	15.140	-16.46	3.989	18.67	5.195	23.03	0.843	3.79	21.086	-23.07	17.42375	13
15	****	****	3.46	20.16	2.55	18.06	3.58	20.48	17.46	2.52	3.21	19.02	4.02	20.45	1.40	14.26	0.32	8.04		
	5.591	23.31	4.829	22.12	3.308	16.42	5.194	23.45	15.128	-16.42	4.006	18.72	5.204	23.04	0.845	3.81	21.084	-23.09	17.55518	15
17	****	****	3.50	20.32	2.52	18.11	3.55	20.47	17.37	2.44	3.14	18.56	3.54	20.38	1.32	14.18	0.24	7.56		
	5.730	23.38	5.125	22.92	3.468	17.06	5.294	23.58	15.117	-16.38	4.023	18.76	5.212	23.05	0.847	3.82	21.083	-23.10	17.68660	17
19	****	****	3.55	20.47	2.50	18.17	3.52	20.46	17.29	2.36	3.07	18.49	3.47	20.31	1.24	14.10	0.16	7.47		
	5.868	23.42	5.433	23.60	3.628	17.68	5.394	23.69	15.106	-16.35	4.040	18.81	5.221	23.06	0.849	3.83	21.081	-23.12	17.81802	19
21	****	****	4.02	21.03	2.48	18.23	3.50	20.45	17.20	2.28	2.60	18.43	3.40	20.23	1.16	14.03	0.08	7.39		
	6.007	23.43	5.748	24.11	3.790	18.26	5.493	23.79	15.097	-16.31	4.056	18.86	5.229	23.07	0.851	3.84	21.079	-23.13	17.94944	21
23	****	****	4.11	21.17	2.46	18.28	3.47	20.43	17.11	2.19	2.53	18.36	3.32	20.16	1.08	13.55	23.56	7.31		
	6.146	23.42	6.068	24.45	3.952	18.82	5.593	23.87	15.088	-16.28	4.073	18.90	5.238	23.08	0.853	3.84	21.077	-23.15	18.08086	23
25	****	****	4.21	21.29	2.44	18.34	3.45	20.42	17.03	2.11	2.45	18.29	3.25	20.09	1.01	13.47	23.48	7.23		
	6.284	23.38	6.389	24.61	4.116	19.35	5.692	23.94	15.079	-16.26	4.089	18.95	5.246	23.09	0.854	3.85	21.074	-23.16	18.21228	25
27	****	****	4.32	21.40	2.43	18.39	3.42	20.41	16.55	2.03	2.38	18.23	3.17	20.01	0.53	13.39	23.40	7.15		
	6.423	23.31	6.708	24.58	4.282	19.85	5.791	23.99	15.072	-16.24	4.105	18.99	5.254	23.10	0.856	3.86	21.072	-23.18	18.34370	27
29	****	****	4.45	21.49	2.42	18.45	3.40	20.39	16.46	1.55	2.31	18.16	3.10	19.54	0.45	13.32	23.33	7.07		
	6.561	23.21	7.021	24.36	4.448	20.31	5.890	24.03	15.065	-16.22	4.121	19.03	5.263	23.11	0.857	3.86	21.070	-23.19	18.47512	29

# LIPIEC 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
182	1	Pon	684	5.52173	-3.54	6.4157	23.05	1.01670	7.0537	20.00	62.799	0.5	0	424	1249.7	2115	500	1315.9	2120	2353	1
183	2	Wto	685	5.56139	-4.06	6.4605	23.01	1.01671	7.5602	17.14	62.375	1.5	2	424	1249.8	2115	607	1403.8	2147	2349	2
184	3	Śro	686	6.00105	-4.17	6.5012	22.56	1.01672	8.4525	13.38	61.889	2.5	6	425	1250.0	2114	717	1450.6	2209	2345	3
185	4	Czw	687	6.04070	-4.28	6.5420	22.51	1.01672	9.3356	9.24	61.349	3.5	12	426	1250.2	2114	830	1536.5	2228	2341	4
186	5	Pią	688	6.08036	-4.38	6.5827	22.45	1.01672	10.2160	4.41	60.758	4.5	19	427	1250.4	2113	943	1622.0	2246	2337	5
187	6	Sob	689	6.12001	-4.49	7.0234	22.39	1.01671	11.1018	-0.20	60.123	5.5	28	428	1250.6	2113	1058	1707.9	2304	2333	6
188	7	Nie	690	6.15567	-4.58	7.0640	22.33	1.01670	11.5938	-5.26	59.456	6.5	39	429	1250.7	2112	1215	1755.2	2323	2329	7
189	8	Pon	691	6.19532	-5.08	7.1046	22.26	1.01668	12.5056	-10.23	58.781	7.5	50	430	1250.9	2111	1334	1844.9	2345	2325	8
190	9	Wto	692	6.23498	-5.17	7.1452	22.19	1.01666	13.4500	-14.54	58.130	1.0	61	431	1251.0	2110	1455	1937.9	****	2321	9
191	10	Śro	693	6.27463	-5.25	7.1857	22.12	1.01663	14.4226	-18.40	57.548	2.0	72	432	1251.2	2110	1617	2034.7	011	2317	10
192	11	Czw	694	6.31429	-5.33	7.2301	22.04	1.01660	15.4315	-21.21	57.087	3.0	82	433	1251.3	2109	1735	2135.1	045	2313	11
193	12	Pią	695	6.35394	-5.41	7.2705	21.56	1.01657	16.4639	-22.38	56.799	4.0	90	434	1251.4	2108	1845	2237.8	131	2309	12
194	13	Sob	696	6.39360	-5.48	7.3109	21.47	1.01653	17.5101	-22.20	56.728	5.0	96	435	1251.5	2107	1942	2340.6	231	2305	13
195	14	Nie	697	6.43326	-5.55	7.3512	21.38	1.01648	18.5423	-20.29	56.900	6.0	99	437	1251.7	2106	2025	*****	344	2301	14
196	15	Pon	698	6.47291	-6.01	7.3915	21.29	1.01644	19.5507	-17.18	57.313	0.3	100	438	1251.8	2105	2058	041.3	506	2258	15
197	16	Wto	699	6.51257	-6.07	7.4317	21.19	1.01639	20.5224	-13.06	57.940	1.3	98	439	1251.9	2104	2123	138.5	630	2254	16
198	17	Śro	700	6.55223	-6.12	7.4719	21.09	1.01634	21.4615	-8.16	58.730	2.3	93	441	1251.9	2102	2145	231.6	752	2250	17
199	18	Czw	701	6.59188	-6.16	7.5120	20.58	1.01628	22.3712	-3.10	59.615	3.3	86	442	1252.0	2101	2203	321.3	912	2246	18
200	19	Pią	702	7.03154	-6.20	7.5521	20.48	1.01622	23.2603	1.55	60.524	4.3	78	443	1252.1	2100	2221	408.3	1028	2242	19
201	20	Sob	703	7.07119	-6.24	7.5921	20.36	1.01616	0.1340	6.46	61.387	5.3	69	445	1252.1	2059	2239	453.7	1141	2238	20
202	21	Nie	704	7.11085	-6.27	8.0320	20.25	1.01609	1.0052	11.12	62.145	6.3	59	446	1252.2	2057	2258	538.3	1253	2234	21
203	22	Pon	705	7.15050	-6.29	8.0719	20.13	1.01602	1.4821	15.05	62.754	0.1	49	447	1252.2	2056	2321	623.1	1402	2230	22
204	23	Wto	706	7.19016	-6.31	8.1118	20.01	1.01595	2.3636	18.16	63.184	1.1	40	449	1252.3	2055	2348	708.6	1510	2226	23
205	24	Śro	707	7.22581	-6.33	8.1516	19.48	1.01587	3.2557	20.40	63.425	2.1	31	450	1252.3	2053	****	755.2	1613	2222	24
206	25	Czw	708	7.26547	-6.33	8.1913	19.35	1.01578	4.1623	22.09	63.477	3.1	22	452	1252.3	2052	021	843.1	1712	2218	25
207	26	Pią	709	7.30512	-6.33	8.2310	19.22	1.01569	5.0742	22.40	63.357	4.1	15	453	1252.3	2050	102	932.0	1803	2214	26
208	27	Sob	710	7.34478	-6.33	8.2706	19.09	1.01559	5.5926	22.09	63.091	5.1	9	455	1252.3	2049	151	1021.4	1846	2210	27
209	28	Nie	711	7.38444	-6.32	8.3101	18.55	1.01549	6.5104	20.37	62.708	6.1	4	457	1252.3	2047	250	1110.8	1922	2206	28
210	29	Pon	712	7.42409	-6.30	8.3456	18.41	1.01538	7.4206	18.06	62.242	7.1	1	458	1252.3	2045	355	1159.5	1950	2203	29
211	30	Wto	713	7.46375	-6.28	8.3851	18.26	1.01527	8.3218	14.43	61.726	8.1	0	500	1252.2	2044	505	1247.2	2014	2159	30
212	31	Śro	714	7.50340	-6.25	8.4245	18.12	1.01515	9.2140	10.36	61.186	0.9	1	501	1252.2	2042	618	1334.1	2035	2155	31

Fazy Księżyca [Dm, h.mm]:      Now 0, 23.34      1kw 8, 13.02      Pełn 15, 4.12      3kw 22, 10.07      Now 30, 13.11

# LIPIEC 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
Dm	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 <sup>h</sup> UT) Dm
1	****	****	4.58	21.57	2.41	18.50	3.38	20.37	16.38	1.47	2.24	18.10	3.02	19.47	0.37	13.24	23.25	6.59	
	6.699	23.08	7.326	23.98	4.616	20.74	5.989	24.06	15.059	-16.20	4.137	19.07	5.271	23.12	0.858	3.87	21.067	-23.21	18.60655 1
3	****	****	5.12	22.02	2.40	18.55	3.36	20.35	16.30	1.39	2.17	18.03	2.55	19.39	0.29	13.16	23.17	6.51	
	6.837	22.93	7.620	23.44	4.785	21.13	6.088	24.07	15.054	-16.19	4.153	19.11	5.279	23.13	0.859	3.87	21.065	-23.23	18.73797 3
5	****	****	5.27	22.06	2.40	18.60	3.34	20.33	16.21	1.30	2.09	17.56	2.47	19.32	0.21	13.08	23.09	6.42	
	6.974	22.75	7.902	22.76	4.954	21.48	6.187	24.07	15.049	-16.18	4.168	19.15	5.287	23.13	0.860	3.88	21.062	-23.24	18.86939 5
7	****	****	5.41	22.08	2.40	19.04	3.32	20.31	16.13	1.22	2.02	17.50	2.40	19.25	0.14	13.01	23.01	6.34	
	7.111	22.55	8.172	21.96	5.125	21.80	6.285	24.06	15.046	-16.17	4.183	19.19	5.295	23.14	0.861	3.88	21.060	-23.26	19.00081 7
9	****	****	5.55	22.09	2.40	19.09	3.30	20.29	16.05	1.14	1.55	17.43	2.33	19.18	0.06	12.53	22.53	6.26	
	7.248	22.32	8.429	21.06	5.297	22.08	6.383	24.03	15.043	-16.17	4.198	19.23	5.303	23.15	0.861	3.88	21.057	-23.28	19.13223 9
11	****	****	6.09	22.09	2.41	19.13	3.29	20.27	15.57	1.06	1.48	17.36	2.25	19.10	23.54	12.45	22.45	6.18	
	7.384	22.06	8.673	20.08	5.469	22.32	6.481	23.98	15.041	-16.17	4.213	19.26	5.311	23.16	0.862	3.88	21.054	-23.29	19.26365 11
13	****	****	6.22	22.07	2.42	19.17	3.27	20.24	15.49	0.58	1.41	17.29	2.18	19.03	23.46	12.37	22.37	6.10	
	7.519	21.78	8.905	19.03	5.642	22.51	6.579	23.92	15.040	-16.17	4.227	19.30	5.318	23.17	0.862	3.88	21.051	-23.31	19.39507 13
15	****	****	6.35	22.05	2.43	19.21	3.26	20.22	15.41	0.51	1.33	17.23	2.10	18.55	23.38	12.29	22.29	6.02	
	7.654	21.48	9.124	17.92	5.816	22.67	6.676	23.85	15.039	-16.18	4.242	19.33	5.326	23.17	0.862	3.88	21.049	-23.32	19.52649 15
17	****	****	6.47	22.02	2.45	19.24	3.24	20.19	15.34	0.43	1.26	17.16	2.03	18.48	23.30	12.21	22.21	5.54	
	7.789	21.15	9.331	16.77	5.990	22.78	6.773	23.77	15.040	-16.19	4.256	19.36	5.333	23.18	0.862	3.88	21.046	-23.34	19.65792 17
19	****	****	6.58	21.59	2.47	19.27	3.23	20.16	15.26	0.35	1.19	17.09	1.55	18.41	23.23	12.13	22.14	5.45	
	7.922	20.79	9.526	15.60	6.165	22.85	6.869	23.67	15.041	-16.20	4.269	19.39	5.341	23.19	0.862	3.88	21.043	-23.36	19.78933 19
21	****	****	7.09	21.54	2.50	19.30	3.22	20.13	15.18	0.27	1.12	17.02	1.48	18.33	23.15	12.06	22.06	5.37	
	8.056	20.41	9.710	14.40	6.340	22.87	6.966	23.56	15.043	-16.22	4.283	19.42	5.348	23.20	0.862	3.87	21.040	-23.37	19.92075 21
23	****	****	7.18	21.50	2.52	19.33	3.20	20.10	15.11	0.19	1.04	16.55	1.40	18.26	23.07	11.58	21.58	5.29	
	8.188	20.01	9.882	13.20	6.515	22.86	7.062	23.44	15.046	-16.24	4.296	19.45	5.355	23.20	0.862	3.87	21.037	-23.39	20.05217 23
25	****	****	7.27	21.44	2.55	19.35	3.19	20.07	15.03	0.11	0.57	16.48	1.33	18.19	22.59	11.50	21.50	5.21	
	8.320	19.59	10.043	12.01	6.691	22.79	7.157	23.31	15.049	-16.26	4.308	19.48	5.362	23.21	0.861	3.86	21.034	-23.41	20.18359 25
27	****	****	7.35	21.39	2.59	19.37	3.18	20.03	14.56	0.04	0.50	16.41	1.25	18.11	22.51	11.42	21.42	5.13	
	8.452	19.15	10.193	10.83	6.866	22.69	7.252	23.16	15.053	-16.29	4.321	19.51	5.369	23.22	0.861	3.86	21.031	-23.42	20.31501 27
29	1.13	0.05	7.42	21.33	3.03	19.38	3.17	20.00	14.48	23.52	0.42	16.34	1.18	18.04	22.43	11.34	21.34	5.05	
	8.582	18.68	10.331	9.67	7.041	22.54	7.347	23.00	15.059	-16.32	4.333	19.53	5.376	23.22	0.860	3.85	21.028	-23.44	20.44644 29
31	1.36	-0.06	7.48	21.26	3.07	19.39	3.16	19.56	14.41	23.44	0.35	16.27	1.10	17.56	22.35	11.26	21.26	4.56	
	8.712	18.20	10.458	8.54	7.216	22.34	7.441	22.83	15.065	-16.35	4.345	19.56	5.382	23.23	0.859	3.84	21.024	-23.45	20.57786 31

# SIERPIEŃ 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
213	1	Czw	715	7.54306	-6.22	8.4638	17.57	1.01503	10.1029	5.57	60.645	1.9	4	503	1252.1	2040	732	1420.4	2054	2151	1
214	2	Pią	716	7.58271	-6.18	8.5030	17.41	1.01490	10.5915	0.58	60.116	2.9	9	505	1252.0	2038	847	1506.7	2112	2147	2
215	3	Sob	717	8.02237	-6.13	8.5422	17.26	1.01476	11.4839	-4.09	59.609	3.9	16	506	1252.0	2037	1003	1553.8	2131	2143	3
216	4	Nie	718	8.06202	-6.08	8.5813	17.10	1.01462	12.3925	-9.08	59.128	4.9	25	508	1251.9	2035	1122	1642.6	2151	2139	4
217	5	Pon	719	8.10168	-6.02	9.0204	16.54	1.01447	13.3220	-13.44	58.680	5.9	36	509	1251.8	2033	1241	1733.8	2216	2135	5
218	6	Wto	720	8.14133	-5.56	9.0554	16.37	1.01432	14.2756	-17.38	58.274	6.9	47	511	1251.7	2031	1402	1828.2	2247	2131	6
219	7	Śro	721	8.18099	-5.48	9.0943	16.21	1.01417	15.2626	-20.34	57.929	0.7	58	513	1251.6	2029	1520	1925.7	2327	2127	7
220	8	Czw	722	8.22065	-5.41	9.1332	16.04	1.01401	16.2721	-22.15	57.668	1.7	69	514	1251.4	2027	1631	2025.7	****	2123	8
221	9	Pią	723	8.26030	-5.32	9.1720	15.46	1.01385	17.2938	-22.30	57.521	2.7	79	516	1251.3	2025	1731	2126.6	020	2119	9
222	10	Sob	724	8.29596	-5.23	9.2108	15.29	1.01368	18.3144	-21.15	57.517	3.7	88	518	1251.1	2023	1819	2226.7	125	2115	10
223	11	Nie	725	8.33561	-5.14	9.2455	15.11	1.01351	19.3211	-18.37	57.679	4.7	95	519	1251.0	2021	1855	2324.3	241	2111	11
224	12	Pon	726	8.37527	-5.04	9.2842	14.53	1.01334	20.2960	-14.52	58.017	5.7	99	521	1250.8	2019	1924	****	402	2107	12
225	13	Wto	727	8.41493	-4.53	9.3227	14.35	1.01317	21.2453	-10.19	58.524	6.7	100	523	1250.6	2017	1947	018.7	525	2104	13
226	14	Śro	728	8.45458	-4.42	9.3613	14.17	1.01299	22.1706	-5.19	59.173	1.0	99	525	1250.4	2015	2007	109.9	646	2100	14
227	15	Czw	729	8.49424	-4.30	9.3958	13.58	1.01282	23.0714	-0.11	59.919	2.0	95	526	1250.3	2013	2026	158.5	804	2056	15
228	16	Pią	730	8.53389	-4.18	9.4342	13.39	1.01264	23.5559	4.49	60.707	3.0	90	528	1250.0	2011	2044	245.2	919	2052	16
229	17	Sob	731	8.57355	-4.05	9.4726	13.20	1.01245	0.4405	9.29	61.477	4.0	83	530	1249.8	2009	2103	331.0	1033	2048	17
230	18	Nie	732	9.01320	-3.52	9.5109	13.01	1.01227	1.3210	13.37	62.169	5.0	74	531	1249.6	2007	2125	416.4	1144	2044	18
231	19	Pon	733	9.05286	-3.38	9.5452	12.41	1.01208	2.2043	17.05	62.734	6.0	65	533	1249.4	2004	2150	502.3	1254	2040	19
232	20	Wto	734	9.09251	-3.24	9.5834	12.21	1.01189	3.1004	19.46	63.132	7.0	56	535	1249.1	2002	2221	548.9	1359	2036	20
233	21	Śro	735	9.13217	-3.09	10.0216	12.01	1.01169	4.0018	21.34	63.340	0.4	47	537	1248.9	2000	2258	636.5	1500	2032	21
234	22	Czw	736	9.17182	-2.54	10.0557	11.41	1.01149	4.5118	22.25	63.347	1.4	37	538	1248.6	1958	2344	725.0	1555	2028	22
235	23	Pią	737	9.21148	-2.38	10.0938	11.21	1.01129	5.4244	22.15	63.161	2.4	28	540	1248.4	1956	****	814.1	1641	2024	23
236	24	Sob	738	9.25113	-2.22	10.1319	11.01	1.01109	6.3413	21.05	62.802	3.4	20	542	1248.1	1953	039	903.3	1719	2020	24
237	25	Nie	739	9.29079	-2.06	10.1659	10.40	1.01088	7.2523	18.55	62.302	4.4	13	543	1247.8	1951	141	952.1	1751	2016	25
238	26	Pon	740	9.33045	-1.49	10.2039	10.19	1.01066	8.1557	15.50	61.705	5.4	7	545	1247.6	1949	249	1040.4	1817	2012	26
239	27	Wto	741	9.37010	-1.32	10.2418	9.58	1.01044	9.0556	11.58	61.056	6.4	3	547	1247.3	1947	401	1127.9	1839	2008	27
240	28	Śro	742	9.40576	-1.15	10.2757	9.37	1.01022	9.5530	7.28	60.403	7.4	0	549	1247.0	1944	515	1215.1	1859	2005	28
241	29	Czw	743	9.44541	-0.57	10.3136	9.16	1.00999	10.4505	2.31	59.789	0.5	0	550	1246.7	1942	631	1302.2	1918	2001	29
242	30	Pią	744	9.48507	-0.39	10.3514	8.54	1.00976	11.3515	-2.38	59.247	1.5	3	552	1246.4	1940	749	1350.0	1938	1957	30
243	31	Sob	745	9.52472	-0.20	10.3852	8.33	1.00952	12.2639	-7.45	58.798	2.5	7	554	1246.1	1937	908	1439.3	1958	1953	31

Fazy Księżycyca [Dm, h.mm]: 1kw 6, 18.43 Pełn 13, 12.44 3kw 21, 3.15 Nów 29, 1.07

# SIERPIEŃ 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	1.44	23.55	7.51	21.22	3.09	19.40	3.16	19.55	14.37	23.40	0.31	16.24	1.06	17.53	22.31	11.22	21.22	4.52		
	8.777	17.94	10.516	8.00	7.303	22.23	7.488	22.74	15.068	-16.37	4.351	19.57	5.385	23.23	0.858	3.84	21.023	-23.46	20.64357	1
3	1.57	23.42	7.55	21.15	3.13	19.40	3.15	19.51	14.30	23.33	0.24	16.17	0.59	17.45	22.24	11.14	21.14	4.44		
	8.906	17.43	10.624	6.95	7.478	21.97	7.582	22.55	15.075	-16.41	4.362	19.59	5.392	23.24	0.857	3.83	21.020	-23.48	20.77498	3
5	2.08	23.31	7.58	21.08	3.18	19.41	3.14	19.47	14.23	23.25	0.17	16.10	0.51	17.38	22.16	11.06	21.06	4.36		
	9.034	16.89	10.718	5.96	7.651	21.67	7.675	22.35	15.083	-16.45	4.373	19.61	5.398	23.24	0.856	3.82	21.017	-23.49	20.90640	5
7	2.18	23.21	7.60	20.60	3.23	19.41	3.14	19.43	14.16	23.17	0.09	16.03	0.44	17.30	22.08	10.58	20.58	4.28		
	9.162	16.34	10.798	5.05	7.825	21.33	7.768	22.14	15.091	-16.49	4.383	19.63	5.404	23.25	0.855	3.81	21.014	-23.51	21.03782	7
9	2.27	23.12	8.00	20.51	3.28	19.40	3.13	19.39	14.09	23.10	0.02	15.56	0.36	17.23	21.60	10.50	20.50	4.20		
	9.289	15.77	10.862	4.24	7.997	20.95	7.860	21.92	15.101	-16.54	4.393	19.65	5.409	23.25	0.853	3.80	21.010	-23.52	21.16924	9
11	2.36	23.03	7.59	20.42	3.34	19.40	3.12	19.35	14.02	23.02	23.51	15.48	0.29	17.15	21.52	10.42	20.42	4.11		
	9.415	15.19	10.909	3.53	8.169	20.52	7.952	21.68	15.111	-16.59	4.403	19.67	5.415	23.26	0.852	3.79	21.007	-23.54	21.30066	11
13	2.44	22.55	7.56	20.33	3.39	19.39	3.12	19.31	13.55	22.55	23.43	15.41	0.21	17.08	21.44	10.34	20.34	4.03		
	9.541	14.58	10.938	2.96	8.339	20.06	8.044	21.44	15.122	-16.64	4.413	19.69	5.420	23.26	0.850	3.78	21.004	-23.55	21.43208	13
15	2.51	22.47	7.51	20.24	3.45	19.38	3.11	19.27	13.48	22.47	23.36	15.34	0.13	17.00	21.36	10.26	20.26	3.55		
	9.666	13.97	10.947	2.53	8.509	19.56	8.134	21.19	15.133	-16.70	4.421	19.70	5.426	23.27	0.848	3.76	21.001	-23.56	21.56350	15
17	2.58	22.39	7.44	20.14	3.51	19.36	3.11	19.22	13.42	22.40	23.28	15.27	0.06	16.53	21.28	10.18	20.19	3.47		
	9.790	13.33	10.935	2.29	8.678	19.02	8.225	20.92	15.145	-16.75	4.430	19.72	5.431	23.27	0.847	3.75	20.998	-23.58	21.69492	17
19	3.05	22.32	7.34	20.03	3.57	19.34	3.10	19.18	13.35	22.32	23.21	15.19	23.54	16.45	21.20	10.10	20.11	3.39		
	9.914	12.69	10.902	2.23	8.846	18.44	8.315	20.65	15.158	-16.81	4.438	19.73	5.436	23.28	0.845	3.74	20.995	-23.59	21.82633	19
21	3.12	22.24	7.22	19.53	4.03	19.33	3.10	19.13	13.28	22.25	23.13	15.12	23.47	16.38	21.12	10.02	20.03	3.31		
	10.038	12.02	10.847	2.39	9.013	17.83	8.404	20.37	15.171	-16.88	4.446	19.74	5.440	23.28	0.842	3.72	20.992	-23.60	21.95775	21
23	3.18	22.17	7.08	19.43	4.10	19.30	3.09	19.09	13.22	22.17	23.06	15.05	23.39	16.30	21.05	9.54	19.55	3.23		
	10.161	11.35	10.773	2.77	9.179	17.18	8.493	20.07	15.186	-16.94	4.453	19.76	5.445	23.29	0.840	3.71	20.989	-23.62	22.08917	23
25	3.24	22.10	6.51	19.33	4.16	19.28	3.09	19.04	13.15	22.10	22.58	14.57	23.31	16.23	20.57	9.46	19.47	3.14		
	10.283	10.67	10.682	3.36	9.344	16.51	8.582	19.77	15.200	-17.01	4.460	19.77	5.449	23.29	0.838	3.69	20.986	-23.63	22.22059	25
27	3.30	22.03	6.33	19.23	4.22	19.26	3.08	18.59	13.09	22.03	22.51	14.50	23.24	16.15	20.49	9.37	19.39	3.06		
	10.405	9.97	10.579	4.15	9.508	15.80	8.670	19.46	15.216	-17.07	4.466	19.77	5.453	23.29	0.836	3.67	20.983	-23.64	22.35201	27
29	3.36	21.56	6.14	19.14	4.29	19.23	3.08	18.55	13.02	21.55	22.43	14.43	23.16	16.07	20.41	9.29	19.31	2.58		
	10.527	9.26	10.473	5.09	9.671	15.06	8.757	19.14	15.232	-17.15	4.472	19.78	5.456	23.30	0.833	3.66	20.980	-23.65	22.48343	29
31	3.41	21.50	5.54	19.05	4.35	19.20	3.07	18.50	12.56	21.48	22.36	14.35	23.08	15.60	20.33	9.21	19.23	2.50		
	10.648	8.55	10.370	6.12	9.832	14.29	8.844	18.82	15.249	-17.22	4.477	19.79	5.460	23.30	0.830	3.64	20.978	-23.66	22.61485	31

# WRZESIEŃ 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 <sup>h</sup> UT)										Czas strefowy [hhmm.]									
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j	astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																			
244	1	Nie	746	9.56437	-0.01	10.4230	8.11	1.00928	13.1953	-12.30	58.453	3.5	14	555	1245.8	1935	1028	1530.6	2022	1949		1
245	2	Pon	747	10.00403	0.18	10.4607	7.49	1.00904	14.1526	-16.37	58.209	4.5	23	557	1245.4	1933	1149	1624.6	2051	1945		2
246	3	Wto	748	10.04369	0.38	10.4944	7.27	1.00879	15.1326	-19.47	58.059	5.5	33	559	1245.1	1930	1308	1721.2	2129	1941		3
247	4	Śro	749	10.08334	0.57	10.5321	7.05	1.00854	16.1327	-21.45	57.996	6.5	44	600	1244.8	1928	1421	1820.0	2217	1937		4
248	5	Czw	750	10.12300	1.17	10.5658	6.43	1.00829	17.1434	-22.21	58.012	0.5	56	602	1244.5	1926	1524	1919.6	2317	1933		5
249	6	Pią	751	10.16265	1.38	11.0034	6.21	1.00804	18.1529	-21.31	58.107	1.5	67	604	1244.1	1923	1615	2018.5	****	1929		6
250	7	Sob	752	10.20231	1.58	11.0410	5.58	1.00778	19.1457	-19.20	58.285	2.5	77	606	1243.8	1921	1654	2115.5	027	1925		7
251	8	Nie	753	10.24196	2.19	11.0746	5.36	1.00752	20.1208	-16.01	58.553	3.5	86	607	1243.4	1918	1725	2209.6	145	1921		8
252	9	Pon	754	10.28162	2.40	11.1122	5.13	1.00726	21.0643	-11.51	58.917	4.5	93	609	1243.1	1916	1750	2300.9	305	1917		9
253	10	Wto	755	10.32127	3.01	11.1457	4.50	1.00700	21.5855	-7.06	59.377	5.5	97	611	1242.7	1914	1811	2349.8	424	1913		10
254	11	Śro	756	10.36093	3.22	11.1832	4.28	1.00674	22.4913	-2.06	59.923	6.5	100	612	1242.4	1911	1830	*****	542	1910		11
255	12	Czw	757	10.40058	3.43	11.2208	4.05	1.00647	23.3816	2.55	60.534	0.5	100	614	1242.0	1909	1849	036.9	658	1906		12
256	13	Pią	758	10.44024	4.05	11.2543	3.42	1.00621	0.2642	7.42	61.178	1.5	97	616	1241.7	1906	1908	123.1	812	1902		13
257	14	Sob	759	10.47589	4.26	11.2918	3.19	1.00594	1.1506	12.02	61.812	2.5	93	618	1241.3	1904	1929	208.9	925	1858		14
258	15	Nie	760	10.51555	4.48	11.3253	2.56	1.00568	2.0354	15.45	62.392	3.5	87	619	1241.0	1902	1953	255.0	1036	1854		15
259	16	Pon	761	10.55520	5.09	11.3628	2.33	1.00542	2.5322	18.43	62.870	4.5	80	621	1240.6	1859	2021	341.7	1143	1850		16
260	17	Wto	762	10.59486	5.31	11.4003	2.09	1.00515	3.4335	20.49	63.207	5.5	72	623	1240.2	1857	2056	429.3	1247	1846		17
261	18	Śro	763	11.03451	5.52	11.4338	1.46	1.00488	4.3423	21.59	63.370	6.5	63	624	1239.9	1854	2139	517.6	1344	1842		18
262	19	Czw	764	11.07417	6.14	11.4713	1.23	1.00461	5.2531	22.10	63.338	7.5	54	626	1239.5	1852	2230	606.3	1433	1838		19
263	20	Pią	765	11.11383	6.35	11.5048	0.60	1.00434	6.1636	21.21	63.105	0.6	44	628	1239.2	1849	2328	655.1	1515	1834		20
264	21	Sob	766	11.15348	6.56	11.5424	0.36	1.00407	7.0721	19.33	62.680	1.6	35	630	1238.8	1847	****	743.5	1549	1830		21
265	22	Nie	767	11.19314	7.17	11.5759	0.13	1.00380	7.5736	16.51	62.089	2.6	26	631	1238.5	1845	033	831.5	1617	1826		22
266	23	Pon	768	11.23279	7.38	12.0135	-0.10	1.00353	8.4721	13.20	61.373	3.6	18	633	1238.1	1842	142	918.8	1641	1822		23
267	24	Wto	769	11.27245	7.59	12.0510	-0.34	1.00325	9.3652	9.06	60.583	4.6	11	635	1237.8	1840	254	1005.9	1702	1818		24
268	25	Śro	770	11.31210	8.20	12.0846	-0.57	1.00297	10.2633	4.20	59.779	5.6	5	636	1237.4	1837	409	1053.1	1722	1814		25
269	26	Czw	771	11.35176	8.41	12.1222	-1.20	1.00269	11.1658	-0.46	59.026	6.6	1	638	1237.1	1835	526	1141.1	1741	1811		26
270	27	Pią	772	11.39141	9.01	12.1558	-1.44	1.00241	12.0848	-5.57	58.380	0.0	0	640	1236.7	1832	646	1230.7	1802	1807		27
271	28	Sob	773	11.43107	9.21	12.1934	-2.07	1.00212	13.0238	-10.55	57.887	1.0	1	642	1236.4	1830	808	1322.4	1825	1803		28
272	29	Nie	774	11.47072	9.41	12.2311	-2.30	1.00183	13.5856	-15.20	57.573	2.0	5	643	1236.1	1828	931	1417.0	1854	1759		29
273	30	Pon	775	11.51038	10.01	12.2648	-2.54	1.00155	14.5747	-18.51	57.443	3.0	12	645	1235.7	1825	1053	1514.4	1929	1755		30

Fazy Księżyca [Dm, h.mm]:    1kw 4, 23.56    Pełn 11, 23.18    3kw 19, 21.56    Nów 27, 11.55



# PAŹDZIERNIK 2030

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 10 lub 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]									
..... Dzień .....		ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2462																					
274	1	Wto	776	11.55003	10.21	12.3025	-3.17	1.00125	15.5840	-21.10	57.486	4.0	20	647	1235.4	1823	1210	1613.9	2015	1751	1
275	2	Śro	777	11.58569	10.40	12.3402	-3.40	1.00096	17.0031	-22.05	57.674	5.0	30	649	1235.1	1821	1317	1714.3	2112	1747	2
276	3	Czw	778	12.02534	10.59	12.3740	-4.03	1.00067	18.0157	-21.34	57.974	6.0	41	650	1234.8	1818	1412	1813.8	2220	1743	3
277	4	Pią	779	12.06500	11.17	12.4118	-4.27	1.00038	19.0138	-19.42	58.353	0.3	53	652	1234.5	1816	1454	1911.1	2335	1739	4
278	5	Sob	780	12.10466	11.35	12.4456	-4.50	1.00008	19.5845	-16.41	58.785	1.3	64	654	1234.2	1813	1527	2005.3	****	1735	5
279	6	Nie	781	12.14431	11.53	12.4835	-5.13	0.99979	20.5304	-12.47	59.252	2.3	74	656	1233.9	1811	1554	2056.5	053	1731	6
280	7	Pon	782	12.18397	12.11	12.5214	-5.36	0.99949	21.4451	-8.17	59.743	3.3	83	657	1233.6	1809	1615	2145.1	211	1727	7
281	8	Wto	783	12.22362	12.28	12.5554	-5.59	0.99920	22.3441	-3.28	60.253	4.3	90	659	1233.3	1806	1635	2231.8	327	1723	8
282	9	Śro	784	12.26328	12.44	12.5933	-6.21	0.99891	23.2316	1.26	60.776	5.3	96	701	1233.0	1804	1654	2317.5	442	1719	9
283	10	Czw	785	12.30293	13.01	13.0314	-6.44	0.99862	0.1116	6.12	61.307	6.3	99	703	1232.7	1802	1712	*****	556	1715	10
284	11	Pią	786	12.34259	13.17	13.0655	-7.07	0.99833	0.5920	10.37	61.832	7.3	100	705	1232.5	1759	1733	002.9	708	1712	11
285	12	Sob	787	12.38224	13.32	13.1036	-7.29	0.99804	1.4753	14.30	62.332	1.0	99	706	1232.2	1757	1756	048.7	819	1708	12
286	13	Nie	788	12.42190	13.47	13.1418	-7.52	0.99776	2.3713	17.42	62.781	2.0	96	708	1232.0	1755	1823	135.2	928	1704	13
287	14	Pon	789	12.46155	14.01	13.1760	-8.14	0.99748	3.2721	20.04	63.149	3.0	92	710	1231.7	1752	1855	222.5	1033	1700	14
288	15	Wto	790	12.50121	14.15	13.2143	-8.36	0.99720	4.1807	21.31	63.401	4.0	86	712	1231.5	1750	1935	310.7	1133	1656	15
289	16	Śro	791	12.54086	14.28	13.2526	-8.58	0.99692	5.0908	22.00	63.508	5.0	79	714	1231.3	1748	2023	359.3	1225	1652	16
290	17	Czw	792	12.58052	14.40	13.2910	-9.20	0.99664	6.0001	21.30	63.443	6.0	70	716	1231.1	1746	2118	448.0	1310	1648	17
291	18	Pią	793	13.02017	14.52	13.3255	-9.42	0.99636	6.5024	20.02	63.190	7.0	61	717	1230.9	1744	2219	536.1	1346	1644	18
292	19	Sob	794	13.05583	15.03	13.3640	-10.04	0.99609	7.4004	17.40	62.745	8.0	52	719	1230.7	1741	2325	623.5	1416	1640	19
293	20	Nie	795	13.09549	15.14	13.4026	-10.25	0.99581	8.2904	14.30	62.120	0.8	42	721	1230.5	1739	****	710.2	1442	1636	20
294	21	Pon	796	13.13514	15.24	13.4413	-10.47	0.99554	9.1740	10.37	61.341	1.8	33	723	1230.3	1737	034	756.3	1503	1632	21
295	22	Wto	797	13.17480	15.33	13.4800	-11.08	0.99527	10.0621	6.09	60.456	2.8	23	725	1230.2	1735	147	842.4	1523	1628	22
296	23	Śro	798	13.21445	15.42	13.5148	-11.29	0.99500	10.5546	1.16	59.524	3.8	15	727	1230.1	1733	301	929.3	1543	1624	23
297	24	Czw	799	13.25411	15.50	13.5537	-11.50	0.99473	11.4638	-3.51	58.617	4.8	8	728	1229.9	1731	418	1017.6	1603	1620	24
298	25	Pią	800	13.29376	15.57	13.5926	-12.11	0.99446	12.3946	-8.55	57.811	5.8	3	730	1229.8	1728	539	1108.4	1625	1617	25
299	26	Sob	801	13.33342	16.03	14.0316	-12.31	0.99418	13.3546	-13.37	57.178	6.8	0	732	1229.7	1726	702	1202.3	1651	1613	26
300	27	Nie	802	13.37307	16.09	14.0707	-12.52	0.99391	14.3457	-17.33	56.771	0.6	0	734	1229.6	1724	827	1259.9	1724	1609	27
300	27	Nie	802	14.37406	16.09	14.0717	-12.52	0.99390	14.3729	-17.42	56.760	1.6	1	634	1129.6	1624	727	1159.9	1624	1509	27
301	28	Pon	803	14.41371	16.14	14.1108	-13.13	0.99363	15.3934	-20.28	56.619	2.6	4	636	1129.5	1622	849	1300.5	1707	1505	28
302	29	Wto	804	14.45337	16.18	14.1501	-13.32	0.99336	16.4318	-21.50	56.731	3.6	10	638	1129.4	1620	1003	1402.9	1802	1501	29
303	30	Śro	805	14.49302	16.22	14.1854	-13.52	0.99309	17.4655	-21.39	57.068	4.6	18	640	1129.4	1618	1105	1505.0	1908	1457	30
304	31	Czw	806	14.53268	16.24	14.2248	-14.12	0.99283	18.4843	-20.02	57.579	5.6	28	642	1129.3	1616	1153	1604.9	2023	1453	31

Fazy Księżyca [Dm, h.mm]: 1kw 4, 5.56 Pełn 11, 12.47 3kw 19, 16.50 Nów 26, 22.17



# PAŹDZIERNIK 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $h^b$ UT)	
1	4.51	20.19	5.56	18.20	6.17	18.22	2.60	17.28	11.22	19.57	20.35	12.34	21.08	13.59	18.30	7.15	17.20	0.45		
	12.507	-3.28	12.045	1.68	12.239	-0.02	10.132	12.89	15.576	-18.52	4.497	19.75	5.484	23.33	0.782	3.32	20.945	-23.77	0.65183	1
3	4.55	20.14	6.10	18.17	6.24	18.18	2.59	17.22	11.16	19.50	20.27	12.26	20.60	13.52	18.22	7.07	17.12	0.37		
	12.628	-4.06	12.263	0.16	12.392	-1.03	10.211	12.46	15.601	-18.61	4.494	19.74	5.483	23.33	0.779	3.30	20.943	-23.77	0.78325	3
5	4.59	20.09	6.23	18.14	6.30	18.14	2.59	17.16	11.10	19.43	20.19	12.18	20.52	13.44	18.14	6.58	17.04	0.30		
	12.749	-4.83	12.480	-1.38	12.544	-2.03	10.290	12.03	15.627	-18.70	4.491	19.73	5.483	23.33	0.775	3.28	20.942	-23.77	0.91467	5
7	5.02	20.04	6.36	18.11	6.37	18.10	2.58	17.11	11.04	19.36	20.11	12.10	20.44	13.36	18.06	6.50	16.56	0.22		
	12.871	-5.59	12.695	-2.91	12.697	-3.03	10.368	11.60	15.653	-18.79	4.487	19.72	5.482	23.33	0.772	3.26	20.941	-23.78	1.04609	7
9	5.06	19.60	6.49	18.07	6.44	18.06	2.57	17.05	10.59	19.30	20.03	12.01	20.36	13.28	17.58	6.42	16.48	0.14		
	12.993	-6.36	12.907	-4.44	12.850	-4.03	10.447	11.17	15.679	-18.89	4.483	19.70	5.480	23.32	0.769	3.23	20.940	-23.78	1.17750	9
11	5.10	19.55	7.02	18.04	6.50	18.02	2.57	16.59	10.53	19.23	19.55	11.53	20.28	13.20	17.50	6.34	16.40	0.06		
	13.115	-7.11	13.117	-5.95	13.003	-5.03	10.524	10.73	15.705	-18.98	4.478	19.69	5.479	23.32	0.765	3.21	20.939	-23.78	1.30892	11
13	5.13	19.50	7.15	18.01	6.57	17.58	2.56	16.53	10.47	19.16	19.47	11.45	20.20	13.12	17.42	6.26	16.32	23.54		
	13.238	-7.86	13.325	-7.43	13.157	-6.02	10.602	10.28	15.732	-19.07	4.473	19.67	5.477	23.32	0.762	3.19	20.939	-23.78	1.44033	13
15	5.17	19.46	7.27	17.57	7.04	17.54	2.55	16.48	10.42	19.09	19.39	11.37	20.12	13.04	17.34	6.17	16.24	23.46		
	13.362	-8.60	13.532	-8.88	13.311	-7.00	10.679	9.84	15.759	-19.16	4.467	19.66	5.475	23.32	0.758	3.17	20.938	-23.78	1.57175	15
17	5.21	19.41	7.39	17.54	7.10	17.50	2.54	16.42	10.36	19.02	19.31	11.28	20.04	12.56	17.26	6.09	16.17	23.38		
	13.486	-9.34	13.737	-10.29	13.466	-7.97	10.755	9.39	15.787	-19.25	4.461	19.64	5.473	23.32	0.755	3.15	20.937	-23.77	1.70318	17
19	5.24	19.37	7.51	17.50	7.17	17.47	2.54	16.36	10.31	18.55	19.23	11.20	19.56	12.48	17.18	6.01	16.09	23.30		
	13.611	-10.06	13.941	-11.66	13.622	-8.93	10.832	8.94	15.815	-19.35	4.454	19.62	5.470	23.32	0.752	3.13	20.937	-23.77	1.83460	19
21	5.28	19.33	8.03	17.47	7.24	17.43	2.53	16.30	10.25	18.48	19.14	11.11	19.48	12.40	17.10	5.53	16.01	23.22		
	13.737	-10.78	14.144	-12.98	13.779	-9.87	10.908	8.49	15.843	-19.44	4.447	19.60	5.468	23.32	0.748	3.11	20.937	-23.77	1.96602	21
23	5.31	19.29	8.15	17.44	7.31	17.39	2.52	16.24	10.20	18.42	19.06	11.03	19.40	12.32	17.02	5.45	15.53	23.15		
	13.863	-11.48	14.346	-14.26	13.936	-10.80	10.983	8.04	15.871	-19.53	4.440	19.58	5.465	23.32	0.745	3.09	20.937	-23.77	2.09743	23
25	5.34	19.25	8.27	17.40	7.37	17.36	2.51	16.18	10.14	18.35	18.58	10.54	19.32	12.24	16.54	5.37	15.45	23.07		
	13.991	-12.18	14.549	-15.49	14.095	-11.72	11.059	7.58	15.900	-19.62	4.432	19.56	5.461	23.31	0.742	3.07	20.937	-23.76	2.22885	25
27	5.38	19.21	8.38	17.37	7.44	17.32	2.50	16.13	10.08	18.28	18.50	10.46	19.24	12.16	16.46	5.28	15.37	22.59		
	14.119	-12.86	14.751	-16.66	14.254	-12.61	11.134	7.13	15.929	-19.71	4.423	19.54	5.458	23.31	0.739	3.05	20.937	-23.76	2.36027	27
27	4.38	18.21	7.39	16.38	6.45	16.32	1.50	15.13	9.09	17.28	17.50	9.46	18.24	11.16	15.46	4.28	14.37	21.59		
	14.121	-12.87	14.755	-16.68	14.258	-12.63	11.135	7.12	15.930	-19.71	4.423	19.54	5.458	23.31	0.739	3.05	20.937	-23.76	2.36027	27
29	4.41	18.18	7.50	16.35	6.51	16.29	1.50	15.07	9.03	17.22	17.42	9.37	18.16	11.07	15.39	4.20	14.29	21.51		
	14.250	-13.54	14.958	-17.79	14.419	-13.51	11.210	6.66	15.959	-19.80	4.415	19.52	5.454	23.31	0.736	3.03	20.937	-23.75	2.49169	29
31	4.45	18.14	8.01	16.32	6.58	16.26	1.49	15.01	8.58	17.15	17.33	9.29	18.08	10.59	15.31	4.12	14.21	21.43		
	14.380	-14.19	15.160	-18.85	14.580	-14.36	11.284	6.20	15.988	-19.89	4.406	19.50	5.451	23.31	0.733	3.01	20.938	-23.75	2.62311	31

# LISTOPAD 2030

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT)										Czas strefowy [hhmm.]								
..... Dzień .....			ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2462																		
305	1	Pią	807	14.57234	16.26	14.2642	-14.31	0.99256	19.4731	-17.10	58.208	6.6	38	643	1129.3	1614	1229	1701.2	2142	1449	1
306	2	Sob	808	15.01199	16.27	14.3038	-14.50	0.99230	20.4256	-13.23	58.898	7.6	50	645	1129.3	1612	1258	1753.8	2301	1445	2
307	3	Nie	809	15.05165	16.28	14.3434	-15.09	0.99203	21.3515	-8.60	59.601	1.0	60	647	1129.3	1611	1321	1843.1	****	1441	3
308	4	Pon	810	15.09130	16.27	14.3831	-15.27	0.99177	22.2509	-4.16	60.282	2.0	71	649	1129.3	1609	1341	1930.0	018	1437	4
309	5	Wto	811	15.13096	16.26	14.4229	-15.46	0.99152	23.1325	0.34	60.920	3.0	80	651	1129.3	1607	1400	2015.3	132	1433	5
310	6	Śro	812	15.17061	16.24	14.4628	-16.04	0.99126	0.0053	5.17	61.504	4.0	87	653	1129.4	1605	1418	2100.1	245	1429	6
311	7	Czw	813	15.21027	16.21	14.5027	-16.21	0.99101	0.4817	9.42	62.028	5.0	93	655	1129.4	1603	1438	2145.1	356	1425	7
312	8	Pią	814	15.24592	16.17	14.5428	-16.39	0.99076	1.3612	13.39	62.492	6.0	97	657	1129.5	1602	1459	2230.8	507	1421	8
313	9	Sob	815	15.28558	16.12	14.5829	-16.56	0.99052	2.2460	16.59	62.891	7.0	100	659	1129.5	1600	1525	2317.6	616	1418	9
314	10	Nie	816	15.32523	16.07	15.0231	-17.13	0.99028	3.1447	19.31	63.220	0.3	100	700	1129.6	1558	1555	*****	722	1414	10
315	11	Pon	817	15.36489	16.01	15.0634	-17.30	0.99005	4.0523	21.11	63.468	1.3	98	702	1129.7	1557	1632	005.4	824	1410	11
316	12	Wto	818	15.40454	15.53	15.1037	-17.46	0.98982	4.5625	21.53	63.618	2.3	95	704	1129.9	1555	1717	053.9	919	1406	12
317	13	Śro	819	15.44420	15.45	15.1442	-18.02	0.98959	5.4722	21.37	63.650	3.3	90	706	1130.0	1553	1810	142.6	1006	1402	13
318	14	Czw	820	15.48386	15.37	15.1847	-18.18	0.98937	6.3745	20.22	63.543	4.3	84	708	1130.1	1552	1909	230.9	1045	1358	14
319	15	Pią	821	15.52351	15.27	15.2254	-18.33	0.98915	7.2714	18.15	63.279	5.3	77	710	1130.3	1550	2013	318.3	1117	1354	15
320	16	Sob	822	15.56317	15.16	15.2701	-18.48	0.98894	8.1544	15.19	62.847	6.3	68	711	1130.5	1549	2120	404.7	1144	1350	16
321	17	Nie	823	16.00282	15.05	15.3109	-19.03	0.98873	9.0328	11.41	62.243	7.3	59	713	1130.7	1548	2229	450.0	1206	1346	17
322	18	Pon	824	16.04248	14.52	15.3518	-19.17	0.98852	9.5053	7.30	61.482	0.1	49	715	1130.9	1546	2340	534.9	1226	1342	18
323	19	Wto	825	16.08214	14.39	15.3927	-19.31	0.98832	10.3837	2.52	60.592	1.1	39	717	1131.1	1545	****	619.9	1245	1338	19
324	20	Śro	826	16.12179	14.25	15.4338	-19.45	0.98812	11.2731	-2.02	59.621	2.1	29	719	1131.3	1544	054	706.0	1304	1334	20
325	21	Czw	827	16.16145	14.11	15.4749	-19.58	0.98792	12.1826	-7.01	58.633	3.1	19	720	1131.6	1542	210	754.0	1325	1330	21
326	22	Pią	828	16.20110	13.55	15.5201	-20.11	0.98772	13.1217	-11.47	57.706	4.1	11	722	1131.8	1541	330	845.2	1348	1326	22
327	23	Sob	829	16.24076	13.38	15.5614	-20.24	0.98753	14.0942	-16.02	56.924	5.1	5	724	1132.1	1540	453	940.3	1417	1322	23
328	24	Nie	830	16.28041	13.21	16.0028	-20.36	0.98734	15.1052	-19.22	56.363	6.1	1	725	1132.4	1539	617	1039.6	1455	1319	24
329	25	Pon	831	16.32007	13.03	16.0443	-20.48	0.98716	16.1502	-21.24	56.081	0.2	0	727	1132.7	1538	737	1142.4	1544	1315	25
330	26	Wto	832	16.35572	12.44	16.0858	-20.59	0.98697	17.2037	-21.53	56.104	1.2	2	729	1133.0	1537	847	1246.7	1647	1311	26
331	27	Śro	833	16.39538	12.25	16.1314	-21.10	0.98679	18.2526	-20.45	56.421	2.2	7	730	1133.3	1536	944	1350.2	1801	1307	27
332	28	Czw	834	16.43504	12.05	16.1731	-21.21	0.98661	19.2737	-18.13	56.990	3.2	14	732	1133.7	1535	1027	1450.5	1922	1303	28
333	29	Pią	835	16.47469	11.44	16.2148	-21.31	0.98643	20.2610	-14.34	57.744	4.2	24	734	1134.0	1534	1059	1546.7	2044	1259	29
334	30	Sob	836	16.51435	11.22	16.2606	-21.41	0.98626	21.2058	-10.11	58.607	5.2	34	735	1134.4	1533	1125	1638.8	2204	1255	30

Fazy Księżyca [Dm, h.mm]:      1kw 2, 12.56      Pełn 10, 4.30      3kw 18, 9.32      Now 25, 7.46

# LISTOPAD 2030 (c.d.)

Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERCURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	
1	4.46	18.12	8.07	16.31	7.02	16.24	1.48	14.58	8.55	17.11	17.29	9.25	18.04	10.55	15.27	4.08	14.17	21.39		
	14.445	-14.52	15.262	-19.35	14.662	-14.78	11.321	5.97	16.003	-19.94	4.401	19.48	5.449	23.31	0.731	3.00	20.938	-23.75	2.68882	1
3	4.50	18.09	8.17	16.29	7.09	16.21	1.47	14.52	8.49	17.05	17.21	9.16	17.56	10.47	15.19	3.60	14.10	21.32		
	14.576	-15.15	15.465	-20.31	14.826	-15.60	11.395	5.52	16.033	-20.02	4.392	19.46	5.445	23.30	0.728	2.98	20.938	-23.74	2.82024	3
5	4.53	18.06	8.28	16.27	7.16	16.18	1.46	14.46	8.44	16.58	17.13	9.07	17.48	10.39	15.11	3.52	14.02	21.24		
	14.708	-15.76	15.669	-21.21	14.991	-16.39	11.468	5.06	16.063	-20.11	4.382	19.44	5.440	23.30	0.726	2.97	20.939	-23.73	2.95166	5
7	4.56	18.03	8.38	16.25	7.22	16.15	1.45	14.40	8.38	16.51	17.04	8.59	17.40	10.31	15.03	3.44	13.54	21.16		
	14.841	-16.36	15.873	-22.03	15.157	-17.15	11.542	4.60	16.093	-20.20	4.372	19.41	5.436	23.30	0.723	2.95	20.940	-23.73	3.08307	7
9	4.59	18.00	8.48	16.24	7.29	16.13	1.44	14.34	8.33	16.45	16.56	8.50	17.32	10.23	14.55	3.36	13.46	21.08		
	14.975	-16.93	16.077	-22.78	15.325	-17.88	11.615	4.14	16.124	-20.28	4.362	19.39	5.431	23.29	0.720	2.93	20.941	-23.72	3.21449	9
11	5.02	17.57	8.57	16.24	7.36	16.11	1.43	14.28	8.27	16.38	16.48	8.41	17.23	10.15	14.47	3.27	13.38	21.01		
	15.109	-17.49	16.281	-23.46	15.494	-18.58	11.687	3.68	16.154	-20.37	4.351	19.36	5.426	23.29	0.718	2.92	20.942	-23.71	3.34591	11
13	5.05	17.55	9.06	16.23	7.43	16.09	1.42	14.22	8.22	16.32	16.39	8.33	17.15	10.06	14.39	3.19	13.30	20.53		
	15.245	-18.03	16.483	-24.06	15.665	-19.25	11.760	3.23	16.185	-20.45	4.340	19.34	5.422	23.29	0.715	2.90	20.943	-23.70	3.47733	13
15	5.08	17.53	9.14	16.23	7.49	16.07	1.41	14.16	8.17	16.25	16.31	8.24	17.07	9.58	14.31	3.11	13.22	20.45		
	15.382	-18.55	16.684	-24.57	15.837	-19.88	11.832	2.77	16.216	-20.54	4.330	19.31	5.416	23.28	0.713	2.89	20.945	-23.69	3.60876	15
17	5.11	17.50	9.22	16.24	7.56	16.05	1.40	14.10	8.11	16.18	16.23	8.15	16.59	9.50	14.23	3.03	13.15	20.37		
	15.519	-19.04	16.882	-25.00	16.010	-20.47	11.904	2.31	16.247	-20.62	4.319	19.28	5.411	23.28	0.710	2.88	20.946	-23.68	3.74018	17
19	5.14	17.48	9.28	16.25	8.02	16.04	1.39	14.04	8.06	16.12	16.14	8.07	16.51	9.42	14.15	2.55	13.07	20.30		
	15.658	-19.52	17.077	-25.34	16.184	-21.03	11.975	1.86	16.278	-20.70	4.307	19.26	5.406	23.27	0.708	2.86	20.948	-23.67	3.87160	19
21	5.17	17.46	9.34	16.26	8.09	16.03	1.37	13.58	8.00	16.05	16.06	7.58	16.43	9.33	14.07	2.47	12.59	20.22		
	15.797	-19.97	17.265	-25.60	16.360	-21.54	12.047	1.41	16.309	-20.78	4.296	19.23	5.400	23.27	0.706	2.85	20.950	-23.66	4.00301	21
23	5.20	17.45	9.38	16.28	8.15	16.02	1.36	13.52	7.55	15.59	15.58	7.49	16.35	9.25	13.59	2.39	12.51	20.14		
	15.937	-20.39	17.446	-25.75	16.537	-22.02	12.118	0.96	16.341	-20.86	4.285	19.20	5.395	23.27	0.704	2.84	20.952	-23.65	4.13443	23
25	5.23	17.43	9.41	16.30	8.21	16.02	1.35	13.46	7.49	15.52	15.49	7.40	16.26	9.17	13.51	2.31	12.43	20.07		
	16.079	-20.79	17.616	-25.81	16.715	-22.45	12.188	0.51	16.372	-20.93	4.273	19.18	5.389	23.26	0.702	2.83	20.954	-23.64	4.26585	25
27	5.25	17.42	9.42	16.31	8.26	16.02	1.34	13.40	7.44	15.46	15.41	7.32	16.18	9.09	13.44	2.23	12.35	19.59		
	16.221	-21.17	17.771	-25.78	16.894	-22.84	12.259	0.06	16.404	-21.01	4.262	19.15	5.383	23.26	0.701	2.82	20.956	-23.63	4.39728	27
29	5.28	17.41	9.41	16.33	8.32	16.02	1.32	13.34	7.38	15.39	15.33	7.23	16.10	9.00	13.36	2.15	12.28	19.51		
	16.363	-21.52	17.907	-25.65	17.075	-23.18	12.329	-0.39	16.435	-21.08	4.250	19.13	5.377	23.25	0.699	2.81	20.958	-23.62	4.52870	29

# GRUDZIEŃ 2030

Piwnice, CA UMK ←				Dane na godz. 12 czasu strefowego (= 11 <sup>h</sup> UT) →										Czas strefowy [hhmm.]								
..... Dzień .....				ST	$\Delta\alpha$	$\alpha_{\odot}$	$\delta_{\odot}$	$R_{\odot}$	$\alpha_{\zeta}$	$\delta_{\zeta}$	$R_{\zeta}$	Faza $\zeta$	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	$\rho_{\oplus}$	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2462																			
335	1	Nie	837	16.55400	11.00	16.3025	-21.50	0.98609	22.1234	-5.25	59.505	6.2	45	737	1134.7	1533	1147	1727.4	2321	1251	1	
336	2	Pon	838	16.59366	10.37	16.3444	-21.59	0.98592	23.0151	-0.32	60.377	0.5	55	738	1135.1	1532	1206	1813.8	****	1247	2	
337	3	Wto	839	17.03332	10.14	16.3904	-22.08	0.98576	23.4942	4.15	61.176	1.5	65	739	1135.5	1531	1225	1858.8	035	1243	3	
338	4	Śro	840	17.07297	9.50	16.4325	-22.16	0.98560	0.3701	8.44	61.875	2.5	75	741	1135.9	1531	1244	1943.5	147	1239	4	
339	5	Czw	841	17.11263	9.26	16.4746	-22.24	0.98545	1.2430	12.47	62.460	3.5	83	742	1136.3	1530	1304	2028.6	258	1235	5	
340	6	Pią	842	17.15228	9.00	16.5208	-22.31	0.98531	2.1242	16.14	62.926	4.5	89	743	1136.7	1530	1328	2114.7	407	1231	6	
341	7	Sob	843	17.19194	8.35	16.5630	-22.38	0.98516	3.0152	18.58	63.278	5.5	95	745	1137.2	1529	1357	2201.8	513	1227	7	
342	8	Nie	844	17.23159	8.09	17.0052	-22.44	0.98503	3.5202	20.51	63.523	6.5	98	746	1137.6	1529	1432	2249.9	616	1224	8	
343	9	Pon	845	17.27125	7.42	17.0515	-22.50	0.98490	4.4253	21.48	63.667	7.5	100	747	1138.0	1529	1514	2338.6	714	1220	9	
344	10	Wto	846	17.31090	7.15	17.0939	-22.56	0.98477	5.3356	21.47	63.712	0.5	100	748	1138.5	1528	1604	*****	803	1216	10	
345	11	Śro	847	17.35056	6.48	17.1403	-23.01	0.98466	6.2437	20.47	63.658	1.5	98	749	1138.9	1528	1701	027.2	845	1212	11	
346	12	Czw	848	17.39022	6.20	17.1827	-23.05	0.98454	7.1427	18.53	63.497	2.5	94	750	1139.4	1528	1803	115.1	920	1208	12	
347	13	Pią	849	17.42587	5.52	17.2252	-23.10	0.98444	8.0311	16.09	63.220	3.5	89	751	1139.9	1528	1909	201.8	948	1204	13	
348	14	Sob	850	17.46553	5.24	17.2717	-23.13	0.98434	8.5051	12.44	62.816	4.5	83	752	1140.4	1528	2017	247.3	1012	1200	14	
349	15	Nie	851	17.50518	4.55	17.3142	-23.16	0.98424	9.3744	8.44	62.278	5.5	75	753	1140.8	1528	2127	331.8	1032	1156	15	
350	16	Pon	852	17.54484	4.26	17.3608	-23.19	0.98415	10.2424	4.18	61.608	6.5	66	754	1141.3	1528	2238	415.9	1051	1152	16	
351	17	Wto	853	17.58450	3.57	17.4033	-23.22	0.98407	11.1135	-0.24	60.816	7.5	56	755	1141.8	1529	2350	500.2	1109	1148	17	
352	18	Śro	854	18.02415	3.27	17.4459	-23.23	0.98399	12.0007	-5.14	59.929	0.5	45	756	1142.3	1529	****	545.7	1128	1144	18	
353	19	Czw	855	18.06381	2.58	17.4925	-23.25	0.98391	12.5058	-9.57	58.991	1.5	35	756	1142.8	1529	106	633.5	1149	1140	19	
354	20	Pią	856	18.10346	2.28	17.5352	-23.26	0.98384	13.4459	-14.18	58.063	2.5	24	757	1143.3	1530	225	724.6	1214	1136	20	
355	21	Sob	857	18.14312	1.58	17.5818	-23.26	0.98378	14.4248	-17.59	57.220	3.5	15	757	1143.8	1530	346	819.9	1246	1132	21	
356	22	Nie	858	18.18277	1.28	18.0245	-23.26	0.98371	15.4427	-20.36	56.543	4.5	8	758	1144.3	1531	506	919.5	1327	1128	22	
357	23	Pon	859	18.22243	0.58	18.0711	-23.25	0.98366	16.4902	-21.51	56.106	5.5	2	758	1144.8	1531	622	1022.5	1422	1125	23	
358	24	Wto	860	18.26208	0.28	18.1138	-23.24	0.98360	17.5445	-21.30	55.961	6.5	0	759	1145.3	1532	726	1127.1	1531	1121	24	
359	25	Śro	861	18.30174	-0.01	18.1604	-23.23	0.98355	18.5928	-19.34	56.129	0.7	1	759	1145.8	1532	817	1230.5	1651	1117	25	
360	26	Czw	862	18.34140	-0.31	18.2030	-23.21	0.98350	20.0124	-16.18	56.594	1.7	4	759	1146.3	1533	856	1330.8	1815	1113	26	
361	27	Pią	863	18.38105	-1.01	18.2457	-23.19	0.98346	20.5942	-12.03	57.306	2.7	11	800	1146.8	1534	926	1426.9	1940	1109	27	
362	28	Sob	864	18.42071	-1.30	18.2923	-23.16	0.98342	21.5425	-7.14	58.191	3.7	19	800	1147.3	1535	950	1519.1	2101	1105	28	
363	29	Nie	865	18.46037	-1.60	18.3348	-23.12	0.98338	22.4610	-2.12	59.166	4.7	28	800	1147.7	1536	1011	1608.2	2219	1101	29	
364	30	Pon	866	18.50002	-2.29	18.3814	-23.09	0.98335	23.3549	2.47	60.149	5.7	39	800	1148.2	1537	1031	1655.1	2334	1057	30	
365	31	Wto	867	18.53568	-2.57	18.4239	-23.04	0.98332	0.2414	7.28	61.073	6.7	49	800	1148.7	1538	1050	1740.8	****	1053	31	

Fazy Księżyca [Dm, h.mm]: 1kw 1, 23.57 Pełn 9, 23.40 3kw 18, 1.01 Nów 24, 18.32 1kw 31, 14.36

# GRUDZIEŃ 2030 (c.d.)

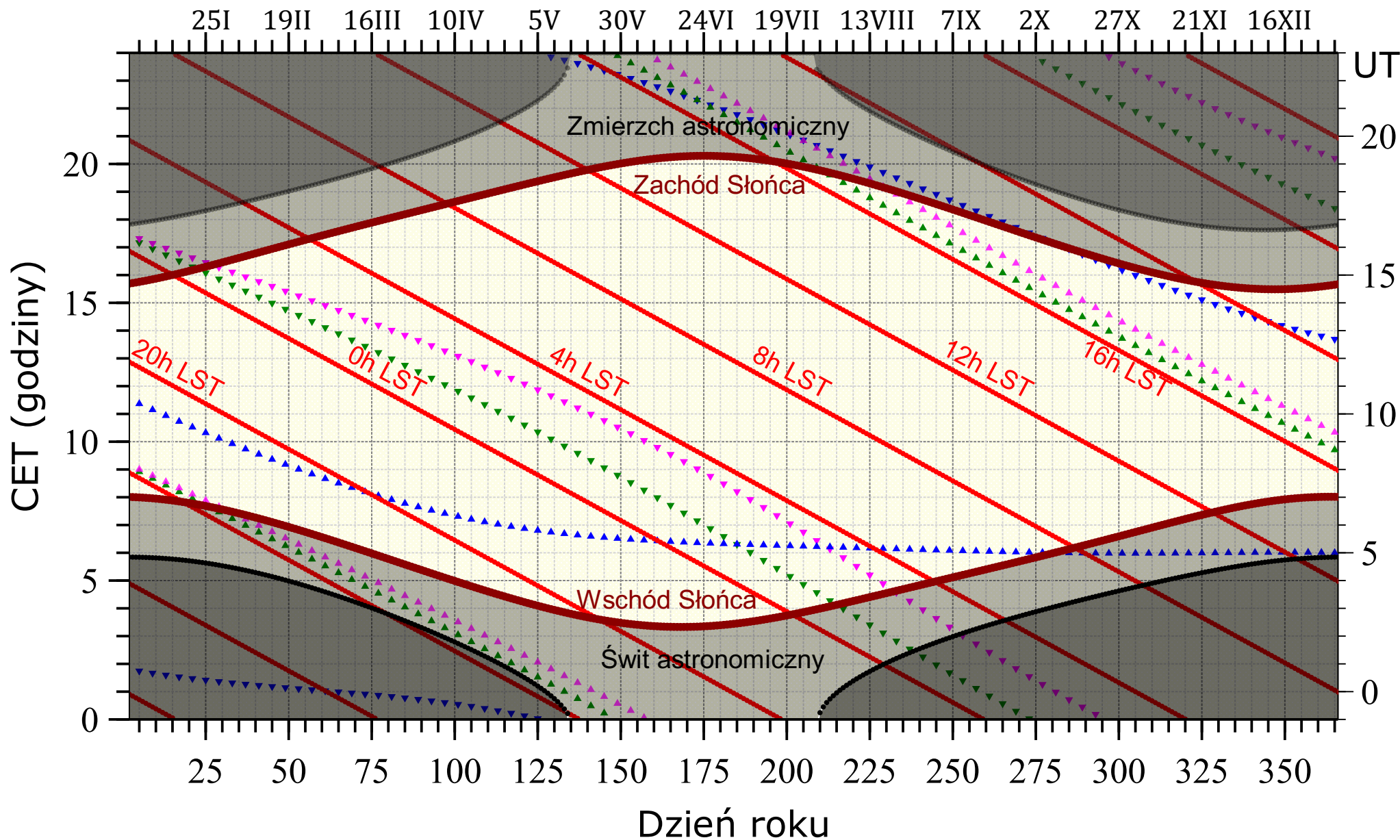
Świty, zmierzchy astronomiczne ( $h_{\odot} = -18^{\circ}$ ; kolumna SŁOŃCE), wschody i zachody planet (w czasie strefowym [hh.mm]) oraz, w drugim wierszu dla danej daty, współrzędne (rektascensja [godziny] i deklinacja [stopnie]) Słońca i planet w południe strefowe dla miejsca Piwnice, CA UMK oraz czas gwiazdowy o północy UT w Greenwich [godziny]

Dm	SŁOŃCE		MERKURY		WENUS		MARS		JOWISZ		SATURN		URAN		NEPTUN		PLUTON		ST	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	( $0^h$ UT)	Dm
1	5.30	17.40	9.38	16.33	8.37	16.03	1.31	13.28	7.33	15.33	15.24	7.14	16.02	8.52	13.28	2.07	12.20	19.44		
	16.507	-21.84	18.017	-25.43	17.256	-23.47	12.399	-0.83	16.467	-21.16	4.239	19.10	5.371	23.25	0.697	2.80	20.960	-23.61	4.66012	1
3	5.33	17.39	9.32	16.33	8.42	16.04	1.30	13.22	7.27	15.26	15.16	7.06	15.54	8.44	13.20	1.59	12.12	19.36		
	16.651	-22.13	18.095	-25.11	17.437	-23.72	12.469	-1.27	16.498	-21.23	4.228	19.07	5.365	23.24	0.696	2.80	20.963	-23.60	4.79154	3
5	5.35	17.38	9.23	16.30	8.47	16.06	1.28	13.16	7.22	15.20	15.08	6.57	15.45	8.36	13.12	1.51	12.04	19.29		
	16.796	-22.40	18.133	-24.71	17.620	-23.92	12.538	-1.70	16.530	-21.30	4.216	19.05	5.359	23.24	0.695	2.79	20.965	-23.58	4.92296	5
7	5.37	17.38	9.11	16.26	8.51	16.08	1.27	13.10	7.17	15.13	14.59	6.48	15.37	8.27	13.04	1.43	11.56	19.21		
	16.942	-22.63	18.124	-24.22	17.803	-24.07	12.607	-2.14	16.562	-21.37	4.205	19.02	5.353	23.23	0.694	2.78	20.968	-23.57	5.05437	7
9	5.39	17.38	8.55	16.19	8.55	16.10	1.25	13.04	7.11	15.07	14.51	6.39	15.29	8.19	12.56	1.35	11.49	19.13		
	17.088	-22.84	18.061	-23.65	17.986	-24.17	12.676	-2.57	16.594	-21.43	4.194	19.00	5.347	23.23	0.693	2.78	20.971	-23.56	5.18580	9
11	5.41	17.38	8.35	16.09	8.58	16.13	1.24	12.58	7.06	15.01	14.42	6.31	15.21	8.11	12.48	1.27	11.41	19.06		
	17.234	-23.01	17.945	-23.00	18.169	-24.23	12.745	-2.99	16.625	-21.50	4.183	18.97	5.341	23.22	0.692	2.78	20.974	-23.54	5.31722	11
13	5.43	17.38	8.13	15.56	9.01	16.16	1.22	12.52	7.00	14.54	14.34	6.22	15.13	8.03	12.40	1.19	11.33	18.58		
	17.381	-23.16	17.783	-22.30	18.353	-24.23	12.813	-3.42	16.657	-21.56	4.172	18.95	5.335	23.21	0.691	2.77	20.977	-23.53	5.44864	13
15	5.44	17.38	7.48	15.42	9.04	16.19	1.21	12.46	6.54	14.48	14.26	6.13	15.05	7.54	12.32	1.11	11.25	18.51		
	17.528	-23.27	17.593	-21.58	18.536	-24.18	12.881	-3.84	16.688	-21.62	4.162	18.93	5.328	23.21	0.691	2.77	20.980	-23.51	5.58007	15
17	5.46	17.39	7.24	15.28	9.06	16.23	1.19	12.40	6.49	14.41	14.17	6.05	14.56	7.46	12.25	1.04	11.17	18.43		
	17.676	-23.36	17.399	-20.89	18.719	-24.08	12.949	-4.25	16.720	-21.69	4.152	18.91	5.322	23.20	0.690	2.77	20.983	-23.50	5.71148	17
19	5.47	17.40	7.02	15.13	9.08	16.27	1.18	12.34	6.43	14.35	14.09	5.56	14.48	7.38	12.17	0.56	11.10	18.36		
	17.824	-23.41	17.227	-20.32	18.902	-23.94	13.016	-4.66	16.752	-21.74	4.142	18.89	5.316	23.20	0.690	2.77	20.986	-23.48	5.84290	19
21	5.48	17.41	6.43	15.00	9.10	16.32	1.16	12.28	6.38	14.29	14.01	5.48	14.40	7.30	12.09	0.48	11.02	18.28		
	17.972	-23.43	17.095	-19.92	19.084	-23.74	13.083	-5.07	16.783	-21.80	4.132	18.86	5.310	23.19	0.690	2.77	20.990	-23.47	5.97432	21
23	5.49	17.42	6.29	14.49	9.11	16.37	1.14	12.22	6.32	14.22	13.52	5.39	14.32	7.21	12.01	0.40	10.54	18.20		
	18.120	-23.42	17.012	-19.71	19.266	-23.49	13.150	-5.47	16.814	-21.86	4.122	18.85	5.304	23.19	0.690	2.77	20.993	-23.45	6.10574	23
25	5.50	17.43	6.19	14.39	9.12	16.42	1.13	12.16	6.27	14.16	13.44	5.31	14.24	7.13	11.53	0.32	10.46	18.13		
	18.268	-23.38	16.978	-19.69	19.446	-23.20	13.216	-5.87	16.845	-21.91	4.113	18.83	5.298	23.18	0.690	2.78	20.996	-23.44	6.23717	25
27	5.50	17.44	6.13	14.31	9.12	16.47	1.11	12.09	6.21	14.09	13.36	5.22	14.15	7.05	11.45	0.24	10.38	18.05		
	18.416	-23.31	16.989	-19.84	19.626	-22.86	13.282	-6.26	16.876	-21.96	4.104	18.81	5.292	23.17	0.690	2.78	21.000	-23.42	6.36859	27
29	5.51	17.46	6.10	14.24	9.12	16.53	1.09	12.03	6.15	14.03	13.28	5.14	14.07	6.56	11.37	0.16	10.31	17.58		
	18.563	-23.21	17.040	-20.10	19.805	-22.48	13.348	-6.65	16.907	-22.01	4.096	18.79	5.286	23.17	0.691	2.78	21.004	-23.41	6.50001	29
31	5.51	17.47	6.09	14.19	9.12	16.59	1.07	11.57	6.10	13.57	13.19	5.05	13.59	6.48	11.29	0.09	10.23	17.50		
	18.711	-23.07	17.122	-20.45	19.983	-22.04	13.413	-7.03	16.938	-22.06	4.088	18.78	5.280	23.16	0.691	2.79	21.007	-23.39	6.63143	31

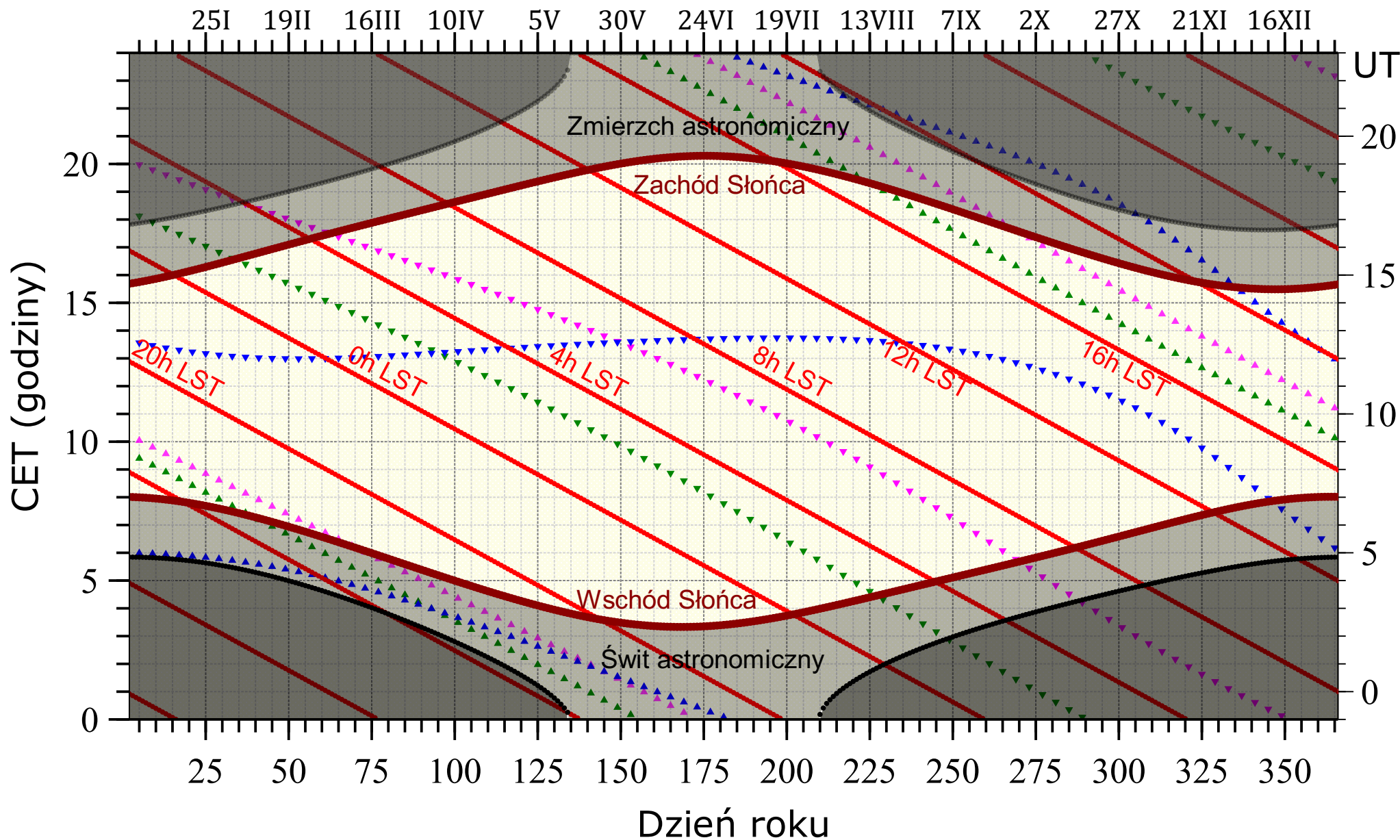
## Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2030

Nowy Rok	Wto	1 styczeń	Dzień Dziecka	Sob	1 czerwiec
Najświętszej Maryi Panny Rodzicielki	Wto	1 styczeń	Dzień Dziękczynienia	Nie	2 czerwiec
Objawienia Pańskiego (Trzech Króli)	Nie	6 styczeń	Zesłania Ducha Świętego	Nie	9 czerwiec
Juliański Nowy Rok	Pon	14 styczeń	Trójcy Najświętszej	Nie	16 czerwiec
Dzień Babci	Pon	21 styczeń	Boże Ciało	Czw	20 czerwiec
Dzień Dziadka	Wto	22 styczeń	Dzień Ojca	Nie	23 czerwiec
Ofiarowania Pańskiego	Sob	2 luty	Noc Świętojańska	Nie	23 czerwiec
Matki Boskiej Gromnicznej	Sob	2 luty	Najświętszego Serca Pana Jezusa	Pią	28 czerwiec
Walentynki	Czw	14 luty	Św. Piotra i Pawła	Sob	29 czerwiec
Święto UMK	Wto	19 luty	Wniebowzięcia N.M.P.	Czw	15 sierpień
Tłusty czwartek	Czw	28 luty	Święto Wojska Polskiego	Czw	15 sierpień
Środa Popielcowa	Śro	6 marzec	Dzień Solidarności i Wolności	Sob	31 sierpień
Dzień Kobiet	Pią	8 marzec	Dzień Programisty	Pią	13 wrzesień
Narodowy Dzień Życia	Nie	24 marzec	Dożynki – Święto Plonów	Pon	23 wrzesień
Niedziela Palmowa	Nie	14 kwiecień	Dzień Papieski	Nie	13 październik
Niedziela Wielkanocna	Nie	21 kwiecień	Dzień Edukacji Narodowej	Pon	14 październik
Niedziela Miłosierdzia Bożego	Nie	28 kwiecień	Dzień Papieża Jana Pawła II	Śro	16 październik
Święto Pracy	Śro	1 maj	Wszystkich Świętych	Pią	1 listopad
Dzień Flagi Rzeczypospolitej Polskiej	Czw	2 maj	Zaduszki	Sob	2 listopad
Najświętsza Maryja Królowa Polski	Pią	3 maj	Święto Niepodległości	Pon	11 listopad
Święto Konstytucji 3 Maja	Pią	3 maj	Pierwsza niedziela Adwentu	Nie	1 grudzień
Dzień Polskiej Niezapominajki	Śro	15 maj	Niepokalane Poczęcie N.M.P.	Nie	8 grudzień
Dzień Matki	Nie	26 maj	Boże Narodzenie	Śro	25 grudzień
Wniebowstąpienia Pańskiego	Czw	30 maj	Sylwester	Wto	31 grudzień

Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2021 r. w Piwnicach

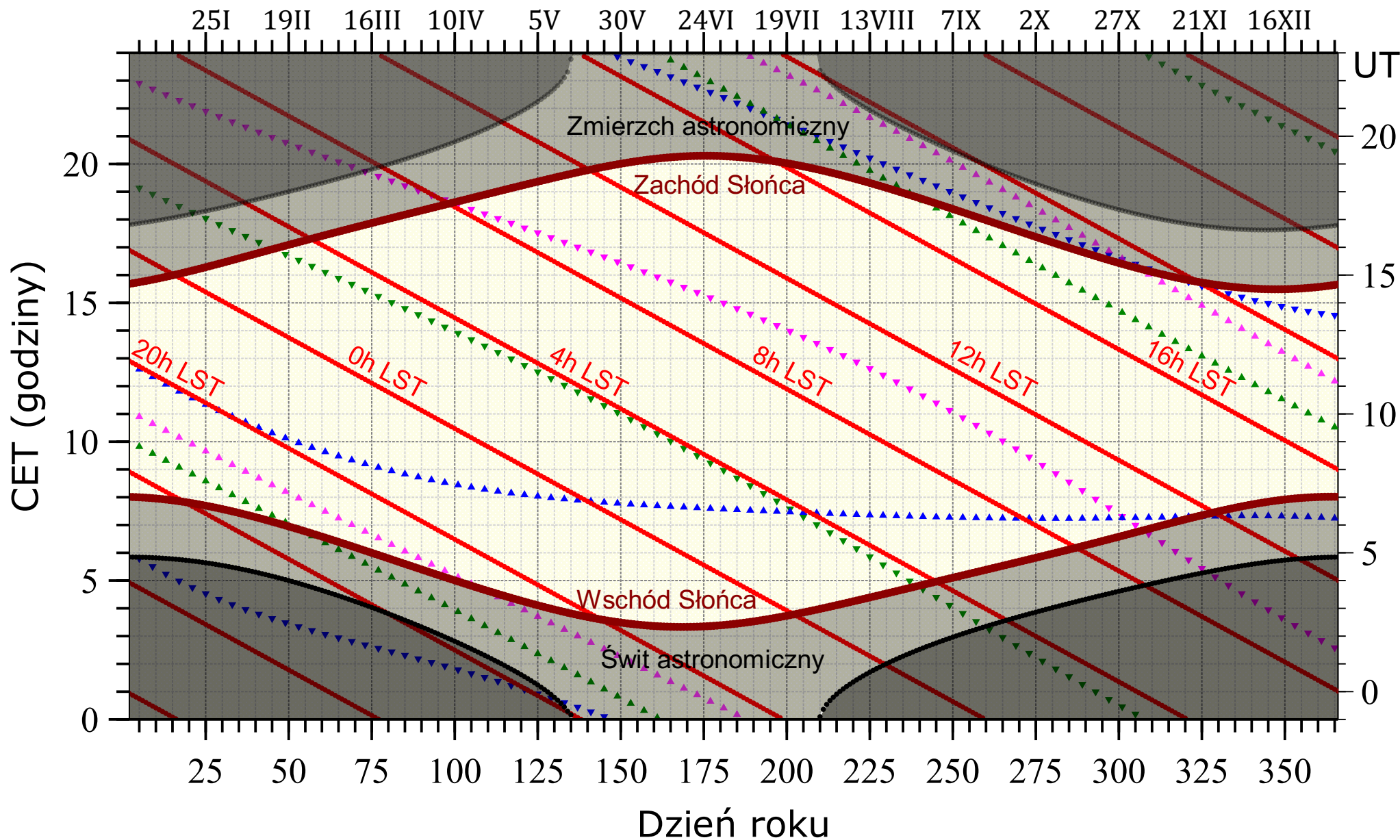


Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2022 r. w Piwnicach

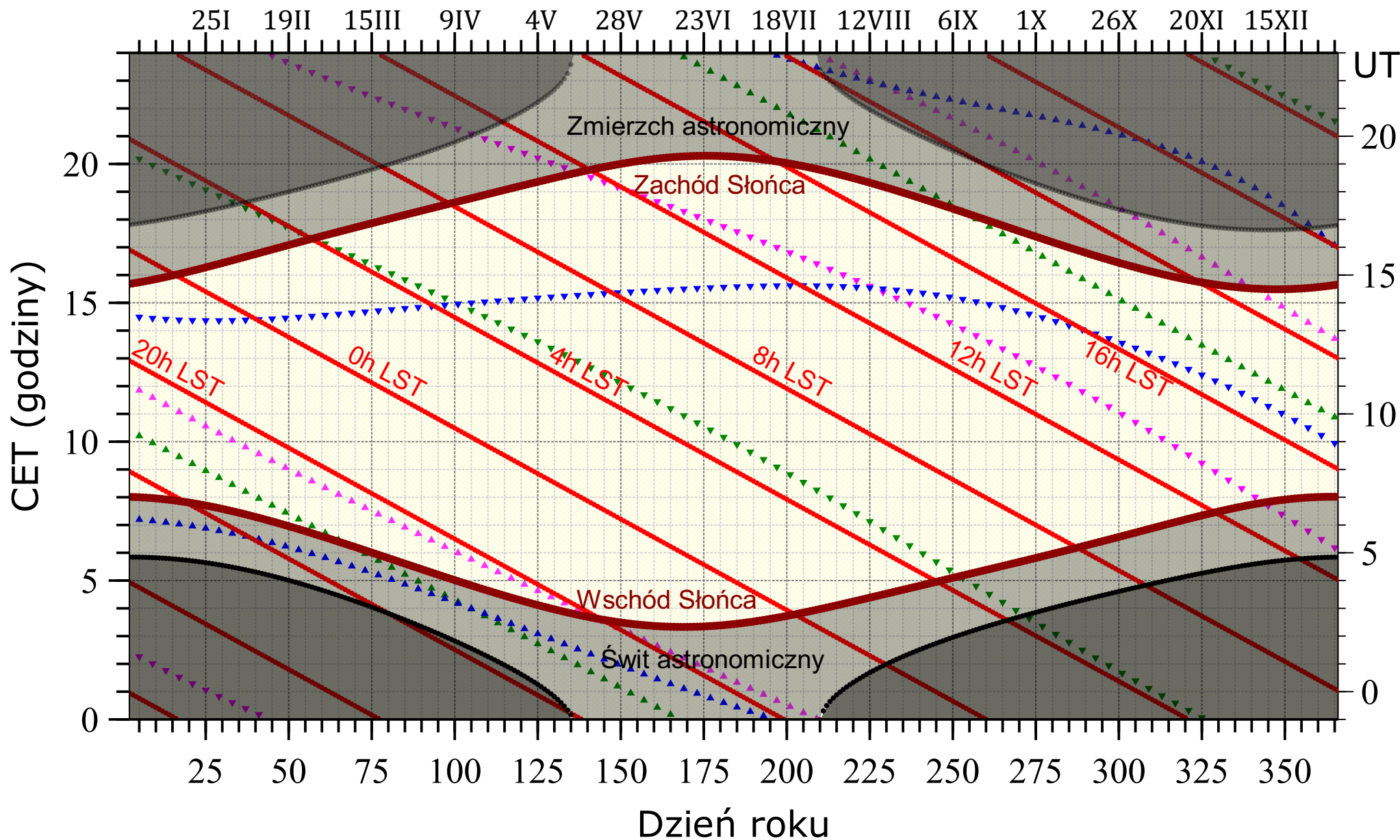




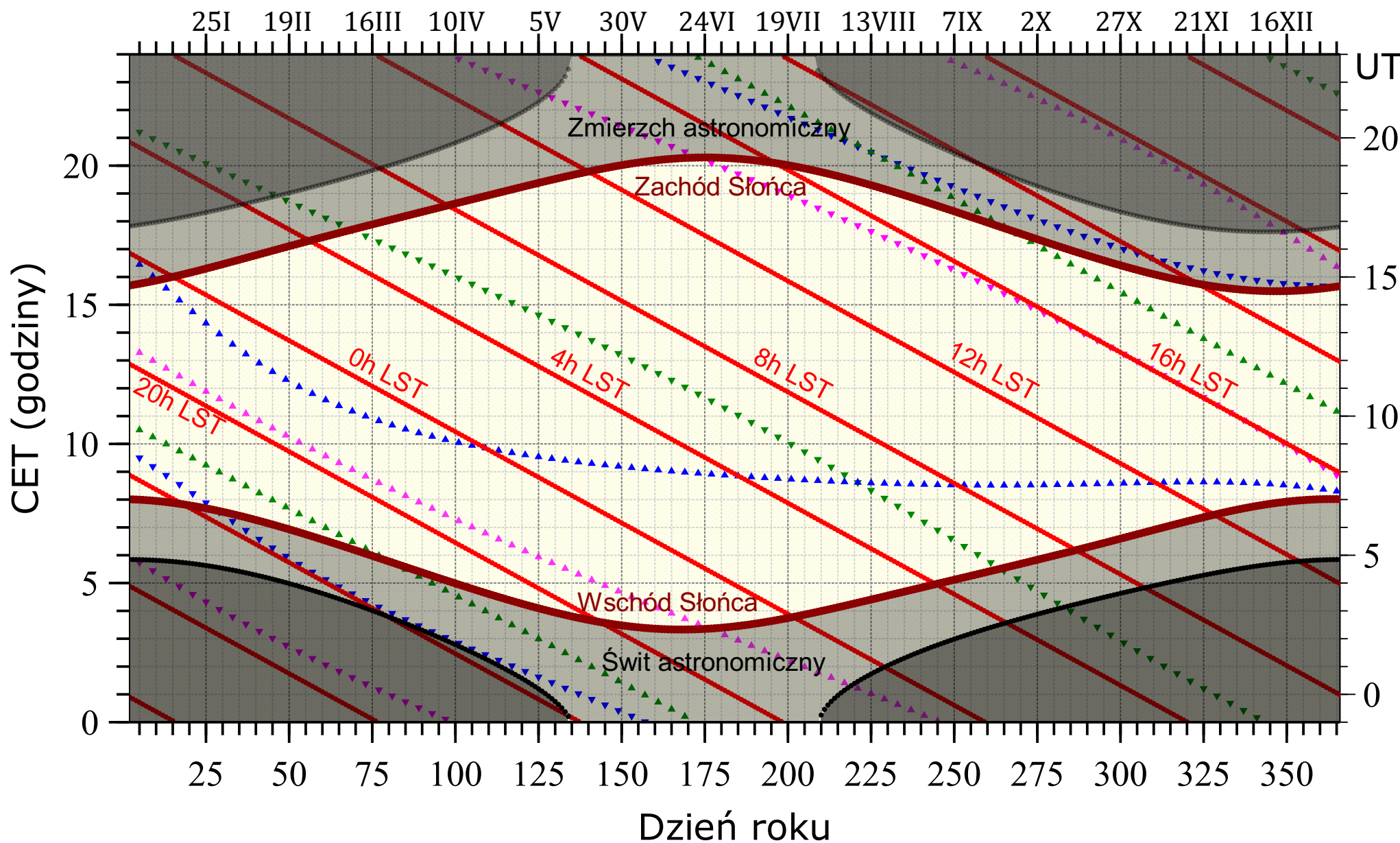
Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2023 r. w Piwnicach



Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2024 r. w Piwnicach

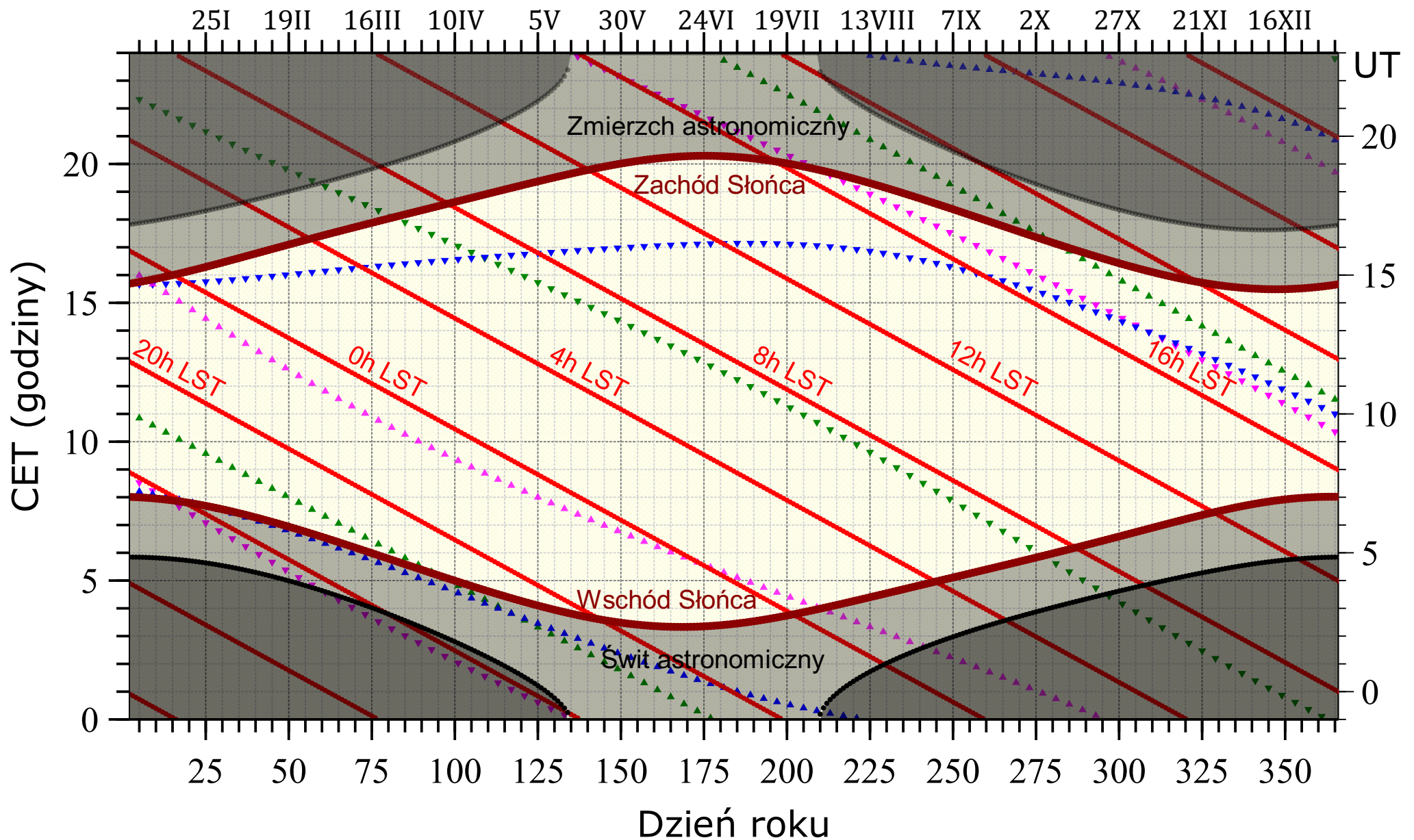


Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2025 r. w Piwnicach

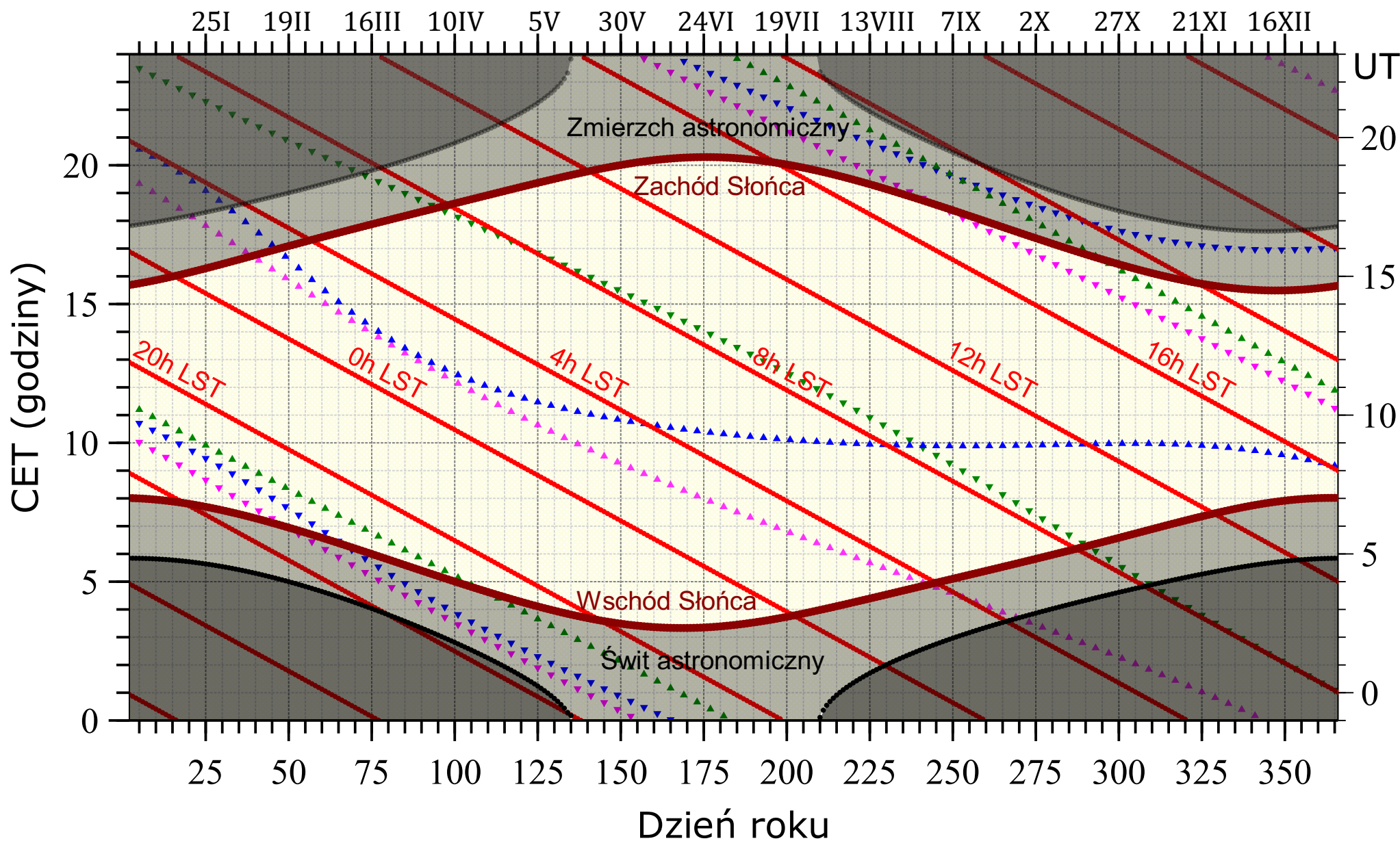




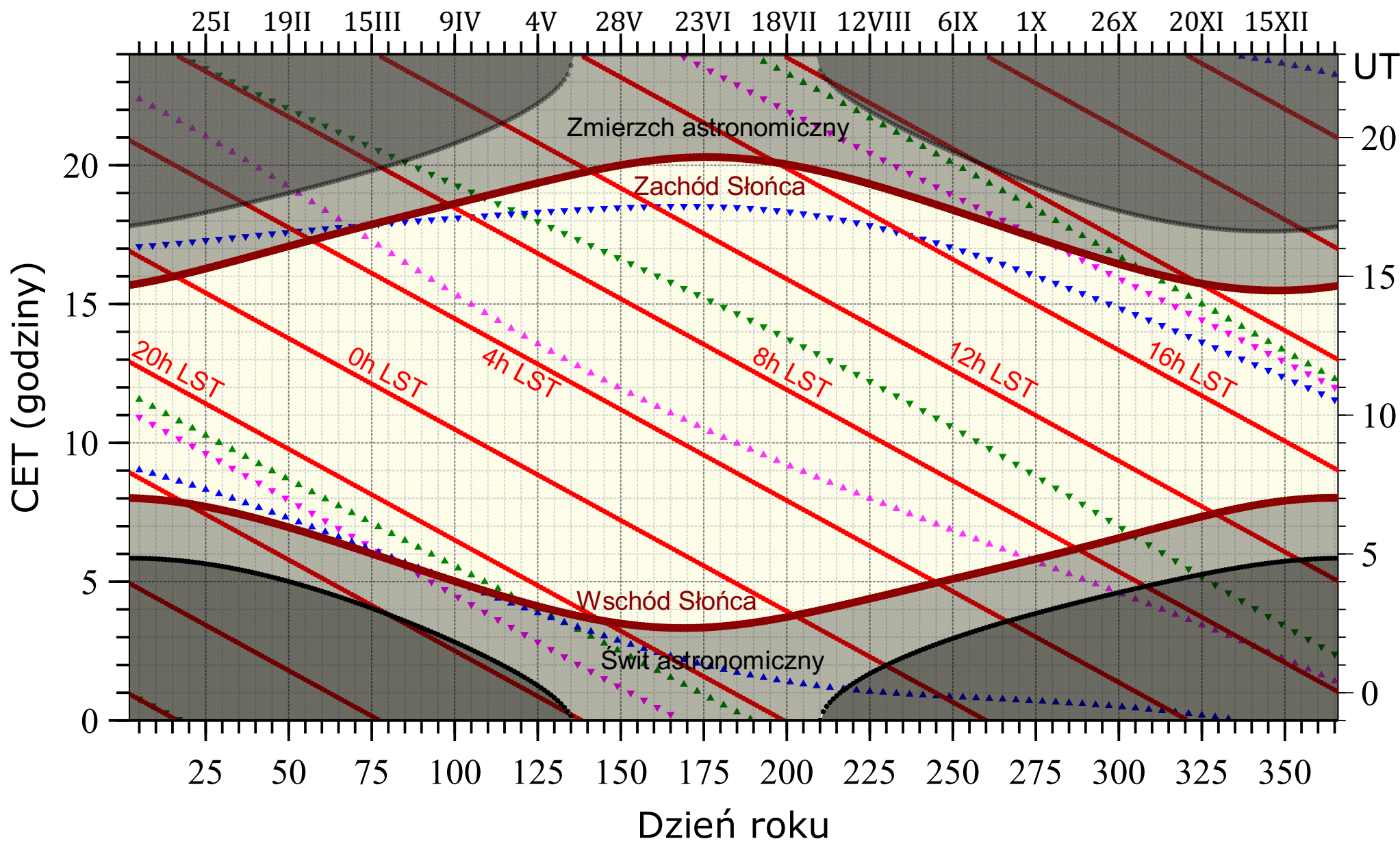
Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2026 r. w Piwnicach



Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2027 r. w Piwnicach

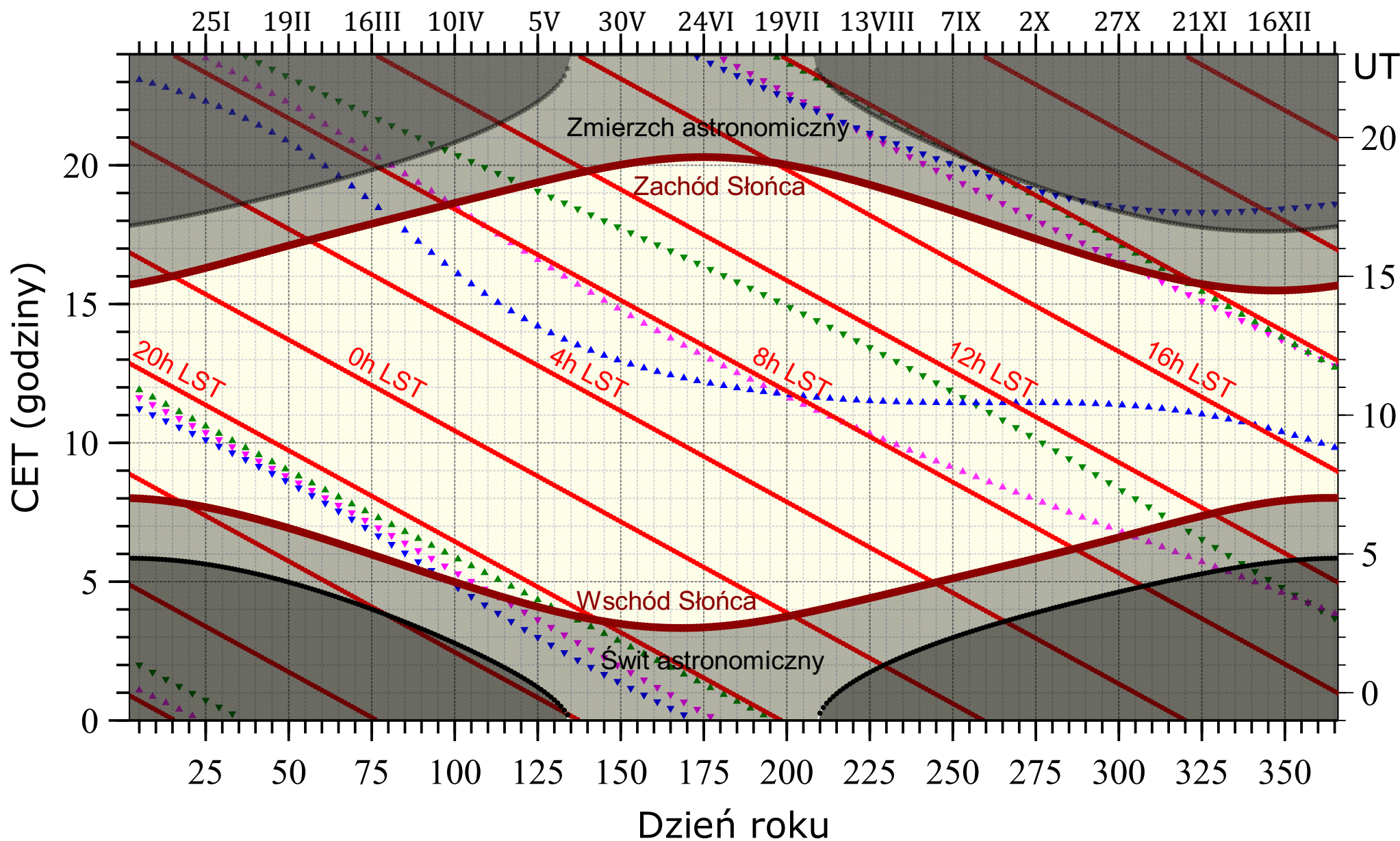


Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2028 r. w Piwnicach

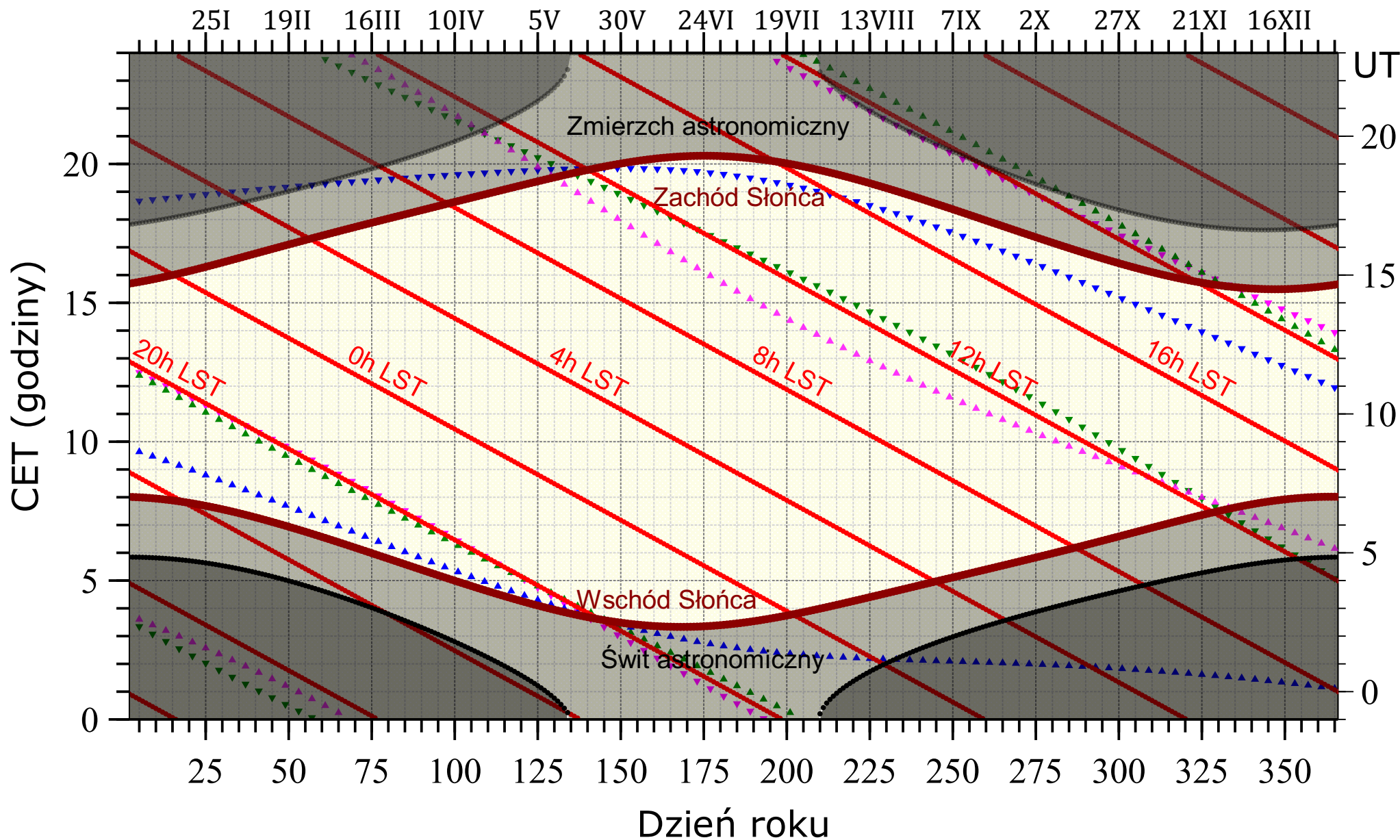




Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2029 r. w Piwnicach



Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy (LST) oraz wschody i zachody (▲ i ▼) Marsa, Jowisza i Saturna w 2030 r. w Piwnicach





# CHWILE WSTĘPOWANIA SŁOŃCA W POSZCZEGÓLNE ZNAKI ZODIAKU w latach 2021-2040

Dzień miesiąca znajduje się w kolumnie numeru miesiąca **M**, przed **hh.mm** (w czasie środkowoeuropejskim);  
dla **M = 3, 6, 9 i 12** momenty te są jednocześnie początkami pór roku. Do obliczeń użyto efemerydy JPL DE405.

Rok\M	Wodnik		Ryby		Baran		Byk		Bliźnięta		Rak		Lew		Panna		Waga		Skorpion		Strzelec		Koziorożec		Rok
	1	hh.mm	2	hh.mm	3	hh.mm	4	hh.mm	5	hh.mm	6	hh.mm	7	hh.mm	8	hh.mm	9	hh.mm	10	hh.mm	11	hh.mm	12	hh.mm	
2021	19	21.40	18	11.44	20	10.37	19	21.33	20	20.37	21	4.32	22	15.26	22	22.35	22	20.21	23	5.51	22	3.34	21	16.59	2021
2022	20	3.39	18	17.43	20	16.33	20	3.24	21	2.23	21	10.14	22	21.07	23	4.16	23	2.04	23	11.36	22	9.20	21	22.48	2022
2023	20	9.30	18	23.34	20	22.24	20	9.14	21	8.09	21	15.58	23	2.50	23	10.01	23	7.50	23	17.21	22	15.03	22	4.27	2023
2024	20	15.07	19	5.13	20	4.06	19	15.00	20	13.59	20	21.51	22	8.44	22	15.55	22	13.44	22	23.15	21	20.56	21	10.21	2024
2025	19	21.00	18	11.07	20	10.01	19	20.56	20	19.55	21	3.42	22	14.29	22	21.34	22	19.19	23	4.51	22	2.36	21	16.03	2025
2026	20	2.45	18	16.52	20	15.46	20	2.39	21	1.37	21	9.24	22	20.13	23	3.19	23	1.05	23	10.38	22	8.23	21	21.50	2026
2027	20	8.30	18	22.33	20	21.25	20	8.18	21	7.18	21	15.11	23	2.05	23	9.14	23	7.02	23	16.33	22	14.16	22	3.42	2027
2028	20	14.22	19	4.26	20	3.17	19	14.09	20	13.10	20	21.02	22	7.54	22	15.01	22	12.45	22	22.13	21	19.54	21	9.20	2028
2029	19	20.01	18	10.08	20	9.02	19	19.56	20	18.56	21	2.48	22	13.42	22	20.52	22	18.38	23	4.08	22	1.49	21	15.14	2029
2030	20	1.54	18	16.00	20	14.52	20	1.43	21	0.41	21	8.31	22	19.25	23	2.36	23	0.27	23	10.00	22	7.44	21	21.10	2030
2031	20	7.48	18	21.51	20	20.41	20	7.31	21	6.28	21	14.17	23	1.10	23	8.23	23	6.15	23	15.49	22	13.32	22	2.55	2031
2032	20	13.31	19	3.32	20	2.22	19	13.14	20	12.15	20	20.09	22	7.05	22	14.18	22	12.11	22	21.46	21	19.31	21	8.56	2032
2033	19	19.33	18	9.34	20	8.23	19	19.13	20	18.11	21	2.01	22	12.53	22	20.02	22	17.52	23	3.27	22	1.16	21	14.46	2033
2034	20	1.27	18	15.30	20	14.17	20	1.04	20	23.57	21	7.44	22	18.36	23	1.48	22	23.39	23	9.16	22	7.05	21	20.34	2034
2035	20	7.14	18	21.16	20	20.03	20	6.49	21	5.43	21	13.33	23	0.28	23	7.44	23	5.39	23	15.16	22	13.03	22	2.31	2035
2036	20	13.11	19	3.14	20	2.03	19	12.50	20	11.45	20	19.32	22	6.22	22	13.32	22	11.23	22	20.59	21	18.45	21	8.13	2036
2037	19	18.54	18	8.59	20	7.50	19	18.40	20	17.35	21	1.22	22	12.12	22	19.22	22	17.13	23	2.50	22	0.38	21	14.08	2037
2038	20	0.49	18	14.52	20	13.40	20	0.28	20	23.22	21	7.09	22	18.00	23	1.10	22	23.02	23	8.40	22	6.31	21	20.02	2038
2039	20	6.43	18	20.45	20	19.32	20	6.18	21	5.11	21	12.57	22	23.48	23	6.58	23	4.49	23	14.25	22	12.12	22	1.40	2039
2040	20	12.21	19	2.24	20	1.11	19	11.59	20	10.55	20	18.46	22	5.41	22	12.53	22	10.45	22	20.19	21	18.05	21	7.33	2040





# ZAĆMIENIA SŁOŃCA I KSIĘŻYCA w latach 2021-2040

## widoczne w Piwnicach

( $\varphi = 53.096^\circ$ ,  $\lambda = 18.564^\circ$ ,  $H = 100$  m n.p.m.)

### Oznaczenia kolumn tabel:

**DATA** podana jest w formie: rok (4 cyfry), miesiąc i dzień (po 2 cyfry) oraz dzień tygodnia (pierwsze dwie litery angielskiej nazwy), **CET** – czas środkowoeuropejski [hh.mm], **h** i **Az** – wysokość i azymut (Słońca lub Księżyca) nad horyzontem [stopnie], **FAZA f** lub **fp** – ułamek przesłoniętej średnicy tarczy, **FAZA % F** lub **Fp** – procent przesłoniętej powierzchni tarczy (dla całkowitych zaćmień Księżyca w tym miejscu podano czas półtrwania całkowitego zaćmienia **tp** [minuty] i oznaczono go literą **t**), **V** i **P** [stopnie] – kąty pozycyjne środków tarcz (lub cienia), **Ds**, **Dm**, **Du** i **Dp** – średnice [minuty łuku] tarczy Słońca, Księżyca, cienia i półcienia (odpowiednio), **Wsch/Zach** lub **W/Z** – najbliższy do zaćmienia moment wschodu lub zachodu Słońca lub Księżyca (definiowany jako chwila, gdy dolny skraj tarczy pokrywa się z horyzontem; *CET*), **Long** i **Lat** – długość i szerokość geograficzna punktu podslonecznego (podksiężycowego) w chwili maksymalnej fazy [stopnie], **TT-UT** lub **dt** – przyjęta różnica między czasem efemeryd (*TDT*, *ET*) i czasem uniwersalnym [s], **durp**, **dur** i **durt** – w tabeli zaćmień półcieniowych oznaczają czas trwania [minuty] fazy zaćmienia półcieniowego, cieniowego i całkowitego (odpowiednio).

## ZAĆMIENIA SŁOŃCA

DATA				POCZ.		MAX.		KONIEC		FAZA		V Az		Srednice		Wsch	TT-UT
Rok	M	D	d	CET	h	CET	h	CET	h	f	%	deg	Ds	Dm	/Zach		
2021	6	10	Th	1048	58	1150	60	1252	57	0.228	12p	344	2	31.51	29.97	2006.2	1.16
2022	10	25	Tu	1012	23	1120	25	1228	24	0.504	39p	37	357	32.17	31.98	633.7	1.16
2025	3	29	Sa	1143	40	1226	40	1309	38	0.204	11p	315	12	32.04	33.71	1812.1	1.18
2026	8	12	We	1814	8	1906	1	1955	-6	0.861	83p	171	114	31.57	32.57	1915.0	1.19
2027	8	2	Mo	925	45	1019	50	1115	54	0.402	29p	227	324	31.52	33.91	407.9	1.19
2029	6	12	Tu	327	0	355	4	425	7	0.146	7p	29	235	31.50	30.38	324.1	1.21
2030	6	1	Sa	519	14	624	23	734	34	0.693	60p	211	264	31.55	29.61	330.6	1.21
2034	3	20	Mo	1113	36	1147	37	1221	37	0.111	4p	157	358	32.12	33.41	551.9	1.29
2036	8	21	Th	1811	6	1855	0	1947	-7	0.724	66p	319	110	31.62	33.37	1854.6	1.33
2037	11	6	Fr	908	8	1034	14	1204	16	0.643	54p	8	340	32.52	29.85	754.9	1.35
2038	1	5	Tu	1503	4	1540	0	1636	-7	0.212	11p	153	51	32.53	31.18	1539.7	1.37
2038	7	2	Fr	1509	42	1520	40	1531	39	0.010	0p	146	74	31.46	31.04	2010.1	1.37
2039	6	21	Tu	1825	13	1926	5	2023	-2	0.869	81p	328	123	31.48	29.57	2011.4	1.39

## CIENIOWE ZAĆMIENIA KSIĘŻYCA

DATA			POCZATEK					MAKSIMUM					KONIEC					FAZA		Dp	Du	Dm	TT-UT	W/Z	Lon	Lat
Rok	M	D	d	CET	h	Az	V	P	CET	h	Az	V	P	CET	h	Az	V	P	f	%	[arcmin]	[s]	CET	[deg]		
2022	51	6	Mo	328	2	53	65	96	511-12	72	342	20		655-27	91	264	303	1.42	t43	155.9	91.3	33.0	70	343	296.1-19.3	
2023	10	28	Sa	2035	37	303	165	133	2114	42	313	182	155	2154	46	325	197	176	0.13	6	154.0	88.2	32.3	70	1612	52.0 14.1
2024	9	18	We	312	18	57	318	349	344	14	64	298	331	416	10	71	279	313	0.09	4	157.7	92.7	33.4	72	530	318.0 -2.6
2025	9	7	Su	1727	-8	271	83	46	1912	7	291	6	332	2057	20	314	283	257	1.37	t41	153.5	88.7	32.3	71	1821	86.7 -6.0
2026	8	28	Fr	333	10	58	62	93	513	-3	78	116	153	652-17	97	176	213	0.93	97	147.0	82.3	30.6	71	450	296.9 -9.3	
2028	11	2	We	444	27	91	138	179	513	23	96	154	195	542	19	101	171	211	0.07	3	157.5	91.0	33.2	72	808	299.0 22.7
2028	7	6	Th	1809-17	288	65	26	1920	-7	301	22	348	2031	1	315	337	309	0.39	33	145.8	81.5	30.3	72	2018	86.5-23.3	
2028	12	31	Su	1607	4	237	152	119	1752	18	256	230	190	1937	33	276	302	262	1.25	t36	151.8	85.3	31.6	72	1528	107.9 23.3
2029	6	26	Tu	232	4	38	60	83	422	-8	59	142	176	612-22	79	221	261	1.85	t51	152.1	87.8	32.0	72	319	310.2-23.3	
2029	12	20	Th	2155	54	316	99	72	2342	60	359	6	6	2529	54	43	272	298	1.12	t27	145.7	79.2	30.0	72	1511	19.0 23.1
2030	6	15	Sa	1821-14	291	171	134	1933	-4	304	209	177	2046	4	318	245	219	0.51	47	156.9	92.6	33.3	73	2008	81.8-22.6	
2032	10	18	Mo	1824	16	275	136	98	2002	30	296	198	164	2141	41	321	253	230	1.11	t24	155.5	89.9	32.8	75	1634	70.5 10.4
2033	4	14	Th	1825	-2	284	165	129	2013	12	306	225	196	2200	22	331	279	262	1.10	t25	143.6	78.4	29.6	76	1837	72.0 -9.4
2034	9	28	Th	331	18	64	318	350	346	16	68	308	342	402	14	71	299	334	0.02	0	155.0	89.8	32.7	77	545	316.4 1.0
2035	8	19	Su	132	20	27	130	146	211	17	37	144	166	250	14	46	160	186	0.11	5	145.4	80.8	30.2	79	445	343.0-12.0
2036	2	11	Mo	2131	41	310	114	85	2312	49	342	24	13	2453	48	19	290	301	1.30	t38	157.6	91.3	33.2	80	1628	30.5 13.6
2036	8	7	Th	155	15	32	71	91	351	3	56	137	169	547-12	79	209	247	1.46	t48	142.5	78.0	29.4	80	418	318.6-16.1	
2037	1	31	Sa	1321-18	201	134	121	1500-10	223	216	190	1639	1	243	294	260	1.21	t32	158.2	91.8	33.4	81	1630	153.4 17.5		
2037	7	27	Mo	332	2	51	19	48	509-10	70	315	352	645-24	88	256	295	0.81	85	144.7	80.3	30.0	81	351	299.6-19.6		
2039	6	6	Mo	1823-12	291	171	134	1953	-1	308	222	192	2123	7	326	270	249	0.89	93	157.5	93.1	33.4	83	2003	76.6-22.1	
2039	11	30	We	1612	5	242	81	46	1755	19	261	25	345	1938	34	281	323	284	0.95	97	143.7	77.4	29.5	83	1532	103.5 21.3
2040	1	18	Su	1813	21	267	124	84	2003	38	290	198	161	2154	51	320	262	238	1.40	t44	148.0	81.9	30.7	85	1538	70.4 19.7

## CIENIOWE I PÓLCIENIOWE ZAĆMIENIA KSIĘŻYCA

DATA	CET	h	Az	V	P	fp	Fp/tp	durp	f	F	dur	durt	Dp	Du	Dm	dT	W/Z	Long	Lat
Rok M D d																			
20211119Fr	1002.9	-16	158	327	341	2.099	227t	365.2	0.978	99	208.9	0.0	143.5	77.4	29.5	70	709	220.8	19.2
2022 516Mo	511.5	-12	72	342	20	2.398	205t	321.7	1.418	100	207.8	85.5	155.9	91.3	33.0	70	343	296.1	-19.3
2023 5 5Fr	1822.9	-9	289	59	23	0.990	100	261.8	-0.041	0	0.0	0.0	150.2	85.3	31.4	70	1927	98.1	-17.2
20231028Sa	2114.1	42	313	182	155	1.144	84t	268.4	0.127	6	78.8	0.0	154.0	88.2	32.3	70	1612	52.0	14.1
2024 918We	344.2	14	64	298	331	1.063	54t	250.0	0.090	4	64.6	0.0	157.7	92.7	33.4	72	530	318.0	-2.6
2025 314Fr	758.8	-17	117	177	209	2.286	233t	366.2	1.182	100	218.7	66.1	144.4	78.6	29.8	71	605	257.8	2.7
2025 9 7Su	1911.7	7	291	6	332	2.370	210t	329.8	1.366	100	210.0	82.8	153.5	88.7	32.3	71	1821	86.7	-6.0
2026 828Fr	512.8	-3	78	116	153	1.991	207t	341.3	0.934	97	198.7	0.0	147.0	82.3	30.6	71	450	296.9	-9.3
2027 220Sa	2412.9	46	6	23	26	0.953	98	245.0	-0.052	0	0.0	0.0	156.3	90.2	32.9	72	3049	14.7	9.8
2028 112We	513.0	23	96	154	195	1.073	59t	254.5	0.071	3	57.8	0.0	157.5	91.0	33.2	72	808	299.0	22.7
2028 7 6Th	1919.7	-7	301	22	348	1.453	154t	314.5	0.393	33	142.3	0.0	145.8	81.5	30.3	72	2018	86.5	-23.3
20281231Su	1751.9	18	256	230	190	2.300	216t	339.5	1.250	100	209.4	72.0	151.8	85.3	31.6	72	1528	107.9	23.3
2029 626Tu	422.2	-8	59	142	176	2.853	221t	338.3	1.848	100	220.1	102.4	152.1	87.8	32.0	72	319	310.2	-23.3
20291220Th	2341.9	60	359	6	6	2.228	228t	361.6	1.121	100	213.8	54.4	145.7	79.2	30.0	72	1511	19.0	23.1
2030 615Sa	1933.3	-4	304	209	177	1.474	140t	281.6	0.507	47	145.2	0.0	156.9	92.6	33.3	73	2008	81.8	-22.6
203012 9Mo	2327.6	58	355	4	0	0.969	99	284.1	-0.160	0	0.0	0.0	143.4	77.0	29.4	73	1518	21.2	21.9
2031 5 7We	450.8	-8	69	335	11	0.907	95	241.5	-0.086	0	0.0	0.0	154.6	89.8	32.6	74	353	301.2	-17.8
20321018Mo	2002.5	30	296	198	164	2.109	197t	318.5	1.107	100	196.5	48.2	155.5	89.9	32.8	75	1634	70.5	10.4
2033 414Th	2012.5	12	306	225	196	2.198	229t	364.8	1.098	100	215.5	50.0	143.6	78.4	29.6	76	1837	72.0	-9.4
2034 4 3Mo	2005.6	15	301	228	197	0.881	93	270.4	-0.224	0	0.0	0.0	143.5	78.1	29.6	77	1814	74.7	-4.6
2034 928Th	346.3	16	68	308	342	1.017	29t	252.6	0.019	0	30.7	0.0	155.0	89.8	32.7	77	545	316.4	1.0
2035 818Sa	2610.9	17	37	144	166	1.177	101t	294.1	0.107	5	77.9	0.0	145.4	80.8	30.2	79	2845	343.0	-12.0
2036 211Mo	2311.8	49	342	24	13	2.301	202t	319.1	1.304	100	202.5	75.1	157.6	91.3	33.2	80	1628	30.5	13.6
2036 8 7Th	351.1	3	56	137	169	2.553	244t	375.7	1.458	100	231.8	95.9	142.5	78.0	29.4	80	418	318.6	-16.1
2037 131Sa	1500.2	-10	223	216	190	2.206	197t	315.2	1.212	100	198.0	64.5	158.2	91.8	33.4	81	1630	153.4	17.5
2037 727Mo	508.6	-10	70	315	352	1.885	204t	344.5	0.813	85	193.0	0.0	144.7	80.3	30.0	81	351	299.6	-19.6
2038 121Th	448.5	26	90	147	187	0.926	96	250.0	-0.110	0	0.0	0.0	153.4	86.9	32.1	82	760	305.8	20.9
2038 617Th	343.6	-2	53	156	187	0.468	44	181.9	-0.523	0	0.0	0.0	153.8	89.5	32.5	82	330	319.5	-22.1
20381211Sa	1843.6	26	269	30	350	0.832	88	263.5	-0.286	0	0.0	0.0	144.5	78.1	29.7	82	1530	92.6	22.0
2039 6 6Mo	1953.0	-1	308	222	192	1.853	175t	299.9	0.890	93	180.0	0.0	157.5	93.1	33.4	83	2003	76.6	-22.1
20391130We	1755.1	19	261	25	345	2.069	225t	363.8	0.946	97	206.5	0.0	143.7	77.4	29.5	83	1532	103.5	21.3
20401118Su	2003.3	38	290	198	161	2.479	231t	357.0	1.401	100	221.0	88.4	148.0	81.9	30.7	85	1538	70.4	19.7