

KALENDARZE ASTRONOMICZNE

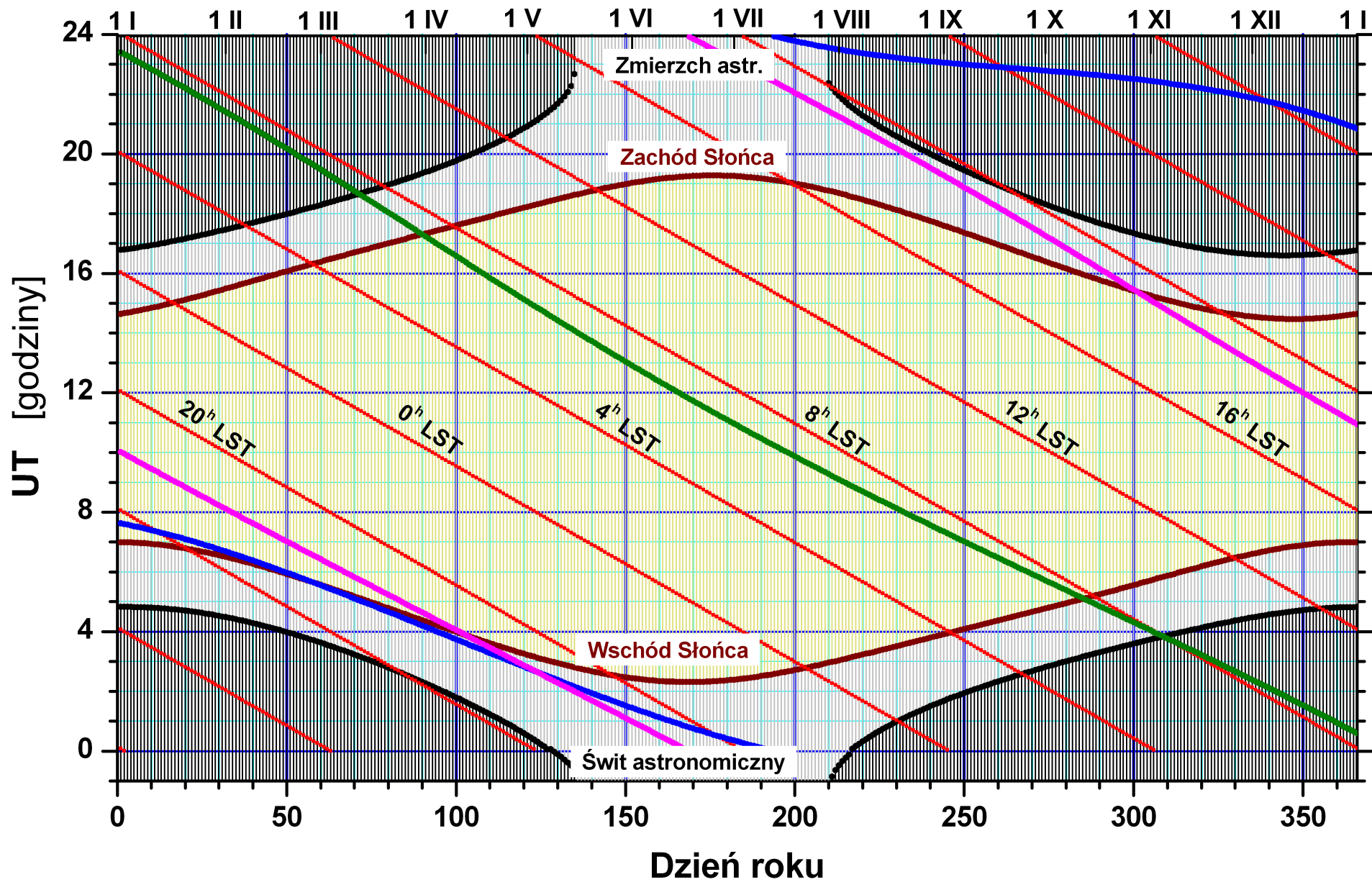
na lata 2011 – 2020

oraz tabele zjawisk na lata 2000 – 2025

Piwnice

Centrum Astronomii UMK, Toruń 2010

**Świty, zmierzchy, wschody i zachody Słońca, czas gwiazdowy
oraz wchody *Marsa*, *Jowisza* i *Saturna* w 2011 r. w Piwnicach**



Kalendarz astronomiczny 2011

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 7.10.2010 r.)

Data Wielkanocy: **2011 KWIECIEŃ 24**

Dla całego roku przyjęto: TDT – UT = 67 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 21, 0.21**, Lato **VI 21, 18.16**, Jesień **IX 23, 10.05**, Zima **XII 22, 6.30**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 27 marca do 30 października 2011 r.**

Oznaczenia:

Dr — dzień 2011 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j_{astr} — jednostka astronomiczna

ρ_{\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 2011

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2455																			
1	1	Sob	563	18.57164	-3.23	18.4625	-23.01	0.98335	16.1203	-23.36	59.684	4.3	9	800	1149.1	1539	520	908.3	1253	1049	1	
2	2	Nie	564	19.01130	-3.52	18.5050	-22.55	0.98334	17.1026	-24.14	60.175	5.3	4	800	1149.6	1540	625	1004.9	1345	1045	2	
3	3	Pon	565	19.05096	-4.20	18.5514	-22.50	0.98334	18.0753	-23.31	60.707	6.3	1	759	1150.1	1541	717	1100.6	1447	1041	3	
4	4	Wto	566	19.09061	-4.47	18.5938	-22.44	0.98334	19.0313	-21.33	61.268	0.1	0	759	1150.5	1542	757	1154.0	1558	1037	4	
5	5	Sro	567	19.13027	-5.14	19.0402	-22.37	0.98335	19.5543	-18.33	61.834	1.1	1	759	1151.0	1543	826	1244.2	1711	1033	5	
6	6	Czw	568	19.16592	-5.41	19.0825	-22.30	0.98335	20.4514	-14.45	62.372	2.1	4	758	1151.4	1545	849	1331.1	1824	1029	6	
7	7	Pią	569	19.20558	-6.07	19.1248	-22.23	0.98337	21.3205	-10.24	62.845	3.1	9	758	1151.9	1546	907	1415.1	1935	1025	7	
8	8	Sob	570	19.24524	-6.33	19.1711	-22.15	0.98338	22.1655	-5.44	63.213	4.1	15	757	1152.3	1547	922	1457.0	2045	1021	8	
9	9	Nie	571	19.28489	-6.58	19.2132	-22.07	0.98340	23.0029	-0.54	63.438	5.1	23	757	1152.7	1549	936	1537.6	2153	1018	9	
10	10	Pon	572	19.32455	-7.23	19.2554	-21.58	0.98343	23.4340	3.56	63.490	6.1	31	756	1153.1	1550	949	1618.0	2301	1014	10	
11	11	Wto	573	19.36420	-7.47	19.3014	-21.49	0.98346	0.2720	8.38	63.347	7.1	40	756	1153.5	1552	1003	1659.1	****	1010	11	
12	12	Sro	574	19.40386	-8.11	19.3434	-21.40	0.98349	1.1222	13.02	63.002	8.1	50	755	1153.9	1553	1019	1741.8	010	1006	12	
13	13	Czw	575	19.44351	-8.34	19.3854	-21.30	0.98353	1.5937	16.60	62.465	1.0	59	754	1154.3	1555	1039	1827.2	120	1002	13	
14	14	Pią	576	19.48317	-8.56	19.4312	-21.19	0.98357	2.4944	20.18	61.760	2.0	69	753	1154.7	1557	1103	1915.9	231	958	14	
15	15	Sob	577	19.52282	-9.17	19.4731	-21.08	0.98362	3.4309	22.44	60.931	3.0	78	752	1155.0	1558	1135	2008.3	342	954	15	
16	16	Nie	578	19.56248	-9.38	19.5148	-20.57	0.98368	4.3944	24.03	60.035	4.0	86	751	1155.4	1600	1219	2104.0	450	950	16	
17	17	Pon	579	20.00214	-9.58	19.5605	-20.46	0.98374	5.3845	24.02	59.139	5.0	92	750	1155.7	1601	1317	2201.9	550	946	17	
18	18	Wto	580	20.04179	-10.18	20.0021	-20.34	0.98381	6.3856	22.33	58.319	6.0	97	749	1156.0	1603	1429	2300.5	639	942	18	
19	19	Sro	581	20.08145	-10.37	20.0436	-20.21	0.98389	7.3851	19.38	57.642	7.0	100	748	1156.4	1605	1551	2358.1	717	938	19	
20	20	Czw	582	20.12111	-10.55	20.0851	-20.09	0.98397	8.3723	15.25	57.164	0.6	100	747	1156.7	1607	1719	*****	746	934	20	
21	21	Pią	583	20.16076	-11.12	20.1304	-19.55	0.98405	9.3403	10.14	56.916	1.6	97	746	1156.9	1608	1847	053.8	809	930	21	
22	22	Sob	584	20.20042	-11.28	20.1717	-19.42	0.98415	10.2859	4.27	56.904	2.6	91	745	1157.2	1610	2014	147.5	829	926	22	
23	23	Nie	585	20.24007	-11.44	20.2130	-19.28	0.98425	11.2246	-1.34	57.107	3.6	83	743	1157.5	1612	2141	239.5	847	923	23	
24	24	Pon	586	20.27573	-11.59	20.2541	-19.14	0.98435	12.1613	-7.25	57.486	4.6	73	742	1157.7	1614	2307	330.8	905	919	24	
25	25	Wto	587	20.31538	-12.13	20.2952	-18.59	0.98446	13.1006	-12.46	57.991	5.6	62	741	1158.0	1616	****	422.3	925	915	25	
26	26	Sro	588	20.35504	-12.27	20.3402	-18.44	0.98458	14.0501	-17.20	58.573	6.6	51	739	1158.2	1618	031	514.8	948	911	26	
27	27	Czw	589	20.39469	-12.39	20.3811	-18.29	0.98470	15.0114	-20.52	59.188	0.9	40	738	1158.4	1619	153	608.6	1016	907	27	
28	28	Pią	590	20.43435	-12.51	20.4220	-18.13	0.98482	15.5828	-23.10	59.806	1.9	30	736	1158.6	1621	310	703.8	1053	903	28	
29	29	Sob	591	20.47400	-13.02	20.4627	-17.58	0.98495	16.5600	-24.09	60.406	2.9	20	735	1158.8	1623	418	759.5	1140	859	29	
30	30	Nie	592	20.51366	-13.13	20.5034	-17.41	0.98509	17.5249	-23.47	60.977	3.9	13	733	1159.0	1625	513	854.5	1238	855	30	
31	31	Pon	593	20.55332	-13.22	20.5440	-17.25	0.98522	18.4753	-22.11	61.516	4.9	7	732	1159.1	1627	556	947.8	1345	851	31	

Fazy Księżyca [Dm, h.mm]: Nów 4, 10.03 1kw 12, 12.31 Pełn 19, 22.21 3kw 26, 13.57

STYCZEŃ 2011 (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	5.51	17.48	6.15	14.27	3.56	13.11	8.39	16.11	11.03	22.41	0.30	11.49	10.60	22.45	10.08	19.51	7.10	15.43		
	18.774	-23.01	17.287	-20.27	15.502	-15.38	19.363	-23.11	23.827	-2.51	13.086	-4.33	23.834	-1.88	21.944	-13.04	18.382	-18.75	6.68689	1
3	5.51	17.50	6.12	14.20	3.59	13.09	8.36	16.11	10.55	22.35	0.22	11.41	10.52	22.38	10.00	19.43	7.02	15.35		
	18.921	-22.83	17.346	-20.57	15.632	-15.83	19.474	-22.90	23.843	-2.39	13.092	-4.35	23.837	-1.86	21.948	-13.02	18.387	-18.75	6.81831	3
5	5.51	17.52	6.12	14.16	4.02	13.06	8.33	16.12	10.48	22.29	0.15	11.34	10.44	22.30	9.52	19.36	6.55	15.27		
	19.067	-22.62	17.436	-20.91	15.766	-16.28	19.585	-22.66	23.861	-2.27	13.097	-4.37	23.840	-1.84	21.952	-13.00	18.392	-18.75	6.94974	5
7	5.51	17.54	6.14	14.12	4.05	13.03	8.30	16.12	10.40	22.23	0.07	11.26	10.36	22.23	9.45	19.28	6.47	15.20		
	19.213	-22.38	17.550	-21.29	15.902	-16.72	19.695	-22.41	23.878	-2.15	13.101	-4.39	23.843	-1.82	21.956	-12.98	18.397	-18.75	7.08116	7
9	5.50	17.57	6.17	14.09	4.08	13.01	8.27	16.13	10.33	22.17	23.56	11.18	10.29	22.15	9.37	19.21	6.40	15.12		
	19.359	-22.12	17.685	-21.67	16.040	-17.15	19.806	-22.15	23.897	-2.02	13.106	-4.41	23.847	-1.79	21.960	-12.96	18.402	-18.75	7.21258	9
11	5.49	17.59	6.20	14.08	4.11	12.59	8.24	16.14	10.25	22.11	23.48	11.11	10.21	22.08	9.29	19.13	6.32	15.05		
	19.504	-21.82	17.835	-22.02	16.181	-17.57	19.916	-21.86	23.916	-1.89	13.109	-4.42	23.850	-1.77	21.964	-12.94	18.407	-18.75	7.34400	11
13	5.48	18.02	6.25	14.08	4.15	12.57	8.20	16.14	10.18	22.05	23.41	11.03	10.13	21.60	9.21	19.06	6.25	14.57		
	19.648	-21.49	17.999	-22.35	16.324	-17.98	20.026	-21.56	23.935	-1.75	13.112	-4.43	23.854	-1.74	21.968	-12.92	18.412	-18.74	7.47542	13
15	5.47	18.04	6.29	14.08	4.18	12.55	8.17	16.15	10.10	21.59	23.33	10.55	10.05	21.53	9.14	18.58	6.17	14.50		
	19.792	-21.14	18.173	-22.63	16.469	-18.37	20.135	-21.25	23.955	-1.62	13.115	-4.44	23.858	-1.72	21.972	-12.89	18.417	-18.74	7.60684	15
17	5.46	18.07	6.34	14.10	4.21	12.54	8.13	16.16	10.03	21.53	23.25	10.47	9.57	21.45	9.06	18.51	6.09	14.42		
	19.935	-20.76	18.356	-22.85	16.616	-18.74	20.245	-20.92	23.976	-1.48	13.118	-4.44	23.862	-1.69	21.976	-12.87	18.422	-18.74	7.73826	17
19	5.45	18.10	6.39	14.12	4.25	12.53	8.09	16.17	9.56	21.47	23.18	10.40	9.50	21.38	8.58	18.43	6.02	14.34		
	20.077	-20.36	18.547	-23.01	16.765	-19.09	20.353	-20.57	23.997	-1.33	13.120	-4.44	23.866	-1.66	21.981	-12.85	18.426	-18.74	7.86968	19
21	5.43	18.13	6.43	14.15	4.28	12.52	8.06	16.19	9.48	21.41	23.10	10.32	9.42	21.30	8.51	18.36	5.54	14.27		
	20.218	-19.92	18.743	-23.10	16.916	-19.42	20.462	-20.21	0.018	-1.19	13.121	-4.44	23.871	-1.63	21.985	-12.82	18.431	-18.74	8.00111	21
23	5.41	18.16	6.48	14.19	4.31	12.51	8.02	16.20	9.41	21.36	23.02	10.24	9.34	21.23	8.43	18.28	5.47	14.19		
	20.358	-19.47	18.945	-23.12	17.068	-19.73	20.570	-19.83	0.040	-1.04	13.122	-4.44	23.875	-1.60	21.990	-12.80	18.436	-18.74	8.13252	23
25	5.39	18.19	6.52	14.24	4.35	12.50	7.58	16.21	9.34	21.30	22.54	10.16	9.26	21.15	8.35	18.21	5.39	14.12		
	20.498	-18.99	19.151	-23.06	17.223	-20.01	20.677	-19.44	0.063	-0.89	13.123	-4.43	23.880	-1.57	21.994	-12.78	18.440	-18.74	8.26394	25
27	5.37	18.22	6.55	14.30	4.38	12.50	7.53	16.22	9.26	21.24	22.46	10.09	9.19	21.08	8.27	18.14	5.31	14.04		
	20.636	-18.48	19.361	-22.92	17.379	-20.26	20.785	-19.03	0.085	-0.73	13.123	-4.42	23.885	-1.53	21.999	-12.75	18.445	-18.73	8.39536	27
29	5.35	18.25	6.59	14.36	4.41	12.50	7.49	16.23	9.19	21.19	22.38	10.01	9.11	21.01	8.20	18.06	5.24	13.57		
	20.774	-17.96	19.574	-22.69	17.537	-20.49	20.891	-18.61	0.109	-0.57	13.123	-4.41	23.890	-1.50	22.004	-12.73	18.449	-18.73	8.52678	29
31	5.32	18.28	7.01	14.44	4.44	12.50	7.45	16.25	9.12	21.13	22.30	9.53	9.03	20.53	8.12	17.59	5.16	13.49		
	20.911	-17.41	19.790	-22.38	17.696	-20.68	20.998	-18.17	0.132	-0.42	13.122	-4.40	23.895	-1.47	22.008	-12.70	18.454	-18.73	8.65820	31

LUTY 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2455																			
32	1	Wto	594	20.59297	-13.31	20.5846	-17.08	0.98536	19.4030	-19.31	62.018	5.9	3	730	1159.3	1629	629	1038.4	1456	847	1	
33	2	Śro	595	21.03263	-13.39	21.0250	-16.51	0.98551	20.3027	-15.60	62.479	6.9	0	729	1159.4	1631	653	1126.0	1608	843	2	
34	3	Czw	596	21.07228	-13.46	21.0654	-16.33	0.98565	21.1753	-11.51	62.888	0.4	0	727	1159.5	1633	713	1210.9	1720	839	3	
35	4	Pią	597	21.11194	-13.52	21.1056	-16.15	0.98580	22.0316	-7.16	63.230	1.4	2	725	1159.6	1635	729	1253.5	1830	835	4	
36	5	Sob	598	21.15159	-13.57	21.1458	-15.57	0.98595	22.4716	-2.29	63.484	2.4	5	723	1159.7	1637	744	1334.6	1939	831	5	
37	6	Nie	599	21.19125	-14.02	21.1859	-15.39	0.98611	23.3035	2.21	63.624	3.4	10	722	1159.8	1639	757	1415.1	2047	827	6	
38	7	Pon	600	21.23090	-14.06	21.2260	-15.20	0.98627	0.1401	7.05	63.624	4.4	16	720	1159.8	1641	811	1455.8	2155	824	7	
39	8	Wto	601	21.27056	-14.09	21.2659	-15.01	0.98643	0.5820	11.34	63.463	5.4	24	718	1159.9	1643	826	1537.5	2304	820	8	
40	9	Śro	602	21.31021	-14.11	21.3058	-14.42	0.98659	1.4418	15.37	63.123	6.4	32	716	1159.9	1645	844	1621.2	****	816	9	
41	10	Czw	603	21.34587	-14.12	21.3456	-14.23	0.98676	2.3234	19.06	62.600	7.4	42	714	1160.0	1647	906	1707.5	014	812	10	
42	11	Pią	604	21.38553	-14.13	21.3853	-14.03	0.98693	3.2338	21.48	61.904	0.2	52	712	1160.0	1648	934	1756.9	124	808	11	
43	12	Sob	605	21.42518	-14.13	21.4250	-13.44	0.98711	4.1737	23.32	61.059	1.2	61	710	1160.0	1650	1011	1849.6	231	804	12	
44	13	Nie	606	21.46484	-14.12	21.4645	-13.24	0.98729	5.1415	24.04	60.111	2.2	71	708	1159.9	1652	1100	1944.9	333	800	13	
45	14	Pon	607	21.50449	-14.10	21.5040	-13.03	0.98748	6.1242	23.16	59.120	3.2	80	706	1159.9	1654	1204	2042.0	426	756	14	
46	15	Wto	608	21.54415	-14.07	21.5434	-12.43	0.98767	7.1155	21.02	58.162	4.2	88	704	1159.9	1656	1319	2139.5	509	752	15	
47	16	Śro	609	21.58381	-14.04	21.5827	-12.22	0.98786	8.1048	17.27	57.319	5.2	95	702	1159.8	1658	1444	2236.2	543	748	16	
48	17	Czw	610	22.02346	-14.00	22.0220	-12.01	0.98806	9.0840	12.41	56.670	6.2	99	700	1159.8	1700	1612	2331.6	609	744	17	
49	18	Pią	611	22.06312	-13.56	22.0612	-11.40	0.98827	10.0519	7.04	56.276	0.1	100	658	1159.7	1702	1742	*****	631	740	18	
50	19	Sob	612	22.10277	-13.50	22.1003	-11.19	0.98848	11.0104	0.59	56.172	1.1	98	656	1159.6	1704	1912	025.8	651	736	19	
51	20	Nie	613	22.14243	-13.44	22.1354	-10.57	0.98869	11.5629	-5.08	56.358	2.1	93	654	1159.5	1706	2041	119.2	710	732	20	
52	21	Pon	614	22.18208	-13.38	22.1744	-10.36	0.98891	12.5213	-10.53	56.802	3.1	86	652	1159.4	1708	2209	212.7	729	728	21	
53	22	Wto	615	22.22174	-13.30	22.2133	-10.14	0.98914	13.4847	-15.53	57.448	4.1	77	650	1159.3	1710	2336	307.0	752	725	22	
54	23	Śro	616	22.26139	-13.23	22.2521	-9.52	0.98937	14.4620	-19.50	58.225	5.1	67	647	1159.1	1712	****	402.3	819	721	23	
55	24	Czw	617	22.30105	-13.14	22.2910	-9.30	0.98960	15.4435	-22.31	59.064	6.1	56	645	1159.0	1714	057	458.5	854	717	24	
56	25	Pią	618	22.34070	-13.05	22.3257	-9.08	0.98983	16.4249	-23.50	59.904	0.5	45	643	1158.8	1716	209	555.1	939	713	25	
57	26	Sob	619	22.38036	-12.55	22.3644	-8.46	0.99007	17.4003	-23.48	60.699	1.5	35	641	1158.7	1717	309	650.7	1034	709	26	
58	27	Nie	620	22.42001	-12.45	22.4030	-8.23	0.99031	18.3522	-22.30	61.417	2.5	25	639	1158.5	1719	356	744.5	1138	705	27	
59	28	Pon	621	22.45567	-12.35	22.4416	-8.00	0.99055	19.2809	-20.07	62.043	3.5	17	636	1158.3	1721	431	835.5	1247	701	28	

Fazy Księżyca [Dm, h.mm]: Nów 3, 3.31 1kw 11, 8.18 Pełn 18, 9.35 3kw 25, 0.26

LUTY 2011 (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 (0^h UT) Dm
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	
1	5.31	18.30	7.03	14.48	4.45	12.51	7.43	16.25	9.08	21.10	22.26	9.49	8.59	20.49	8.08	17.55	5.12	13.45	
	20.979	-17.13	19.899	-22.19	17.776	-20.77	21.051	-17.95	0.144	-0.33	13.122	-4.39	23.898	-1.45	22.011	-12.69	18.456	-18.73	8.72391 1
3	5.28	18.33	7.05	14.56	4.48	12.51	7.38	16.27	9.01	21.05	22.18	9.41	8.52	20.42	8.00	17.47	5.05	13.38	
	21.115	-16.55	20.117	-21.75	17.936	-20.91	21.156	-17.50	0.168	-0.17	13.120	-4.37	23.903	-1.41	22.015	-12.66	18.460	-18.73	8.85534 3
5	5.25	18.36	7.06	15.05	4.51	12.53	7.34	16.28	8.54	20.59	22.10	9.33	8.44	20.35	7.53	17.40	4.57	13.30	
	21.250	-15.95	20.338	-21.22	18.098	-21.02	21.261	-17.03	0.193	-0.01	13.118	-4.35	23.909	-1.37	22.020	-12.64	18.464	-18.72	8.98675 5
7	5.22	18.40	7.07	15.15	4.53	12.54	7.29	16.30	8.46	20.54	22.02	9.25	8.36	20.27	7.45	17.33	4.49	13.22	
	21.383	-15.34	20.559	-20.60	18.261	-21.09	21.366	-16.55	0.218	0.16	13.116	-4.33	23.914	-1.34	22.025	-12.61	18.468	-18.72	9.11817 7
9	5.19	18.43	7.08	15.25	4.55	12.56	7.24	16.31	8.39	20.48	21.54	9.18	8.28	20.20	7.37	17.25	4.42	13.15	
	21.516	-14.71	20.782	-19.88	18.425	-21.13	21.470	-16.07	0.243	0.33	13.114	-4.30	23.920	-1.30	22.030	-12.59	18.472	-18.72	9.24959 9
11	5.15	18.46	7.08	15.36	4.57	12.57	7.20	16.32	8.32	20.43	21.46	9.10	8.21	20.13	7.29	17.18	4.34	13.07	
	21.648	-14.06	21.007	-19.08	18.589	-21.14	21.574	-15.57	0.268	0.50	13.110	-4.27	23.926	-1.26	22.035	-12.56	18.476	-18.71	9.38101 11
13	5.12	18.50	7.08	15.48	4.59	12.60	7.15	16.34	8.25	20.37	21.37	9.02	8.13	20.06	7.22	17.10	4.27	12.60	
	21.779	-13.39	21.232	-18.18	18.754	-21.10	21.677	-15.05	0.294	0.67	13.107	-4.24	23.932	-1.22	22.040	-12.53	18.480	-18.71	9.51243 13
15	5.08	18.53	7.07	15.60	5.01	13.02	7.10	16.35	8.17	20.32	21.29	8.54	8.05	19.58	7.14	17.03	4.19	12.52	
	21.909	-12.71	21.458	-17.18	18.919	-21.03	21.780	-14.53	0.321	0.85	13.103	-4.21	23.938	-1.18	22.045	-12.51	18.483	-18.71	9.64385 15
17	5.05	18.57	7.06	16.12	5.02	13.05	7.05	16.37	8.10	20.27	21.21	8.46	7.58	19.51	7.06	16.56	4.11	12.44	
	22.039	-12.02	21.685	-16.10	19.085	-20.92	21.882	-14.00	0.347	1.02	13.099	-4.17	23.944	-1.14	22.049	-12.48	18.487	-18.71	9.77527 17
19	5.01	19.01	7.05	16.25	5.03	13.08	7.00	16.38	8.03	20.21	21.12	8.38	7.50	19.44	6.59	16.48	4.04	12.37	
	22.168	-11.32	21.913	-14.92	19.250	-20.77	21.984	-13.46	0.374	1.20	13.094	-4.13	23.951	-1.10	22.054	-12.46	18.490	-18.70	9.90669 19
21	4.57	19.04	7.03	16.39	5.04	13.12	6.55	16.39	7.56	20.16	21.04	8.30	7.42	19.36	6.51	16.41	3.56	12.29	
	22.295	-10.60	22.142	-13.65	19.416	-20.58	22.086	-12.91	0.401	1.38	13.089	-4.09	23.957	-1.05	22.059	-12.43	18.494	-18.70	10.03810 21
23	4.53	19.08	7.01	16.52	5.04	13.15	6.50	16.41	7.49	20.11	20.56	8.22	7.34	19.29	6.43	16.33	3.48	12.21	
	22.423	-9.87	22.371	-12.28	19.582	-20.36	22.186	-12.35	0.428	1.56	13.084	-4.05	23.963	-1.01	22.064	-12.40	18.497	-18.70	10.16952 23
25	4.48	19.11	6.58	17.07	5.04	13.19	6.45	16.42	7.41	20.05	20.47	8.14	7.27	19.22	6.35	16.26	3.40	12.14	
	22.549	-9.13	22.601	-10.83	19.748	-20.10	22.287	-11.79	0.455	1.74	13.078	-4.01	23.970	-0.97	22.069	-12.38	18.500	-18.69	10.30094 25
27	4.44	19.15	6.56	17.21	5.04	13.23	6.40	16.44	7.34	20.00	20.39	8.06	7.19	19.15	6.28	16.18	3.33	12.06	
	22.675	-8.38	22.832	-9.29	19.914	-19.79	22.387	-11.22	0.483	1.92	13.072	-3.96	23.976	-0.93	22.074	-12.35	18.503	-18.69	10.43236 27

MARZEC 2011

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]								
..... Dzień				ST	Δα	α _☉	δ _☉	R _☉	α _☾	δ _☾	R _☾	Faza ☾	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ _☉	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2455																			
60	1	Wto	622	22.49533	-12.23	22.4802	-7.38	0.99080	20.1815	-16.51	62.569	4.5	10	634	1158.1	1723	458	923.5	1358	657	1	
61	2	Śro	623	22.53498	-12.12	22.5146	-7.15	0.99105	21.0551	-12.55	62.996	5.5	5	632	1157.9	1725	519	1008.8	1509	653	2	
62	3	Czw	624	22.57464	-11.59	22.5531	-6.52	0.99129	21.5126	-8.31	63.327	6.5	2	629	1157.7	1727	536	1051.8	1619	649	3	
63	4	Pią	625	23.01429	-11.47	22.5915	-6.29	0.99154	22.3536	-3.49	63.564	7.5	0	627	1157.5	1729	551	1133.1	1728	645	4	
64	5	Sob	626	23.05395	-11.34	23.0258	-6.06	0.99179	23.1903	0.58	63.705	0.6	0	625	1157.3	1731	605	1213.9	1836	641	5	
65	6	Nie	627	23.09360	-11.20	23.0641	-5.42	0.99204	0.0228	5.43	63.745	1.6	2	623	1157.1	1733	620	1254.4	1944	637	6	
66	7	Pon	628	23.13326	-11.06	23.1024	-5.19	0.99230	0.4635	10.14	63.672	2.6	6	620	1156.8	1734	634	1335.8	2052	633	7	
67	8	Wto	629	23.17291	-10.52	23.1406	-4.56	0.99255	1.3201	14.23	63.474	3.6	11	618	1156.6	1736	651	1418.7	2201	630	8	
68	9	Śro	630	23.21256	-10.37	23.1748	-4.32	0.99281	2.1922	17.60	63.136	4.6	18	616	1156.4	1738	712	1503.7	2310	626	9	
69	10	Czw	631	23.25222	-10.22	23.2129	-4.09	0.99306	3.0901	20.53	62.650	5.6	26	613	1156.1	1740	737	1551.3	****	622	10	
70	11	Pią	632	23.29188	-10.06	23.2510	-3.45	0.99332	4.0108	22.52	62.014	6.6	35	611	1155.9	1742	810	1641.6	018	618	11	
71	12	Sob	633	23.33153	-9.51	23.2851	-3.22	0.99358	4.5533	23.47	61.238	7.6	45	608	1155.6	1744	853	1734.3	120	614	12	
72	13	Nie	634	23.37119	-9.34	23.3231	-2.58	0.99384	5.5142	23.28	60.347	0.5	55	606	1155.3	1746	949	1828.8	216	610	13	
73	14	Pon	635	23.41084	-9.18	23.3611	-2.34	0.99410	6.4848	21.51	59.385	1.5	65	604	1155.0	1747	1057	1924.2	301	606	14	
74	15	Wto	636	23.45050	-9.01	23.3951	-2.11	0.99437	7.4602	18.56	58.410	2.5	75	601	1154.8	1749	1214	2019.4	338	602	15	
75	16	Śro	637	23.49015	-8.44	23.4331	-1.47	0.99464	8.4252	14.48	57.498	3.5	85	559	1154.5	1751	1338	2114.1	407	558	16	
76	17	Czw	638	23.52581	-8.27	23.4710	-1.23	0.99491	9.3904	9.40	56.731	4.5	92	557	1154.2	1753	1505	2208.1	431	554	17	
77	18	Pią	639	23.56546	-8.10	23.5049	-0.60	0.99518	10.3452	3.51	56.186	5.5	97	554	1153.9	1755	1635	2301.8	452	550	18	
78	19	Sob	640	24.00512	-7.52	23.5428	-0.36	0.99546	11.3046	-2.16	55.925	6.5	100	552	1153.6	1756	1805	2356.0	511	546	19	
79	20	Nie	641	0.04477	-7.34	23.5807	-0.12	0.99574	12.2722	-8.17	55.975	0.7	99	549	1153.3	1758	1935	*****	531	542	20	
80	21	Pon	642	0.08443	-7.17	0.0146	0.11	0.99602	13.2510	-13.45	56.332	1.7	96	547	1153.0	1800	2106	051.3	553	538	21	
81	22	Wto	643	0.12408	-6.59	0.0525	0.35	0.99630	14.2421	-18.15	56.953	2.7	89	545	1152.7	1802	2233	148.1	619	534	22	
82	23	Śro	644	0.16374	-6.41	0.0903	0.59	0.99659	15.2433	-21.30	57.771	3.7	81	542	1152.4	1804	2352	246.3	652	531	23	
83	24	Czw	645	0.20339	-6.23	0.1242	1.22	0.99688	16.2452	-23.19	58.706	4.7	71	540	1152.1	1806	****	345.0	734	527	24	
84	25	Pią	646	0.24305	-6.04	0.1620	1.46	0.99717	17.2406	-23.41	59.679	5.7	61	537	1151.8	1807	059	443.1	827	523	25	
85	26	Sob	647	0.28271	-5.46	0.1958	2.10	0.99746	18.2108	-22.41	60.619	6.7	50	535	1151.5	1809	151	539.0	930	519	26	
86	27	Nie	648	0.32236	-5.28	0.2337	2.33	0.99775	19.1516	-20.33	61.473	1.0	40	533	1151.2	1811	231	631.8	1038	515	27	
86	27	Nie	648	23.32137	-5.29	0.2328	2.32	0.99774	19.1304	-20.40	61.440	0.9	41	633	1251.2	1911	331	731.8	1138	615	27	
87	28	Pon	649	23.36103	-5.11	0.2706	2.56	0.99803	20.0413	-17.38	62.178	1.9	31	630	1250.9	1913	401	821.1	1249	611	28	
88	29	Wto	650	23.40069	-4.53	0.3045	3.19	0.99832	20.5231	-13.54	62.775	2.9	23	628	1250.6	1915	424	907.3	1400	607	29	
89	30	Śro	651	23.44034	-4.35	0.3423	3.42	0.99861	21.3829	-9.40	63.225	3.9	15	625	1250.3	1916	443	950.8	1510	603	30	
90	31	Czw	652	23.47600	-4.17	0.3802	4.06	0.99890	22.2251	-5.06	63.532	4.9	9	623	1250.0	1918	459	1032.5	1619	559	31	

Fazy Księżyca [Dm, h.mm]: Nów 4, 21.46 1kw 13, 0.45 Pełn 19, 19.10 3kw 26, 13.07 3kw 26, 14.07

MARZEC 2011 (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)	Dm		
1	4.40	19.19	6.53	17.36	5.04	13.27	6.35	16.45	7.27	19.55	20.30	7.58	7.11	19.08	6.20	16.11	3.25	11.58				
	22.800	-7.63	23.064	-7.67	20.079	-19.45	22.487	-10.64	0.511	2.10	13.065	-3.92	23.983	-0.88	22.078	-12.33	18.506	-18.69	10.56378	1		
3	4.35	19.23	6.50	17.51	5.04	13.32	6.29	16.46	7.20	19.50	20.22	7.50	7.04	19.00	6.12	16.04	3.17	11.51				
	22.925	-6.86	23.295	-5.98	20.244	-19.08	22.586	-10.05	0.539	2.28	13.058	-3.87	23.990	-0.84	22.083	-12.30	18.509	-18.68	10.69520	3		
5	4.30	19.27	6.46	18.07	5.03	13.37	6.24	16.48	7.13	19.45	20.13	7.42	6.56	18.53	6.04	15.56	3.10	11.43				
	23.049	-6.09	23.525	-4.23	20.409	-18.67	22.685	-9.46	0.567	2.47	13.051	-3.82	23.997	-0.79	22.088	-12.28	18.511	-18.68	10.82662	5		
7	4.25	19.31	6.42	18.22	5.02	13.41	6.19	16.49	7.06	19.39	20.05	7.34	6.48	18.46	5.57	15.49	3.02	11.35				
	23.173	-5.32	23.754	-2.42	20.572	-18.22	22.784	-8.86	0.596	2.65	13.044	-3.76	0.003	-0.75	22.093	-12.25	18.514	-18.68	10.95803	7		
9	4.21	19.35	6.38	18.37	5.01	13.46	6.14	16.51	6.58	19.34	19.56	7.26	6.41	18.39	5.49	15.41	2.54	11.28				
	23.297	-4.54	23.979	-0.59	20.736	-17.74	22.882	-8.25	0.624	2.84	13.036	-3.71	0.010	-0.70	22.097	-12.23	18.516	-18.68	11.08945	9		
11	4.16	19.39	6.34	18.52	4.59	13.52	6.08	16.52	6.51	19.29	19.47	7.18	6.33	18.31	5.41	15.34	2.46	11.20				
	23.419	-3.76	0.198	1.24	20.898	-17.22	22.980	-7.64	0.653	3.03	13.028	-3.65	0.017	-0.66	22.102	-12.20	18.518	-18.67	11.22087	11		
13	4.11	19.43	6.29	19.07	4.58	13.57	6.03	16.53	6.44	19.24	19.39	7.10	6.25	18.24	5.34	15.26	2.39	11.12				
	23.542	-2.97	0.410	3.05	21.060	-16.67	23.077	-7.03	0.682	3.21	13.020	-3.60	0.024	-0.61	22.107	-12.18	18.520	-18.67	11.35229	13		
15	4.05	19.47	6.23	19.20	4.56	14.02	5.57	16.54	6.37	19.19	19.30	7.02	6.17	18.17	5.26	15.19	2.31	11.04				
	23.664	-2.18	0.610	4.79	21.221	-16.09	23.174	-6.42	0.711	3.40	13.012	-3.54	0.031	-0.57	22.111	-12.15	18.522	-18.67	11.48371	15		
17	4.00	19.51	6.18	19.32	4.54	14.08	5.52	16.56	6.30	19.14	19.21	6.54	6.10	18.10	5.18	15.11	2.23	10.57				
	23.786	-1.39	0.795	6.43	21.381	-15.48	23.271	-5.80	0.740	3.59	13.003	-3.48	0.038	-0.52	22.116	-12.13	18.524	-18.66	11.61513	17		
19	3.55	19.55	6.12	19.43	4.52	14.13	5.47	16.57	6.23	19.09	19.13	6.46	6.02	18.03	5.10	15.04	2.15	10.49				
	23.908	-0.60	0.962	7.94	21.540	-14.84	23.368	-5.17	0.769	3.78	12.994	-3.42	0.045	-0.48	22.120	-12.10	18.525	-18.66	11.74654	19		
21	3.49	19.59	6.05	19.51	4.49	14.19	5.41	16.58	6.16	19.04	19.04	6.38	5.54	17.55	5.03	14.57	2.07	10.41				
	0.029	0.19	1.107	9.27	21.698	-14.18	23.464	-4.55	0.799	3.96	12.985	-3.36	0.052	-0.43	22.124	-12.08	18.527	-18.66	11.87796	21		
23	3.44	20.04	5.58	19.57	4.47	14.24	5.36	16.60	6.09	18.58	18.55	6.30	5.47	17.48	4.55	14.49	1.60	10.33				
	0.151	0.98	1.226	10.41	21.856	-13.48	23.560	-3.92	0.828	4.15	12.976	-3.30	0.059	-0.38	22.129	-12.06	18.528	-18.66	12.00938	23		
25	3.38	20.08	5.50	19.60	4.44	14.30	5.30	17.01	6.01	18.53	18.46	6.21	5.39	17.41	4.47	14.42	1.52	10.26				
	0.272	1.77	1.319	11.32	22.013	-12.76	23.656	-3.29	0.858	4.34	12.967	-3.24	0.066	-0.34	22.133	-12.04	18.529	-18.65	12.14080	25		
27	3.32	20.13	5.42	19.59	4.41	14.36	5.25	17.02	5.54	18.48	18.38	6.13	5.31	17.34	4.39	14.34	1.44	10.18				
	0.394	2.55	1.382	11.98	22.168	-12.02	23.752	-2.66	0.888	4.53	12.958	-3.18	0.073	-0.29	22.137	-12.01	18.530	-18.65	12.27222	27		
27	4.32	21.13	6.42	20.59	5.41	15.36	6.25	18.02	6.54	19.48	19.38	7.13	6.31	18.34	5.39	15.34	2.44	11.18				
	0.391	2.54	1.381	11.97	22.165	-12.03	23.750	-2.68	0.887	4.52	12.958	-3.18	0.073	-0.29	22.137	-12.01	18.530	-18.65	12.27222	27		
29	4.27	21.18	6.34	20.56	5.38	15.41	6.19	18.03	6.47	19.43	19.29	7.05	6.24	18.27	5.32	15.27	2.36	11.10				
	0.512	3.32	1.415	12.38	22.320	-11.27	23.845	-2.04	0.917	4.71	12.949	-3.12	0.080	-0.25	22.141	-11.99	18.531	-18.65	12.40364	29		
31	4.21	21.22	6.26	20.49	5.35	15.47	6.14	18.04	6.40	19.38	19.20	6.57	6.16	18.19	5.24	15.19	2.28	11.02				
	0.634	4.10	1.419	12.51	22.475	-10.48	23.940	-1.41	0.947	4.90	12.939	-3.06	0.087	-0.20	22.145	-11.97	18.532	-18.65	12.53506	31		

KWIECIEŃ 2011

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2455																		
91	1	Pią	653	23.51565	-3.59	0.4141	4.29	0.99919	23.0621	-0.23	63.705	5.9	4	621	1249.7	1920	513	1113.2	1726	555	1
92	2	Sob	654	23.55531	-3.41	0.4519	4.52	0.99948	23.4943	4.20	63.757	6.9	1	618	1249.4	1922	527	1153.7	1834	551	2
93	3	Nie	655	23.59496	-3.24	0.4858	5.15	0.99977	0.3340	8.54	63.700	7.9	0	616	1249.1	1924	542	1234.9	1942	547	3
94	4	Pon	656	0.03462	-3.06	0.5238	5.38	1.00006	1.1851	13.08	63.540	0.8	1	614	1248.9	1925	559	1317.4	2051	543	4
95	5	Wto	657	0.07427	-2.49	0.5617	6.01	1.00034	2.0549	16.54	63.281	1.8	3	611	1248.6	1927	618	1401.9	2200	539	5
96	6	Śro	658	0.11393	-2.32	0.5956	6.24	1.00063	2.5455	19.58	62.924	2.8	7	609	1248.3	1929	642	1448.7	2308	535	6
97	7	Czw	659	0.15358	-2.15	1.0336	6.46	1.00091	3.4615	22.12	62.465	3.8	13	606	1248.0	1931	713	1538.1	****	532	7
98	8	Pią	660	0.19324	-1.58	1.0716	7.09	1.00119	4.3937	23.24	61.901	4.8	20	604	1247.7	1933	753	1629.6	012	528	8
99	9	Sob	661	0.23289	-1.42	1.1056	7.31	1.00147	5.3428	23.26	61.236	5.8	29	602	1247.4	1934	843	1722.6	109	524	9
100	10	Nie	662	0.27255	-1.25	1.1436	7.54	1.00175	6.3003	22.15	60.479	6.8	39	559	1247.2	1936	946	1816.2	157	520	10
101	11	Pon	663	0.31221	-1.09	1.1817	8.16	1.00203	7.2538	19.51	59.653	7.8	49	557	1246.9	1938	1057	1909.6	236	516	11
102	12	Wto	664	0.35186	-0.54	1.2157	8.38	1.00231	8.2043	16.18	58.795	0.9	60	555	1246.6	1940	1216	2002.5	306	512	12
103	13	Śro	665	0.39152	-0.38	1.2539	8.60	1.00258	9.1512	11.44	57.958	1.9	71	552	1246.4	1941	1338	2054.7	332	508	13
104	14	Czw	666	0.43117	-0.23	1.2920	9.21	1.00286	10.0920	6.24	57.207	2.9	81	550	1246.1	1943	1503	2146.7	353	504	14
105	15	Pią	667	0.47083	-0.08	1.3302	9.43	1.00314	11.0340	0.35	56.614	3.9	89	548	1245.9	1945	1630	2239.2	412	500	15
106	16	Sob	668	0.51048	0.06	1.3644	10.04	1.00342	11.5856	-5.23	56.245	4.9	96	546	1245.6	1947	1759	2333.1	432	456	16
107	17	Nie	669	0.55014	0.20	1.4026	10.25	1.00369	12.5549	-11.04	56.148	5.9	99	543	1245.4	1949	1929	*****	453	452	17
108	18	Pon	670	0.58579	0.34	1.4409	10.46	1.00397	13.5443	-16.04	56.345	0.3	100	541	1245.2	1950	2059	029.2	517	448	18
109	19	Wto	671	1.02545	0.48	1.4752	11.07	1.00425	14.5532	-19.58	56.823	1.3	97	539	1245.0	1952	2224	127.5	547	444	19
110	20	Śro	672	1.06510	1.00	1.5136	11.28	1.00453	15.5728	-22.29	57.538	2.3	92	537	1244.7	1954	2339	227.6	625	440	20
111	21	Czw	673	1.10476	1.13	1.5520	11.49	1.00481	16.5908	-23.29	58.420	3.3	85	534	1244.5	1956	****	328.0	715	437	21
112	22	Pią	674	1.14441	1.25	1.5904	12.09	1.00509	17.5858	-22.59	59.391	4.3	77	532	1244.3	1958	040	427.0	816	433	22
113	23	Sob	675	1.18407	1.37	2.0249	12.29	1.00536	18.5548	-21.12	60.371	5.3	67	530	1244.1	1959	127	522.9	924	429	23
114	24	Nie	676	1.22373	1.48	2.0635	12.49	1.00564	19.4906	-18.23	61.290	6.3	57	528	1244.0	2001	201	615.0	1037	425	24
115	25	Pon	677	1.26338	1.58	2.1021	13.09	1.00591	20.3901	-14.47	62.093	0.3	47	526	1243.8	2003	227	703.3	1149	421	25
116	26	Wto	678	1.30304	2.09	2.1407	13.28	1.00619	21.2604	-10.38	62.744	1.3	37	524	1243.6	2005	247	748.3	1300	417	26
117	27	Śro	679	1.34269	2.18	2.1754	13.47	1.00646	22.1103	-6.09	63.222	2.3	28	522	1243.4	2006	305	830.8	1409	413	27
118	28	Czw	680	1.38235	2.27	2.2141	14.06	1.00673	22.5447	-1.29	63.522	3.3	20	520	1243.3	2008	320	911.8	1517	409	28
119	29	Pią	681	1.42200	2.36	2.2529	14.25	1.00699	23.3808	3.13	63.653	4.3	13	517	1243.1	2010	334	952.4	1624	405	29
120	30	Sob	682	1.46166	2.44	2.2918	14.44	1.00725	0.2154	7.48	63.629	5.3	7	515	1243.0	2012	349	1033.3	1732	401	30

Fazy Księżyca [Dm, h.mm]: Nów 3, 16.32 1kw 11, 14.05 Pełn 18, 4.44 3kw 25, 4.47

KWIECIEŃ 2011 (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	4.18	21.25	6.21	20.44	5.34	15.50	6.11	18.05	6.37	19.36	19.16	6.53	6.12	18.16	5.20	15.15	2.24	10.58		
	0.695	4.48	1.411	12.48	22.552	-10.08	23.988	-1.10	0.961	4.99	12.934	-3.03	0.090	-0.18	22.147	-11.96	18.532	-18.65	12.60076	1
3	4.12	21.30	6.13	20.33	5.30	15.56	6.05	18.06	6.30	19.30	19.07	6.45	6.04	18.09	5.12	15.08	2.17	10.50		
	0.816	5.25	1.375	12.22	22.705	-9.26	0.083	-0.47	0.991	5.18	12.925	-2.97	0.097	-0.14	22.151	-11.94	18.533	-18.64	12.73218	3
5	4.05	21.35	6.05	20.19	5.27	16.02	5.60	18.07	6.22	19.25	18.58	6.37	5.57	18.01	5.04	15.00	2.09	10.43		
	0.938	6.02	1.317	11.71	22.857	-8.43	0.178	0.16	1.021	5.36	12.915	-2.91	0.104	-0.09	22.154	-11.92	18.533	-18.64	12.86360	5
7	3.59	21.40	5.57	20.02	5.23	16.08	5.54	18.08	6.15	19.20	18.50	6.29	5.49	17.54	4.57	14.53	2.01	10.35		
	1.060	6.77	1.244	10.98	23.009	-7.57	0.273	0.79	1.051	5.55	12.906	-2.85	0.111	-0.05	22.158	-11.90	18.533	-18.64	12.99501	7
9	3.53	21.45	5.49	19.44	5.20	16.14	5.49	18.09	6.08	19.15	18.41	6.21	5.41	17.47	4.49	14.45	1.53	10.27		
	1.182	7.52	1.161	10.08	23.160	-6.71	0.367	1.42	1.081	5.74	12.896	-2.79	0.118	-0.01	22.162	-11.88	18.533	-18.64	13.12644	9
11	3.46	21.51	5.42	19.26	5.16	16.20	5.43	18.11	6.01	19.10	18.32	6.13	5.34	17.40	4.41	14.38	1.45	10.19		
	1.305	8.26	1.077	9.08	23.311	-5.83	0.462	2.04	1.111	5.92	12.887	-2.73	0.124	0.04	22.165	-11.86	18.533	-18.64	13.25786	11
13	3.40	21.56	5.35	19.07	5.13	16.26	5.38	18.12	5.54	19.05	18.23	6.04	5.26	17.32	4.33	14.30	1.37	10.11		
	1.427	8.99	0.997	8.03	23.461	-4.94	0.556	2.67	1.141	6.10	12.877	-2.67	0.131	0.08	22.168	-11.85	18.533	-18.64	13.38928	13
15	3.33	22.02	5.28	18.49	5.09	16.32	5.32	18.13	5.47	19.00	18.15	5.56	5.18	17.25	4.26	14.22	1.29	10.03		
	1.550	9.71	0.927	7.01	23.611	-4.04	0.651	3.29	1.171	6.29	12.868	-2.61	0.138	0.12	22.172	-11.83	18.533	-18.64	13.52069	15
17	3.26	22.08	5.22	18.33	5.05	16.37	5.27	18.14	5.40	18.55	18.06	5.48	5.11	17.18	4.18	14.15	1.21	9.55		
	1.674	10.42	0.872	6.06	23.761	-3.13	0.745	3.90	1.201	6.47	12.859	-2.56	0.144	0.17	22.175	-11.81	18.532	-18.64	13.65211	17
19	3.19	22.14	5.17	18.18	5.01	16.43	5.21	18.15	5.33	18.50	17.57	5.40	5.03	17.11	4.10	14.07	1.14	9.48		
	1.798	11.12	0.834	5.24	23.910	-2.21	0.840	4.52	1.231	6.65	12.850	-2.50	0.151	0.21	22.178	-11.80	18.531	-18.63	13.78352	19
21	3.12	22.21	5.12	18.06	4.57	16.49	5.16	18.16	5.26	18.45	17.48	5.32	4.55	17.03	4.02	13.60	1.06	9.40		
	1.922	11.81	0.817	4.56	0.059	-1.28	0.934	5.12	1.260	6.83	12.841	-2.45	0.157	0.25	22.181	-11.78	18.531	-18.63	13.91494	21
23	3.05	22.27	5.07	17.55	4.54	16.55	5.10	18.17	5.19	18.40	17.40	5.24	4.47	16.56	3.55	13.52	0.58	9.32		
	2.047	12.48	0.819	4.05	0.208	-0.36	1.029	5.73	1.290	7.01	12.832	-2.40	0.163	0.29	22.184	-11.77	18.530	-18.63	14.04637	23
25	2.57	22.34	5.02	17.47	4.50	17.01	5.05	18.18	5.12	18.35	17.31	5.16	4.40	16.49	3.47	13.44	0.50	9.24		
	2.172	13.14	0.840	3.72	0.357	0.58	1.123	6.33	1.320	7.19	12.823	-2.35	0.169	0.33	22.186	-11.75	18.529	-18.63	14.17779	25
27	2.50	22.41	4.57	17.41	4.46	17.07	4.59	18.19	5.05	18.29	17.23	5.08	4.32	16.42	3.39	13.37	0.42	9.16		
	2.298	13.79	0.881	3.56	0.506	1.51	1.218	6.92	1.349	7.36	12.815	-2.30	0.176	0.37	22.189	-11.74	18.527	-18.63	14.30921	27
29	2.42	22.49	4.53	17.36	4.42	17.13	4.54	18.20	4.58	18.24	17.14	4.60	4.24	16.34	3.31	13.29	0.34	9.08		
	2.425	14.42	0.938	3.57	0.655	2.44	1.312	7.51	1.379	7.54	12.807	-2.25	0.182	0.41	22.191	-11.73	18.526	-18.63	14.44062	29

MAJ 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2455																			
121	1	Nie	683	1.50131	2.52	2.3307	15.02	1.00751	1.0650	12.06	63.474	6.3	3	513	1242.9	2014	405	1115.4	1841	357	1	
122	2	Pon	684	1.54097	2.59	2.3656	15.20	1.00777	1.5331	15.59	63.211	7.3	1	511	1242.8	2015	424	1159.4	1950	353	2	
123	3	Wto	685	1.58062	3.05	2.4046	15.38	1.00802	2.4224	19.13	62.859	0.1	0	509	1242.7	2017	447	1245.8	2059	349	3	
124	4	Śro	686	2.02028	3.11	2.4437	15.55	1.00827	3.3338	21.39	62.437	1.1	1	508	1242.6	2019	515	1334.8	2204	345	4	
125	5	Czw	687	2.05593	3.16	2.4828	16.13	1.00851	4.2658	23.05	61.958	2.1	4	506	1242.5	2021	553	1426.1	2304	341	5	
126	6	Pią	688	2.09559	3.21	2.5220	16.30	1.00875	5.2147	23.23	61.428	3.1	9	504	1242.4	2022	641	1519.0	2355	338	6	
127	7	Sob	689	2.13525	3.25	2.5612	16.46	1.00899	6.1715	22.28	60.853	4.1	16	502	1242.3	2024	740	1612.5	****	334	7	
128	8	Nie	690	2.17490	3.29	3.0005	17.03	1.00922	7.1229	20.20	60.239	5.1	25	500	1242.3	2026	848	1705.5	036	330	8	
129	9	Pon	691	2.21456	3.32	3.0359	17.19	1.00945	8.0653	17.05	59.596	6.1	34	458	1242.2	2027	1004	1757.5	109	326	9	
130	10	Wto	692	2.25421	3.35	3.0753	17.35	1.00968	9.0016	12.52	58.939	7.1	45	456	1242.2	2029	1123	1848.5	135	322	10	
131	11	Śro	693	2.29387	3.37	3.1147	17.51	1.00991	9.5254	7.54	58.299	0.6	56	455	1242.1	2031	1244	1938.7	157	318	11	
132	12	Czw	694	2.33352	3.38	3.1542	18.06	1.01013	10.4520	2.24	57.714	1.6	68	453	1242.1	2032	1407	2029.0	216	314	12	
133	13	Pią	695	2.37318	3.39	3.1938	18.21	1.01035	11.3823	-3.19	57.232	2.6	78	451	1242.1	2034	1532	2120.4	235	310	13	
134	14	Sob	696	2.41283	3.39	3.2334	18.36	1.01056	12.3255	-8.57	56.904	3.6	87	450	1242.1	2036	1658	2213.7	254	306	14	
135	15	Nie	697	2.45249	3.39	3.2731	18.50	1.01078	13.2938	-14.07	56.778	4.6	94	448	1242.1	2037	1826	2309.7	316	302	15	
136	16	Pon	698	2.49214	3.39	3.3128	19.04	1.01099	14.2851	-18.26	56.884	5.6	98	446	1242.1	2039	1953	*****	342	258	16	
137	17	Wto	699	2.53180	3.37	3.3526	19.18	1.01120	15.3012	-21.32	57.230	6.6	100	445	1242.1	2041	2113	008.4	416	254	17	
138	18	Śro	700	2.57146	3.35	3.3924	19.31	1.01141	16.3233	-23.10	57.798	1.0	99	443	1242.2	2042	2223	108.9	500	250	18	
139	19	Czw	701	3.01111	3.33	3.4323	19.44	1.01162	17.3413	-23.15	58.545	2.0	95	442	1242.2	2044	2317	209.6	557	246	19	
140	20	Pią	702	3.05077	3.30	3.4723	19.57	1.01183	18.3334	-21.55	59.407	3.0	89	440	1242.2	2045	2357	308.4	704	242	20	
141	21	Sob	703	3.09042	3.27	3.5123	20.09	1.01203	19.2932	-19.23	60.314	4.0	81	439	1242.3	2047	****	403.7	817	239	21	
142	22	Nie	704	3.13008	3.22	3.5524	20.21	1.01223	20.2149	-15.57	61.195	5.0	73	438	1242.4	2048	028	455.0	931	235	22	
143	23	Pon	705	3.16574	3.18	3.5925	20.33	1.01243	21.1045	-11.53	61.987	6.0	63	436	1242.4	2050	051	542.3	1044	231	23	
144	24	Wto	706	3.20539	3.13	4.0326	20.44	1.01262	21.5701	-7.25	62.639	7.0	54	435	1242.5	2051	109	626.6	1155	227	24	
145	25	Śro	707	3.24505	3.07	4.0729	20.55	1.01281	22.4130	-2.46	63.118	0.6	44	434	1242.6	2053	126	708.6	1304	223	25	
146	26	Czw	708	3.28470	3.01	4.1131	21.06	1.01300	23.2508	1.57	63.405	1.6	35	432	1242.7	2054	140	749.5	1412	219	26	
147	27	Pią	709	3.32436	2.54	4.1535	21.16	1.01318	0.0848	6.34	63.499	2.6	26	431	1242.8	2055	155	830.3	1520	215	27	
148	28	Sob	710	3.36401	2.47	4.1938	21.26	1.01336	0.5320	10.57	63.411	3.6	18	430	1243.0	2057	211	911.9	1628	211	28	
149	29	Nie	711	3.40367	2.39	4.2343	21.36	1.01354	1.3928	14.57	63.164	4.6	11	429	1243.1	2058	228	955.2	1737	207	29	
150	30	Pon	712	3.44332	2.31	4.2747	21.45	1.01370	2.2749	18.23	62.789	5.6	6	428	1243.2	2059	250	1040.8	1846	203	30	
151	31	Wto	713	3.48298	2.23	4.3152	21.54	1.01387	3.1839	21.04	62.321	6.6	2	427	1243.4	2100	316	1129.1	1954	159	31	

Fazy Księżyca [Dm, h.mm]: Nów 3, 8.51 1kw 10, 22.33 Pełn 17, 13.09 3kw 24, 20.52

MAJ 2011 (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	2.33	22.57	4.48	17.34	4.38	17.19	4.48	18.21	4.51	18.19	17.05	4.51	4.17	16.27	3.23	13.22	0.26	8.60		
	2.552	15.03	1.011	3.73	0.804	3.38	1.407	8.10	1.408	7.71	12.799	-2.20	0.187	0.44	22.194	-11.72	18.525	-18.63	14.57204	1
3	2.25	23.06	4.44	17.33	4.34	17.26	4.43	18.22	4.43	18.14	16.57	4.43	4.09	16.20	3.16	13.14	0.18	8.52		
	2.680	15.63	1.100	4.04	0.954	4.31	1.502	8.67	1.438	7.89	12.791	-2.16	0.193	0.48	22.196	-11.70	18.523	-18.63	14.70346	3
5	2.15	23.15	4.40	17.33	4.30	17.32	4.38	18.23	4.36	18.09	16.48	4.35	4.01	16.12	3.08	13.06	0.10	8.44		
	2.808	16.21	1.201	4.48	1.103	5.23	1.597	9.24	1.467	8.06	12.784	-2.12	0.199	0.52	22.198	-11.69	18.521	-18.64	14.83488	5
7	2.06	23.25	4.36	17.35	4.26	17.38	4.32	18.24	4.29	18.04	16.40	4.27	3.54	16.05	3.00	12.59	0.02	8.36		
	2.937	16.77	1.316	5.05	1.254	6.15	1.692	9.81	1.496	8.23	12.777	-2.08	0.205	0.55	22.200	-11.68	18.520	-18.64	14.96630	7
9	1.55	23.36	4.32	17.39	4.22	17.44	4.27	18.25	4.22	17.59	16.31	4.19	3.46	15.58	2.52	12.51	23.50	8.28		
	3.066	17.32	1.442	5.73	1.405	7.06	1.787	10.37	1.525	8.40	12.770	-2.04	0.210	0.59	22.201	-11.68	18.518	-18.64	15.09772	9
11	1.43	23.49	4.28	17.44	4.19	17.50	4.22	18.26	4.15	17.53	16.23	4.11	3.38	15.50	2.44	12.43	23.42	8.20		
	3.196	17.84	1.580	6.51	1.556	7.96	1.882	10.91	1.554	8.56	12.763	-2.00	0.215	0.62	22.203	-11.67	18.515	-18.64	15.22914	11
13	1.28	0.15	4.24	17.49	4.15	17.56	4.16	18.27	4.08	17.48	16.14	4.03	3.30	15.43	2.37	12.35	23.34	8.12		
	3.327	18.35	1.728	7.39	1.708	8.85	1.978	11.46	1.583	8.73	12.757	-1.97	0.221	0.65	22.205	-11.66	18.513	-18.64	15.36056	13
15	1.09	1.05	4.21	17.56	4.11	18.02	4.11	18.28	4.01	17.43	16.06	3.55	3.23	15.35	2.29	12.28	23.26	8.04		
	3.459	18.83	1.887	8.35	1.861	9.73	2.073	11.99	1.611	8.89	12.751	-1.94	0.226	0.69	22.206	-11.65	18.511	-18.64	15.49198	15
17	****	****	4.17	18.04	4.08	18.09	4.06	18.29	3.54	17.38	15.58	3.47	3.15	15.28	2.21	12.20	23.18	7.56		
	3.591	19.29	2.056	9.38	2.014	10.60	2.169	12.51	1.640	9.05	12.745	-1.91	0.230	0.72	22.207	-11.65	18.509	-18.64	15.62340	17
19	****	****	4.14	18.13	4.04	18.15	4.01	18.30	3.47	17.32	15.49	3.39	3.07	15.21	2.13	12.12	23.10	7.48		
	3.723	19.74	2.236	10.48	2.169	11.45	2.265	13.03	1.668	9.21	12.740	-1.88	0.235	0.75	22.208	-11.64	18.506	-18.65	15.75482	19
21	****	****	4.11	18.24	4.01	18.21	3.56	18.31	3.40	17.27	15.41	3.31	2.59	15.13	2.05	12.04	23.02	7.40		
	3.856	20.15	2.425	11.63	2.324	12.29	2.361	13.53	1.696	9.37	12.735	-1.86	0.240	0.78	22.209	-11.64	18.504	-18.65	15.88624	21
23	****	****	4.08	18.35	3.57	18.28	3.50	18.32	3.33	17.22	15.33	3.23	2.52	15.06	1.57	11.57	22.54	7.32		
	3.990	20.55	2.626	12.83	2.480	13.10	2.457	14.03	1.724	9.52	12.731	-1.84	0.244	0.80	22.210	-11.63	18.501	-18.65	16.01766	23
25	****	****	4.05	18.47	3.54	18.34	3.45	18.33	3.26	17.16	15.25	3.15	2.44	14.58	1.50	11.49	22.46	7.24		
	4.125	20.92	2.839	14.06	2.638	13.90	2.553	14.52	1.751	9.68	12.727	-1.82	0.249	0.83	22.211	-11.63	18.498	-18.65	16.14908	25
27	****	****	4.03	19.00	3.51	18.40	3.40	18.33	3.19	17.11	15.16	3.07	2.36	14.51	1.42	11.41	22.38	7.16		
	4.260	21.27	3.063	15.31	2.796	14.67	2.650	14.99	1.779	9.83	12.723	-1.81	0.253	0.86	22.211	-11.63	18.495	-18.66	16.28050	27
29	****	****	4.01	19.14	3.48	18.47	3.35	18.34	3.12	17.06	15.08	2.59	2.28	14.43	1.34	11.33	22.30	7.08		
	4.395	21.59	3.299	16.58	2.956	15.42	2.747	15.46	1.806	9.98	12.719	-1.79	0.257	0.88	22.212	-11.63	18.492	-18.66	16.41192	29
31	****	****	4.00	19.30	3.45	18.53	3.30	18.35	3.04	17.00	15.00	2.51	2.21	14.36	1.26	11.25	22.22	6.60		
	4.531	21.89	3.549	17.83	3.117	16.15	2.844	15.92	1.833	10.12	12.717	-1.78	0.261	0.91	22.212	-11.63	18.489	-18.66	16.54334	31

CZERWIEC 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2455																		
152	1	Śro	714	3.52264	2.14	4.3558	22.02	1.01403	4.1156	22.47	61.794	7.6	0	426	1243.5	2102	351	1220.3	2056	155	1
153	2	Czw	715	3.56229	2.04	4.4004	22.10	1.01418	5.0705	23.23	61.241	0.5	0	425	1243.7	2103	436	1313.4	2151	151	2
154	3	Pią	716	4.00195	1.55	4.4410	22.18	1.01433	6.0314	22.46	60.686	1.5	3	425	1243.8	2104	532	1407.6	2236	147	3
155	4	Sob	717	4.04160	1.44	4.4817	22.25	1.01447	6.5918	20.53	60.148	2.5	7	424	1244.0	2105	639	1501.6	2311	144	4
156	5	Nie	718	4.08126	1.34	4.5224	22.32	1.01460	7.5427	17.51	59.638	3.5	13	423	1244.2	2106	753	1554.5	2339	140	5
157	6	Pon	719	4.12092	1.23	4.5631	22.38	1.01473	8.4816	13.49	59.163	4.5	22	422	1244.4	2107	912	1645.9	****	136	6
158	7	Wto	720	4.16057	1.12	5.0039	22.44	1.01486	9.4048	9.00	58.727	5.5	31	422	1244.5	2108	1032	1736.0	003	132	7
159	8	Śro	721	4.20023	1.01	5.0446	22.50	1.01498	10.3234	3.41	58.336	6.5	42	421	1244.7	2109	1154	1825.3	022	128	8
160	9	Czw	722	4.23588	0.49	5.0855	22.55	1.01510	11.2420	-1.54	58.005	0.3	54	421	1244.9	2110	1316	1915.0	041	124	9
161	10	Pią	723	4.27554	0.38	5.1303	22.60	1.01521	12.1658	-7.26	57.751	1.3	65	420	1245.1	2110	1439	2005.9	059	120	10
162	11	Sob	724	4.31519	0.26	5.1711	23.04	1.01532	13.1120	-12.37	57.600	2.3	76	420	1245.3	2111	1604	2059.0	119	116	11
163	12	Nie	725	4.35485	0.13	5.2120	23.08	1.01543	14.0802	-17.06	57.579	3.3	85	420	1245.5	2112	1728	2154.8	143	112	12
164	13	Pon	726	4.39450	0.01	5.2529	23.12	1.01553	15.0710	-20.34	57.711	4.3	92	419	1245.7	2113	1850	2253.2	212	108	13
165	14	Wto	727	4.43416	-0.11	5.2938	23.15	1.01563	16.0808	-22.43	58.010	5.3	97	419	1245.9	2113	2004	2353.0	251	104	14
166	15	Śro	728	4.47382	-0.24	5.3347	23.18	1.01572	17.0936	-23.24	58.474	6.3	100	419	1246.1	2114	2105	*****	341	100	15
167	16	Czw	729	4.51347	-0.37	5.3757	23.20	1.01582	18.0955	-22.36	59.082	0.6	100	419	1246.4	2114	2151	052.5	443	056	16
168	17	Pią	730	4.55313	-0.50	5.4206	23.22	1.01591	19.0738	-20.30	59.797	1.6	97	419	1246.6	2115	2226	149.8	554	052	17
169	18	Sob	731	4.59279	-1.03	5.4616	23.24	1.01599	20.0159	-17.20	60.567	2.6	92	419	1246.8	2115	2253	243.5	709	048	18
170	19	Nie	732	5.03244	-1.16	5.5025	23.25	1.01607	20.5253	-13.25	61.335	3.6	86	419	1247.0	2115	2313	333.4	824	045	19
171	20	Pon	733	5.07210	-1.29	5.5435	23.26	1.01615	21.4047	-9.00	62.042	4.6	78	419	1247.2	2116	2331	419.7	937	041	20
172	21	Wto	734	5.11175	-1.42	5.5844	23.26	1.01623	22.2626	-4.20	62.636	5.6	70	419	1247.4	2116	2346	503.3	1048	037	21
173	22	Śro	735	5.15141	-1.55	6.0254	23.26	1.01630	23.1043	0.26	63.074	6.6	60	419	1247.7	2116	****	545.1	1157	033	22
174	23	Czw	736	5.19106	-2.08	6.0703	23.26	1.01637	23.5432	5.07	63.326	7.6	51	419	1247.9	2116	001	626.2	1305	029	23
175	24	Pią	737	5.23072	-2.20	6.1113	23.25	1.01643	0.3846	9.35	63.378	0.9	41	420	1248.1	2116	016	707.4	1413	025	24
176	25	Sob	738	5.27037	-2.33	6.1522	23.23	1.01649	1.2413	13.43	63.232	1.9	32	420	1248.3	2116	033	749.9	1522	021	25
177	26	Nie	739	5.31003	-2.46	6.1931	23.22	1.01654	2.1137	17.21	62.904	2.9	23	420	1248.5	2116	053	834.3	1631	017	26
178	27	Pon	740	5.34569	-2.59	6.2341	23.20	1.01658	3.0128	20.17	62.424	3.9	16	421	1248.7	2116	117	921.4	1739	013	27
179	28	Wto	741	5.38534	-3.11	6.2750	23.17	1.01662	3.5356	22.20	61.831	4.9	9	422	1248.9	2116	148	1011.3	1844	009	28
180	29	Śro	742	5.42500	-3.23	6.3159	23.14	1.01666	4.4846	23.20	61.172	5.9	4	422	1249.1	2116	228	1104.0	1942	005	29
181	30	Czw	743	5.46465	-3.36	6.3607	23.11	1.01669	5.4512	23.06	60.496	6.9	1	423	1249.3	2116	320	1158.4	2032	001	30

Fazy Księżyca [Dm, h.mm]: Nów 1, 23.03 1kw 9, 4.11 Pełn 15, 22.14 3kw 23, 13.48

CZERWIEC 2011 (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	****	****	4.00	19.37	3.44	18.56	3.28	18.35	3.01	16.57	14.56	2.47	2.17	14.32	1.22	11.21	22.18	6.56		
	4.599	22.03	3.679	18.45	3.198	16.51	2.892	16.14	1.846	10.20	12.715	-1.78	0.263	0.92	22.212	-11.63	18.488	-18.66	16.60905	1
3	****	****	4.00	19.54	3.41	19.02	3.23	18.36	2.54	16.52	14.48	2.39	2.09	14.25	1.14	11.13	22.10	6.48		
	4.736	22.29	3.948	19.65	3.360	17.19	2.990	16.58	1.873	10.34	12.713	-1.77	0.266	0.94	22.212	-11.63	18.485	-18.67	16.74047	3
5	****	****	4.01	20.11	3.39	19.09	3.18	18.37	2.47	16.46	14.40	2.31	2.01	14.17	1.06	11.06	22.02	6.40		
	4.873	22.53	4.230	20.79	3.524	17.85	3.087	17.01	1.899	10.48	12.711	-1.77	0.270	0.96	22.212	-11.63	18.481	-18.67	16.87190	5
7	****	****	4.03	20.28	3.37	19.15	3.14	18.38	2.40	16.41	14.32	2.23	1.53	14.09	0.59	10.58	21.54	6.31		
	5.011	22.74	4.524	21.84	3.689	18.48	3.185	17.42	1.925	10.62	12.709	-1.76	0.273	0.98	22.212	-11.63	18.478	-18.68	17.00332	7
9	****	****	4.07	20.46	3.35	19.21	3.09	18.38	2.33	16.35	14.24	2.15	1.46	14.02	0.51	10.50	21.46	6.23		
	5.148	22.92	4.829	22.77	3.855	19.08	3.283	17.83	1.950	10.75	12.708	-1.77	0.276	1.00	22.212	-11.63	18.475	-18.68	17.13474	9
11	****	****	4.11	21.03	3.33	19.27	3.04	18.39	2.25	16.30	14.16	2.07	1.38	13.54	0.43	10.42	21.38	6.15		
	5.287	23.07	5.142	23.56	4.023	19.64	3.380	18.22	1.976	10.89	12.707	-1.77	0.279	1.02	22.211	-11.64	18.472	-18.68	17.26616	11
13	****	****	4.17	21.19	3.32	19.33	2.60	18.39	2.18	16.24	14.08	1.59	1.30	13.47	0.35	10.34	21.30	6.07		
	5.425	23.20	5.460	24.19	4.192	20.17	3.479	18.60	2.000	11.02	12.707	-1.78	0.281	1.03	22.211	-11.64	18.468	-18.69	17.39758	13
15	****	****	4.25	21.34	3.31	19.39	2.55	18.40	2.11	16.19	14.01	1.51	1.22	13.39	0.27	10.26	21.22	5.59		
	5.563	23.30	5.780	24.64	4.361	20.67	3.577	18.97	2.025	11.15	12.707	-1.78	0.284	1.05	22.210	-11.65	18.465	-18.69	17.52900	15
17	****	****	4.34	21.47	3.30	19.44	2.51	18.40	2.04	16.13	13.53	1.43	1.14	13.31	0.19	10.18	21.14	5.51		
	5.702	23.37	6.099	24.90	4.532	21.12	3.675	19.33	2.049	11.27	12.707	-1.80	0.286	1.06	22.209	-11.65	18.461	-18.70	17.66042	17
19	****	****	4.44	21.59	3.29	19.50	2.47	18.41	1.57	16.07	13.45	1.35	1.07	13.24	0.11	10.10	21.06	5.43		
	5.840	23.42	6.413	24.98	4.704	21.54	3.774	19.67	2.073	11.40	12.708	-1.81	0.288	1.07	22.208	-11.66	18.458	-18.70	17.79185	19
21	****	****	4.56	22.08	3.29	19.55	2.43	18.41	1.50	16.01	13.37	1.28	0.59	13.16	0.03	10.02	20.58	5.35		
	5.979	23.44	6.718	24.87	4.877	21.92	3.873	20.00	2.097	11.52	12.710	-1.83	0.290	1.09	22.207	-11.67	18.454	-18.71	17.92327	21
23	****	****	5.08	22.16	3.29	20.00	2.38	18.41	1.43	15.56	13.30	1.20	0.51	13.08	23.52	9.54	20.50	5.27		
	6.118	23.43	7.014	24.60	5.052	22.26	3.972	20.32	2.120	11.63	12.711	-1.85	0.292	1.10	22.206	-11.67	18.451	-18.71	18.05468	23
25	****	****	5.20	22.22	3.29	20.05	2.34	18.42	1.35	15.50	13.22	1.12	0.43	13.01	23.44	9.46	20.42	5.19		
	6.256	23.39	7.299	24.18	5.226	22.56	4.071	20.62	2.143	11.75	12.713	-1.87	0.294	1.10	22.204	-11.68	18.447	-18.72	18.18610	25
27	****	****	5.33	22.26	3.30	20.10	2.30	18.42	1.28	15.44	13.15	1.04	0.35	12.53	23.36	9.38	20.34	5.10		
	6.395	23.33	7.571	23.62	5.402	22.81	4.170	20.91	2.165	11.86	12.716	-1.90	0.295	1.11	22.203	-11.69	18.444	-18.72	18.31752	27
29	****	****	5.46	22.28	3.31	20.14	2.26	18.42	1.21	15.38	13.07	0.56	0.28	12.45	23.28	9.30	20.26	5.02		
	6.533	23.23	7.830	22.95	5.578	23.02	4.269	21.18	2.187	11.97	12.719	-1.92	0.296	1.12	22.201	-11.70	18.440	-18.73	18.44894	29

LIPIEC 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2455																					
182	1	Pią	744	5.50431	-3.47	6.4016	23.07	1.01671	6.4213	21.36	59.850	0.0	0	423	1249.5	2115	424	1253.5	2111	2353	1
183	2	Sob	745	5.54397	-3.59	6.4424	23.03	1.01673	7.3844	18.50	59.272	1.0	1	424	1249.7	2115	538	1348.0	2143	2349	2
184	3	Nie	746	5.58362	-4.10	6.4832	22.58	1.01674	8.3403	14.59	58.790	2.0	5	425	1249.9	2114	657	1441.2	2208	2346	3
185	4	Pon	747	6.02328	-4.21	6.5239	22.53	1.01674	9.2755	10.17	58.417	3.0	11	426	1250.1	2114	819	1532.7	2229	2342	4
186	5	Wto	748	6.06293	-4.32	6.5647	22.48	1.01674	10.2036	4.59	58.157	4.0	19	427	1250.3	2113	941	1623.0	2248	2338	5
187	6	Śro	749	6.10259	-4.42	7.0053	22.42	1.01673	11.1242	-0.36	58.003	5.0	29	427	1250.5	2113	1104	1712.8	2307	2334	6
188	7	Czw	750	6.14224	-4.52	7.0460	22.36	1.01672	12.0503	-6.10	57.944	6.0	40	428	1250.6	2112	1226	1803.1	2326	2330	7
189	8	Pią	751	6.18190	-5.02	7.0906	22.29	1.01670	12.5827	-11.25	57.972	0.1	52	429	1250.8	2112	1350	1854.7	2348	2326	8
190	9	Sob	752	6.22155	-5.11	7.1312	22.22	1.01668	13.5336	-16.01	58.081	1.1	63	430	1250.9	2111	1513	1948.5	****	2322	9
191	10	Nie	753	6.26121	-5.20	7.1717	22.15	1.01665	14.5049	-19.42	58.271	2.1	74	432	1251.1	2110	1634	2044.6	014	2318	10
192	11	Pon	754	6.30087	-5.28	7.2122	22.07	1.01662	15.4953	-22.12	58.544	3.1	83	433	1251.2	2109	1749	2142.4	048	2314	11
193	12	Wto	755	6.34052	-5.36	7.2526	21.59	1.01659	16.4955	-23.19	58.906	4.1	91	434	1251.3	2108	1854	2240.8	132	2310	12
194	13	Śro	756	6.38018	-5.43	7.2930	21.51	1.01655	17.4936	-23.02	59.356	5.1	96	435	1251.5	2107	1945	2338.1	228	2306	13
195	14	Czw	757	6.41584	-5.50	7.3333	21.42	1.01650	18.4732	-21.23	59.887	6.1	99	436	1251.6	2106	2025	*****	335	2302	14
196	15	Pią	758	6.45549	-5.56	7.3736	21.33	1.01646	19.4245	-18.37	60.482	0.1	100	437	1251.7	2105	2054	032.8	448	2258	15
197	16	Sob	759	6.49515	-6.02	7.4139	21.23	1.01641	20.3451	-14.57	61.112	1.1	99	439	1251.8	2104	2117	124.2	603	2254	16
198	17	Nie	760	6.53480	-6.08	7.4541	21.13	1.01636	21.2360	-10.41	61.740	2.1	95	440	1251.9	2103	2136	212.1	718	2251	17
199	18	Pon	761	6.57446	-6.12	7.4942	21.03	1.01630	22.1044	-6.03	62.322	3.1	90	441	1252.0	2102	2153	257.2	830	2247	18
200	19	Wto	762	7.01411	-6.17	7.5343	20.52	1.01624	22.5547	-1.17	62.814	4.1	83	443	1252.0	2101	2208	340.0	940	2243	19
201	20	Śro	763	7.05377	-6.20	7.5743	20.41	1.01618	23.3958	3.28	63.174	5.1	75	444	1252.1	2059	2223	421.6	1049	2239	20
202	21	Czw	764	7.09342	-6.24	8.0143	20.30	1.01611	0.2408	8.03	63.369	6.1	67	445	1252.1	2058	2239	502.9	1157	2235	21
203	22	Pią	765	7.13308	-6.26	8.0542	20.18	1.01604	1.0903	12.18	63.376	7.1	58	447	1252.2	2057	2257	544.8	1305	2231	22
204	23	Sob	766	7.17273	-6.28	8.0941	20.06	1.01597	1.5528	16.05	63.182	0.2	48	448	1252.2	2055	2319	628.1	1414	2227	23
205	24	Nie	767	7.21239	-6.30	8.1339	19.54	1.01589	2.4359	19.15	62.795	1.2	39	450	1252.2	2054	2347	713.6	1522	2223	24
206	25	Pon	768	7.25205	-6.31	8.1737	19.41	1.01580	3.3459	21.38	62.234	2.2	29	451	1252.3	2052	****	801.7	1628	2219	25
207	26	Wto	769	7.29170	-6.31	8.2134	19.28	1.01571	4.2828	23.02	61.536	3.2	21	453	1252.3	2051	022	852.7	1729	2215	26
208	27	Śro	770	7.33136	-6.31	8.2530	19.14	1.01562	5.2403	23.17	60.749	4.2	13	454	1252.3	2049	108	946.0	1822	2211	27
209	28	Czw	771	7.37101	-6.31	8.2926	19.01	1.01551	6.2055	22.16	59.931	5.2	7	456	1252.3	2048	207	1040.9	1907	2207	28
210	29	Pią	772	7.41067	-6.29	8.3321	18.47	1.01541	7.1805	19.59	59.147	6.2	2	457	1252.2	2046	316	1136.1	1942	2203	29
211	30	Sob	773	7.45033	-6.27	8.3716	18.32	1.01529	8.1440	16.29	58.457	7.2	0	459	1252.2	2044	434	1230.8	2010	2159	30
212	31	Nie	774	7.48598	-6.25	8.4110	18.18	1.01518	9.1010	11.59	57.911	0.6	1	501	1252.2	2043	557	1324.2	2034	2155	31

Fazy Księżyca [Dm, h.mm]: Nów 1, 10.54 1kw 8, 8.29 Pełn 15, 8.40 3kw 23, 7.02 Nów 30, 20.40

LIPIEC 2011 (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	*****	*****	5.59	22.29	3.32	20.18	2.23	18.42	1.14	15.32	12.60	0.48	0.20	12.37	23.20	9.22	20.18	4.54		
	6.671	23.11	8.076	22.18	5.755	23.19	4.369	21.45	2.208	12.07	12.722	-1.95	0.297	1.12	22.199	-11.71	18.437	-18.74	18.58037	1
3	*****	*****	6.11	22.29	3.34	20.22	2.19	18.42	1.07	15.26	12.52	0.40	0.12	12.29	23.12	9.14	20.10	4.46		
	6.809	22.97	8.308	21.32	5.933	23.31	4.468	21.70	2.229	12.18	12.726	-1.99	0.298	1.13	22.197	-11.72	18.433	-18.74	18.71179	3
5	*****	*****	6.23	22.27	3.36	20.25	2.15	18.42	0.59	15.20	12.45	0.33	0.04	12.22	23.04	9.06	20.02	4.38		
	6.946	22.80	8.526	20.40	6.111	23.39	4.567	21.93	2.249	12.27	12.730	-2.02	0.299	1.13	22.195	-11.74	18.429	-18.75	18.84321	5
7	*****	*****	6.34	22.25	3.39	20.28	2.12	18.41	0.52	15.14	12.37	0.25	23.52	12.14	22.56	8.58	19.53	4.30		
	7.083	22.60	8.732	19.42	6.289	23.42	4.667	22.15	2.269	12.37	12.734	-2.06	0.299	1.13	22.193	-11.75	18.426	-18.76	18.97463	7
9	*****	*****	6.45	22.22	3.42	20.31	2.08	18.41	0.45	15.08	12.30	0.17	23.44	12.06	22.48	8.50	19.45	4.22		
	7.220	22.37	8.924	18.41	6.467	23.40	4.766	22.36	2.289	12.46	12.739	-2.10	0.299	1.13	22.191	-11.76	18.422	-18.76	19.10605	9
11	*****	*****	6.55	22.18	3.45	20.33	2.05	18.40	0.38	15.01	12.23	0.09	23.37	11.58	22.40	8.42	19.37	4.14		
	7.356	22.12	9.103	17.37	6.645	23.34	4.866	22.55	2.307	12.55	12.744	-2.14	0.299	1.13	22.189	-11.78	18.419	-18.77	19.23747	11
13	*****	*****	7.03	22.13	3.49	20.35	2.01	18.40	0.30	14.55	12.15	0.02	23.29	11.50	22.32	8.34	19.29	4.05		
	7.492	21.84	9.269	16.31	6.823	23.23	4.965	22.73	2.326	12.64	12.750	-2.18	0.299	1.13	22.187	-11.79	18.416	-18.78	19.36889	13
15	*****	*****	7.11	22.08	3.53	20.36	1.58	18.39	0.23	14.49	12.08	23.50	23.21	11.42	22.25	8.26	19.21	3.57		
	7.627	21.54	9.423	15.25	7.000	23.08	5.064	22.90	2.343	12.72	12.756	-2.23	0.299	1.12	22.184	-11.80	18.412	-18.78	19.50032	15
17	*****	*****	7.18	22.02	3.57	20.38	1.55	18.38	0.16	14.42	12.01	23.42	23.13	11.34	22.17	8.17	19.13	3.49		
	7.761	21.22	9.562	14.20	7.177	22.88	5.164	23.05	2.361	12.80	12.762	-2.28	0.298	1.12	22.181	-11.82	18.409	-18.79	19.63174	17
19	*****	*****	7.24	21.55	4.01	20.39	1.52	18.38	0.08	14.36	11.54	23.34	23.05	11.26	22.09	8.09	19.05	3.41		
	7.895	20.87	9.688	13.17	7.354	22.64	5.263	23.18	2.377	12.88	12.769	-2.33	0.297	1.11	22.179	-11.83	18.406	-18.80	19.76316	19
21	*****	*****	7.29	21.48	4.06	20.39	1.49	18.37	23.57	14.30	11.46	23.27	22.57	11.18	22.01	8.01	18.57	3.33		
	8.029	20.50	9.800	12.17	7.530	22.35	5.362	23.31	2.393	12.95	12.776	-2.38	0.296	1.10	22.176	-11.85	18.402	-18.80	19.89458	21
23	*****	*****	7.32	21.41	4.11	20.39	1.46	18.36	23.50	14.23	11.39	23.19	22.49	11.10	21.53	7.53	18.49	3.25		
	8.161	20.10	9.897	11.23	7.706	22.02	5.461	23.41	2.408	13.02	12.784	-2.44	0.295	1.10	22.173	-11.87	18.399	-18.81	20.02599	23
25	*****	*****	7.34	21.33	4.17	20.39	1.44	18.34	23.42	14.16	11.32	23.11	22.41	11.02	21.45	7.45	18.41	3.17		
	8.293	19.68	9.979	10.34	7.880	21.65	5.560	23.51	2.423	13.09	12.791	-2.49	0.294	1.09	22.170	-11.88	18.396	-18.82	20.15741	25
27	*****	*****	7.35	21.24	4.22	20.38	1.41	18.33	23.35	14.10	11.25	23.04	22.34	10.54	21.37	7.37	18.33	3.09		
	8.425	19.24	10.044	9.53	8.054	21.23	5.658	23.59	2.437	13.15	12.799	-2.55	0.292	1.07	22.167	-11.90	18.393	-18.83	20.28884	27
29	1.04	0.04	7.34	21.15	4.28	20.38	1.39	18.32	23.28	14.03	11.18	22.56	22.26	10.46	21.29	7.29	18.25	3.01		
	8.556	18.78	10.091	8.80	8.227	20.77	5.757	23.66	2.450	13.21	12.808	-2.61	0.290	1.06	22.164	-11.92	18.390	-18.83	20.42026	29
31	1.32	-0.04	7.31	21.05	4.34	20.37	1.36	18.30	23.20	13.56	11.11	22.48	22.18	10.38	21.21	7.21	18.17	2.53		
	8.686	18.30	10.119	8.19	8.399	20.27	5.855	23.71	2.463	13.26	12.817	-2.68	0.288	1.05	22.161	-11.94	18.387	-18.84	20.55168	31

SIERPIEŃ 2011

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2455																		
213	1	Pon	775	7.52564	-6.22	8.4503	18.03	1.01505	10.0433	6.44	57.543	1.6	4	502	1252.1	2041	721	1416.4	2054	2152	1
214	2	Wto	776	7.56529	-6.18	8.4856	17.48	1.01492	10.5812	1.05	57.365	2.6	9	504	1252.0	2039	846	1507.8	2113	2148	2
215	3	Śro	777	8.00495	-6.13	8.5248	17.32	1.01479	11.5143	-4.38	57.371	3.6	17	505	1252.0	2037	1011	1559.2	2133	2144	3
216	4	Czw	778	8.04460	-6.08	8.5639	17.16	1.01465	12.4549	-10.04	57.536	4.6	27	507	1251.9	2036	1136	1651.4	2154	2140	4
217	5	Pią	779	8.08426	-6.03	9.0030	17.00	1.01450	13.4108	-14.54	57.829	5.6	38	509	1251.8	2034	1300	1745.0	2220	2136	5
218	6	Sob	780	8.12391	-5.56	9.0421	16.44	1.01435	14.3801	-18.50	58.215	6.6	49	510	1251.7	2032	1422	1840.4	2251	2132	6
219	7	Nie	781	8.16357	-5.50	9.0810	16.27	1.01420	15.3620	-21.36	58.664	1.0	61	512	1251.6	2030	1539	1937.3	2331	2128	7
220	8	Pon	782	8.20323	-5.42	9.1159	16.11	1.01404	16.3526	-23.03	59.153	2.0	71	514	1251.4	2028	1646	2034.7	****	2124	8
221	9	Wto	783	8.24288	-5.34	9.1548	15.53	1.01388	17.3417	-23.08	59.666	3.0	81	515	1251.3	2026	1741	2131.3	022	2120	9
222	10	Śro	784	8.28254	-5.25	9.1936	15.36	1.01371	18.3144	-21.54	60.194	4.0	88	517	1251.2	2024	1824	2225.9	124	2116	10
223	11	Czw	785	8.32219	-5.16	9.2323	15.18	1.01354	19.2650	-19.29	60.731	5.0	94	519	1251.0	2022	1856	2317.7	234	2112	11
224	12	Pią	786	8.36185	-5.06	9.2710	15.01	1.01337	20.1911	-16.09	61.271	6.0	98	520	1250.8	2020	1921	*****	347	2108	12
225	13	Sob	787	8.40150	-4.56	9.3056	14.43	1.01320	21.0848	-12.07	61.801	7.0	100	522	1250.7	2018	1942	006.3	501	2104	13
226	14	Nie	788	8.44116	-4.45	9.3441	14.24	1.01302	21.5605	-7.38	62.304	0.6	100	524	1250.5	2016	1959	052.1	614	2100	14
227	15	Pon	789	8.48081	-4.33	9.3826	14.06	1.01284	22.4138	-2.55	62.756	1.6	97	526	1250.3	2014	2015	135.7	725	2056	15
228	16	Wto	790	8.52047	-4.21	9.4211	13.47	1.01266	23.2610	1.51	63.130	2.6	93	527	1250.1	2012	2030	217.8	834	2053	16
229	17	Śro	791	8.56013	-4.09	9.4555	13.28	1.01248	0.1024	6.29	63.394	3.6	88	529	1249.9	2010	2046	259.3	942	2049	17
230	18	Czw	792	8.59578	-3.56	9.4938	13.09	1.01229	0.5503	10.50	63.518	4.6	81	531	1249.7	2007	2103	340.9	1050	2045	18
231	19	Pią	793	9.03543	-3.42	9.5321	12.49	1.01210	1.4049	14.45	63.476	5.6	73	532	1249.4	2005	2124	423.6	1158	2041	19
232	20	Sob	794	9.07509	-3.28	9.5704	12.30	1.01191	2.2815	18.07	63.251	6.6	64	534	1249.2	2003	2149	507.8	1306	2037	20
233	21	Nie	795	9.11475	-3.14	10.0046	12.10	1.01172	3.1745	20.44	62.838	7.6	55	536	1249.0	2001	2220	554.2	1412	2033	21
234	22	Pon	796	9.15440	-2.59	10.0428	11.50	1.01152	4.0930	22.28	62.243	0.5	45	537	1248.7	1959	2300	643.1	1514	2029	22
235	23	Wto	797	9.19406	-2.43	10.0809	11.29	1.01132	5.0320	23.09	61.491	1.5	35	539	1248.5	1957	2352	734.4	1610	2025	23
236	24	Śro	798	9.23371	-2.27	10.1150	11.09	1.01111	5.5846	22.39	60.623	2.5	26	541	1248.2	1954	****	827.5	1658	2021	24
237	25	Czw	799	9.27337	-2.11	10.1530	10.48	1.01090	6.5503	20.56	59.695	3.5	17	543	1247.9	1952	055	921.8	1737	2017	25
238	26	Pią	800	9.31302	-1.55	10.1910	10.28	1.01069	7.5128	17.58	58.776	4.5	10	544	1247.7	1950	208	1016.2	1809	2013	26
239	27	Sob	801	9.35268	-1.38	10.2250	10.07	1.01047	8.4727	13.54	57.942	5.5	4	546	1247.4	1947	328	1110.3	1834	2009	27
240	28	Nie	802	9.39233	-1.20	10.2629	9.46	1.01025	9.4249	8.56	57.265	6.5	1	548	1247.1	1945	452	1203.6	1857	2005	28
241	29	Pon	803	9.43199	-1.03	10.3008	9.24	1.01002	10.3744	3.20	56.802	0.3	0	549	1246.8	1943	619	1256.5	1917	2001	29
242	30	Wto	804	9.47165	-0.45	10.3346	9.03	1.00979	11.3241	-2.30	56.590	1.3	2	551	1246.5	1941	745	1349.4	1937	1958	30
243	31	Śro	805	9.51130	-0.26	10.3724	8.42	1.00955	12.2814	-8.12	56.635	2.3	8	553	1246.2	1938	913	1443.0	1959	1954	31

Fazy Księżyca [Dm, h.mm]: 1kw 6, 13.08 Pełn 13, 20.57 3kw 21, 23.55 Now 29, 5.04

SIERPIEŃ 2011 (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	1.40	23.58	7.29	21.00	4.37	20.36	1.35	18.29	23.16	13.53	11.08	22.44	22.14	10.34	21.17	7.16	18.13	2.49		
	8.751	18.05	10.126	7.93	8.484	20.01	5.904	23.73	2.469	13.29	12.821	-2.71	0.287	1.04	22.160	-11.95	18.386	-18.85	20.61739	1
3	1.54	23.45	7.24	20.50	4.43	20.34	1.33	18.27	23.09	13.46	11.01	22.37	22.06	10.26	21.09	7.08	18.05	2.40		
	8.880	17.54	10.125	7.52	8.654	19.45	6.002	23.76	2.480	13.34	12.830	-2.77	0.285	1.03	22.156	-11.96	18.383	-18.85	20.74881	3
5	2.06	23.34	7.16	20.39	4.50	20.33	1.31	18.26	23.01	13.39	10.54	22.29	21.58	10.18	21.01	7.00	17.57	2.32		
	9.008	17.01	10.103	7.26	8.823	18.86	6.099	23.78	2.491	13.38	12.840	-2.84	0.283	1.01	22.153	-11.98	18.380	-18.86	20.88022	5
7	2.16	23.23	7.06	20.29	4.56	20.30	1.29	18.24	22.54	13.32	10.47	22.21	21.50	10.10	20.53	6.52	17.49	2.24		
	9.136	16.46	10.060	7.18	8.991	18.23	6.196	23.79	2.501	13.42	12.850	-2.91	0.280	0.99	22.150	-12.00	18.378	-18.87	21.01164	7
9	2.26	23.14	6.54	20.18	5.02	20.28	1.27	18.21	22.46	13.25	10.40	22.14	21.42	10.02	20.45	6.44	17.41	2.16		
	9.263	15.89	9.997	7.28	9.158	17.57	6.293	23.78	2.511	13.46	12.860	-2.98	0.277	0.97	22.146	-12.02	18.375	-18.88	21.14306	9
11	2.34	23.05	6.39	20.06	5.09	20.26	1.25	18.19	22.39	13.18	10.33	22.06	21.34	9.54	20.37	6.36	17.34	2.08		
	9.390	15.31	9.917	7.56	9.323	16.88	6.390	23.76	2.519	13.49	12.870	-3.05	0.275	0.95	22.143	-12.04	18.373	-18.88	21.27449	11
13	2.42	22.57	6.23	19.56	5.16	20.23	1.23	18.17	22.31	13.10	10.26	21.59	21.26	9.46	20.29	6.27	17.26	2.00		
	9.516	14.71	9.824	8.02	9.487	16.15	6.486	23.72	2.527	13.52	12.881	-3.12	0.272	0.93	22.140	-12.06	18.371	-18.89	21.40591	13
15	2.50	22.49	6.06	19.45	5.22	20.20	1.21	18.14	22.24	13.03	10.19	21.51	21.18	9.37	20.21	6.19	17.18	1.52		
	9.641	14.09	9.723	8.65	9.650	15.39	6.581	23.68	2.534	13.55	12.892	-3.20	0.268	0.91	22.136	-12.08	18.369	-18.90	21.53732	15
17	2.57	22.41	5.48	19.35	5.29	20.17	1.19	18.12	22.16	12.56	10.13	21.43	21.10	9.29	20.13	6.11	17.10	1.44		
	9.765	13.46	9.621	9.39	9.812	14.61	6.677	23.62	2.540	13.57	12.903	-3.28	0.265	0.89	22.133	-12.10	18.367	-18.91	21.66874	17
19	3.04	22.33	5.30	19.26	5.36	20.14	1.18	18.09	22.08	12.48	10.06	21.36	21.02	9.21	20.05	6.03	17.02	1.36		
	9.889	12.82	9.526	10.22	9.973	13.80	6.772	23.54	2.545	13.59	12.914	-3.35	0.262	0.87	22.129	-12.12	18.365	-18.92	21.80016	19
21	3.10	22.26	5.12	19.19	5.42	20.11	1.16	18.06	22.01	12.41	9.59	21.28	20.54	9.13	19.57	5.55	16.54	1.28		
	10.013	12.16	9.446	11.07	10.132	12.96	6.866	23.46	2.550	13.60	12.926	-3.43	0.258	0.84	22.126	-12.14	18.363	-18.93	21.93158	21
23	3.17	22.18	4.56	19.12	5.49	20.07	1.15	18.03	21.53	12.33	9.52	21.21	20.47	9.05	19.50	5.47	16.46	1.20		
	10.136	11.49	9.389	11.89	10.291	12.10	6.960	23.36	2.553	13.61	12.938	-3.51	0.254	0.82	22.122	-12.16	18.361	-18.93	22.06300	23
25	3.23	22.11	4.42	19.07	5.56	20.04	1.13	17.60	21.45	12.26	9.46	21.13	20.39	8.56	19.42	5.38	16.38	1.12		
	10.258	10.81	9.361	12.63	10.448	11.22	7.054	23.26	2.556	13.62	12.950	-3.59	0.250	0.79	22.119	-12.18	18.360	-18.94	22.19442	25
27	3.29	22.04	4.31	19.03	6.02	20.00	1.12	17.57	21.38	12.18	9.39	21.05	20.31	8.48	19.34	5.30	16.30	1.04		
	10.380	10.11	9.365	13.25	10.605	10.32	7.147	23.14	2.558	13.62	12.962	-3.67	0.246	0.76	22.115	-12.20	18.358	-18.95	22.32584	27
29	3.34	21.58	4.23	19.00	6.09	19.56	1.11	17.53	21.30	12.10	9.32	20.58	20.23	8.40	19.26	5.22	16.22	0.56		
	10.502	9.41	9.405	13.70	10.761	9.40	7.239	23.01	2.559	13.62	12.975	-3.76	0.242	0.74	22.112	-12.21	18.357	-18.96	22.45726	29
31	3.40	21.51	4.18	18.58	6.16	19.52	1.09	17.50	21.22	12.02	9.26	20.50	20.15	8.32	19.18	5.14	16.14	0.48		
	10.623	8.69	9.479	13.97	10.915	8.46	7.331	22.87	2.559	13.61	12.988	-3.84	0.238	0.71	22.108	-12.23	18.356	-18.97	22.58867	31

WRZESIEŃ 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2455																			
244	1	Czw	806	9.55095	-0.07	10.4102	8.20	1.00931	13.2454	-13.22	56.916	3.3	15	555	1245.9	1936	1040	1537.9	2024	1950	1	
245	2	Pią	807	9.59061	0.12	10.4439	7.58	1.00907	14.2256	-17.40	57.390	4.3	25	556	1245.6	1934	1206	1634.3	2054	1946	2	
246	3	Sob	808	10.03026	0.31	10.4817	7.36	1.00882	15.2209	-20.49	58.000	5.3	35	558	1245.2	1931	1326	1732.0	2132	1942	3	
247	4	Nie	809	10.06592	0.51	10.5154	7.14	1.00857	16.2154	-22.37	58.690	6.3	46	600	1244.9	1929	1438	1830.1	2220	1938	4	
248	5	Pon	810	10.10558	1.11	10.5530	6.52	1.00832	17.2109	-23.01	59.408	0.7	57	601	1244.6	1927	1537	1927.2	2319	1934	5	
249	6	Wto	811	10.14523	1.31	10.5907	6.30	1.00807	18.1848	-22.05	60.114	1.7	68	603	1244.2	1924	1623	2022.2	****	1930	6	
250	7	Śro	812	10.18489	1.51	11.0243	6.07	1.00781	19.1401	-19.59	60.782	2.7	77	605	1243.9	1922	1658	2114.2	026	1926	7	
251	8	Czw	813	10.22454	2.12	11.0619	5.45	1.00755	20.0626	-16.55	61.396	3.7	85	607	1243.6	1919	1726	2203.2	137	1922	8	
252	9	Pią	814	10.26420	2.32	11.0955	5.22	1.00729	20.5608	-13.08	61.949	4.7	92	608	1243.2	1917	1747	2249.3	250	1918	9	
253	10	Sob	815	10.30385	2.53	11.1330	4.60	1.00703	21.4331	-8.50	62.436	5.7	96	610	1242.9	1915	1806	2333.2	402	1914	10	
254	11	Nie	816	10.34351	3.14	11.1706	4.37	1.00676	22.2910	-4.14	62.854	6.7	99	612	1242.5	1912	1822	*****	512	1910	11	
255	12	Pon	817	10.38316	3.36	11.2041	4.14	1.00650	23.1347	0.28	63.198	0.0	100	613	1242.2	1910	1838	015.5	622	1906	12	
256	13	Wto	818	10.42282	3.57	11.2416	3.51	1.00624	23.5801	5.06	63.458	1.0	99	615	1241.8	1907	1853	057.1	730	1902	13	
257	14	Śro	819	10.46247	4.18	11.2751	3.28	1.00597	0.4234	9.30	63.619	2.0	96	617	1241.4	1905	1911	138.6	838	1859	14	
258	15	Czw	820	10.50213	4.40	11.3127	3.05	1.00571	1.2759	13.32	63.664	3.0	92	619	1241.1	1903	1930	220.9	946	1855	15	
259	16	Pią	821	10.54178	5.01	11.3502	2.42	1.00544	2.1449	17.01	63.573	4.0	86	620	1240.7	1900	1953	304.4	1053	1851	16	
260	17	Sob	822	10.58144	5.23	11.3837	2.19	1.00518	3.0324	19.49	63.329	5.0	79	622	1240.4	1858	2022	349.8	1159	1847	17	
261	18	Nie	823	11.02109	5.44	11.4212	1.56	1.00491	3.5352	21.47	62.920	6.0	71	624	1240.0	1855	2058	437.2	1302	1843	18	
262	19	Pon	824	11.06075	6.06	11.4547	1.32	1.00464	4.4608	22.47	62.343	7.0	61	625	1239.7	1853	2144	526.7	1400	1839	19	
263	20	Wto	825	11.10041	6.27	11.4922	1.09	1.00437	5.3949	22.42	61.610	8.0	52	627	1239.3	1850	2241	617.9	1449	1835	20	
264	21	Śro	826	11.14006	6.48	11.5257	0.46	1.00410	6.3423	21.28	60.744	0.8	41	629	1238.9	1848	2348	710.2	1531	1831	21	
265	22	Czw	827	11.17572	7.10	11.5633	0.22	1.00383	7.2917	19.03	59.790	1.8	31	631	1238.6	1846	****	803.0	1605	1827	22	
266	23	Pią	828	11.21537	7.31	12.0008	-0.01	1.00355	8.2407	15.32	58.807	2.8	22	632	1238.2	1843	102	855.8	1633	1823	23	
267	24	Sob	829	11.25503	7.52	12.0344	-0.24	1.00328	9.1845	11.03	57.871	3.8	13	634	1237.9	1841	222	948.3	1657	1819	24	
268	25	Nie	830	11.29468	8.12	12.0719	-0.48	1.00300	10.1320	5.48	57.062	4.8	6	636	1237.5	1838	346	1040.8	1718	1815	25	
269	26	Pon	831	11.33434	8.33	12.1055	-1.11	1.00272	11.0819	0.05	56.458	5.8	2	637	1237.2	1836	512	1133.8	1739	1811	26	
270	27	Wto	832	11.37399	8.54	12.1432	-1.34	1.00244	12.0416	-5.44	56.120	6.8	0	639	1236.9	1833	640	1227.6	1800	1807	27	
271	28	Śro	833	11.41365	9.14	12.1808	-1.58	1.00215	13.0145	-11.14	56.081	1.0	1	641	1236.5	1831	809	1323.3	1824	1803	28	
272	29	Czw	834	11.45330	9.34	12.2144	-2.21	1.00186	14.0101	-16.00	56.338	2.0	6	643	1236.2	1829	939	1421.0	1853	1800	29	
273	30	Pią	835	11.49296	9.54	12.2521	-2.44	1.00158	15.0153	-19.40	56.855	3.0	13	644	1235.9	1826	1104	1520.5	1929	1756	30	

Fazy Księżyca [Dm, h.mm]: 1kw 4, 19.39 Pełn 12, 11.27 3kw 20, 15.39 Now 27, 13.09

WRZESIEŃ 2011 (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	21.48	4.16	18.58	6.19	19.51	1.09	17.48	21.18	11.58	9.22	20.47	20.11	8.28	19.14	5.10	16.10	0.44		
	10.684	8.33	9.529	14.03	10.993	7.98	7.377	22.79	2.559	13.61	12.994	-3.88	0.236	0.70	22.107	-12.24	18.355	-18.97	22.65438	1
3	3.48	21.41	4.16	18.57	6.26	19.47	1.07	17.44	21.10	11.50	9.16	20.39	20.03	8.19	19.06	5.02	16.03	0.36		
	10.805	7.60	9.653	13.98	11.146	7.02	7.468	22.64	2.557	13.59	13.007	-3.97	0.232	0.67	22.103	-12.26	18.354	-18.98	22.78580	3
5	3.53	21.35	4.19	18.57	6.32	19.43	1.06	17.41	21.02	11.42	9.09	20.32	19.55	8.11	18.58	4.53	15.55	0.28		
	10.925	6.86	9.807	13.70	11.299	6.05	7.558	22.47	2.555	13.58	13.020	-4.06	0.227	0.64	22.100	-12.28	18.353	-18.99	22.91722	5
7	3.58	21.29	4.25	18.57	6.39	19.38	1.05	17.37	20.54	11.34	9.03	20.24	19.47	8.03	18.50	4.45	15.47	0.20		
	11.045	6.12	9.985	13.19	11.452	5.06	7.648	22.29	2.552	13.55	13.034	-4.14	0.223	0.61	22.097	-12.30	18.353	-19.00	23.04864	7
9	4.03	21.22	4.33	18.56	6.45	19.34	1.04	17.33	20.46	11.26	8.56	20.16	19.39	7.54	18.42	4.37	15.39	0.12		
	11.165	5.37	10.184	12.47	11.604	4.07	7.737	22.10	2.549	13.53	13.047	-4.23	0.218	0.58	22.093	-12.32	18.352	-19.00	23.18006	9
11	4.08	21.16	4.44	18.56	6.52	19.30	1.03	17.29	20.38	11.17	8.49	20.09	19.31	7.46	18.34	4.29	15.31	0.04		
	11.285	4.61	10.397	11.55	11.756	3.07	7.826	21.91	2.544	13.50	13.061	-4.32	0.213	0.55	22.090	-12.34	18.352	-19.01	23.31148	11
13	4.12	21.10	4.56	18.55	6.59	19.26	1.02	17.25	20.30	11.09	8.43	20.01	19.23	7.38	18.26	4.21	15.23	23.52		
	11.405	3.85	10.621	10.45	11.907	2.06	7.914	21.70	2.539	13.47	13.075	-4.41	0.209	0.52	22.087	-12.35	18.351	-19.02	23.44289	13
15	4.17	21.04	5.08	18.54	7.05	19.22	1.01	17.21	20.22	11.01	8.36	19.54	19.15	7.29	18.18	4.13	15.16	23.44		
	11.524	3.08	10.850	9.21	12.058	1.04	8.002	21.49	2.532	13.43	13.089	-4.50	0.204	0.49	22.084	-12.37	18.351	-19.03	23.57430	15
17	4.21	20.59	5.22	18.52	7.12	19.18	0.60	17.16	20.14	10.52	8.30	19.46	19.07	7.21	18.10	4.04	15.08	23.36		
	11.644	2.31	11.081	7.86	12.209	0.02	8.089	21.27	2.525	13.39	13.103	-4.59	0.199	0.45	22.081	-12.39	18.351	-19.04	23.70572	17
19	4.26	20.53	5.36	18.50	7.18	19.13	0.59	17.12	20.06	10.43	8.23	19.39	18.59	7.13	18.02	3.56	14.60	23.29		
	11.763	1.54	11.313	6.42	12.360	-1.00	8.175	21.04	2.517	13.35	13.118	-4.68	0.194	0.42	22.078	-12.40	18.351	-19.04	23.83714	19
21	4.30	20.47	5.50	18.48	7.25	19.09	0.58	17.07	19.58	10.35	8.17	19.31	18.51	7.05	17.54	3.48	14.52	23.21		
	11.883	0.76	11.542	4.92	12.511	-2.02	8.260	20.80	2.508	13.30	13.132	-4.77	0.189	0.39	22.075	-12.42	18.352	-19.05	23.96856	21
23	4.34	20.42	6.04	18.45	7.32	19.05	0.57	17.03	19.50	10.26	8.10	19.24	18.43	6.56	17.46	3.40	14.44	23.13		
	12.002	-0.01	11.768	3.37	12.663	-3.03	8.345	20.55	2.499	13.25	13.147	-4.86	0.184	0.36	22.072	-12.44	18.352	-19.06	0.09999	23
25	4.38	20.36	6.18	18.43	7.38	19.01	0.56	16.58	19.42	10.17	8.04	19.16	18.35	6.48	17.38	3.32	14.37	23.05		
	12.122	-0.79	11.991	1.81	12.814	-4.05	8.429	20.30	2.488	13.19	13.161	-4.96	0.180	0.33	22.069	-12.45	18.353	-19.07	0.23140	25
27	4.42	20.31	6.31	18.39	7.45	18.56	0.55	16.54	19.34	10.08	7.57	19.09	18.27	6.40	17.30	3.24	14.29	22.57		
	12.242	-1.57	12.210	0.24	12.966	-5.06	8.513	20.04	2.477	13.13	13.176	-5.05	0.175	0.29	22.066	-12.47	18.353	-19.07	0.36282	27
29	4.46	20.26	6.45	18.36	7.51	18.52	0.54	16.49	19.26	9.59	7.51	19.02	18.19	6.31	17.22	3.16	14.21	22.49		
	12.362	-2.35	12.426	-1.33	13.119	-6.06	8.595	19.77	2.465	13.07	13.191	-5.14	0.170	0.26	22.063	-12.48	18.354	-19.08	0.49423	29

PAŹDZIERNIK 2011

Piwnice, CA UMK			← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									 Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2455																		
274	1	Sob	836	11.53261	10.13	12.2858	-3.08	1.00129	16.0333	-21.58	57.573	4.0	22	646	1235.5	1824	1223	1620.6	2015	1752	1
275	2	Nie	837	11.57227	10.32	12.3235	-3.31	1.00099	17.0445	-22.47	58.417	5.0	32	648	1235.2	1821	1328	1720.0	2112	1748	2
276	3	Pon	838	12.01192	10.51	12.3613	-3.54	1.00070	18.0411	-22.11	59.313	6.0	42	650	1234.9	1819	1420	1817.0	2218	1744	3
277	4	Wto	839	12.05158	11.10	12.3951	-4.17	1.00041	19.0049	-20.21	60.197	0.3	53	651	1234.6	1817	1459	1910.7	2329	1740	4
278	5	Śro	840	12.09124	11.28	12.4329	-4.40	1.00011	19.5414	-17.29	61.019	1.3	63	653	1234.3	1814	1529	2000.9	****	1736	5
279	6	Czw	841	12.13089	11.46	12.4708	-5.04	0.99982	20.4434	-13.53	61.746	2.3	73	655	1234.0	1812	1552	2047.8	041	1732	6
280	7	Pią	842	12.17055	12.04	12.5047	-5.27	0.99952	21.3216	-9.44	62.361	3.3	81	657	1233.7	1810	1612	2132.0	153	1728	7
281	8	Sob	843	12.21020	12.21	12.5426	-5.49	0.99923	22.1801	-5.16	62.857	4.3	88	659	1233.4	1807	1629	2214.5	303	1724	8
282	9	Nie	844	12.24586	12.38	12.5806	-6.12	0.99894	23.0235	-0.39	63.236	5.3	94	700	1233.1	1805	1645	2256.0	412	1720	9
283	10	Pon	845	12.28551	12.54	13.0146	-6.35	0.99865	23.4642	3.57	63.503	6.3	97	702	1232.8	1803	1701	2337.3	520	1716	10
284	11	Wto	846	12.32517	13.10	13.0527	-6.58	0.99836	0.3104	8.22	63.664	7.3	100	704	1232.6	1800	1717	*****	628	1712	11
285	12	Śro	847	12.36482	13.26	13.0908	-7.20	0.99807	1.1616	12.28	63.723	0.3	100	706	1232.3	1758	1736	019.3	736	1708	12
286	13	Czw	848	12.40448	13.41	13.1249	-7.43	0.99779	2.0249	16.04	63.678	1.3	98	708	1232.1	1756	1758	102.5	843	1705	13
287	14	Pią	849	12.44413	13.55	13.1631	-8.05	0.99751	2.5101	19.02	63.526	2.3	95	709	1231.8	1753	1825	147.4	949	1701	14
288	15	Sob	850	12.48379	14.09	13.2014	-8.27	0.99722	3.4059	21.12	63.257	3.3	90	711	1231.6	1751	1859	234.1	1053	1657	15
289	16	Nie	851	12.52344	14.22	13.2357	-8.50	0.99694	4.3231	22.25	62.864	4.3	84	713	1231.4	1749	1942	322.8	1152	1653	16
290	17	Pon	852	12.56310	14.35	13.2741	-9.12	0.99667	5.2515	22.36	62.339	5.3	76	715	1231.2	1747	2034	412.9	1244	1649	17
291	18	Wto	853	13.00275	14.47	13.3126	-9.34	0.99639	6.1836	21.42	61.683	6.3	67	717	1231.0	1744	2136	503.9	1328	1645	18
292	19	Śro	854	13.04241	14.59	13.3511	-9.55	0.99612	7.1204	19.41	60.906	7.3	58	718	1230.8	1742	2245	555.2	1403	1641	19
293	20	Czw	855	13.08207	15.09	13.3856	-10.17	0.99584	8.0517	16.38	60.034	0.3	47	720	1230.6	1740	****	646.3	1433	1637	20
294	21	Pią	856	13.12172	15.20	13.4243	-10.38	0.99557	8.5810	12.37	59.106	1.3	36	722	1230.4	1738	001	737.0	1457	1633	21
295	22	Sob	857	13.16138	15.29	13.4630	-10.60	0.99530	9.5059	7.50	58.182	2.3	26	724	1230.3	1736	120	827.6	1519	1629	22
296	23	Nie	858	13.20103	15.38	13.5018	-11.21	0.99503	10.4413	2.28	57.332	3.3	17	726	1230.1	1734	241	918.5	1539	1625	23
297	24	Pon	859	13.24069	15.46	13.5406	-11.42	0.99475	11.3836	-3.11	56.636	4.3	9	728	1230.0	1731	406	1010.7	1600	1621	24
298	25	Wto	860	13.28034	15.53	13.5755	-12.03	0.99448	12.3449	-8.46	56.168	5.3	3	730	1229.9	1729	533	1104.8	1622	1617	25
299	26	Śro	861	13.31599	16.00	14.0145	-12.23	0.99421	13.3325	-13.53	55.982	6.3	0	731	1229.7	1727	702	1201.5	1649	1613	26
300	27	Czw	862	13.35565	16.06	14.0536	-12.44	0.99394	14.3430	-18.06	56.106	0.6	1	733	1229.6	1725	831	1301.1	1722	1609	27
301	28	Pią	863	13.39531	16.11	14.0927	-13.04	0.99367	15.3727	-21.02	56.528	1.6	4	735	1229.6	1723	956	1402.7	1804	1606	28
302	29	Sob	864	13.43496	16.16	14.1319	-13.24	0.99341	16.4055	-22.28	57.204	2.6	10	737	1229.5	1721	1110	1504.7	1858	1602	29
303	30	Nie	865	13.47462	16.19	14.1712	-13.44	0.99314	17.4309	-22.22	58.065	3.6	18	739	1229.4	1719	1210	1605.1	2003	1558	30
303	30	Nie	865	14.47560	16.20	14.1722	-13.45	0.99313	17.4542	-22.19	58.103	4.6	18	639	1129.4	1619	1110	1505.1	1903	1458	30
304	31	Pon	866	14.51526	16.23	14.2115	-14.04	0.99286	18.4504	-20.46	59.068	5.6	27	641	1129.4	1617	1156	1602.2	2015	1454	31

Fazy Księżyca [Dm, h.mm]: 1kw 4, 5.15 Pełn 12, 4.06 3kw 20, 5.30 Nów 26, 21.56

PAŹDZIERNIK 2011 (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	4.50	20.20	6.58	18.33	7.58	18.48	0.52	16.44	19.17	9.50	7.44	18.54	18.11	6.23	17.14	3.08	14.13	22.41		
	12.483	-3.13	12.637	-2.89	13.272	-7.06	8.677	19.50	2.453	13.00	13.206	-5.23	0.165	0.23	22.061	-12.49	18.355	-19.09	0.62565	1
3	4.54	20.15	7.11	18.29	8.05	18.44	0.51	16.39	19.09	9.41	7.38	18.47	18.03	6.15	17.07	2.59	14.06	22.34		
	12.604	-3.90	12.846	-4.43	13.425	-8.05	8.759	19.22	2.440	12.94	13.221	-5.32	0.160	0.20	22.058	-12.51	18.357	-19.10	0.75707	3
5	4.58	20.10	7.23	18.25	8.12	18.40	0.50	16.34	19.01	9.32	7.31	18.39	17.55	6.06	16.59	2.51	13.58	22.26		
	12.725	-4.67	13.052	-5.94	13.580	-9.02	8.839	18.93	2.426	12.87	13.236	-5.42	0.155	0.17	22.056	-12.52	18.358	-19.10	0.88849	5
7	5.02	20.05	7.35	18.22	8.18	18.36	0.49	16.29	18.53	9.23	7.25	18.32	17.47	5.58	16.51	2.43	13.50	22.18		
	12.846	-5.44	13.255	-7.41	13.735	-9.98	8.919	18.64	2.412	12.79	13.251	-5.51	0.150	0.14	22.054	-12.53	18.359	-19.11	1.01991	7
9	5.05	20.00	7.48	18.18	8.25	18.32	0.48	16.24	18.44	9.14	7.18	18.24	17.39	5.50	16.43	2.35	13.42	22.10		
	12.968	-6.20	13.456	-8.86	13.891	-10.93	8.998	18.35	2.397	12.72	13.266	-5.60	0.145	0.11	22.052	-12.54	18.361	-19.12	1.15133	9
11	5.09	19.56	7.59	18.14	8.32	18.29	0.47	16.19	18.36	9.05	7.12	18.17	17.31	5.41	16.35	2.27	13.35	22.02		
	13.091	-6.96	13.656	-10.26	14.048	-11.86	9.077	18.05	2.382	12.64	13.281	-5.69	0.141	0.08	22.050	-12.55	18.363	-19.12	1.28275	11
13	5.13	19.51	8.11	18.10	8.39	18.25	0.46	16.14	18.28	8.55	7.06	18.09	17.23	5.33	16.27	2.19	13.27	21.54		
	13.214	-7.71	13.853	-11.62	14.206	-12.77	9.154	17.75	2.366	12.56	13.296	-5.78	0.136	0.05	22.048	-12.56	18.365	-19.13	1.41416	13
15	5.16	19.47	8.23	18.07	8.46	18.21	0.44	16.08	18.19	8.46	6.59	18.02	17.15	5.25	16.19	2.11	13.19	21.47		
	13.337	-8.46	14.050	-12.93	14.365	-13.66	9.231	17.44	2.350	12.47	13.311	-5.87	0.132	0.02	22.046	-12.57	18.367	-19.14	1.54558	15
17	5.20	19.42	8.34	18.03	8.53	18.18	0.43	16.03	18.11	8.37	6.53	17.54	17.07	5.16	16.11	2.03	13.12	21.39		
	13.461	-9.19	14.246	-14.20	14.525	-14.53	9.307	17.13	2.334	12.39	13.326	-5.97	0.127	-0.01	22.044	-12.58	18.369	-19.14	1.67700	17
19	5.23	19.38	8.45	17.60	8.59	18.15	0.42	15.58	18.03	8.27	6.46	17.47	16.59	5.08	16.03	1.55	13.04	21.31		
	13.586	-9.92	14.441	-15.41	14.687	-15.37	9.383	16.82	2.317	12.31	13.342	-6.06	0.123	-0.04	22.043	-12.59	18.371	-19.15	1.80842	19
21	5.27	19.34	8.56	17.56	9.06	18.11	0.40	15.52	17.54	8.18	6.40	17.40	16.51	4.60	15.55	1.47	12.56	21.23		
	13.712	-10.64	14.636	-16.57	14.849	-16.19	9.457	16.50	2.300	12.22	13.357	-6.15	0.118	-0.07	22.041	-12.60	18.374	-19.16	1.93984	21
23	5.30	19.30	9.07	17.53	9.13	18.08	0.39	15.47	17.46	8.08	6.33	17.32	16.43	4.52	15.47	1.39	12.49	21.16		
	13.838	-11.35	14.831	-17.67	15.013	-16.98	9.531	16.18	2.282	12.13	13.372	-6.24	0.114	-0.09	22.040	-12.61	18.376	-19.16	2.07126	23
25	5.34	19.26	9.17	17.50	9.20	18.06	0.37	15.41	17.37	7.59	6.27	17.25	16.35	4.43	15.39	1.31	12.41	21.08		
	13.965	-12.04	15.025	-18.72	15.179	-17.75	9.604	15.86	2.265	12.05	13.387	-6.32	0.110	-0.12	22.039	-12.61	18.379	-19.17	2.20268	25
27	5.37	19.22	9.27	17.47	9.27	18.03	0.36	15.36	17.29	7.50	6.20	17.17	16.27	4.35	15.32	1.23	12.33	21.00		
	14.093	-12.73	15.218	-19.70	15.346	-18.48	9.676	15.54	2.248	11.96	13.402	-6.41	0.106	-0.14	22.038	-12.62	18.382	-19.17	2.33409	27
29	5.41	19.18	9.37	17.45	9.34	18.01	0.34	15.30	17.21	7.40	6.14	17.10	16.19	4.27	15.24	1.15	12.26	20.52		
	14.222	-13.40	15.411	-20.62	15.514	-19.18	9.748	15.22	2.230	11.87	13.417	-6.50	0.102	-0.17	22.037	-12.62	18.385	-19.18	2.46551	29
31	4.44	18.15	8.47	16.43	8.41	16.59	23.29	14.25	16.12	6.31	5.07	16.02	15.11	3.19	14.16	0.07	11.18	19.45		
	14.354	-14.07	15.607	-21.49	15.687	-19.86	9.820	14.88	2.212	11.78	13.432	-6.59	0.098	-0.19	22.036	-12.62	18.388	-19.18	2.59693	31

LISTOPAD 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2455																					
305	1	Wto	867	14.55492	16.25	14.2510	-14.23	0.99259	19.4050	-18.05	60.050	6.6	37	643	1129.3	1615	1230	1655.2	2129	1450	1
306	2	Śro	868	14.59457	16.26	14.2905	-14.43	0.99233	20.3255	-14.34	60.981	7.6	48	645	1129.3	1613	1256	1744.2	2242	1446	2
307	3	Czw	869	15.03423	16.27	14.3301	-15.01	0.99206	21.2149	-10.29	61.806	0.8	58	647	1129.3	1611	1317	1829.9	2354	1442	3
308	4	Pią	870	15.07388	16.26	14.3658	-15.20	0.99180	22.0815	-6.04	62.493	1.8	67	648	1129.3	1609	1335	1913.1	****	1438	4
309	5	Sob	871	15.11354	16.25	14.4055	-15.38	0.99155	22.5306	-1.29	63.022	2.8	76	650	1129.3	1608	1351	1954.8	103	1434	5
310	6	Nie	872	15.15319	16.23	14.4454	-15.57	0.99129	23.3713	3.06	63.391	3.8	84	652	1129.4	1606	1407	2036.1	211	1430	6
311	7	Pon	873	15.19285	16.21	14.4853	-16.14	0.99104	0.2124	7.32	63.606	4.8	90	654	1129.4	1604	1424	2117.7	319	1426	7
312	8	Wto	874	15.23250	16.17	14.5253	-16.32	0.99079	1.0621	11.40	63.682	5.8	95	656	1129.5	1602	1442	2200.4	426	1422	8
313	9	Śro	875	15.27216	16.13	14.5654	-16.49	0.99055	1.5239	15.21	63.636	6.8	98	658	1129.5	1601	1503	2244.8	533	1418	9
314	10	Czw	876	15.31181	16.08	15.0055	-17.06	0.99031	2.4040	18.27	63.484	7.8	100	700	1129.6	1559	1529	2331.2	640	1414	10
315	11	Pią	877	15.35147	16.02	15.0458	-17.23	0.99008	3.3033	20.46	63.240	0.6	100	702	1129.7	1557	1601	*****	745	1410	11
316	12	Sob	878	15.39112	15.55	15.0901	-17.40	0.98984	4.2206	22.10	62.913	1.6	98	703	1129.8	1556	1641	019.6	846	1407	12
317	13	Nie	879	15.43078	15.47	15.1306	-17.56	0.98962	5.1452	22.33	62.505	2.6	94	705	1130.0	1554	1730	109.6	940	1403	13
318	14	Pon	880	15.47044	15.39	15.1711	-18.12	0.98940	6.0810	21.50	62.019	3.6	88	707	1130.1	1552	1829	200.6	1027	1359	14
319	15	Wto	881	15.51009	15.29	15.2117	-18.27	0.98918	7.0119	20.02	61.453	4.6	81	709	1130.3	1551	1936	251.7	1104	1355	15
320	16	Śro	882	15.54575	15.19	15.2524	-18.42	0.98896	7.5353	17.13	60.809	5.6	72	711	1130.4	1550	2048	342.3	1135	1351	16
321	17	Czw	883	15.58541	15.08	15.2931	-18.57	0.98875	8.4542	13.29	60.098	6.6	63	713	1130.6	1548	2204	432.0	1200	1347	17
322	18	Pią	884	16.02506	14.56	15.3340	-19.12	0.98855	9.3659	9.00	59.339	7.6	52	714	1130.8	1547	2322	521.1	1222	1343	18
323	19	Sob	885	16.06471	14.43	15.3749	-19.26	0.98834	10.2815	3.58	58.565	0.8	41	716	1131.0	1545	****	610.0	1242	1339	19
324	20	Nie	886	16.10437	14.29	15.4159	-19.40	0.98814	11.2015	-1.24	57.826	1.8	30	718	1131.3	1544	042	659.4	1302	1335	20
325	21	Pon	887	16.14403	14.15	15.4611	-19.53	0.98795	12.1351	-6.51	57.182	2.8	20	720	1131.5	1543	204	750.5	1323	1331	21
326	22	Wto	888	16.18368	13.60	15.5022	-20.06	0.98775	13.0951	-12.00	56.697	3.8	11	721	1131.8	1542	329	844.0	1346	1327	22
327	23	Śro	889	16.22334	13.43	15.5435	-20.19	0.98756	14.0846	-16.31	56.431	4.8	5	723	1132.0	1540	456	940.8	1415	1323	23
328	24	Czw	890	16.26299	13.26	15.5849	-20.31	0.98737	15.1031	-19.57	56.427	5.8	1	725	1132.3	1539	623	1040.8	1452	1319	24
329	25	Pią	891	16.30265	13.09	16.0303	-20.43	0.98718	16.1410	-22.01	56.701	0.2	0	727	1132.6	1538	743	1143.2	1540	1315	25
330	26	Sob	892	16.34230	12.50	16.0718	-20.55	0.98700	17.1802	-22.32	57.236	1.2	2	728	1132.9	1537	852	1245.6	1640	1312	26
331	27	Nie	893	16.38196	12.31	16.1134	-21.06	0.98682	18.2011	-21.30	57.985	2.2	7	730	1133.2	1536	946	1346.1	1751	1308	27
332	28	Pon	894	16.42162	12.11	16.1550	-21.17	0.98664	19.1907	-19.10	58.880	3.2	13	731	1133.6	1535	1026	1442.9	1907	1304	28
333	29	Wto	895	16.46127	11.50	16.2007	-21.27	0.98646	20.1411	-15.50	59.841	4.2	22	733	1133.9	1534	1057	1535.3	2024	1300	29
334	30	Śro	896	16.50093	11.29	16.2425	-21.37	0.98629	21.0531	-11.49	60.789	5.2	31	735	1134.3	1534	1120	1623.7	2138	1256	30

Fazy Księżyca [Dm, h.mm]: 1kw 2, 17.38 Pełn 10, 21.16 3kw 18, 16.09 Nów 25, 7.10

LISTOPAD 2011 (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	4.46	18.13	8.52	16.41	8.44	16.58	23.28	14.22	16.08	6.26	5.04	15.59	15.07	3.15	14.12	0.03	11.14	19.41		
	14.419	-14.39	15.702	-21.89	15.772	-20.18	9.855	14.72	2.203	11.74	13.440	-6.63	0.096	-0.20	22.036	-12.63	18.389	-19.19	2.66265	1
3	4.49	18.10	9.01	16.40	8.51	16.56	23.26	14.16	15.60	6.17	4.57	15.51	14.59	3.06	14.04	23.52	11.06	19.33		
	14.550	-15.02	15.892	-22.62	15.944	-20.79	9.924	14.40	2.186	11.65	13.455	-6.72	0.093	-0.22	22.036	-12.63	18.393	-19.19	2.79407	3
5	4.52	18.07	9.09	16.38	8.57	16.54	23.24	14.10	15.51	6.07	4.51	15.44	14.51	2.58	13.56	23.44	10.59	19.25		
	14.682	-15.64	16.078	-23.28	16.117	-21.36	9.992	14.07	2.169	11.56	13.469	-6.80	0.090	-0.25	22.035	-12.63	18.396	-19.20	2.92549	5
7	4.55	18.04	9.16	16.37	9.04	16.53	23.23	14.04	15.43	5.58	4.44	15.36	14.43	2.50	13.48	23.36	10.51	19.18		
	14.815	-16.24	16.260	-23.86	16.291	-21.89	10.060	13.75	2.152	11.48	13.484	-6.89	0.086	-0.27	22.035	-12.63	18.399	-19.20	3.05690	7
9	4.59	18.01	9.23	16.36	9.10	16.52	23.21	13.59	15.34	5.49	4.38	15.29	14.35	2.42	13.40	23.28	10.44	19.10		
	14.948	-16.82	16.438	-24.35	16.467	-22.39	10.126	13.42	2.135	11.40	13.499	-6.97	0.083	-0.28	22.035	-12.63	18.403	-19.21	3.18832	9
11	5.02	17.58	9.28	16.35	9.16	16.52	23.19	13.53	15.26	5.39	4.31	15.21	14.28	2.34	13.33	23.20	10.36	19.02		
	15.083	-17.39	16.607	-24.75	16.643	-22.83	10.192	13.10	2.119	11.31	13.513	-7.05	0.080	-0.30	22.035	-12.63	18.407	-19.21	3.31974	11
13	5.05	17.55	9.33	16.34	9.22	16.51	23.17	13.47	15.18	5.30	4.25	15.14	14.20	2.26	13.25	23.12	10.28	18.55		
	15.218	-17.93	16.767	-25.06	16.821	-23.24	10.257	12.78	2.103	11.24	13.527	-7.13	0.078	-0.32	22.035	-12.63	18.411	-19.21	3.45116	13
15	5.08	17.53	9.35	16.33	9.27	16.51	23.14	13.41	15.09	5.21	4.18	15.07	14.12	2.18	13.17	23.04	10.21	18.47		
	15.355	-18.45	16.914	-25.26	16.999	-23.60	10.321	12.46	2.087	11.16	13.542	-7.21	0.075	-0.33	22.035	-12.63	18.414	-19.22	3.58258	15
17	5.11	17.51	9.36	16.32	9.32	16.52	23.12	13.35	15.01	5.12	4.12	14.59	14.04	2.09	13.09	22.57	10.13	18.39		
	15.492	-18.95	17.043	-25.36	17.179	-23.91	10.384	12.14	2.072	11.08	13.556	-7.29	0.073	-0.35	22.036	-12.62	18.418	-19.22	3.71401	17
19	5.14	17.49	9.34	16.31	9.37	16.53	23.10	13.29	14.53	5.02	4.05	14.52	13.56	2.01	13.01	22.49	10.06	18.32		
	15.630	-19.43	17.150	-25.34	17.359	-24.18	10.446	11.83	2.057	11.01	13.569	-7.36	0.070	-0.36	22.037	-12.62	18.423	-19.22	3.84542	19
21	5.17	17.47	9.30	16.29	9.42	16.54	23.07	13.23	14.44	4.53	3.58	14.44	13.48	1.53	12.53	22.41	9.58	18.24		
	15.770	-19.88	17.227	-25.21	17.540	-24.39	10.507	11.52	2.043	10.95	13.583	-7.44	0.068	-0.37	22.037	-12.62	18.427	-19.23	3.97684	21
23	5.19	17.45	9.22	16.26	9.46	16.56	23.05	13.17	14.36	4.44	3.52	14.37	13.40	1.45	12.45	22.33	9.50	18.17		
	15.910	-20.31	17.269	-24.94	17.722	-24.56	10.567	11.21	2.029	10.88	13.597	-7.51	0.067	-0.38	22.038	-12.61	18.431	-19.23	4.10826	23
25	5.22	17.44	9.11	16.21	9.50	16.58	23.02	13.11	14.28	4.35	3.45	14.29	13.32	1.37	12.38	22.25	9.43	18.09		
	16.051	-20.72	17.267	-24.53	17.903	-24.68	10.626	10.91	2.016	10.82	13.610	-7.59	0.065	-0.39	22.039	-12.61	18.435	-19.23	4.23968	25
27	5.25	17.42	8.56	16.14	9.54	17.00	22.60	13.05	14.19	4.26	3.38	14.22	13.24	1.29	12.30	22.18	9.35	18.01		
	16.193	-21.10	17.216	-23.97	18.086	-24.75	10.684	10.61	2.004	10.76	13.623	-7.66	0.063	-0.40	22.041	-12.60	18.440	-19.24	4.37110	27
29	5.27	17.41	8.36	16.06	9.57	17.03	22.57	12.59	14.11	4.17	3.32	14.14	13.16	1.21	12.22	22.10	9.28	17.54		
	16.335	-21.45	17.114	-23.24	18.268	-24.77	10.741	10.31	1.992	10.71	13.636	-7.73	0.062	-0.41	22.042	-12.59	18.444	-19.24	4.50253	29

GRUDZIEŃ 2011

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2455																					
335	1	Czw	897	16.54058	11.07	16.2844	-21.47	0.98612	21.5345	-7.23	61.657	6.2	41	736	1134.6	1533	1140	1708.9	2250	1252	1
336	2	Pią	898	16.58024	10.45	16.3303	-21.56	0.98595	22.3945	-2.46	62.393	0.0	50	738	1135.0	1532	1157	1751.8	****	1248	2
337	3	Sob	899	17.01589	10.21	16.3723	-22.05	0.98579	23.2426	1.52	62.960	1.0	60	739	1135.4	1532	1213	1833.5	000	1244	3
338	4	Nie	900	17.05555	9.58	16.4143	-22.13	0.98563	0.0844	6.22	63.340	2.0	69	740	1135.8	1531	1230	1915.1	107	1240	4
339	5	Pon	901	17.09521	9.33	16.4604	-22.21	0.98548	0.5326	10.35	63.533	3.0	78	742	1136.2	1530	1247	1957.3	214	1236	5
340	6	Wto	902	17.13486	9.08	16.5025	-22.28	0.98533	1.3916	14.24	63.550	4.0	85	743	1136.6	1530	1307	2041.0	322	1232	6
341	7	Śro	903	17.17452	8.43	16.5447	-22.35	0.98519	2.2646	17.40	63.411	5.0	91	744	1137.0	1529	1331	2126.7	429	1228	7
342	8	Czw	904	17.21417	8.17	16.5910	-22.42	0.98505	3.1614	20.13	63.146	6.0	96	746	1137.5	1529	1401	2214.6	535	1224	8
343	9	Pią	905	17.25383	7.51	17.0333	-22.48	0.98492	4.0739	21.53	62.784	7.0	99	747	1137.9	1529	1438	2304.5	638	1220	9
344	10	Sob	906	17.29348	7.24	17.0756	-22.54	0.98480	5.0038	22.33	62.354	8.0	100	748	1138.3	1529	1525	2355.9	735	1216	10
345	11	Nie	907	17.33314	6.57	17.1220	-22.59	0.98468	5.5429	22.07	61.879	0.8	99	749	1138.8	1528	1622	*****	825	1213	11
346	12	Pon	908	17.37280	6.29	17.1644	-23.04	0.98457	6.4824	20.33	61.378	1.8	97	750	1139.3	1528	1727	047.7	906	1209	12
347	13	Wto	909	17.41245	6.01	17.2109	-23.08	0.98446	7.4141	17.56	60.861	2.8	92	751	1139.7	1528	1838	139.2	939	1205	13
348	14	Śro	910	17.45211	5.33	17.2533	-23.12	0.98436	8.3357	14.23	60.333	3.8	85	752	1140.2	1528	1953	229.6	1006	1201	14
349	15	Czw	911	17.49176	5.04	17.2959	-23.15	0.98426	9.2513	10.04	59.800	4.8	77	753	1140.7	1528	2110	319.0	1028	1157	15
350	16	Pią	912	17.53142	4.35	17.3424	-23.18	0.98417	10.1553	5.12	59.264	5.8	67	754	1141.2	1528	2228	407.4	1049	1153	16
351	17	Sob	913	17.57108	4.06	17.3850	-23.21	0.98409	11.0635	0.00	58.736	6.8	56	755	1141.6	1529	2348	455.6	1108	1149	17
352	18	Nie	914	18.01073	3.37	17.4316	-23.23	0.98401	11.5809	-5.18	58.237	0.4	45	755	1142.1	1529	****	544.5	1127	1145	18
353	19	Pon	915	18.05038	3.07	17.4742	-23.24	0.98393	12.5129	-10.24	57.794	1.4	34	756	1142.6	1529	109	635.1	1149	1141	19
354	20	Wto	916	18.09004	2.38	17.5208	-23.25	0.98386	13.4719	-14.60	57.448	2.4	23	757	1143.1	1529	232	728.4	1214	1137	20
355	21	Śro	917	18.12570	2.08	17.5634	-23.26	0.98380	14.4602	-18.45	57.239	3.4	14	757	1143.6	1530	356	824.8	1245	1133	21
356	22	Czw	918	18.16535	1.38	18.0101	-23.26	0.98373	15.4720	-21.20	57.207	4.4	7	758	1144.1	1530	517	924.2	1326	1129	22
357	23	Pią	919	18.20501	1.08	18.0527	-23.26	0.98367	16.5009	-22.30	57.380	5.4	2	758	1144.6	1531	630	1025.5	1420	1125	23
358	24	Sob	920	18.24467	0.38	18.0954	-23.25	0.98362	17.5247	-22.09	57.763	6.4	0	759	1145.1	1532	731	1126.7	1525	1121	24
359	25	Nie	921	18.28432	0.08	18.1420	-23.24	0.98357	18.5329	-20.22	58.341	0.7	1	759	1145.6	1532	819	1225.8	1639	1117	25
360	26	Pon	922	18.32398	-0.22	18.1847	-23.22	0.98352	19.5060	-17.23	59.072	1.7	4	759	1146.1	1533	854	1321.3	1757	1114	26
361	27	Wto	923	18.36363	-0.52	18.2313	-23.20	0.98348	20.4454	-13.33	59.899	2.7	9	800	1146.6	1534	922	1412.8	1914	1110	27
362	28	Śro	924	18.40329	-1.21	18.2739	-23.17	0.98344	21.3526	-9.10	60.755	3.7	16	800	1147.1	1535	944	1500.6	2029	1106	28
363	29	Czw	925	18.44295	-1.51	18.3205	-23.14	0.98340	22.2315	-4.30	61.572	4.7	24	800	1147.6	1535	1002	1545.5	2141	1102	29
364	30	Pią	926	18.48260	-2.20	18.3631	-23.10	0.98337	23.0911	0.14	62.288	5.7	33	800	1148.1	1536	1019	1628.5	2251	1058	30
365	31	Sob	927	18.52226	-2.49	18.4056	-23.06	0.98334	23.5409	4.51	62.854	6.7	42	800	1148.6	1537	1036	1710.6	****	1054	31

Fazy Księżyca [Dm, h.mm]: 1kw 2, 10.52 Pełn 10, 15.36 3kw 18, 1.48 Now 24, 19.06

GRUDZIEŃ 2011 (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 (0 ^h UT) Dm	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	5.30	17.40	8.13	15.56	9.60	17.06	22.54	12.52	14.03	4.09	3.25	14.07	13.08	1.13	12.14	22.02	9.20	17.46		
	16.479	-21.78	16.966	-22.37	18.450	-24.74	10.796	10.03	1.981	10.66	13.649	-7.79	0.061	-0.41	22.043	-12.58	18.449	-19.24	4.63395	1
3	5.32	17.39	7.48	15.44	10.02	17.10	22.51	12.46	13.55	3.60	3.18	13.59	13.00	1.05	12.06	21.55	9.12	17.38		
	16.623	-22.08	16.786	-21.40	18.632	-24.65	10.851	9.74	1.971	10.61	13.662	-7.86	0.060	-0.42	22.045	-12.57	18.454	-19.24	4.76537	3
5	5.34	17.39	7.21	15.32	10.04	17.14	22.48	12.40	13.47	3.51	3.11	13.52	12.53	0.58	11.58	21.47	9.05	17.31		
	16.768	-22.35	16.598	-20.41	18.813	-24.52	10.904	9.47	1.962	10.57	13.674	-7.93	0.060	-0.42	22.047	-12.56	18.458	-19.25	4.89678	5
7	5.37	17.38	6.57	15.20	10.06	17.18	22.45	12.34	13.38	3.43	3.05	13.44	12.45	0.50	11.51	21.39	8.57	17.23		
	16.913	-22.59	16.425	-19.51	18.994	-24.34	10.956	9.20	1.953	10.53	13.686	-7.99	0.059	-0.42	22.049	-12.55	18.463	-19.25	5.02820	7
9	5.39	17.38	6.37	15.08	10.07	17.23	22.41	12.27	13.30	3.34	2.58	13.37	12.37	0.42	11.43	21.31	8.50	17.16		
	17.059	-22.80	16.289	-18.81	19.174	-24.11	11.006	8.93	1.946	10.50	13.698	-8.05	0.059	-0.42	22.051	-12.54	18.468	-19.25	5.15963	9
11	5.41	17.38	6.20	14.58	10.08	17.28	22.38	12.21	13.22	3.26	2.51	13.29	12.29	0.34	11.35	21.24	8.42	17.08		
	17.205	-22.98	16.201	-18.35	19.353	-23.83	11.056	8.68	1.939	10.47	13.709	-8.11	0.059	-0.42	22.053	-12.53	18.473	-19.25	5.29105	11
13	5.42	17.38	6.09	14.49	10.08	17.33	22.34	12.15	13.14	3.17	2.44	13.22	12.21	0.26	11.27	21.16	8.35	17.01		
	17.352	-23.14	16.163	-18.16	19.532	-23.51	11.104	8.43	1.932	10.45	13.720	-8.17	0.059	-0.42	22.055	-12.52	18.477	-19.25	5.42247	13
15	5.44	17.38	6.02	14.42	10.08	17.39	22.30	12.08	13.06	3.09	2.37	13.14	12.13	0.18	11.19	21.09	8.27	16.53		
	17.500	-23.26	16.171	-18.20	19.709	-23.14	11.150	8.19	1.927	10.43	13.731	-8.22	0.060	-0.41	22.058	-12.50	18.482	-19.25	5.55389	15
17	5.45	17.39	5.58	14.35	10.07	17.45	22.27	12.02	12.58	3.01	2.30	13.07	12.05	0.10	11.12	21.01	8.20	16.45		
	17.647	-23.35	16.220	-18.43	19.885	-22.72	11.195	7.96	1.923	10.42	13.742	-8.28	0.060	-0.41	22.061	-12.49	18.487	-19.25	5.68531	17
19	5.47	17.40	5.58	14.30	10.07	17.51	22.22	11.55	12.50	2.53	2.23	12.59	11.57	0.03	11.04	20.53	8.12	16.38		
	17.795	-23.41	16.302	-18.81	20.060	-22.25	11.239	7.74	1.919	10.41	13.753	-8.33	0.061	-0.40	22.063	-12.47	18.492	-19.25	5.81673	19
21	5.48	17.40	5.60	14.25	10.05	17.57	22.18	11.49	12.42	2.45	2.16	12.52	11.50	23.51	10.56	20.46	8.04	16.30		
	17.943	-23.43	16.412	-19.29	20.233	-21.75	11.281	7.53	1.917	10.41	13.763	-8.38	0.062	-0.39	22.066	-12.46	18.497	-19.25	5.94815	21
23	5.49	17.41	6.03	14.22	10.04	18.03	22.14	11.42	12.34	2.37	2.09	12.44	11.42	23.43	10.48	20.38	7.57	16.23		
	18.091	-23.43	16.544	-19.82	20.405	-21.20	11.321	7.33	1.915	10.41	13.772	-8.42	0.063	-0.38	22.069	-12.44	18.502	-19.25	6.07957	23
25	5.50	17.43	6.08	14.19	10.02	18.10	22.09	11.36	12.26	2.29	2.02	12.37	11.34	23.36	10.41	20.31	7.49	16.15		
	18.239	-23.40	16.694	-20.38	20.576	-20.61	11.360	7.15	1.914	10.41	13.782	-8.47	0.065	-0.37	22.072	-12.42	18.507	-19.25	6.21100	25
27	5.50	17.44	6.14	14.17	10.00	18.16	22.05	11.29	12.18	2.21	1.55	12.29	11.26	23.28	10.33	20.23	7.42	16.08		
	18.387	-23.33	16.858	-20.95	20.745	-19.99	11.396	6.97	1.914	10.42	13.791	-8.51	0.066	-0.36	22.075	-12.41	18.512	-19.25	6.34242	27
29	5.51	17.45	6.21	14.16	9.58	18.23	21.60	11.22	12.10	2.13	1.48	12.22	11.18	23.20	10.25	20.15	7.34	16.00		
	18.535	-23.23	17.033	-21.49	20.913	-19.32	11.431	6.81	1.915	10.44	13.800	-8.55	0.068	-0.35	22.079	-12.39	18.517	-19.25	6.47384	29
31	5.51	17.47	6.27	14.15	9.55	18.30	21.55	11.16	12.02	2.06	1.41	12.14	11.10	23.13	10.17	20.08	7.27	15.52		
	18.682	-23.10	17.217	-22.00	21.079	-18.62	11.464	6.66	1.916	10.46	13.808	-8.59	0.070	-0.33	22.082	-12.37	18.522	-19.25	6.60526	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2011

Nowy Rok	Sob	1 styczeń	Wniebowstąpienia Pańskiego	Czw	2 czerwiec
Najświętszej Maryi Panny Rodzicielki	Sob	1 styczeń	Dzień Dziękczynienia	Nie	5 czerwiec
Objawienia Pańskiego (Trzech Króli)	Czw	6 styczeń	Zesłania Ducha Świętego	Nie	12 czerwiec
Juliański Nowy Rok	Pią	14 styczeń	Trójcy Najświętszej	Nie	19 czerwiec
Dzień Babci	Pią	21 styczeń	Boże Ciało	Czw	23 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	Św. Piotra i Pawła	Śro	29 czerwiec
Walentynki	Pon	14 luty	Najświętszego Serca Pana Jezusa	Pią	1 lipiec
Święto UMK	Sob	19 luty	Wniebowzięcia N.M.P.	Pon	15 sierpień
Tłusty czwartek	Czw	3 marzec	Święto Wojska Polskiego	Pon	15 sierpień
Dzień Kobiet	Wto	8 marzec	Dzień Solidarności i Wolności	Śro	31 sierpień
Środa Popielcowa	Śro	9 marzec	Dzień Programisty	Wto	13 wrzesień
Narodowy Dzień Życia	Czw	24 marzec	Dożynki – Święto Plonów	Pią	23 wrzesień
Niedziela Palmowa	Nie	17 kwiecień	Dzień Edukacji Narodowej	Pią	14 październik
Niedziela Wielkanocna	Nie	24 kwiecień	Dzień Papieski	Nie	16 październik
Święto Pracy	Nie	1 maj	Dzień Papieża Jana Pawła II	Nie	16 październik
Niedziela Miłosierdzia Bożego	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
Dzień Matki	Czw	26 maj	Boże Narodzenie	Nie	25 grudzień
Dzień Dziecka	Śro	1 czerwiec	Sylwester	Sob	31 grudzień

Kalendarz astronomiczny 2012

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 7.10.2010 r.)

Data Wielkanocy: **2012 KWIECIEŃ 8**

Dla całego roku przyjęto: TDT – UT = 67 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 6.14**, Lato **VI 21, 0.08**, Jesień **IX 22, 15.49**, Zima **XII 21, 12.12**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 25 marca do 28 października 2012 r.**

Oznaczenia:

Dr — dzień 2012 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j_{astr} — jednostka astronomiczna

ρ_{\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 2012

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2455																		
1	1	Nie	928	18.56191	-3.17	18.4521	-23.02	0.98332	0.3900	9.13	63.236	0.2	52	800	1149.0	1538	1053	1752.8	000	1050	1
2	2	Pon	929	19.00157	-3.45	18.4946	-22.57	0.98330	1.2431	13.11	63.417	1.2	61	800	1149.5	1540	1112	1835.9	107	1046	2
3	3	Wto	930	19.04122	-4.13	18.5411	-22.51	0.98329	2.1121	16.38	63.395	2.2	70	759	1150.0	1541	1134	1920.7	214	1042	3
4	4	Śro	931	19.08088	-4.41	18.5835	-22.45	0.98328	2.5960	19.26	63.186	3.2	78	759	1150.4	1542	1201	2007.5	321	1038	4
5	5	Czw	932	19.12053	-5.08	19.0258	-22.39	0.98328	3.5039	21.25	62.818	4.2	86	759	1150.9	1543	1234	2056.5	425	1034	5
6	6	Pią	933	19.16019	-5.35	19.0722	-22.32	0.98329	4.4310	22.26	62.326	5.2	92	758	1151.3	1544	1317	2147.4	525	1030	6
7	7	Sob	934	19.19585	-6.01	19.1144	-22.25	0.98330	5.3704	22.22	61.755	6.2	96	758	1151.8	1546	1410	2239.6	618	1026	7
8	8	Nie	935	19.23550	-6.26	19.1607	-22.17	0.98332	6.3137	21.10	61.148	7.2	99	758	1152.2	1547	1513	2332.1	703	1022	8
9	9	Pon	936	19.27516	-6.52	19.2028	-22.09	0.98334	7.2600	18.51	60.547	0.1	100	757	1152.6	1549	1624	*****	740	1019	9
10	10	Wto	937	19.31482	-7.16	19.2450	-22.00	0.98337	8.1937	15.31	59.985	1.1	99	756	1153.0	1550	1739	024.0	809	1015	10
11	11	Śro	938	19.35447	-7.40	19.2910	-21.51	0.98341	9.1213	11.19	59.484	2.1	95	756	1153.4	1551	1857	114.9	834	1011	11
12	12	Czw	939	19.39412	-8.04	19.3330	-21.42	0.98345	10.0355	6.30	59.058	3.1	89	755	1153.8	1553	2016	204.6	856	1007	12
13	13	Pią	940	19.43378	-8.27	19.3750	-21.32	0.98350	10.5512	1.18	58.708	4.1	81	754	1154.2	1555	2136	253.7	915	1003	13
14	14	Sob	941	19.47344	-8.49	19.4209	-21.22	0.98356	11.4643	-4.00	58.430	5.1	71	753	1154.6	1556	2256	342.7	935	959	14
15	15	Nie	942	19.51309	-9.11	19.4627	-21.11	0.98362	12.3915	-9.08	58.220	6.1	60	753	1154.9	1558	****	432.5	955	955	15
16	16	Pon	943	19.55275	-9.32	19.5045	-21.00	0.98369	13.3333	-13.49	58.076	0.1	49	752	1155.3	1559	018	524.1	1019	951	16
17	17	Wto	944	19.59240	-9.53	19.5502	-20.49	0.98376	14.3005	-17.44	58.001	1.1	38	751	1155.6	1601	140	618.0	1047	947	17
18	18	Śro	945	20.03206	-10.12	19.5918	-20.37	0.98384	15.2854	-20.36	58.008	2.1	27	750	1156.0	1603	300	714.6	1123	943	18
19	19	Czw	946	20.07171	-10.31	20.0334	-20.24	0.98392	16.2925	-22.12	58.112	3.1	18	749	1156.3	1604	414	813.2	1209	939	19
20	20	Pią	947	20.11137	-10.50	20.0748	-20.12	0.98400	17.3030	-22.24	58.329	4.1	10	747	1156.6	1606	519	912.7	1308	935	20
21	21	Sob	948	20.15103	-11.07	20.1203	-19.59	0.98409	18.3039	-21.11	58.670	5.1	4	746	1156.9	1608	611	1011.4	1417	931	21
22	22	Nie	949	20.19068	-11.24	20.1616	-19.45	0.98418	19.2837	-18.42	59.136	6.1	1	745	1157.1	1610	651	1107.6	1532	927	22
23	23	Pon	950	20.23034	-11.40	20.2029	-19.31	0.98428	20.2339	-15.14	59.713	0.1	0	744	1157.4	1612	722	1200.7	1649	924	23
24	24	Wto	951	20.26600	-11.56	20.2441	-19.17	0.98438	21.1539	-11.03	60.371	1.1	1	742	1157.7	1613	746	1250.3	1806	920	24
25	25	Śro	952	20.30565	-12.10	20.2852	-19.03	0.98448	22.0456	-6.27	61.069	2.1	5	741	1157.9	1615	807	1337.0	1920	916	25
26	26	Czw	953	20.34530	-12.24	20.3302	-18.48	0.98458	22.5209	-1.41	61.754	3.1	11	740	1158.1	1617	825	1421.5	2032	912	26
27	27	Pią	954	20.38496	-12.37	20.3711	-18.33	0.98469	23.3804	3.02	62.374	4.1	17	738	1158.4	1619	841	1504.6	2142	908	27
28	28	Sob	955	20.42461	-12.49	20.4120	-18.17	0.98480	0.2326	7.33	62.878	5.1	25	737	1158.6	1621	859	1547.3	2250	904	28
29	29	Nie	956	20.46427	-13.00	20.4528	-18.01	0.98492	1.0901	11.41	63.225	6.1	34	735	1158.7	1623	917	1630.2	2358	900	29
30	30	Pon	957	20.50393	-13.11	20.4935	-17.45	0.98504	1.5526	15.21	63.384	7.1	43	734	1158.9	1625	938	1714.3	0**	856	30
31	31	Wto	958	20.54358	-13.20	20.5341	-17.29	0.98517	2.4315	18.22	63.338	0.3	53	732	1159.1	1627	1002	1759.9	104	852	31

Fazy Księżyca [Dm, h.mm]: 1kw 1, 7.15 Pełn 9, 8.30 3kw 16, 10.08 Nów 23, 8.39 1kw 31, 5.10

STYCZEŃ 2012 (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	5.51	17.48	6.31	14.15	9.54	18.33	21.52	11.12	11.58	2.02	1.37	12.10	11.07	23.09	10.13	20.04	7.23	15.49		
	18.756	-23.03	17.312	-22.24	21.161	-18.26	11.479	6.59	1.918	10.47	13.812	-8.61	0.072	-0.32	22.084	-12.36	18.525	-19.25	6.67097	1
3	5.51	17.50	6.38	14.16	9.51	18.40	21.47	11.06	11.50	1.54	1.30	12.03	10.59	23.01	10.06	19.57	7.15	15.41		
	18.903	-22.85	17.507	-22.68	21.324	-17.51	11.509	6.46	1.921	10.50	13.820	-8.65	0.074	-0.31	22.087	-12.34	18.530	-19.25	6.80239	3
5	5.51	17.52	6.45	14.17	9.48	18.46	21.41	10.59	11.43	1.47	1.23	11.55	10.51	22.53	9.58	19.49	7.08	15.34		
	19.050	-22.65	17.709	-23.06	21.486	-16.73	11.537	6.34	1.925	10.53	13.827	-8.68	0.077	-0.29	22.091	-12.32	18.535	-19.25	6.93381	5
7	5.51	17.54	6.52	14.19	9.45	18.53	21.35	10.52	11.35	1.40	1.16	11.47	10.43	22.46	9.50	19.41	7.00	15.26		
	19.196	-22.41	17.915	-23.38	21.647	-15.92	11.562	6.24	1.930	10.57	13.834	-8.71	0.079	-0.27	22.095	-12.30	18.540	-19.25	7.06523	7
9	5.50	17.56	6.58	14.22	9.41	18.60	21.29	10.45	11.27	1.32	1.08	11.40	10.35	22.38	9.42	19.34	6.53	15.18		
	19.341	-22.15	18.126	-23.62	21.805	-15.08	11.585	6.16	1.935	10.61	13.841	-8.74	0.082	-0.25	22.099	-12.28	18.545	-19.25	7.19666	9
11	5.49	17.59	7.05	14.26	9.38	19.07	21.23	10.38	11.19	1.25	1.01	11.32	10.28	22.31	9.35	19.26	6.45	15.11		
	19.486	-21.86	18.340	-23.79	21.962	-14.22	11.606	6.09	1.942	10.66	13.847	-8.77	0.085	-0.23	22.103	-12.26	18.550	-19.24	7.32808	11
13	5.49	18.01	7.11	14.30	9.34	19.13	21.17	10.31	11.12	1.18	0.54	11.25	10.20	22.23	9.27	19.19	6.37	15.03		
	19.631	-21.53	18.558	-23.88	22.118	-13.33	11.624	6.04	1.949	10.71	13.853	-8.79	0.089	-0.20	22.107	-12.23	18.555	-19.24	7.45950	13
15	5.47	18.04	7.16	14.36	9.30	19.20	21.10	10.24	11.04	1.11	0.46	11.17	10.12	22.16	9.19	19.11	6.30	14.56		
	19.774	-21.19	18.778	-23.89	22.272	-12.42	11.639	6.00	1.957	10.77	13.859	-8.81	0.092	-0.18	22.111	-12.21	18.560	-19.24	7.59091	15
17	5.46	18.07	7.21	14.42	9.26	19.27	21.03	10.16	10.56	1.04	0.39	11.09	10.04	22.08	9.11	19.04	6.22	14.48		
	19.917	-20.81	19.001	-23.81	22.425	-11.49	11.652	5.98	1.966	10.83	13.864	-8.83	0.096	-0.15	22.115	-12.19	18.565	-19.24	7.72233	17
19	5.45	18.09	7.25	14.49	9.22	19.33	20.56	10.09	10.49	0.57	0.31	11.02	9.56	22.01	9.04	18.57	6.15	14.41		
	20.059	-20.41	19.226	-23.64	22.576	-10.54	11.662	5.98	1.976	10.89	13.869	-8.85	0.100	-0.13	22.119	-12.16	18.569	-19.24	7.85375	19
21	5.43	18.12	7.29	14.56	9.17	19.40	20.48	10.02	10.41	0.50	0.24	10.54	9.49	21.53	8.56	18.49	6.07	14.33		
	20.201	-19.98	19.452	-23.38	22.726	-9.57	11.669	6.00	1.987	10.96	13.873	-8.86	0.104	-0.10	22.124	-12.14	18.574	-19.23	7.98518	21
23	5.41	18.15	7.32	15.05	9.13	19.46	20.40	9.54	10.33	0.43	0.16	10.46	9.41	21.46	8.48	18.42	5.59	14.26		
	20.341	-19.52	19.680	-23.03	22.875	-8.59	11.673	6.04	1.998	11.03	13.876	-8.87	0.108	-0.07	22.128	-12.12	18.579	-19.23	8.11660	23
25	5.39	18.18	7.35	15.14	9.08	19.53	20.32	9.47	10.26	0.37	0.08	10.38	9.33	21.38	8.40	18.34	5.52	14.18		
	20.481	-19.05	19.909	-22.59	23.022	-7.59	11.674	6.10	2.010	11.10	13.880	-8.88	0.113	-0.04	22.133	-12.09	18.584	-19.23	8.24802	25
27	5.37	18.21	7.37	15.24	9.04	19.59	20.24	9.39	10.18	0.30	0.31	10.31	9.25	21.31	8.33	18.27	5.44	14.10		
	20.620	-18.55	20.140	-22.05	23.169	-6.58	11.671	6.18	2.023	11.18	13.883	-8.89	0.117	-0.01	22.137	-12.07	18.588	-19.23	8.37944	27
29	5.35	18.24	7.38	15.34	8.59	20.05	20.15	9.32	10.11	0.23	0.23	10.23	9.18	21.23	8.25	18.19	5.37	14.03		
	20.758	-18.02	20.371	-21.42	23.314	-5.56	11.666	6.27	2.036	11.26	13.885	-8.89	0.122	0.02	22.142	-12.04	18.593	-19.22	8.51085	29
31	5.32	18.28	7.39	15.45	8.54	20.12	20.06	9.24	10.03	0.17	0.23	10.15	9.10	21.16	8.17	18.12	5.29	13.55		
	20.895	-17.48	20.602	-20.69	23.459	-4.53	11.657	6.39	2.051	11.35	13.887	-8.89	0.127	0.06	22.146	-12.02	18.597	-19.22	8.64227	31

LUTY 2012

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2455																			
32	1	Śro	959	20.58324	-13.29	20.5746	-17.12	0.98530	3.3248	20.39	63.088	1.3	62	731	1159.2	1629	1033	1847.5	209	848	1	
33	2	Czw	960	21.02289	-13.37	21.0151	-16.55	0.98543	4.2409	22.01	62.650	2.3	71	729	1159.4	1630	1111	1937.1	311	844	2	
34	3	Pią	961	21.06255	-13.44	21.0555	-16.37	0.98557	5.1706	22.23	62.055	3.3	79	727	1159.5	1632	1159	2028.3	407	840	3	
35	4	Sob	962	21.10221	-13.50	21.0957	-16.20	0.98572	6.1108	21.39	61.350	4.3	87	726	1159.6	1634	1256	2120.5	455	836	4	
36	5	Nie	963	21.14186	-13.56	21.1359	-16.02	0.98587	7.0538	19.47	60.587	5.3	93	724	1159.7	1636	1404	2212.9	536	832	5	
37	6	Pon	964	21.18152	-14.00	21.1801	-15.43	0.98602	7.5959	16.50	59.827	6.3	97	722	1159.8	1638	1518	2304.9	609	828	6	
38	7	Wto	965	21.22117	-14.04	21.2201	-15.25	0.98619	8.5346	12.55	59.127	7.3	100	720	1159.8	1640	1636	2356.2	636	825	7	
39	8	Śro	966	21.26083	-14.07	21.2601	-15.06	0.98635	9.4656	8.14	58.538	0.5	100	718	1159.9	1642	1756	*****	700	821	8	
40	9	Czw	967	21.30048	-14.10	21.2959	-14.47	0.98653	10.3943	3.02	58.094	1.5	97	716	1159.9	1644	1918	046.9	721	817	9	
41	10	Pią	968	21.34014	-14.11	21.3357	-14.28	0.98670	11.3235	-2.23	57.813	2.5	92	715	1159.9	1646	2041	137.4	741	813	10	
42	11	Sob	969	21.37579	-14.12	21.3755	-14.08	0.98689	12.2609	-7.42	57.692	3.5	84	713	1159.9	1648	2204	228.4	802	809	11	
43	12	Nie	970	21.41545	-14.12	21.4151	-13.48	0.98707	13.2101	-12.34	57.716	4.5	75	711	1159.9	1650	2327	320.6	825	805	12	
44	13	Pon	971	21.45510	-14.11	21.4547	-13.28	0.98727	14.1734	-16.43	57.859	5.5	64	709	1159.9	1652	****	414.6	852	801	13	
45	14	Wto	972	21.49476	-14.09	21.4942	-13.08	0.98746	15.1551	-19.51	58.094	6.5	53	707	1159.9	1654	048	510.5	926	757	14	
46	15	Śro	973	21.53441	-14.07	21.5336	-12.48	0.98766	16.1525	-21.45	58.398	0.7	42	705	1159.9	1656	204	608.1	1009	753	15	
47	16	Czw	974	21.57407	-14.04	21.5730	-12.27	0.98787	17.1520	-22.17	58.755	1.7	31	703	1159.8	1658	310	706.3	1102	749	16	
48	17	Pią	975	22.01373	-14.01	22.0123	-12.06	0.98808	18.1428	-21.29	59.154	2.7	21	701	1159.8	1700	406	804.0	1206	745	17	
49	18	Sob	976	22.05338	-13.56	22.0515	-11.45	0.98829	19.1145	-19.27	59.594	3.7	13	659	1159.7	1702	449	859.7	1317	741	18	
50	19	Nie	977	22.09304	-13.51	22.0907	-11.24	0.98850	20.0631	-16.22	60.074	4.7	7	656	1159.6	1704	522	952.7	1432	737	19	
51	20	Pon	978	22.13269	-13.45	22.1257	-11.03	0.98871	20.5836	-12.30	60.590	5.7	2	654	1159.5	1706	549	1042.7	1547	733	20	
52	21	Wto	979	22.17235	-13.39	22.1648	-10.41	0.98893	21.4814	-8.07	61.132	6.7	0	652	1159.4	1707	611	1129.9	1701	729	21	
53	22	Śro	980	22.21200	-13.32	22.2037	-10.19	0.98915	22.3556	-3.27	61.683	0.5	0	650	1159.3	1709	630	1215.2	1813	726	22	
54	23	Czw	981	22.25166	-13.25	22.2426	-9.57	0.98937	23.2220	1.16	62.216	1.5	2	648	1159.2	1711	647	1258.8	1924	722	23	
55	24	Pią	982	22.29131	-13.16	22.2814	-9.35	0.98959	0.0804	5.51	62.699	2.5	6	646	1159.0	1713	705	1341.9	2033	718	24	
56	25	Sob	983	22.33097	-13.07	22.3202	-9.13	0.98982	0.5349	10.08	63.094	3.5	12	644	1158.9	1715	723	1424.9	2141	714	25	
57	26	Nie	984	22.37062	-12.58	22.3549	-8.51	0.99004	1.4008	13.58	63.364	4.5	19	641	1158.7	1717	743	1508.7	2248	710	26	
58	27	Pon	985	22.41028	-12.48	22.3936	-8.28	0.99027	2.2730	17.12	63.476	5.5	26	639	1158.5	1719	806	1553.7	2354	706	27	
59	28	Wto	986	22.44593	-12.37	22.4322	-8.06	0.99050	3.1613	19.43	63.404	6.5	35	637	1158.4	1721	834	1640.2	****	702	28	
60	29	Śro	987	22.48559	-12.26	22.4707	-7.43	0.99074	4.0627	21.24	63.137	7.5	44	635	1158.2	1723	908	1728.3	056	658	29	

Fazy Księżyca [Dm, h.mm]: Pełn 7, 22.54 3kw 14, 18.04 Now 21, 23.35

LUTY 2012 (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	18.29	7.39	15.51	8.52	20.15	20.01	9.20	9.59	0.14	23.38	10.11	9.06	21.12	8.13	18.08	5.25	13.51		
	20.963	-17.20	20.718	-20.29	23.531	-4.01	11.652	6.45	2.058	11.40	13.888	-8.89	0.129	0.07	22.149	-12.00	18.599	-19.22	8.70798	1
3	5.28	18.32	7.39	16.03	8.47	20.21	19.52	9.12	9.52	0.07	23.30	10.04	8.58	21.05	8.06	18.01	5.18	13.44		
	21.098	-16.62	20.951	-19.41	23.674	-2.97	11.638	6.60	2.073	11.49	13.889	-8.89	0.134	0.11	22.153	-11.98	18.604	-19.22	8.83940	3
5	5.25	18.36	7.39	16.16	8.42	20.27	19.42	9.04	9.45	23.57	23.22	9.56	8.51	20.58	7.58	17.53	5.10	13.36		
	21.233	-16.03	21.183	-18.43	23.816	-1.93	11.621	6.76	2.089	11.58	13.890	-8.89	0.140	0.14	22.158	-11.95	18.608	-19.21	8.97083	5
7	5.22	18.39	7.38	16.28	8.37	20.33	19.32	8.56	9.37	23.51	23.14	9.48	8.43	20.50	7.50	17.46	5.02	13.29		
	21.367	-15.41	21.416	-17.36	23.958	-0.88	11.601	6.94	2.106	11.68	13.891	-8.88	0.145	0.18	22.163	-11.93	18.612	-19.21	9.10225	7
9	5.19	18.43	7.37	16.42	8.32	20.40	19.22	8.48	9.30	23.44	23.06	9.40	8.35	20.43	7.42	17.38	4.55	13.21		
	21.500	-14.78	21.648	-16.18	0.099	0.17	11.577	7.14	2.123	11.78	13.891	-8.87	0.151	0.22	22.168	-11.90	18.616	-19.21	9.23367	9
11	5.16	18.46	7.35	16.56	8.27	20.46	19.11	8.40	9.22	23.38	22.58	9.32	8.27	20.36	7.35	17.31	4.47	13.13		
	21.632	-14.14	21.880	-14.91	0.239	1.21	11.551	7.35	2.141	11.88	13.890	-8.86	0.156	0.25	22.172	-11.87	18.620	-19.21	9.36508	11
13	5.12	18.49	7.33	17.10	8.22	20.52	19.00	8.31	9.15	23.32	22.50	9.25	8.20	20.28	7.27	17.24	4.39	13.06		
	21.763	-13.47	22.112	-13.55	0.379	2.26	11.521	7.59	2.160	11.99	13.889	-8.84	0.162	0.29	22.177	-11.85	18.624	-19.20	9.49650	13
15	5.09	18.53	7.30	17.24	8.17	20.58	18.49	8.23	9.08	23.26	22.42	9.17	8.12	20.21	7.19	17.16	4.32	12.58		
	21.893	-12.80	22.342	-12.10	0.518	3.30	11.488	7.83	2.179	12.10	13.888	-8.83	0.168	0.33	22.182	-11.82	18.628	-19.20	9.62792	15
17	5.05	18.56	7.27	17.39	8.12	21.04	18.37	8.14	9.00	23.20	22.34	9.09	8.04	20.14	7.11	17.09	4.24	12.51		
	22.023	-12.11	22.570	-10.56	0.657	4.34	11.452	8.09	2.198	12.21	13.886	-8.81	0.174	0.37	22.187	-11.79	18.631	-19.20	9.75934	17
19	5.01	19.00	7.24	17.53	8.07	21.10	18.26	8.05	8.53	23.14	22.26	9.01	7.56	20.06	7.04	17.01	4.16	12.43		
	22.152	-11.40	22.796	-8.96	0.796	5.37	11.414	8.36	2.219	12.32	13.884	-8.79	0.180	0.41	22.192	-11.77	18.635	-19.19	9.89076	19
21	4.57	19.04	7.20	18.08	8.02	21.16	18.14	7.57	8.46	23.08	22.18	8.53	7.49	19.59	6.56	16.54	4.09	12.35		
	22.280	-10.69	23.017	-7.30	0.934	6.40	11.373	8.64	2.240	12.43	13.881	-8.76	0.186	0.45	22.197	-11.74	18.638	-19.19	10.02218	21
23	4.53	19.07	7.16	18.22	7.56	21.22	18.02	7.48	8.38	23.02	22.10	8.45	7.41	19.52	6.48	16.46	4.01	12.28		
	22.407	-9.96	23.232	-5.59	1.072	7.42	11.329	8.92	2.261	12.55	13.878	-8.74	0.192	0.49	22.201	-11.71	18.642	-19.19	10.15360	23
25	4.49	19.11	7.11	18.36	7.51	21.28	17.50	7.39	8.31	22.56	22.01	8.37	7.33	19.45	6.41	16.39	3.53	12.20		
	22.534	-9.22	23.438	-3.88	1.210	8.42	11.284	9.21	2.283	12.67	13.875	-8.71	0.199	0.53	22.206	-11.69	18.645	-19.18	10.28501	25
27	4.45	19.15	7.06	18.48	7.46	21.34	17.37	7.30	8.24	22.50	21.53	8.29	7.26	19.37	6.33	16.32	3.46	12.12		
	22.660	-8.47	23.632	-2.18	1.348	9.41	11.237	9.51	2.305	12.79	13.871	-8.68	0.205	0.58	22.211	-11.66	18.648	-19.18	10.41643	27
29	4.40	19.19	7.00	18.60	7.41	21.40	17.25	7.21	8.17	22.45	21.45	8.21	7.18	19.30	6.25	16.24	3.38	12.05		
	22.785	-7.72	23.810	-0.55	1.486	10.39	11.189	9.80	2.328	12.92	13.867	-8.65	0.212	0.62	22.216	-11.63	18.651	-19.18	10.54785	29

MARZEC 2012

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
61	1	Czw	988	22.52524	-12.15	22.5052	-7.20	0.99097	4.5804	22.07	62.674	0.4	54	632	1158.0	1725	951	1817.9	154	654	1
62	2	Pią	989	22.56490	-12.02	22.5436	-6.57	0.99121	5.5047	21.49	62.033	1.4	63	630	1157.8	1727	1043	1908.7	245	650	2
63	3	Sob	990	23.00456	-11.50	22.5820	-6.34	0.99145	6.4411	20.27	61.249	2.4	73	628	1157.6	1728	1145	1900.0	328	646	3
64	4	Nie	991	23.04421	-11.37	23.0204	-6.11	0.99170	7.3748	17.60	60.372	3.4	81	625	1157.4	1730	1254	2051.5	405	642	4
65	5	Pon	992	23.08387	-11.23	23.0547	-5.48	0.99195	8.3121	14.32	59.465	4.4	89	623	1157.1	1732	1410	2142.8	435	638	5
66	6	Wto	993	23.12352	-11.09	23.0929	-5.25	0.99220	9.2444	10.12	58.601	5.4	95	621	1156.9	1734	1529	2234.0	500	634	6
67	7	Śro	994	23.16318	-10.55	23.1311	-5.02	0.99246	10.1809	5.12	57.851	6.4	99	618	1156.7	1736	1651	2325.3	523	631	7
68	8	Czw	995	23.20283	-10.40	23.1653	-4.38	0.99272	11.1157	-0.12	57.279	0.1	100	616	1156.4	1738	1814	*****	544	627	8
69	9	Pią	996	23.24249	-10.24	23.2034	-4.15	0.99298	12.0641	-5.40	56.929	1.1	98	614	1156.2	1740	1940	017.4	605	623	9
70	10	Sob	997	23.28214	-10.09	23.2416	-3.51	0.99325	13.0250	-10.51	56.819	2.1	94	611	1155.9	1741	2106	110.8	629	619	10
71	11	Nie	998	23.32180	-9.53	23.2756	-3.28	0.99352	14.0044	-15.22	56.941	3.1	87	609	1155.6	1743	2230	206.0	655	615	11
72	12	Pon	999	23.36145	-9.37	23.3137	-3.04	0.99379	15.0019	-18.53	57.262	4.1	78	607	1155.4	1745	2350	303.2	728	611	12
73	13	Wto	000	23.40111	-9.21	23.3517	-2.40	0.99406	16.0101	-21.08	57.737	5.1	68	604	1155.1	1747	****	402.0	808	607	13
74	14	Śro	001	23.44076	-9.04	23.3857	-2.17	0.99434	17.0147	-22.01	58.313	6.1	57	602	1154.8	1749	102	501.3	859	603	14
75	15	Czw	002	23.48042	-8.47	23.4236	-1.53	0.99462	18.0126	-21.31	58.941	0.4	46	600	1154.5	1751	201	559.6	1000	559	15
76	16	Pią	003	23.52007	-8.30	23.4616	-1.29	0.99490	18.5856	-19.46	59.583	1.4	35	557	1154.2	1752	248	655.9	1109	555	16
77	17	Sob	004	23.55573	-8.13	23.4955	-1.06	0.99518	19.5342	-16.59	60.211	2.4	25	555	1154.0	1754	324	749.2	1222	551	17
78	18	Nie	005	23.59538	-7.56	23.5334	-0.42	0.99546	20.4540	-13.23	60.810	3.4	17	552	1153.7	1756	352	839.3	1336	547	18
79	19	Pon	006	0.03504	-7.38	23.5714	-0.18	0.99575	21.3509	-9.13	61.370	4.4	10	550	1153.4	1758	416	926.6	1449	543	19
80	20	Wto	007	0.07470	-7.20	0.0052	0.06	0.99603	22.2241	-4.43	61.889	5.4	5	548	1153.1	1800	435	1011.7	1600	539	20
81	21	Śro	008	0.11435	-7.03	0.0431	0.29	0.99631	23.0855	-0.06	62.361	6.4	1	545	1152.8	1801	453	1055.4	1710	535	21
82	22	Czw	009	0.15400	-6.45	0.0810	0.53	0.99660	23.5432	4.28	62.780	7.4	0	543	1152.5	1803	511	1138.2	1819	532	22
83	23	Pią	010	0.19366	-6.27	0.1148	1.17	0.99688	0.4009	8.47	63.135	0.8	1	540	1152.2	1805	529	1221.3	1928	528	23
84	24	Sob	011	0.23331	-6.09	0.1527	1.40	0.99716	1.2617	12.44	63.407	1.8	3	538	1151.9	1807	548	1304.7	2035	524	24
85	25	Nie	012	0.27297	-5.51	0.1905	2.04	0.99744	2.1323	16.07	63.576	2.8	7	536	1151.6	1809	610	1349.3	2141	520	25
85	25	Nie	012	23.27198	-5.51	0.1856	2.03	0.99743	2.1124	15.59	63.571	2.8	7	636	1251.6	1909	710	1449.3	2241	620	25
86	26	Pon	013	23.31164	-5.33	0.2235	2.27	0.99771	2.5939	18.44	63.618	3.8	13	633	1251.3	1911	736	1535.2	2344	616	26
87	27	Wto	014	23.35130	-5.15	0.2613	2.50	0.99799	3.4912	20.41	63.516	4.8	20	631	1251.0	1912	808	1622.5	****	612	27
88	28	Śro	015	23.39095	-4.57	0.2952	3.13	0.99827	4.3954	21.44	63.246	5.8	28	628	1250.7	1914	848	1711.0	043	608	28
89	29	Czw	016	23.43060	-4.39	0.3330	3.37	0.99855	5.3130	21.48	62.800	6.8	36	626	1250.4	1916	935	1800.5	136	604	29
90	30	Pią	017	23.47026	-4.21	0.3709	4.00	0.99883	6.2337	20.51	62.178	7.8	46	624	1250.1	1918	1032	1850.4	222	600	30
91	31	Sob	018	23.50592	-4.03	0.4047	4.23	0.99911	7.1554	18.53	61.401	0.6	56	621	1249.8	1920	1136	1940.4	300	556	31

Fazy Księżycyca [Dm, h.mm]: 1kw 1, 2.22 Pełn 8, 10.39 3kw 15, 2.25 Nów 22, 15.37 Nów 22, 16.37 1kw 30, 21.41

KWIECIEŃ 2012

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
92	1	Nie	019	23.54557	-3.45	0.4426	4.46	0.99939	8.0807	15.56	60.501	1.6	66	619	1249.5	1921	1247	2030.3	332	552	1	
93	2	Pon	020	23.58523	-3.28	0.4805	5.10	0.99967	9.0017	12.06	59.532	2.6	76	616	1249.2	1923	1402	2120.2	359	548	2	
94	3	Wto	021	0.02488	-3.10	0.5144	5.32	0.99996	9.5237	7.31	58.561	3.6	85	614	1248.9	1925	1521	2210.5	422	544	3	
95	4	Śro	022	0.06454	-2.52	0.5523	5.55	1.00024	10.4535	2.22	57.667	4.6	92	612	1248.6	1927	1643	2301.8	444	540	4	
96	5	Czw	023	0.10419	-2.35	0.5902	6.18	1.00052	11.3945	-3.03	56.931	5.6	97	609	1248.3	1928	1807	2354.7	505	536	5	
97	6	Pią	024	0.14385	-2.18	1.0242	6.41	1.00081	12.3545	-8.24	56.423	6.6	100	607	1248.0	1930	1934	*****	528	533	6	
98	7	Sob	025	0.18350	-2.01	1.0621	7.03	1.00110	13.3402	-13.19	56.191	0.6	99	605	1247.8	1932	2101	049.9	554	529	7	
99	8	Nie	026	0.22316	-1.44	1.1001	7.26	1.00139	14.3440	-17.23	56.251	1.6	96	602	1247.5	1934	2227	147.8	624	525	8	
100	9	Pon	027	0.26281	-1.28	1.1341	7.48	1.00167	15.3705	-20.14	56.586	2.6	90	600	1247.2	1936	2345	248.1	703	521	9	
101	10	Wto	028	0.30247	-1.12	1.1722	8.10	1.00196	16.4006	-21.40	57.150	3.6	82	558	1246.9	1937	****	349.7	751	517	10	
102	11	Śro	029	0.34212	-0.56	1.2102	8.32	1.00225	17.4210	-21.36	57.879	4.6	72	555	1246.7	1939	051	450.7	851	513	11	
103	12	Czw	030	0.38178	-0.40	1.2443	8.54	1.00254	18.4154	-20.11	58.702	5.6	61	553	1246.4	1941	144	549.6	1000	509	12	
104	13	Pią	031	0.42144	-0.25	1.2825	9.16	1.00283	19.3827	-17.38	59.552	6.6	50	551	1246.2	1943	224	645.0	1113	505	13	
105	14	Sob	032	0.46109	-0.10	1.3206	9.37	1.00312	20.3138	-14.13	60.377	1.0	40	548	1245.9	1945	256	736.7	1227	501	14	
106	15	Nie	033	0.50075	0.04	1.3548	9.59	1.00341	21.2148	-10.13	61.136	2.0	30	546	1245.7	1946	320	825.0	1340	457	15	
107	16	Pon	034	0.54040	0.18	1.3931	10.20	1.00369	22.0937	-5.50	61.807	3.0	21	544	1245.4	1948	341	910.5	1452	453	16	
108	17	Wto	035	0.58006	0.32	1.4314	10.41	1.00398	22.5549	-1.18	62.377	4.0	13	542	1245.2	1950	400	954.2	1601	449	17	
109	18	Śro	036	1.01571	0.45	1.4657	11.02	1.00426	23.4111	3.13	62.845	5.0	8	539	1245.0	1952	417	1036.9	1710	445	18	
110	19	Czw	037	1.05537	0.58	1.5041	11.23	1.00454	0.2626	7.34	63.211	6.0	3	537	1244.8	1954	435	1119.4	1818	441	19	
111	20	Pią	038	1.09502	1.11	1.5425	11.43	1.00481	1.1210	11.34	63.479	7.0	1	535	1244.6	1955	454	1202.5	1925	438	20	
112	21	Sob	039	1.13468	1.23	1.5809	12.04	1.00509	1.5851	15.06	63.649	0.1	0	533	1244.4	1957	515	1246.5	2031	434	21	
113	22	Nie	040	1.17433	1.34	2.0154	12.24	1.00536	2.4647	18.00	63.719	1.1	1	531	1244.2	1959	540	1332.0	2135	430	22	
114	23	Pon	041	1.21399	1.46	2.0540	12.44	1.00563	3.3602	20.09	63.681	2.1	4	528	1244.0	2001	610	1418.8	2236	426	23	
115	24	Wto	042	1.25364	1.56	2.0925	13.04	1.00589	4.2626	21.25	63.523	3.1	8	526	1243.8	2002	647	1507.0	2331	422	24	
116	25	Śro	043	1.29330	2.06	2.1312	13.23	1.00615	5.1739	21.43	63.235	4.1	14	524	1243.6	2004	732	1555.9	****	418	25	
117	26	Czw	044	1.33295	2.16	2.1659	13.43	1.00641	6.0912	21.03	62.805	5.1	22	522	1243.5	2006	825	1645.2	018	414	26	
118	27	Pią	045	1.37261	2.25	2.2046	14.02	1.00667	7.0041	19.23	62.230	6.1	30	520	1243.3	2008	926	1734.3	059	410	27	
119	28	Sob	046	1.41227	2.34	2.2434	14.20	1.00692	7.5149	16.46	61.514	7.1	40	518	1243.2	2010	1033	1823.0	132	406	28	
120	29	Nie	047	1.45192	2.42	2.2822	14.39	1.00717	8.4236	13.19	60.677	0.0	50	516	1243.0	2011	1144	1911.3	200	402	29	
121	30	Pon	048	1.49158	2.50	2.3211	14.57	1.00743	9.3316	9.07	59.752	1.0	61	514	1242.9	2013	1259	1959.7	224	358	30	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 21.19 3kw 13, 12.50 Now 21, 9.18 1kw 29, 11.57

KWIECIEŃ 2012 (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	4.15	21.27	5.48	17.38	7.22	0.10	15.21	5.53	7.23	22.17	20.28	7.13	6.15	18.35	5.21	15.25	2.34	11.01		
	0.741	4.77	23.626	-1.48	3.654	23.10	10.520	12.85	2.748	15.03	13.753	-7.92	0.322	1.34	22.287	-11.25	18.680	-19.14	12.65054	1
3	4.09	21.32	5.43	17.26	7.18	0.14	15.12	5.44	7.16	22.12	20.19	7.05	6.07	18.27	5.14	15.17	2.26	10.53		
	0.862	5.54	23.616	-2.10	3.784	23.65	10.499	12.88	2.777	15.17	13.744	-7.86	0.329	1.38	22.291	-11.22	18.680	-19.14	12.78196	3
5	4.03	21.37	5.38	17.17	7.13	0.18	15.03	5.35	7.09	22.06	20.11	6.57	5.60	18.20	5.06	15.10	2.18	10.45		
	0.984	6.30	23.629	-2.55	3.912	24.17	10.481	12.89	2.807	15.30	13.735	-7.81	0.335	1.43	22.295	-11.20	18.681	-19.14	12.91337	5
7	3.57	21.42	5.34	17.10	7.09	0.22	14.54	5.26	7.02	22.01	20.02	6.48	5.52	18.13	4.58	15.02	2.10	10.37		
	1.106	7.06	23.663	-2.83	4.038	24.65	10.466	12.89	2.836	15.44	13.726	-7.75	0.342	1.47	22.298	-11.18	18.681	-19.13	13.04479	7
9	3.50	21.47	5.30	17.04	7.05	0.25	14.46	5.17	6.55	21.56	19.53	6.40	5.44	18.06	4.50	14.55	2.02	10.30		
	1.228	7.80	23.716	-2.95	4.162	25.10	10.455	12.86	2.866	15.57	13.716	-7.70	0.349	1.52	22.302	-11.16	18.681	-19.13	13.17621	9
11	3.44	21.53	5.26	17.01	7.01	0.28	14.38	5.09	6.49	21.51	19.45	6.32	5.36	17.59	4.43	14.47	1.54	10.22		
	1.351	8.54	23.787	-2.90	4.284	25.52	10.447	12.81	2.896	15.71	13.707	-7.64	0.356	1.56	22.305	-11.15	18.681	-19.13	13.30763	11
13	3.37	21.58	5.22	16.59	6.57	0.31	14.30	5.00	6.42	21.45	19.36	6.24	5.29	17.51	4.35	14.40	1.46	10.14		
	1.474	9.26	23.873	-2.70	4.403	25.90	10.442	12.75	2.926	15.85	13.697	-7.59	0.363	1.60	22.309	-11.13	18.681	-19.13	13.43905	13
15	3.31	22.04	5.19	16.59	6.53	0.33	14.23	4.52	6.35	21.40	19.27	6.16	5.21	17.44	4.27	14.32	1.39	10.06		
	1.597	9.98	23.973	-2.36	4.519	26.25	10.440	12.67	2.957	15.98	13.687	-7.53	0.369	1.65	22.312	-11.11	18.681	-19.13	13.57047	15
17	3.24	22.10	5.15	17.01	6.49	0.35	14.15	4.43	6.28	21.35	19.18	6.08	5.13	17.37	4.19	14.24	1.31	9.58		
	1.720	10.69	0.086	-1.89	4.631	26.56	10.442	12.57	2.988	16.11	13.678	-7.48	0.376	1.69	22.315	-11.09	18.680	-19.13	13.70189	17
19	3.17	22.17	5.11	17.03	6.45	0.36	14.09	4.35	6.21	21.30	19.10	5.60	5.06	17.30	4.11	14.17	1.23	9.50		
	1.845	11.38	0.210	-1.30	4.739	26.83	10.446	12.45	3.018	16.25	13.668	-7.42	0.383	1.73	22.318	-11.08	18.680	-19.13	13.83330	19
21	3.09	22.23	5.08	17.07	6.41	0.37	14.02	4.27	6.14	21.25	19.01	5.51	4.58	17.22	4.04	14.09	1.15	9.42		
	1.969	12.06	0.344	-0.61	4.843	27.08	10.453	12.32	3.049	16.38	13.659	-7.37	0.389	1.77	22.321	-11.06	18.679	-19.13	13.96472	21
23	3.02	22.30	5.04	17.12	6.37	0.37	13.55	4.19	6.07	21.19	18.52	5.43	4.50	17.15	3.56	14.02	1.07	9.34		
	2.094	12.73	0.487	0.19	4.943	27.28	10.464	12.18	3.080	16.51	13.649	-7.31	0.396	1.81	22.324	-11.04	18.678	-19.13	14.09614	23
25	2.54	22.37	5.01	17.18	6.33	0.36	13.49	4.11	6.00	21.14	18.43	5.35	4.43	17.08	3.48	13.54	0.59	9.26		
	2.220	13.39	0.640	1.09	5.036	27.46	10.477	12.02	3.112	16.65	13.640	-7.26	0.402	1.85	22.327	-11.03	18.677	-19.13	14.22756	25
27	2.47	22.44	4.57	17.25	6.29	0.35	13.43	4.03	5.54	21.09	18.35	5.27	4.35	17.01	3.40	13.46	0.51	9.18		
	2.346	14.03	0.801	2.08	5.124	27.60	10.492	11.84	3.143	16.78	13.630	-7.21	0.408	1.89	22.330	-11.02	18.676	-19.13	14.35898	27
29	2.39	22.52	4.54	17.33	6.25	0.33	13.38	3.55	5.47	21.04	18.26	5.19	4.27	16.53	3.33	13.39	0.43	9.11		
	2.473	14.65	0.970	3.15	5.206	27.70	10.511	11.66	3.175	16.91	13.621	-7.16	0.414	1.93	22.332	-11.00	18.675	-19.13	14.49040	29

MAJ 2012

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
122	1	Wto	049	1.53123	2.57	2.3600	15.16	1.00767	10.2420	4.20	58.792	2.0	71	512	1242.8	2015	1416	2048.7	245	354	1	
123	2	Śro	050	1.57089	3.04	2.3950	15.33	1.00792	11.1628	-0.50	57.864	3.0	81	510	1242.7	2017	1536	2139.2	306	350	2	
124	3	Czw	051	2.01054	3.10	2.4340	15.51	1.00817	12.1028	-6.07	57.047	4.0	89	508	1242.6	2018	1700	2232.2	328	346	3	
125	4	Pią	052	2.05020	3.16	2.4731	16.08	1.00841	13.0701	-11.11	56.420	5.0	95	506	1242.5	2020	1826	2328.2	351	342	4	
126	5	Sob	053	2.08585	3.21	2.5123	16.25	1.00865	14.0635	-15.38	56.049	6.0	99	504	1242.4	2022	1953	*****	419	339	5	
127	6	Nie	054	2.12551	3.26	2.5515	16.42	1.00890	15.0860	-19.05	55.977	0.3	100	502	1242.3	2024	2117	027.7	453	335	6	
128	7	Pon	055	2.16516	3.30	2.5907	16.59	1.00914	16.1318	-21.10	56.212	1.3	98	500	1242.3	2025	2232	130.0	538	331	7	
129	8	Wto	056	2.20482	3.33	3.0300	17.15	1.00938	17.1748	-21.42	56.728	2.3	92	459	1242.2	2027	2333	233.3	634	327	8	
130	9	Śro	057	2.24447	3.36	3.0654	17.31	1.00961	18.2035	-20.44	57.466	3.3	85	457	1242.1	2029	****	335.6	741	323	9	
131	10	Czw	058	2.28413	3.38	3.1048	17.47	1.00985	19.2014	-18.27	58.354	4.3	76	455	1242.1	2030	020	434.8	856	319	10	
132	11	Pią	059	2.32379	3.40	3.1443	18.02	1.01008	20.1606	-15.11	59.310	5.3	66	453	1242.1	2032	056	529.8	1012	315	11	
133	12	Sob	060	2.36344	3.41	3.1839	18.17	1.01031	21.0819	-11.13	60.261	6.3	55	452	1242.1	2034	124	620.7	1128	311	12	
134	13	Nie	061	2.40310	3.41	3.2235	18.32	1.01054	21.5730	-6.52	61.147	0.5	45	450	1242.1	2035	146	708.1	1241	307	13	
135	14	Pon	062	2.44275	3.41	3.2632	18.46	1.01077	22.4429	-2.19	61.924	1.5	35	448	1242.1	2037	206	752.8	1352	303	14	
136	15	Wto	063	2.48241	3.40	3.3029	19.00	1.01099	23.3010	2.13	62.568	2.5	26	447	1242.1	2039	224	835.9	1501	259	15	
137	16	Śro	064	2.52206	3.39	3.3427	19.14	1.01121	0.1521	6.36	63.066	3.5	18	445	1242.1	2040	241	918.4	1609	255	16	
138	17	Czw	065	2.56172	3.37	3.3825	19.28	1.01142	1.0048	10.41	63.418	4.5	11	444	1242.1	2042	300	1001.1	1716	251	17	
139	18	Pią	066	3.00137	3.35	3.4224	19.41	1.01163	1.4705	14.18	63.633	5.5	6	442	1242.2	2043	320	1044.7	1822	247	18	
140	19	Sob	067	3.04103	3.32	3.4624	19.54	1.01184	2.3437	17.21	63.721	6.5	2	441	1242.2	2045	344	1129.4	1927	243	19	
141	20	Nie	068	3.08068	3.28	3.5024	20.06	1.01204	3.2333	19.41	63.695	7.5	0	439	1242.3	2046	412	1216.1	2029	240	20	
142	21	Pon	069	3.12034	3.24	3.5424	20.18	1.01223	4.1349	21.10	63.564	0.4	0	438	1242.3	2048	447	1303.9	2126	236	21	
143	22	Wto	070	3.15600	3.20	3.5826	20.30	1.01242	5.0502	21.42	63.334	1.4	2	437	1242.4	2049	529	1352.8	2216	232	22	
144	23	Śro	071	3.19565	3.14	4.0227	20.42	1.01261	5.5641	21.16	63.005	2.4	5	435	1242.5	2051	620	1442.2	2259	228	23	
145	24	Czw	072	3.23531	3.09	4.0629	20.53	1.01279	6.4813	19.49	62.578	3.4	10	434	1242.6	2052	719	1531.3	2334	224	24	
146	25	Pią	073	3.27497	3.03	4.1032	21.03	1.01297	7.3914	17.27	62.049	4.4	17	433	1242.7	2054	824	1619.9	****	220	25	
147	26	Sob	074	3.31462	2.56	4.1435	21.14	1.01314	8.2932	14.13	61.420	5.4	25	432	1242.8	2055	933	1707.6	003	216	26	
148	27	Nie	075	3.35428	2.49	4.1839	21.24	1.01331	9.1918	10.17	60.697	6.4	35	430	1242.9	2056	1045	1754.9	028	212	27	
149	28	Pon	076	3.39393	2.42	4.2243	21.33	1.01347	10.0856	5.46	59.901	7.4	45	429	1243.1	2058	1159	1842.2	050	208	28	
150	29	Wto	077	3.43359	2.34	4.2647	21.43	1.01363	10.5907	0.51	59.062	0.6	56	428	1243.2	2059	1316	1930.3	110	204	29	
151	30	Śro	078	3.47324	2.25	4.3052	21.51	1.01378	11.5038	-4.15	58.227	1.6	67	427	1243.3	2100	1435	2020.1	130	200	30	
152	31	Czw	079	3.51290	2.17	4.3457	21.60	1.01394	12.4422	-9.16	57.458	2.6	78	426	1243.5	2101	1557	2112.8	152	156	31	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 5.35 3kw 12, 23.47 Now 21, 1.47 1kw 28, 22.16

MAJ 2012 (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)	Dm	
1	2.30	23.00	4.51	17.42	6.21	0.30	13.32	3.47	5.40	20.59	18.17	5.11	4.19	16.46	3.25	13.31	0.35	9.03			
	2.600	15.26	1.147	4.29	5.280	27.78	10.532	11.45	3.206	17.04	13.612	-7.11	0.421	1.97	22.335	-10.99	18.674	-19.14	14.62182	1	
3	2.21	23.09	4.47	17.52	6.17	0.27	13.27	3.39	5.33	20.54	18.09	5.03	4.12	16.39	3.17	13.23	0.27	8.55			
	2.728	15.85	1.331	5.50	5.347	27.81	10.555	11.24	3.238	17.16	13.603	-7.06	0.427	2.01	22.337	-10.98	18.672	-19.14	14.75323	3	
5	2.12	23.18	4.44	18.02	6.12	0.22	13.22	3.32	5.26	20.49	18.00	4.54	4.04	16.31	3.09	13.16	0.19	8.47			
	2.856	16.42	1.525	6.77	5.405	27.82	10.580	11.01	3.270	17.29	13.594	-7.01	0.432	2.05	22.339	-10.97	18.671	-19.14	14.88465	5	
7	2.02	23.29	4.41	18.14	6.07	0.17	13.17	3.24	5.20	20.43	17.51	4.46	3.56	16.24	3.01	13.08	0.11	8.39			
	2.985	16.98	1.726	8.10	5.454	27.79	10.608	10.78	3.302	17.41	13.585	-6.96	0.438	2.08	22.341	-10.96	18.669	-19.14	15.01607	7	
9	1.50	23.41	4.38	18.26	6.03	0.11	13.13	3.17	5.13	20.38	17.43	4.38	3.49	16.17	2.54	13.00	0.03	8.31			
	3.115	17.52	1.937	9.47	5.494	27.73	10.637	10.53	3.334	17.54	13.577	-6.92	0.444	2.12	22.343	-10.95	18.667	-19.14	15.14749	9	
11	1.38	23.55	4.35	18.40	5.57	0.04	13.08	3.09	5.06	20.33	17.34	4.30	3.41	16.09	2.46	12.53	23.51	8.23			
	3.245	18.03	2.156	10.89	5.523	27.63	10.669	10.27	3.366	17.66	13.569	-6.88	0.449	2.15	22.345	-10.94	18.665	-19.14	15.27892	11	
13	1.21	0.26	4.33	18.54	5.52	23.52	13.04	3.02	4.59	20.28	17.26	4.22	3.33	16.02	2.38	12.45	23.43	8.15			
	3.376	18.53	2.386	12.33	5.542	27.50	10.703	10.00	3.398	17.78	13.561	-6.84	0.455	2.19	22.346	-10.93	18.663	-19.15	15.41034	13	
15	****	****	4.31	19.09	5.46	23.43	12.60	2.55	4.53	20.23	17.17	4.14	3.25	15.55	2.30	12.37	23.36	8.07			
	3.508	19.01	2.627	13.79	5.549	27.33	10.738	9.71	3.430	17.90	13.553	-6.80	0.460	2.22	22.348	-10.92	18.661	-19.15	15.54175	15	
17	****	****	4.29	19.25	5.40	23.33	12.56	2.47	4.46	20.18	17.09	4.06	3.18	15.47	2.22	12.30	23.28	7.59			
	3.640	19.46	2.879	15.25	5.545	27.12	10.775	9.42	3.462	18.02	13.546	-6.76	0.465	2.25	22.349	-10.91	18.658	-19.15	15.67317	17	
19	****	****	4.28	19.42	5.34	23.22	12.52	2.40	4.39	20.13	17.00	3.58	3.10	15.40	2.14	12.22	23.20	7.51			
	3.773	19.90	3.142	16.70	5.529	26.87	10.814	9.12	3.494	18.14	13.538	-6.72	0.470	2.29	22.350	-10.91	18.656	-19.15	15.80459	19	
21	****	****	4.27	19.60	5.27	23.10	12.48	2.33	4.33	20.07	16.52	3.50	3.02	15.33	2.07	12.14	23.12	7.43			
	3.907	20.31	3.416	18.11	5.502	26.58	10.854	8.81	3.526	18.26	13.531	-6.69	0.475	2.32	22.351	-10.90	18.653	-19.16	15.93601	21	
23	****	****	4.27	20.18	5.20	22.56	12.44	2.26	4.26	20.02	16.43	3.41	2.55	15.25	1.59	12.06	23.04	7.35			
	4.041	20.69	3.702	19.46	5.462	26.24	10.896	8.49	3.559	18.37	13.525	-6.66	0.480	2.35	22.352	-10.90	18.651	-19.16	16.06743	23	
25	****	****	4.28	20.37	5.12	22.42	12.41	2.19	4.19	19.57	16.35	3.33	2.47	15.18	1.51	11.58	22.56	7.27			
	4.176	21.06	3.997	20.73	5.412	25.86	10.939	8.17	3.591	18.48	13.519	-6.63	0.485	2.37	22.353	-10.90	18.648	-19.16	16.19886	25	
27	****	****	4.30	20.56	5.04	22.27	12.38	2.12	4.12	19.52	16.26	3.25	2.39	15.10	1.43	11.51	22.48	7.18			
	4.311	21.39	4.301	21.88	5.352	25.43	10.984	7.83	3.623	18.60	13.513	-6.60	0.489	2.40	22.354	-10.89	18.645	-19.17	16.33028	27	
29	****	****	4.33	21.14	4.56	22.11	12.34	2.05	4.06	19.47	16.18	3.17	2.31	15.03	1.35	11.43	22.40	7.10			
	4.446	21.71	4.610	22.89	5.282	24.96	11.030	7.48	3.655	18.71	13.507	-6.57	0.493	2.43	22.354	-10.89	18.642	-19.17	16.46169	29	
31	****	****	4.37	21.31	4.48	21.54	12.31	1.58	3.59	19.41	16.10	3.09	2.24	14.55	1.27	11.35	22.32	7.02			
	4.583	22.00	4.922	23.74	5.205	24.45	11.078	7.13	3.687	18.81	13.502	-6.55	0.497	2.45	22.355	-10.89	18.639	-19.18	16.59311	31	

CZERWIEC 2012

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
153	1	Pią	080	3.55255	2.08	4.3903	22.08	1.01408	13.4103	-13.52	56.822	3.6	87	426	1243.6	2102	1722	2209.0	216	152	1	
154	2	Sob	081	3.59221	1.58	4.4309	22.16	1.01423	14.4102	-17.43	56.387	4.6	94	425	1243.8	2104	1846	2308.8	246	148	2	
155	3	Nie	082	4.03186	1.48	4.4716	22.23	1.01437	15.4401	-20.24	56.208	5.6	98	424	1243.9	2105	2006	*****	325	145	3	
156	4	Pon	083	4.07152	1.38	4.5122	22.30	1.01452	16.4844	-21.39	56.314	6.6	100	423	1244.1	2106	2115	011.5	414	141	4	
157	5	Wto	084	4.11118	1.28	4.5529	22.37	1.01465	17.5317	-21.20	56.703	0.9	99	423	1244.3	2107	2210	115.2	517	137	5	
158	6	Śro	085	4.15083	1.17	4.5937	22.43	1.01479	18.5544	-19.32	57.340	1.9	95	422	1244.5	2108	2252	217.3	630	133	6	
159	7	Czw	086	4.19049	1.06	5.0344	22.48	1.01492	19.5445	-16.33	58.166	2.9	88	421	1244.7	2108	2324	316.1	748	129	7	
160	8	Pią	087	4.23015	0.54	5.0752	22.54	1.01505	20.4956	-12.42	59.104	3.9	80	421	1244.8	2109	2349	410.7	907	125	8	
161	9	Sob	088	4.26580	0.43	5.1201	22.59	1.01517	21.4133	-8.20	60.075	4.9	70	420	1245.0	2110	****	501.1	1024	121	9	
162	10	Nie	089	4.30546	0.31	5.1609	23.03	1.01530	22.3022	-3.43	61.007	5.9	60	420	1245.2	2111	011	548.1	1138	117	10	
163	11	Pon	090	4.34511	0.18	5.2018	23.07	1.01541	23.1714	0.56	61.840	6.9	50	420	1245.4	2112	030	632.8	1249	113	11	
164	12	Wto	091	4.38477	0.06	5.2427	23.11	1.01553	0.0304	5.25	62.533	1.0	40	419	1245.6	2112	048	716.1	1358	109	12	
165	13	Śro	092	4.42442	-0.07	5.2836	23.14	1.01564	0.4842	9.37	63.060	2.0	31	419	1245.9	2113	106	759.0	1506	105	13	
166	14	Czw	093	4.46408	-0.19	5.3245	23.17	1.01574	1.3450	13.24	63.411	3.0	23	419	1246.1	2114	126	842.4	1613	101	14	
167	15	Pią	094	4.50373	-0.32	5.3655	23.20	1.01584	2.2160	16.37	63.590	4.0	15	419	1246.3	2114	148	926.8	1718	057	15	
168	16	Sob	095	4.54339	-0.45	5.4104	23.22	1.01593	3.1032	19.09	63.612	5.0	9	419	1246.5	2115	214	1012.6	1821	053	16	
169	17	Nie	096	4.58305	-0.58	5.4514	23.24	1.01602	4.0030	20.52	63.496	6.0	4	419	1246.7	2115	247	1100.1	1920	049	17	
170	18	Pon	097	5.02270	-1.11	5.4924	23.25	1.01610	4.5140	21.40	63.265	7.0	1	419	1246.9	2115	327	1148.9	2013	046	18	
171	19	Wto	098	5.06236	-1.25	5.5333	23.26	1.01618	5.4333	21.29	62.939	8.0	0	419	1247.2	2116	415	1238.5	2058	042	19	
172	20	Śro	099	5.10201	-1.38	5.5743	23.26	1.01625	6.3534	20.18	62.539	0.8	1	419	1247.4	2116	511	1328.2	2136	038	20	
173	21	Czw	100	5.14167	-1.51	6.0153	23.26	1.01631	7.2710	18.08	62.078	1.8	3	419	1247.6	2116	615	1417.4	2208	034	21	
174	22	Pią	101	5.18133	-2.04	6.0602	23.26	1.01637	8.1759	15.05	61.565	2.8	8	419	1247.8	2116	724	1505.8	2234	030	22	
175	23	Sob	102	5.22098	-2.17	6.1012	23.25	1.01642	9.0760	11.18	61.007	3.8	14	420	1248.0	2116	835	1553.3	2257	026	23	
176	24	Nie	103	5.26064	-2.30	6.1421	23.24	1.01646	9.5727	6.55	60.408	4.8	22	420	1248.2	2116	949	1640.2	2317	022	24	
177	25	Pon	104	5.30029	-2.43	6.1831	23.22	1.01651	10.4653	2.09	59.777	5.8	31	420	1248.5	2116	1103	1727.3	2337	018	25	
178	26	Wto	105	5.33595	-2.55	6.2240	23.20	1.01654	11.3701	-2.49	59.128	6.8	42	421	1248.7	2116	1220	1815.3	2357	014	26	
179	27	Śro	106	5.37560	-3.08	6.2649	23.18	1.01657	12.2841	-7.46	58.487	0.3	53	421	1248.9	2116	1339	1905.3	****	010	27	
180	28	Czw	107	5.41526	-3.20	6.3058	23.15	1.01660	13.2240	-12.24	57.889	1.3	64	422	1249.1	2116	1500	1958.1	020	006	28	
181	29	Pią	108	5.45491	-3.32	6.3506	23.11	1.01662	14.1936	-16.25	57.380	2.3	75	423	1249.3	2116	1621	2054.3	046	002	29	
182	30	Sob	109	5.49457	-3.44	6.3915	23.08	1.01664	15.1939	-19.29	57.010	3.3	84	423	1249.5	2115	1741	2153.9	119	2354	30	

Fazy Księżyca [Dm, h.mm]: Pełn 4, 13.12 3kw 11, 12.41 Now 19, 17.02 1kw 27, 5.30

CZERWIEC 2012 (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	*****	*****	4.40	21.40	4.44	21.45	12.30	1.54	3.56	19.39	16.06	3.05	2.20	14.52	1.24	11.31	22.28	6.58		
	4.651	22.13	5.079	24.11	5.165	24.17	11.102	6.95	3.703	18.87	13.499	-6.54	0.499	2.47	22.355	-10.89	18.638	-19.18	16.65882	1
3	*****	*****	4.45	21.55	4.36	21.28	12.27	1.47	3.49	19.34	15.57	2.57	2.12	14.44	1.16	11.23	22.19	6.50		
	4.788	22.38	5.389	24.69	5.080	23.61	11.151	6.59	3.735	18.97	13.494	-6.52	0.503	2.49	22.355	-10.89	18.635	-19.18	16.79024	3
5	*****	*****	4.52	22.09	4.27	21.10	12.24	1.40	3.42	19.28	15.49	2.49	2.04	14.36	1.08	11.15	22.11	6.42		
	4.925	22.61	5.695	25.09	4.993	23.02	11.202	6.22	3.767	19.08	13.490	-6.50	0.507	2.51	22.355	-10.89	18.632	-19.19	16.92167	5
7	*****	*****	5.01	22.21	4.19	20.53	12.21	1.33	3.36	19.23	15.41	2.41	1.56	14.29	0.60	11.07	22.03	6.34		
	5.062	22.81	5.993	25.31	4.907	22.41	11.253	5.84	3.798	19.18	13.486	-6.49	0.510	2.54	22.355	-10.89	18.629	-19.19	17.05309	7
9	*****	*****	5.09	22.31	4.11	20.35	12.19	1.27	3.29	19.18	15.33	2.33	1.49	14.21	0.52	10.60	21.55	6.26		
	5.200	22.98	6.281	25.36	4.823	21.80	11.306	5.45	3.830	19.28	13.482	-6.47	0.514	2.56	22.355	-10.90	18.625	-19.20	17.18451	9
11	*****	*****	5.19	22.38	4.02	20.18	12.16	1.20	3.23	19.12	15.25	2.25	1.41	14.14	0.44	10.52	21.47	6.18		
	5.338	23.12	6.557	25.25	4.743	21.20	11.359	5.06	3.862	19.38	13.479	-6.46	0.517	2.58	22.354	-10.90	18.622	-19.20	17.31593	11
13	*****	*****	5.29	22.44	3.54	20.02	12.14	1.13	3.16	19.07	15.17	2.17	1.33	14.06	0.36	10.44	21.39	6.10		
	5.477	23.24	6.821	25.00	4.670	20.62	11.414	4.66	3.893	19.47	13.476	-6.45	0.520	2.59	22.354	-10.90	18.619	-19.21	17.44735	13
15	*****	*****	5.39	22.48	3.46	19.46	12.11	1.06	3.09	19.02	15.09	2.09	1.25	13.59	0.28	10.36	21.31	6.02		
	5.615	23.33	7.071	24.63	4.604	20.07	11.469	4.26	3.924	19.57	13.474	-6.45	0.523	2.61	22.353	-10.91	18.615	-19.21	17.57877	15
17	*****	*****	5.50	22.50	3.39	19.31	12.09	0.60	3.03	18.56	15.01	2.01	1.17	13.51	0.21	10.28	21.23	5.54		
	5.754	23.39	7.307	24.14	4.548	19.56	11.525	3.84	3.956	19.66	13.472	-6.45	0.526	2.63	22.352	-10.91	18.612	-19.22	17.71019	17
19	*****	*****	5.60	22.51	3.31	19.17	12.07	0.53	2.56	18.51	14.53	1.53	1.10	13.43	0.13	10.20	21.15	5.45		
	5.893	23.43	7.528	23.55	4.502	19.10	11.583	3.43	3.987	19.75	13.470	-6.45	0.528	2.64	22.352	-10.92	18.608	-19.22	17.84161	19
21	*****	*****	6.09	22.50	3.24	19.05	12.05	0.46	2.49	18.46	14.45	1.45	1.02	13.36	0.05	10.12	21.07	5.37		
	6.031	23.44	7.735	22.89	4.466	18.69	11.641	3.01	4.017	19.84	13.469	-6.45	0.530	2.65	22.351	-10.93	18.605	-19.23	17.97304	21
23	*****	*****	6.19	22.48	3.17	18.53	12.03	0.40	2.43	18.40	14.37	1.37	0.54	13.28	23.53	10.04	20.59	5.29		
	6.170	23.42	7.927	22.17	4.440	18.34	11.700	2.58	4.048	19.93	13.468	-6.45	0.532	2.67	22.349	-10.93	18.601	-19.24	18.10446	23
25	*****	*****	6.27	22.45	3.10	18.42	12.01	0.33	2.36	18.35	14.29	1.29	0.46	13.20	23.45	9.56	20.51	5.21		
	6.309	23.37	8.103	21.39	4.426	18.04	11.760	2.14	4.079	20.01	13.468	-6.46	0.534	2.68	22.348	-10.94	18.598	-19.24	18.23588	25
27	*****	*****	6.35	22.41	3.04	18.33	11.59	0.27	2.29	18.29	14.21	1.21	0.38	13.13	23.37	9.48	20.43	5.13		
	6.447	23.29	8.265	20.58	4.422	17.81	11.821	1.71	4.109	20.09	13.468	-6.47	0.536	2.69	22.347	-10.95	18.594	-19.25	18.36729	27
29	*****	*****	6.41	22.36	2.57	18.24	11.57	0.20	2.23	18.24	14.13	1.14	0.31	13.05	23.29	9.40	20.35	5.05		
	6.585	23.19	8.410	19.76	4.428	17.63	11.882	1.26	4.139	20.18	13.468	-6.48	0.537	2.70	22.345	-10.96	18.591	-19.26	18.49871	29

LIPIEC 2012

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
183	1	Nie	110	5.53423	-3.55	6.4323	23.04	1.01665	16.2213	-21.18	56.826	4.3	92	424	1249.7	2115	1854	2255.8	202	2350	1
184	2	Pon	111	5.57388	-4.07	6.4731	22.59	1.01666	17.2558	-21.39	56.865	5.3	97	425	1249.9	2115	1956	2358.1	257	2347	2
185	3	Wto	112	6.01354	-4.17	6.5138	22.54	1.01667	18.2905	-20.30	57.142	6.3	100	425	1250.0	2114	2044	*****	404	2343	3
186	4	Śro	113	6.05319	-4.28	6.5545	22.49	1.01668	19.2954	-18.00	57.645	0.6	99	426	1250.2	2114	2121	058.7	520	2339	4
187	5	Czw	114	6.09285	-4.38	6.5952	22.43	1.01668	20.2727	-14.27	58.339	1.6	96	427	1250.4	2113	2150	156.0	640	2335	5
188	6	Pią	115	6.13251	-4.48	7.0359	22.37	1.01667	21.2131	-10.12	59.166	2.6	91	428	1250.6	2112	2214	249.4	759	2331	6
189	7	Sob	116	6.17216	-4.58	7.0805	22.31	1.01667	22.1231	-5.33	60.058	3.6	84	429	1250.7	2112	2234	339.1	916	2327	7
190	8	Nie	117	6.21182	-5.07	7.1210	22.24	1.01666	23.0108	-0.48	60.943	4.6	75	430	1250.9	2111	2253	426.0	1031	2323	8
191	9	Pon	118	6.25147	-5.16	7.1616	22.17	1.01664	23.4813	3.51	61.757	5.6	66	431	1251.0	2110	2312	510.9	1142	2319	9
192	10	Wto	119	6.29113	-5.24	7.2021	22.09	1.01662	0.3436	8.14	62.446	6.6	56	432	1251.2	2109	2331	554.7	1252	2315	10
193	11	Śro	120	6.33078	-5.32	7.2425	22.01	1.01660	1.2101	12.11	62.971	0.3	47	433	1251.3	2108	2353	638.4	1359	2311	11
194	12	Czw	121	6.37044	-5.40	7.2829	21.53	1.01657	2.0805	15.37	63.310	1.3	37	435	1251.4	2107	****	722.7	1506	2307	12
195	13	Pią	122	6.41009	-5.47	7.3233	21.44	1.01654	2.5616	18.22	63.457	2.3	28	436	1251.5	2106	017	808.1	1610	2303	13
196	14	Sob	123	6.44575	-5.54	7.3636	21.35	1.01650	3.4547	20.22	63.419	3.3	20	437	1251.6	2105	047	855.0	1711	2259	14
197	15	Nie	124	6.48541	-5.60	7.4039	21.25	1.01646	4.3635	21.28	63.216	4.3	13	438	1251.7	2104	124	943.2	1806	2255	15
198	16	Pon	125	6.52506	-6.05	7.4441	21.16	1.01641	5.2822	21.36	62.877	5.3	7	440	1251.8	2103	209	1032.7	1855	2252	16
199	17	Wto	126	6.56472	-6.10	7.4843	21.05	1.01635	6.2037	20.43	62.436	6.3	3	441	1251.9	2102	302	1122.6	1936	2248	17
200	18	Śro	127	7.00437	-6.15	7.5244	20.55	1.01629	7.1249	18.51	61.927	7.3	1	442	1252.0	2101	404	1212.6	2010	2244	18
201	19	Czw	128	7.04403	-6.19	7.5645	20.44	1.01623	8.0429	16.02	61.383	0.2	0	444	1252.1	2100	512	1301.9	2038	2240	19
202	20	Pią	129	7.08369	-6.23	8.0045	20.32	1.01615	8.5525	12.24	60.831	1.2	2	445	1252.1	2058	623	1350.4	2103	2236	20
203	21	Sob	130	7.12334	-6.26	8.0444	20.21	1.01607	9.4543	8.08	60.291	2.2	5	446	1252.2	2057	737	1438.3	2124	2232	21
204	22	Nie	131	7.16300	-6.28	8.0843	20.09	1.01599	10.3541	3.24	59.778	3.2	11	448	1252.2	2055	853	1525.8	2145	2228	22
205	23	Pon	132	7.20265	-6.30	8.1241	19.57	1.01590	11.2555	-1.33	59.297	4.2	19	449	1252.2	2054	1009	1613.8	2205	2224	23
206	24	Wto	133	7.24231	-6.31	8.1639	19.44	1.01580	12.1706	-6.30	58.853	5.2	29	451	1252.3	2053	1127	1702.9	2226	2220	24
207	25	Śro	134	7.28196	-6.31	8.2036	19.31	1.01570	13.0957	-11.10	58.453	6.2	39	452	1252.3	2051	1246	1754.0	2251	2216	25
208	26	Czw	135	7.32162	-6.31	8.2433	19.18	1.01560	14.0505	-15.18	58.107	0.0	50	454	1252.3	2050	1406	1847.8	2321	2212	26
209	27	Pią	136	7.36127	-6.31	8.2829	19.04	1.01549	15.0249	-18.35	57.832	1.0	62	455	1252.3	2048	1525	1944.5	2358	2208	27
210	28	Sob	137	7.40093	-6.29	8.3224	18.50	1.01537	16.0255	-20.45	57.650	2.0	73	457	1252.2	2046	1638	2043.7	0**	2204	28
211	29	Nie	138	7.44059	-6.27	8.3618	18.36	1.01525	17.0433	-21.35	57.590	3.0	82	459	1252.2	2045	1743	2144.1	047	2200	29
212	30	Pon	139	7.48024	-6.25	8.4012	18.21	1.01513	18.0623	-21.01	57.676	4.0	90	500	1252.2	2043	1836	2244.0	147	2156	30
213	31	Wto	140	7.51590	-6.22	8.4406	18.07	1.01501	19.0656	-19.04	57.925	5.0	96	502	1252.1	2041	1917	2341.8	257	2153	31

Fazy Księżyca [Dm, h.mm]: Pełn 3, 20.52 3kw 11, 3.48 Now 19, 6.24 1kw 26, 10.56

LIPIEC 2012 (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	*****	*****	6.47	22.31	2.51	18.16	11.55	0.14	2.16	18.18	14.06	1.06	0.23	12.57	23.21	9.32	20.27	4.57		
	6.723	23.06	8.540	18.92	4.444	17.50	11.944	0.82	4.169	20.25	13.469	-6.49	0.539	2.70	22.343	-10.97	18.587	-19.26	18.63013	1
3	*****	*****	6.51	22.24	2.45	18.09	11.54	0.07	2.09	18.13	13.58	0.58	0.15	12.49	23.13	9.24	20.19	4.49		
	6.861	22.91	8.652	18.09	4.470	17.42	12.007	0.37	4.198	20.33	13.470	-6.51	0.540	2.71	22.342	-10.98	18.584	-19.27	18.76156	3
5	*****	*****	6.55	22.16	2.40	18.03	11.52	23.57	2.03	18.07	13.50	0.50	0.07	12.42	23.06	9.16	20.11	4.41		
	6.998	22.72	8.748	17.27	4.505	17.38	12.071	-0.09	4.227	20.41	13.472	-6.53	0.541	2.71	22.340	-10.99	18.580	-19.28	18.89298	5
7	*****	*****	6.56	22.08	2.35	17.58	11.50	23.50	1.56	18.02	13.43	0.42	23.55	12.34	22.58	9.08	20.03	4.32		
	7.135	22.51	8.825	16.50	4.548	17.39	12.135	-0.55	4.256	20.48	13.474	-6.55	0.541	2.72	22.338	-11.01	18.577	-19.28	19.02440	7
9	*****	*****	6.56	21.59	2.30	17.54	11.49	23.44	1.50	17.56	13.35	0.34	23.48	12.26	22.50	8.60	19.55	4.24		
	7.271	22.28	8.883	15.77	4.600	17.44	12.200	-1.01	4.285	20.55	13.477	-6.58	0.542	2.72	22.336	-11.02	18.573	-19.29	19.15582	9
11	*****	*****	6.55	21.50	2.25	17.50	11.47	23.37	1.43	17.50	13.28	0.26	23.40	12.18	22.42	8.52	19.47	4.16		
	7.407	22.02	8.922	15.11	4.659	17.52	12.266	-1.48	4.314	20.62	13.480	-6.60	0.542	2.72	22.334	-11.03	18.570	-19.30	19.28724	11
13	*****	*****	6.52	21.39	2.20	17.46	11.46	23.31	1.36	17.44	13.20	0.19	23.32	12.10	22.34	8.44	19.39	4.08		
	7.542	21.73	8.941	14.52	4.725	17.62	12.332	-1.94	4.342	20.69	13.483	-6.63	0.542	2.72	22.331	-11.05	18.566	-19.30	19.41866	13
15	*****	*****	6.47	21.28	2.16	17.44	11.45	23.25	1.30	17.39	13.13	0.11	23.24	12.02	22.26	8.36	19.31	3.60		
	7.677	21.42	8.939	14.03	4.797	17.75	12.399	-2.41	4.369	20.75	13.486	-6.66	0.542	2.72	22.329	-11.06	18.563	-19.31	19.55008	15
17	*****	*****	6.40	21.17	2.12	17.42	11.43	23.18	1.23	17.33	13.05	0.03	23.16	11.55	22.18	8.27	19.23	3.52		
	7.812	21.09	8.916	13.65	4.876	17.90	12.467	-2.89	4.397	20.82	13.491	-6.70	0.542	2.71	22.326	-11.08	18.560	-19.32	19.68151	17
19	*****	*****	6.31	21.05	2.08	17.40	11.42	23.12	1.16	17.27	12.58	23.51	23.08	11.47	22.10	8.19	19.15	3.44		
	7.946	20.73	8.874	13.39	4.960	18.06	12.535	-3.37	4.424	20.88	13.495	-6.73	0.542	2.71	22.324	-11.09	18.556	-19.33	19.81293	19
21	*****	*****	6.20	20.52	2.04	17.39	11.41	23.06	1.10	17.21	12.50	23.43	23.00	11.39	22.02	8.11	19.07	3.36		
	8.079	20.35	8.812	13.26	5.050	18.23	12.605	-3.84	4.451	20.94	13.500	-6.77	0.541	2.70	22.321	-11.11	18.553	-19.33	19.94435	21
23	*****	*****	6.08	20.40	2.01	17.38	11.40	22.59	1.03	17.15	12.43	23.36	22.52	11.31	21.54	8.03	18.59	3.27		
	8.211	19.94	8.735	13.27	5.145	18.41	12.674	-4.32	4.477	20.99	13.505	-6.81	0.540	2.70	22.318	-11.12	18.550	-19.34	20.07576	23
25	*****	*****	5.54	20.28	1.58	17.37	11.39	22.53	0.56	17.10	12.36	23.28	22.45	11.23	21.46	7.55	18.51	3.19		
	8.343	19.52	8.646	13.41	5.245	18.59	12.745	-4.81	4.503	21.05	13.511	-6.85	0.539	2.69	22.315	-11.14	18.547	-19.35	20.20718	25
27	*****	*****	5.39	20.16	1.55	17.36	11.38	22.47	0.49	17.04	12.28	23.20	22.37	11.15	21.38	7.47	18.43	3.11		
	8.475	19.07	8.550	13.68	5.349	18.77	12.816	-5.29	4.528	21.10	13.517	-6.90	0.538	2.68	22.313	-11.16	18.544	-19.36	20.33860	27
29	1.18	0.03	5.23	20.04	1.52	17.36	11.37	22.41	0.43	16.58	12.21	23.12	22.29	11.07	21.30	7.39	18.35	3.03		
	8.605	18.60	8.454	14.05	5.457	18.95	12.888	-5.78	4.553	21.16	13.523	-6.94	0.536	2.67	22.310	-11.18	18.541	-19.37	20.47002	29
31	1.39	23.59	5.07	19.54	1.50	17.36	11.36	22.35	0.36	16.52	12.14	23.05	22.21	10.59	21.23	7.31	18.27	2.55		
	8.735	18.11	8.365	14.52	5.570	19.13	12.960	-6.26	4.578	21.20	13.530	-6.99	0.535	2.66	22.307	-11.19	18.538	-19.37	20.60144	31

SIERPIEŃ 2012

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
214	1	Śro	141	7.55555	-6.18	8.4759	17.51	1.01488	20.0506	-15.59	58.339	6.0	99	503	1252.0	2040	1950	*****	414	2149	1
215	2	Czw	142	7.59521	-6.14	8.5151	17.36	1.01475	21.0021	-12.02	58.905	0.3	100	505	1252.0	2038	2016	036.6	533	2145	2
216	3	Pią	143	8.03487	-6.09	8.5542	17.20	1.01461	21.5246	-7.32	59.590	1.3	98	507	1251.9	2036	2038	128.1	652	2141	3
217	4	Sob	144	8.07452	-6.03	8.5933	17.04	1.01448	22.4248	-2.46	60.345	2.3	94	508	1251.8	2034	2058	216.7	808	2137	4
218	5	Nie	145	8.11417	-5.57	9.0324	16.48	1.01434	23.3107	1.59	61.114	3.3	88	510	1251.7	2032	2117	303.1	922	2133	5
219	6	Pon	146	8.15383	-5.50	9.0713	16.32	1.01419	0.1826	6.31	61.840	4.3	80	512	1251.6	2030	2136	348.1	1033	2129	6
220	7	Wto	147	8.19348	-5.43	9.1103	16.15	1.01405	1.0527	10.41	62.466	5.3	72	513	1251.5	2028	2157	432.5	1143	2125	7
221	8	Śro	148	8.23314	-5.35	9.1451	15.58	1.01390	1.5245	14.20	62.948	6.3	63	515	1251.3	2027	2221	517.1	1250	2121	8
222	9	Czw	149	8.27279	-5.26	9.1839	15.40	1.01375	2.4048	17.21	63.253	7.3	54	517	1251.2	2025	2249	602.3	1356	2117	9
223	10	Pią	150	8.31245	-5.17	9.2227	15.23	1.01359	3.2954	19.36	63.361	0.6	44	518	1251.0	2023	2322	648.7	1458	2113	10
224	11	Sob	151	8.35211	-5.07	9.2614	15.05	1.01343	4.2009	21.01	63.269	1.6	35	520	1250.9	2021	****	736.3	1556	2109	11
225	12	Nie	152	8.39176	-4.57	9.3000	14.47	1.01326	5.1123	21.30	62.990	2.6	26	522	1250.7	2018	004	825.0	1647	2105	12
226	13	Pon	153	8.43142	-4.47	9.3346	14.29	1.01310	6.0318	20.59	62.550	3.6	18	523	1250.5	2016	053	914.6	1731	2101	13
227	14	Wto	154	8.47108	-4.35	9.3731	14.10	1.01292	6.5528	19.29	61.985	4.6	11	525	1250.3	2014	151	1004.5	1809	2057	14
228	15	Śro	155	8.51073	-4.24	9.4116	13.51	1.01274	7.4729	17.00	61.341	5.6	6	527	1250.1	2012	256	1054.2	1840	2054	15
229	16	Czw	156	8.55039	-4.11	9.4500	13.32	1.01256	8.3907	13.39	60.668	6.6	2	529	1249.9	2010	407	1143.5	1906	2050	16
230	17	Pią	157	8.59004	-3.59	9.4844	13.13	1.01237	9.3019	9.33	60.013	7.6	0	530	1249.7	2008	521	1232.4	1929	2046	17
231	18	Sob	158	9.02570	-3.45	9.5227	12.54	1.01217	10.2118	4.54	59.417	0.8	1	532	1249.5	2006	637	1321.1	1950	2042	18
232	19	Nie	159	9.06535	-3.32	9.5610	12.34	1.01198	11.1229	-0.04	58.912	1.8	4	534	1249.3	2004	754	1409.9	2011	2038	19
233	20	Pon	160	9.10501	-3.17	9.5953	12.14	1.01177	12.0425	-5.06	58.514	2.8	9	535	1249.0	2001	913	1459.7	2033	2034	20
234	21	Wto	161	9.14466	-3.03	10.0334	11.54	1.01156	12.5742	-9.55	58.230	3.8	17	537	1248.8	1959	1033	1551.1	2057	2030	21
235	22	Śro	162	9.18432	-2.47	10.0716	11.34	1.01135	13.5248	-14.13	58.054	4.8	26	539	1248.5	1957	1154	1644.5	2126	2026	22
236	23	Czw	163	9.22397	-2.32	10.1057	11.14	1.01113	14.5000	-17.42	57.975	5.8	37	541	1248.3	1955	1313	1740.3	2201	2022	23
237	24	Pią	164	9.26363	-2.16	10.1437	10.53	1.01091	15.4907	-20.07	57.983	6.8	48	542	1248.0	1953	1428	1838.1	2245	2018	24
238	25	Sob	165	9.30328	-1.59	10.1817	10.33	1.01069	16.4928	-21.17	58.071	0.8	60	544	1247.7	1950	1534	1937.0	2340	2014	25
239	26	Nie	166	9.34294	-1.42	10.2157	10.12	1.01046	17.5000	-21.06	58.237	1.8	70	546	1247.4	1948	1630	2035.6	****	2010	26
240	27	Pon	167	9.38259	-1.25	10.2536	9.51	1.01023	18.4931	-19.37	58.483	2.8	80	547	1247.2	1946	1714	2132.7	045	2006	27
241	28	Wto	168	9.42225	-1.07	10.2915	9.30	1.01000	19.4703	-16.57	58.814	3.8	88	549	1246.9	1943	1749	2227.3	158	2002	28
242	29	Śro	169	9.46191	-0.49	10.3253	9.08	1.00977	20.4207	-13.23	59.232	4.8	95	551	1246.6	1941	1817	2319.1	314	1959	29
243	30	Czw	170	9.50156	-0.30	10.3631	8.47	1.00953	21.3442	-9.09	59.734	5.8	98	553	1246.3	1939	1841	*****	431	1955	30
244	31	Pią	171	9.54121	-0.11	10.4009	8.25	1.00930	22.2507	-4.33	60.306	6.8	100	554	1245.9	1936	1902	008.2	547	1951	31

Fazy Księżyca [Dm, h.mm]: Pełn 2, 5.27 3kw 9, 20.55 Now 17, 17.55 1kw 24, 15.53 Pełn 31, 15.58

SIERPIEŃ 2012 (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	1.46	23.52	4.59	19.49	1.49	17.36	11.36	22.32	0.32	16.49	12.10	23.01	22.17	10.55	21.19	7.26	18.23	2.51		
	8.800	17.86	8.325	14.77	5.627	19.21	12.997	-6.50	4.590	21.23	13.533	-7.02	0.534	2.65	22.305	-11.20	18.536	-19.38	20.66715	1
3	1.59	23.40	4.44	19.41	1.47	17.37	11.35	22.25	0.26	16.42	12.03	22.53	22.09	10.47	21.11	7.18	18.15	2.43		
	8.928	17.34	8.257	15.32	5.745	19.37	13.070	-6.99	4.614	21.28	13.541	-7.07	0.532	2.64	22.302	-11.22	18.533	-19.39	20.79857	3
5	2.10	23.30	4.29	19.34	1.45	17.37	11.34	22.19	0.19	16.36	11.56	22.45	22.01	10.39	21.03	7.10	18.07	2.35		
	9.057	16.80	8.212	15.87	5.866	19.52	13.144	-7.48	4.637	21.32	13.548	-7.12	0.530	2.63	22.299	-11.24	18.531	-19.39	20.92999	5
7	2.20	23.20	4.17	19.28	1.44	17.38	11.33	22.13	0.12	16.30	11.49	22.38	21.53	10.31	20.55	7.02	17.59	2.27		
	9.184	16.25	8.192	16.42	5.990	19.65	13.219	-7.96	4.660	21.36	13.556	-7.17	0.527	2.61	22.295	-11.26	18.528	-19.40	21.06141	7
9	2.29	23.11	4.07	19.24	1.43	17.38	11.33	22.07	0.05	16.24	11.42	22.30	21.45	10.22	20.47	6.54	17.51	2.19		
	9.311	15.67	8.203	16.92	6.117	19.76	13.294	-8.45	4.682	21.41	13.565	-7.23	0.525	2.59	22.292	-11.28	18.526	-19.41	21.19283	9
11	2.37	23.02	3.59	19.21	1.42	17.39	11.32	22.01	23.54	16.18	11.35	22.22	21.37	10.14	20.39	6.46	17.43	2.11		
	9.437	15.08	8.246	17.35	6.247	19.86	13.371	-8.93	4.704	21.45	13.573	-7.29	0.522	2.58	22.289	-11.30	18.523	-19.42	21.32425	11
13	2.45	22.54	3.53	19.20	1.42	17.39	11.31	21.55	23.48	16.11	11.28	22.15	21.29	10.06	20.31	6.37	17.35	2.03		
	9.563	14.48	8.320	17.68	6.380	19.93	13.447	-9.42	4.725	21.48	13.582	-7.35	0.520	2.56	22.285	-11.32	18.521	-19.43	21.45567	13
15	2.53	22.46	3.50	19.20	1.41	17.40	11.31	21.49	23.41	16.05	11.21	22.07	21.22	9.58	20.23	6.29	17.27	1.55		
	9.688	13.86	8.427	17.89	6.514	19.98	13.525	-9.90	4.746	21.52	13.591	-7.41	0.517	2.54	22.282	-11.34	18.519	-19.43	21.58709	15
17	2.60	22.38	3.50	19.21	1.42	17.40	11.30	21.44	23.34	15.59	11.14	21.60	21.14	9.50	20.15	6.21	17.19	1.47		
	9.812	13.22	8.563	17.96	6.652	20.01	13.603	-10.38	4.766	21.55	13.601	-7.47	0.514	2.52	22.279	-11.36	18.516	-19.44	21.71851	17
19	3.06	22.30	3.53	19.22	1.42	17.41	11.30	21.38	23.27	15.52	11.07	21.52	21.06	9.42	20.07	6.13	17.11	1.38		
	9.936	12.57	8.728	17.87	6.791	20.00	13.682	-10.86	4.785	21.59	13.611	-7.54	0.510	2.49	22.275	-11.38	18.514	-19.45	21.84993	19
21	3.13	22.23	3.58	19.24	1.43	17.41	11.29	21.32	23.20	15.46	11.00	21.44	20.58	9.34	19.59	6.05	17.03	1.30		
	10.060	11.91	8.918	17.60	6.932	19.98	13.762	-11.34	4.804	21.62	13.621	-7.60	0.507	2.47	22.272	-11.40	18.513	-19.46	21.98134	21
23	3.19	22.16	4.06	19.26	1.44	17.41	11.29	21.26	23.13	15.39	10.53	21.37	20.50	9.25	19.51	5.57	16.55	1.22		
	10.182	11.23	9.129	17.14	7.074	19.92	13.842	-11.81	4.822	21.65	13.631	-7.67	0.503	2.45	22.268	-11.42	18.511	-19.47	22.11276	23
25	3.25	22.09	4.16	19.27	1.45	17.42	11.29	21.20	23.06	15.32	10.47	21.29	20.42	9.17	19.43	5.48	16.48	1.14		
	10.305	10.54	9.356	16.48	7.218	19.83	13.923	-12.29	4.839	21.67	13.642	-7.74	0.500	2.42	22.265	-11.44	18.509	-19.47	22.24418	25
27	3.31	22.02	4.27	19.28	1.47	17.42	11.29	21.15	22.59	15.26	10.40	21.21	20.34	9.09	19.35	5.40	16.40	1.06		
	10.427	9.85	9.596	15.64	7.364	19.71	14.005	-12.75	4.856	21.70	13.653	-7.81	0.496	2.40	22.261	-11.46	18.508	-19.48	22.37560	27
29	3.37	21.55	4.40	19.29	1.49	17.41	11.28	21.09	22.52	15.19	10.33	21.14	20.26	9.01	19.27	5.32	16.32	0.58		
	10.548	9.14	9.843	14.63	7.510	19.57	14.088	-13.22	4.872	21.73	13.664	-7.88	0.492	2.37	22.258	-11.48	18.506	-19.49	22.50702	29
31	3.42	21.49	4.55	19.29	1.51	17.41	11.28	21.04	22.45	15.12	10.26	21.06	20.18	8.52	19.19	5.24	16.24	0.50		
	10.669	8.42	10.094	13.47	7.658	19.38	14.171	-13.68	4.887	21.75	13.676	-7.95	0.488	2.35	22.254	-11.50	18.505	-19.50	22.63844	31

WRZESIEŃ 2012

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
245	1	Sob	172	9.58087	0.08	10.4346	8.03	1.00906	23.1356	0.11	60.923	0.8	99	556	1245.6	1934	1922	055.3	702	1947	1	
246	2	Nie	173	10.02052	0.27	10.4723	7.41	1.00882	0.0145	4.47	61.551	1.8	96	558	1245.3	1932	1941	140.9	814	1943	2	
247	3	Pon	174	10.06018	0.47	10.5100	7.19	1.00858	0.4910	9.06	62.148	2.8	92	559	1245.0	1929	2002	225.9	925	1939	3	
248	4	Wto	175	10.09583	1.07	10.5437	6.57	1.00834	1.3643	12.57	62.669	3.8	85	601	1244.6	1927	2024	310.7	1033	1935	4	
249	5	Śro	176	10.13549	1.27	10.5813	6.35	1.00809	2.2449	16.11	63.072	4.8	78	603	1244.3	1925	2051	356.0	1140	1931	5	
250	6	Czw	177	10.17515	1.47	11.0150	6.13	1.00785	3.1343	18.42	63.320	5.8	70	604	1244.0	1922	2122	442.2	1244	1927	6	
251	7	Pią	178	10.21480	2.08	11.0526	5.50	1.00760	4.0331	20.24	63.385	6.8	61	606	1243.6	1920	2200	529.2	1344	1923	7	
252	8	Sob	179	10.25446	2.28	11.0901	5.28	1.00735	4.5408	21.11	63.252	7.8	51	608	1243.3	1918	2246	617.3	1437	1919	8	
253	9	Nie	180	10.29411	2.49	11.1237	5.05	1.00710	5.4521	21.02	62.921	0.9	42	610	1242.9	1915	2339	706.0	1524	1915	9	
254	10	Pon	181	10.33377	3.10	11.1613	4.42	1.00685	6.3651	19.55	62.407	1.9	32	611	1242.6	1913	****	755.2	1604	1911	10	
255	11	Wto	182	10.37342	3.31	11.1948	4.20	1.00659	7.2821	17.50	61.743	2.9	24	613	1242.2	1910	041	844.4	1637	1907	11	
256	12	Śro	183	10.41308	3.52	11.2324	3.57	1.00634	8.1943	14.51	60.973	3.9	15	615	1241.9	1908	148	933.4	1706	1903	12	
257	13	Czw	184	10.45273	4.13	11.2659	3.34	1.00607	9.1057	11.04	60.155	4.9	9	616	1241.5	1906	300	1022.3	1730	1900	13	
258	14	Pią	185	10.49239	4.35	11.3034	3.11	1.00581	10.0213	6.39	59.352	5.9	4	618	1241.2	1903	415	1111.3	1753	1856	14	
259	15	Sob	186	10.53204	4.56	11.3410	2.48	1.00554	10.5357	1.46	58.627	6.9	1	620	1240.8	1901	532	1200.7	1815	1852	15	
260	16	Nie	187	10.57170	5.17	11.3745	2.24	1.00527	11.4637	-3.20	58.035	0.3	0	622	1240.5	1858	652	1251.1	1837	1848	16	
261	17	Pon	188	11.01135	5.39	11.4120	2.01	1.00500	12.4045	-8.19	57.616	1.3	2	623	1240.1	1856	813	1343.2	1901	1844	17	
262	18	Wto	189	11.05101	6.00	11.4455	1.38	1.00472	13.3647	-12.52	57.390	2.3	7	625	1239.7	1853	936	1437.5	1929	1840	18	
263	19	Śro	190	11.09066	6.21	11.4831	1.15	1.00444	14.3454	-16.40	57.353	3.3	14	627	1239.4	1851	1058	1534.1	2002	1836	19	
264	20	Czw	191	11.13032	6.43	11.5206	0.51	1.00416	15.3448	-19.25	57.485	4.3	24	628	1239.0	1849	1216	1632.5	2044	1832	20	
265	21	Pią	192	11.16597	7.04	11.5541	0.28	1.00387	16.3544	-20.54	57.754	5.3	34	630	1238.7	1846	1326	1732.0	2137	1828	21	
266	22	Sob	193	11.20563	7.25	11.5917	0.05	1.00359	17.3634	-21.01	58.125	6.3	45	632	1238.3	1844	1425	1831.0	2239	1824	22	
267	23	Nie	194	11.24529	7.46	12.0252	-0.19	1.00330	18.3607	-19.50	58.563	0.6	57	634	1238.0	1841	1513	1928.2	2349	1820	23	
268	24	Pon	195	11.28494	8.07	12.0628	-0.42	1.00301	19.3329	-17.29	59.043	1.6	68	635	1237.6	1839	1550	2022.8	****	1816	24	
269	25	Wto	196	11.32460	8.28	12.1004	-1.05	1.00273	20.2815	-14.12	59.547	2.6	77	637	1237.3	1836	1620	2114.4	103	1812	25	
270	26	Śro	197	11.36425	8.48	12.1340	-1.29	1.00244	21.2029	-10.14	60.065	3.6	86	639	1236.9	1834	1645	2203.4	219	1808	26	
271	27	Czw	198	11.40391	9.09	12.1716	-1.52	1.00215	22.1035	-5.50	60.592	4.6	92	641	1236.6	1832	1706	2250.3	333	1804	27	
272	28	Pią	199	11.44356	9.29	12.2052	-2.15	1.00186	22.5908	-1.14	61.121	5.6	97	642	1236.3	1829	1726	2335.8	446	1801	28	
273	29	Sob	200	11.48322	9.49	12.2429	-2.39	1.00157	23.4644	3.20	61.646	6.6	99	644	1235.9	1827	1746	*****	558	1757	29	
274	30	Nie	201	11.52287	10.09	12.2805	-3.02	1.00128	0.3401	7.42	62.151	0.3	100	646	1235.6	1824	1806	020.5	709	1753	30	

Fazy Księżyca [Dm, h.mm]: Pełn 0, 15.58 3kw 8, 15.15 Now 16, 4.11 1kw 22, 21.41 Pełn 30, 5.19

WRZESIEŃ 2012 (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	5.02	19.29	1.52	17.41	11.28	21.01	22.41	15.09	10.23	21.03	20.14	8.48	19.15	5.20	16.20	0.46		
	10.730	8.06	10.219	12.84	7.733	19.28	14.213	-13.91	4.895	21.76	13.682	-7.99	0.486	2.33	22.253	-11.50	18.504	-19.50	22.70415	1
3	3.50	21.39	5.17	19.28	1.55	17.40	11.28	20.55	22.34	15.02	10.16	20.55	20.06	8.40	19.07	5.12	16.12	0.38		
	10.850	7.32	10.469	11.50	7.882	19.05	14.298	-14.36	4.909	21.78	13.694	-8.06	0.482	2.31	22.249	-11.52	18.503	-19.51	22.83556	3
5	3.55	21.32	5.32	19.27	1.58	17.40	11.28	20.50	22.27	14.55	10.09	20.47	19.58	8.32	18.59	5.03	16.04	0.30		
	10.970	6.59	10.715	10.07	8.032	18.79	14.383	-14.81	4.922	21.80	13.706	-8.14	0.477	2.28	22.246	-11.54	18.502	-19.52	22.96698	5
7	3.60	21.26	5.47	19.25	2.01	17.39	11.28	20.44	22.19	14.48	10.03	20.40	19.50	8.23	18.51	4.55	15.56	0.23		
	11.090	5.84	10.956	8.58	8.183	18.49	14.469	-15.26	4.935	21.82	13.718	-8.21	0.473	2.25	22.242	-11.56	18.502	-19.52	23.09840	7
9	4.05	21.20	6.02	19.23	2.04	17.38	11.28	20.39	22.12	14.41	9.56	20.32	19.42	8.15	18.43	4.47	15.48	0.15		
	11.210	5.08	11.192	7.04	8.334	18.16	14.556	-15.70	4.946	21.83	13.731	-8.29	0.469	2.22	22.239	-11.58	18.501	-19.53	23.22982	9
11	4.10	21.14	6.16	19.20	2.08	17.37	11.28	20.34	22.05	14.34	9.49	20.25	19.34	8.07	18.35	4.39	15.41	0.07		
	11.330	4.33	11.422	5.47	8.485	17.80	14.643	-16.13	4.957	21.85	13.744	-8.37	0.464	2.19	22.236	-11.60	18.500	-19.54	23.36124	11
13	4.14	21.08	6.30	19.17	2.12	17.35	11.28	20.29	21.57	14.27	9.43	20.17	19.26	7.59	18.28	4.31	15.33	23.55		
	11.450	3.56	11.646	3.89	8.637	17.40	14.732	-16.56	4.968	21.86	13.757	-8.45	0.459	2.16	22.233	-11.62	18.500	-19.55	23.49266	13
15	4.19	21.02	6.44	19.14	2.16	17.34	11.28	20.23	21.50	14.20	9.36	20.10	19.18	7.50	18.20	4.23	15.25	23.47		
	11.569	2.79	11.865	2.30	8.790	16.98	14.821	-16.98	4.977	21.87	13.770	-8.53	0.455	2.13	22.229	-11.64	18.500	-19.55	23.62407	15
17	4.23	20.56	6.57	19.10	2.20	17.32	11.28	20.18	21.43	14.12	9.29	20.02	19.10	7.42	18.12	4.14	15.17	23.39		
	11.689	2.02	12.078	0.72	8.942	16.51	14.911	-17.39	4.985	21.88	13.783	-8.61	0.450	2.10	22.226	-11.65	18.500	-19.56	23.75549	17
19	4.27	20.51	7.10	19.07	2.24	17.30	11.28	20.13	21.35	14.05	9.23	19.55	19.02	7.34	18.04	4.06	15.09	23.31		
	11.808	1.24	12.287	-0.85	9.094	16.02	15.002	-17.80	4.993	21.89	13.797	-8.69	0.445	2.07	22.223	-11.67	18.500	-19.57	23.88690	19
21	4.32	20.45	7.23	19.03	2.29	17.28	11.29	20.08	21.28	13.57	9.16	19.47	18.54	7.25	17.56	3.58	15.02	23.23		
	11.928	0.47	12.492	-2.40	9.247	15.50	15.093	-18.20	4.999	21.90	13.811	-8.77	0.440	2.04	22.220	-11.69	18.500	-19.58	0.01832	21
23	4.36	20.40	7.35	18.59	2.34	17.26	11.29	20.03	21.20	13.50	9.10	19.40	18.46	7.17	17.48	3.50	14.54	23.15		
	12.048	-0.31	12.692	-3.92	9.399	14.95	15.186	-18.59	5.005	21.91	13.825	-8.85	0.435	2.00	22.217	-11.70	18.500	-19.58	0.14975	23
25	4.40	20.34	7.47	18.55	2.38	17.24	11.29	19.59	21.12	13.42	9.03	19.32	18.38	7.09	17.40	3.42	14.46	23.07		
	12.168	-1.09	12.890	-5.41	9.551	14.36	15.279	-18.97	5.010	21.91	13.839	-8.93	0.430	1.97	22.214	-11.72	18.501	-19.59	0.28117	25
27	4.44	20.29	7.59	18.51	2.43	17.21	11.29	19.54	21.05	13.35	8.56	19.25	18.30	7.00	17.32	3.34	14.38	22.59		
	12.288	-1.87	13.084	-6.87	9.703	13.75	15.373	-19.34	5.014	21.92	13.853	-9.02	0.426	1.94	22.212	-11.74	18.501	-19.60	0.41258	27
29	4.48	20.24	8.10	18.46	2.48	17.19	11.30	19.49	20.57	13.27	8.50	19.17	18.22	6.52	17.24	3.26	14.30	22.52		
	12.408	-2.65	13.275	-8.30	9.855	13.11	15.468	-19.70	5.017	21.92	13.867	-9.10	0.421	1.91	22.209	-11.75	18.502	-19.60	0.54400	29

PAŹDZIERNIK 2012

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									 Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2456																					
275	1	Pon	202	11.56253	10.28	12.3142	-3.25	1.00100	1.2127	11.39	62.616	1.3	98	648	1235.3	1822	1828	105.3	818	1749	1
276	2	Wto	203	12.00218	10.47	12.3520	-3.48	1.00071	2.0927	15.04	63.015	2.3	95	649	1235.0	1820	1853	150.4	926	1745	2
277	3	Śro	204	12.04184	11.06	12.3858	-4.12	1.00043	2.5813	17.49	63.317	3.3	90	651	1234.6	1817	1923	236.3	1031	1741	3
278	4	Czw	205	12.08149	11.25	12.4236	-4.35	1.00015	3.4748	19.45	63.492	4.3	84	653	1234.3	1815	1958	323.1	1132	1737	4
279	5	Pią	206	12.12115	11.43	12.4614	-4.58	0.99986	4.3803	20.49	63.510	5.3	76	655	1234.0	1813	2041	410.8	1228	1733	5
280	6	Sob	207	12.16080	12.00	12.4953	-5.21	0.99958	5.2844	20.58	63.351	6.3	68	656	1233.7	1810	2131	459.0	1317	1729	6
281	7	Nie	208	12.20046	12.18	12.5332	-5.44	0.99930	6.1931	20.11	63.003	7.3	59	658	1233.5	1808	2228	547.4	1359	1725	7
282	8	Pon	209	12.24011	12.34	12.5712	-6.07	0.99902	7.1011	18.27	62.467	0.1	49	700	1233.2	1805	2331	635.7	1434	1721	8
283	9	Wto	210	12.27577	12.51	13.0052	-6.29	0.99874	8.0036	15.52	61.763	1.1	39	702	1232.9	1803	****	723.8	1504	1717	9
284	10	Śro	211	12.31542	13.07	13.0433	-6.52	0.99846	8.5050	12.28	60.924	2.1	30	703	1232.6	1801	039	811.6	1530	1713	10
285	11	Czw	212	12.35508	13.22	13.0814	-7.15	0.99818	9.4110	8.23	60.002	3.1	20	705	1232.4	1759	151	859.5	1553	1709	11
286	12	Pią	213	12.39474	13.37	13.1156	-7.37	0.99789	10.3204	3.45	59.064	4.1	12	707	1232.1	1756	306	948.0	1615	1706	12
287	13	Sob	214	12.43439	13.51	13.1538	-7.60	0.99761	11.2406	-1.13	58.185	5.1	6	709	1231.9	1754	424	1037.6	1637	1702	13
288	14	Nie	215	12.47404	14.05	13.1920	-8.22	0.99733	12.1754	-6.16	57.441	6.1	2	711	1231.7	1752	545	1129.3	1701	1658	14
289	15	Pon	216	12.51370	14.19	13.2304	-8.44	0.99705	13.1402	-11.05	56.897	7.1	0	713	1231.4	1749	708	1223.2	1727	1654	15
290	16	Wto	217	12.55335	14.31	13.2648	-9.06	0.99676	14.1247	-15.16	56.600	0.9	1	714	1231.2	1747	832	1320.4	1759	1650	16
291	17	Śro	218	12.59301	14.43	13.3032	-9.28	0.99648	15.1357	-18.29	56.566	1.9	5	716	1231.0	1745	955	1420.2	1839	1646	17
292	18	Czw	219	13.03267	14.55	13.3417	-9.50	0.99619	16.1639	-20.26	56.783	2.9	12	718	1230.8	1743	1111	1521.5	1929	1642	18
293	19	Pią	220	13.07232	15.06	13.3803	-10.12	0.99591	17.1931	-20.57	57.212	3.9	21	720	1230.6	1741	1217	1622.8	2030	1638	19
294	20	Sob	221	13.11198	15.16	13.4149	-10.33	0.99562	18.2102	-20.04	57.798	4.9	31	722	1230.5	1738	1310	1722.3	2139	1634	20
295	21	Nie	222	13.15163	15.26	13.4536	-10.55	0.99534	19.1959	-17.57	58.481	5.9	42	724	1230.3	1736	1351	1818.7	2254	1630	21
296	22	Pon	223	13.19129	15.35	13.4923	-11.16	0.99506	20.1550	-14.51	59.204	0.3	53	725	1230.2	1734	1423	1911.6	****	1626	22
297	23	Wto	224	13.23094	15.43	13.5312	-11.37	0.99477	21.0839	-11.02	59.923	1.3	64	727	1230.0	1732	1449	2001.3	009	1622	23
298	24	Śro	225	13.27060	15.51	13.5700	-11.58	0.99449	21.5853	-6.45	60.607	2.3	74	729	1229.9	1730	1512	2048.3	124	1618	24
299	25	Czw	226	13.31025	15.58	14.0050	-12.18	0.99422	22.4714	-2.16	61.237	3.3	82	731	1229.8	1728	1532	2133.6	237	1614	25
300	26	Pią	227	13.34591	16.04	14.0440	-12.39	0.99394	23.3427	2.15	61.803	4.3	89	733	1229.7	1726	1551	2217.9	348	1610	26
301	27	Sob	228	13.38556	16.10	14.0831	-12.59	0.99367	0.2114	6.36	62.302	5.3	95	735	1229.6	1724	1611	2302.1	458	1607	27
302	28	Nie	229	13.42522	16.14	14.1223	-13.19	0.99340	1.0810	10.37	62.733	6.3	98	737	1229.5	1722	1632	2346.6	606	1603	28
302	28	Nie	229	14.43021	16.15	14.1233	-13.20	0.99339	1.1008	10.46	62.750	6.3	98	637	1129.5	1622	1532	2246.6	506	1503	28
303	29	Pon	230	14.46586	16.19	14.1625	-13.40	0.99312	1.5744	14.17	63.107	7.3	100	639	1129.4	1620	1556	2332.1	614	1459	29
304	30	Wto	231	14.50552	16.22	14.2019	-13.59	0.99286	2.4613	17.10	63.387	0.6	100	640	1129.4	1618	1624	****	720	1455	30
305	31	Śro	232	14.54517	16.24	14.2413	-14.19	0.99260	3.3537	19.17	63.577	1.6	98	642	1129.3	1616	1658	018.6	822	1451	31

Fazy Księżyca [Dm, h.mm]: 3kw 8, 9.33 Now 15, 14.02 1kw 22, 5.32 1kw 22, 4.32 Pełn 29, 20.49

PAŹDZIERNIK 2012 (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	8.21	18.42	2.54	17.16	11.30	19.45	20.49	13.19	8.43	19.10	18.14	6.44	17.16	3.17	14.23	22.44		
	12.528	-3.42	13.465	-9.68	10.006	12.44	15.564	-20.06	5.019	21.92	13.882	-9.18	0.416	1.88	22.206	-11.77	18.503	-19.61	0.67541	1
3	4.56	20.13	8.32	18.38	2.59	17.13	11.30	19.40	20.41	13.12	8.37	19.03	18.06	6.35	17.08	3.09	14.15	22.36		
	12.649	-4.19	13.652	-11.02	10.157	11.75	15.660	-20.40	5.020	21.92	13.896	-9.27	0.411	1.85	22.204	-11.78	18.504	-19.62	0.80683	3
5	4.59	20.08	8.43	18.34	3.04	17.10	11.30	19.36	20.34	13.04	8.30	18.55	17.58	6.27	17.00	3.01	14.07	22.28		
	12.771	-4.96	13.837	-12.32	10.308	11.03	15.757	-20.73	5.020	21.92	13.911	-9.35	0.406	1.81	22.201	-11.79	18.505	-19.62	0.93825	5
7	5.03	20.03	8.53	18.30	3.09	17.07	11.30	19.32	20.26	12.56	8.24	18.48	17.50	6.19	16.52	2.53	13.59	22.20		
	12.892	-5.73	14.020	-13.56	10.459	10.29	15.856	-21.05	5.019	21.92	13.926	-9.44	0.401	1.78	22.199	-11.81	18.507	-19.63	1.06967	7
9	5.07	19.59	9.03	18.26	3.15	17.04	11.31	19.28	20.18	12.48	8.17	18.40	17.42	6.10	16.44	2.45	13.52	22.12		
	13.014	-6.49	14.202	-14.76	10.610	9.53	15.954	-21.36	5.017	21.91	13.941	-9.52	0.396	1.75	22.197	-11.82	18.508	-19.63	1.20109	9
11	5.10	19.54	9.13	18.22	3.20	17.01	11.31	19.24	20.10	12.40	8.11	18.33	17.34	6.02	16.36	2.37	13.44	22.05		
	13.137	-7.25	14.382	-15.90	10.760	8.75	16.054	-21.66	5.014	21.91	13.956	-9.60	0.391	1.72	22.195	-11.83	18.510	-19.64	1.33251	11
13	5.14	19.49	9.22	18.18	3.26	16.57	11.31	19.20	20.02	12.32	8.04	18.25	17.26	5.54	16.28	2.29	13.36	21.57		
	13.260	-8.00	14.559	-16.99	10.910	7.94	16.155	-21.94	5.010	21.90	13.971	-9.69	0.386	1.69	22.193	-11.84	18.512	-19.65	1.46393	13
15	5.18	19.45	9.32	18.14	3.32	16.54	11.31	19.16	19.54	12.23	7.58	18.18	17.18	5.45	16.21	2.21	13.29	21.49		
	13.384	-8.74	14.735	-18.01	11.060	7.12	16.256	-22.22	5.005	21.89	13.986	-9.77	0.382	1.66	22.191	-11.85	18.514	-19.65	1.59534	15
17	5.21	19.41	9.40	18.10	3.37	16.50	11.31	19.12	19.46	12.15	7.51	18.10	17.10	5.37	16.13	2.13	13.21	21.41		
	13.509	-9.47	14.907	-18.97	11.209	6.28	16.358	-22.48	5.000	21.88	14.001	-9.86	0.377	1.63	22.189	-11.86	18.516	-19.66	1.72676	17
19	5.25	19.36	9.48	18.06	3.43	16.47	11.31	19.09	19.37	12.07	7.45	18.03	17.02	5.29	16.05	2.05	13.13	21.34		
	13.634	-10.20	15.076	-19.86	11.359	5.43	16.460	-22.72	4.993	21.87	14.017	-9.94	0.373	1.60	22.188	-11.87	18.518	-19.66	1.85818	19
21	5.28	19.32	9.56	18.03	3.49	16.43	11.32	19.05	19.29	11.58	7.38	17.56	16.54	5.21	15.57	1.57	13.05	21.26		
	13.760	-10.91	15.240	-20.67	11.508	4.56	16.564	-22.95	4.986	21.86	14.032	-10.02	0.368	1.57	22.186	-11.88	18.520	-19.67	1.98960	21
23	5.32	19.28	10.03	17.59	3.55	16.39	11.32	19.02	19.21	11.50	7.32	17.48	16.46	5.12	15.49	1.49	12.58	21.18		
	13.887	-11.61	15.399	-21.41	11.657	3.68	16.668	-23.17	4.977	21.85	14.047	-10.11	0.364	1.55	22.185	-11.88	18.523	-19.67	2.12102	23
25	5.35	19.24	10.09	17.56	4.00	16.36	11.31	18.59	19.13	11.41	7.25	17.41	16.38	5.04	15.41	1.41	12.50	21.10		
	14.014	-12.30	15.550	-22.05	11.807	2.79	16.773	-23.37	4.968	21.83	14.063	-10.19	0.359	1.52	22.183	-11.89	18.525	-19.68	2.25244	25
27	5.39	19.21	10.13	17.52	4.06	16.32	11.31	18.56	19.04	11.33	7.19	17.33	16.30	4.56	15.33	1.33	12.42	21.03		
	14.142	-12.98	15.691	-22.60	11.956	1.89	16.878	-23.56	4.957	21.82	14.078	-10.27	0.355	1.49	22.182	-11.90	18.528	-19.68	2.38385	27
29	4.42	18.17	9.16	16.49	3.13	15.28	10.31	17.53	17.56	10.24	6.13	16.26	15.22	3.48	14.25	0.25	11.35	19.55		
	14.274	-13.66	15.821	-23.05	12.109	0.96	16.987	-23.74	4.946	21.80	14.094	-10.36	0.351	1.47	22.181	-11.90	18.531	-19.69	2.51527	29
31	4.45	18.14	9.18	16.45	3.19	15.25	10.31	17.51	17.47	10.15	6.06	16.19	15.14	3.39	14.17	0.17	11.27	19.47		
	14.404	-14.31	15.933	-23.38	12.258	0.05	17.093	-23.89	4.934	21.78	14.109	-10.44	0.347	1.44	22.180	-11.91	18.534	-19.69	2.64669	31

LISTOPAD 2012

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
306	1	Czw	233	14.58483	16.26	14.2808	-14.38	0.99234	4.2545	20.33	63.661	2.6	94	644	1129.3	1614	1738	106.0	920	1447	1	
307	2	Pią	234	15.02448	16.27	14.3203	-14.57	0.99209	5.1618	20.55	63.618	3.6	89	646	1129.3	1612	1825	154.0	1012	1443	2	
308	3	Sob	235	15.06414	16.27	14.3560	-15.16	0.99184	6.0651	20.21	63.432	4.6	82	648	1129.3	1610	1919	242.2	1056	1439	3	
309	4	Nie	236	15.10379	16.26	14.3957	-15.34	0.99159	6.5704	18.52	63.085	5.6	74	650	1129.3	1608	2020	330.2	1133	1435	4	
310	5	Pon	237	15.14345	16.24	14.4355	-15.52	0.99135	7.4644	16.32	62.570	6.6	65	652	1129.3	1606	2125	417.6	1205	1431	5	
311	6	Wto	238	15.18311	16.22	14.4754	-16.10	0.99111	8.3554	13.26	61.892	7.6	56	654	1129.4	1604	2233	504.4	1231	1427	6	
312	7	Śro	239	15.22276	16.19	14.5154	-16.28	0.99087	9.2451	9.39	61.069	0.4	46	655	1129.4	1603	2345	550.9	1255	1423	7	
313	8	Czw	240	15.26242	16.14	14.5555	-16.45	0.99063	10.1405	5.19	60.137	1.4	35	657	1129.5	1601	****	637.5	1316	1419	8	
314	9	Pią	241	15.30207	16.09	14.5957	-17.02	0.99040	11.0413	0.36	59.151	2.4	25	659	1129.6	1559	058	725.0	1338	1415	9	
315	10	Sob	242	15.34173	16.03	15.0359	-17.19	0.99017	11.5604	-4.19	58.182	3.4	16	701	1129.7	1558	215	814.2	1400	1411	10	
316	11	Nie	243	15.38138	15.57	15.0803	-17.36	0.98994	12.5024	-9.10	57.310	4.4	9	703	1129.8	1556	336	906.0	1424	1408	11	
317	12	Pon	244	15.42104	15.49	15.1207	-17.52	0.98971	13.4748	-13.37	56.618	5.4	3	705	1129.9	1554	459	1001.2	1453	1404	12	
318	13	Wto	245	15.46069	15.40	15.1612	-18.08	0.98949	14.4830	-17.17	56.175	6.4	0	707	1130.1	1553	623	1000.0	1529	1400	13	
319	14	Śro	246	15.50035	15.31	15.2018	-18.23	0.98927	15.5155	-19.48	56.029	0.5	0	709	1130.2	1551	745	1202.0	1614	1356	14	
320	15	Czw	247	15.54000	15.21	15.2425	-18.39	0.98904	16.5644	-20.53	56.188	1.5	4	710	1130.4	1550	858	1305.6	1712	1352	15	
321	16	Pią	248	15.57566	15.10	15.2832	-18.54	0.98882	18.0102	-20.27	56.630	2.5	9	712	1130.6	1548	959	1408.4	1821	1348	16	
322	17	Sob	249	16.01532	14.58	15.3241	-19.08	0.98861	19.0304	-18.37	57.298	3.5	17	714	1130.8	1547	1047	1508.6	1937	1344	17	
323	18	Nie	250	16.05497	14.45	15.3650	-19.22	0.98839	20.0144	-15.39	58.121	4.5	27	716	1131.0	1546	1124	1604.9	2055	1340	18	
324	19	Pon	251	16.09463	14.31	15.4100	-19.36	0.98818	20.5645	-11.53	59.020	5.5	38	718	1131.2	1544	1153	1657.1	2212	1336	19	
325	20	Wto	252	16.13428	14.17	15.4511	-19.50	0.98797	21.4830	-7.37	59.925	6.5	48	719	1131.5	1543	1217	1745.9	2327	1332	20	
326	21	Śro	253	16.17394	14.02	15.4923	-20.03	0.98776	22.3744	-3.06	60.780	0.9	59	721	1131.7	1542	1238	1832.1	****	1328	21	
327	22	Czw	254	16.21359	13.46	15.5335	-20.16	0.98756	23.2517	1.25	61.545	1.9	69	723	1132.0	1541	1258	1916.7	039	1324	22	
328	23	Pią	255	16.25325	13.30	15.5748	-20.28	0.98736	0.1159	5.48	62.199	2.9	78	724	1132.3	1540	1317	2000.7	149	1320	23	
329	24	Sob	256	16.29291	13.12	16.0202	-20.40	0.98717	0.5835	9.52	62.730	3.9	85	726	1132.5	1538	1338	2044.8	257	1316	24	
330	25	Nie	257	16.33256	12.54	16.0617	-20.52	0.98698	1.4539	13.28	63.139	4.9	91	728	1132.8	1537	1401	2129.5	405	1313	25	
331	26	Pon	258	16.37222	12.35	16.1032	-21.03	0.98679	2.3336	16.30	63.434	5.9	96	729	1133.2	1536	1427	2215.4	511	1309	26	
332	27	Wto	259	16.41187	12.16	16.1448	-21.14	0.98661	3.2235	18.49	63.620	6.9	99	731	1133.5	1536	1458	2302.4	614	1305	27	
333	28	Śro	260	16.45153	11.55	16.1905	-21.25	0.98644	4.1232	20.19	63.705	7.9	100	733	1133.8	1535	1536	2350.3	714	1301	28	
334	29	Czw	261	16.49118	11.34	16.2323	-21.35	0.98627	5.0306	20.55	63.691	0.8	99	734	1134.2	1534	1621	****	808	1257	29	
335	30	Pią	262	16.53084	11.13	16.2741	-21.45	0.98611	5.5349	20.35	63.576	1.8	97	736	1134.5	1533	1713	038.6	855	1253	30	

Fazy Księżyca [Dm, h.mm]: 3kw 7, 1.36 Nów 13, 23.08 1kw 20, 15.31 Pełn 28, 15.46

LISTOPAD 2012 (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	9.17	16.43	3.22	15.23	10.31	17.49	17.43	10.11	6.03	16.15	15.10	3.35	14.13	0.13	11.23	19.43		
	14.469	-14.63	15.981	-23.49	12.333	-0.41	17.147	-23.97	4.928	21.78	14.117	-10.48	0.345	1.43	22.180	-11.91	18.536	-19.69	2.71240	1
3	4.50	18.09	9.15	16.39	3.28	15.19	10.30	17.47	17.35	10.02	5.56	16.08	15.03	3.27	14.05	0.05	11.16	19.36		
	14.600	-15.26	16.059	-23.61	12.483	-1.33	17.254	-24.10	4.915	21.76	14.132	-10.56	0.341	1.41	22.179	-11.91	18.539	-19.70	2.84382	3
5	4.53	18.05	9.10	16.35	3.34	15.15	10.30	17.45	17.26	9.53	5.50	16.00	14.55	3.19	13.58	23.53	11.08	19.28		
	14.732	-15.87	16.108	-23.57	12.633	-2.26	17.362	-24.22	4.901	21.73	14.148	-10.64	0.338	1.38	22.179	-11.91	18.542	-19.70	2.97524	5
7	4.57	18.02	9.01	16.29	3.40	15.11	10.29	17.43	17.17	9.45	5.43	15.53	14.47	3.11	13.50	23.46	11.00	19.20		
	14.865	-16.46	16.121	-23.34	12.784	-3.18	17.471	-24.31	4.886	21.71	14.163	-10.72	0.334	1.36	22.179	-11.91	18.545	-19.70	3.10666	7
9	4.60	17.60	8.48	16.23	3.46	15.08	10.29	17.41	17.09	9.36	5.37	15.45	14.39	3.02	13.42	23.38	10.53	19.12		
	14.999	-17.04	16.093	-22.90	12.935	-4.11	17.580	-24.40	4.871	21.69	14.178	-10.80	0.331	1.34	22.178	-11.91	18.549	-19.71	3.23808	9
11	5.03	17.57	8.31	16.16	3.52	15.04	10.28	17.39	17.00	9.27	5.30	15.38	14.31	2.54	13.34	23.30	10.45	19.05		
	15.134	-17.59	16.021	-22.23	13.087	-5.03	17.689	-24.46	4.855	21.66	14.194	-10.88	0.328	1.32	22.178	-11.91	18.553	-19.71	3.36950	11
13	5.06	17.54	8.10	16.07	3.58	15.00	10.27	17.37	16.52	9.18	5.24	15.31	14.23	2.46	13.26	23.22	10.37	18.57		
	15.270	-18.13	15.905	-21.32	13.240	-5.95	17.799	-24.51	4.839	21.64	14.209	-10.95	0.325	1.30	22.178	-11.91	18.556	-19.71	3.50092	13
15	5.09	17.52	7.45	15.58	4.04	14.57	10.26	17.36	16.43	9.08	5.17	15.23	14.15	2.38	13.18	23.14	10.30	18.50		
	15.407	-18.64	15.753	-20.18	13.393	-6.86	17.909	-24.54	4.822	21.61	14.224	-11.03	0.322	1.29	22.179	-11.91	18.560	-19.72	3.63234	15
17	5.12	17.50	7.18	15.49	4.11	14.53	10.25	17.34	16.34	8.59	5.11	15.16	14.07	2.30	13.10	23.06	10.22	18.42		
	15.545	-19.14	15.582	-18.91	13.547	-7.77	18.020	-24.55	4.804	21.58	14.239	-11.11	0.319	1.27	22.179	-11.91	18.564	-19.72	3.76376	17
19	5.15	17.48	6.52	15.39	4.17	14.49	10.24	17.33	16.25	8.50	5.04	15.08	13.59	2.22	13.03	22.58	10.15	18.34		
	15.683	-19.60	15.413	-17.63	13.701	-8.66	18.131	-24.55	4.786	21.56	14.254	-11.18	0.317	1.26	22.180	-11.91	18.568	-19.72	3.89518	19
21	5.18	17.46	6.28	15.30	4.23	14.46	10.22	17.32	16.17	8.41	4.58	15.01	13.51	2.14	12.55	22.51	10.07	18.27		
	15.823	-20.05	15.267	-16.48	13.857	-9.55	18.242	-24.53	4.768	21.53	14.268	-11.25	0.314	1.24	22.180	-11.90	18.572	-19.72	4.02660	21
23	5.21	17.44	6.09	15.21	4.30	14.43	10.21	17.31	16.08	8.32	4.51	14.54	13.43	2.06	12.47	22.43	9.59	18.19		
	15.963	-20.47	15.162	-15.60	14.013	-10.42	18.353	-24.48	4.750	21.50	14.283	-11.33	0.312	1.23	22.181	-11.90	18.576	-19.72	4.15802	23
25	5.23	17.43	5.54	15.13	4.36	14.39	10.19	17.30	15.59	8.23	4.44	14.46	13.35	1.58	12.39	22.35	9.52	18.11		
	16.105	-20.87	15.105	-15.05	14.171	-11.28	18.465	-24.42	4.731	21.47	14.297	-11.40	0.310	1.22	22.182	-11.89	18.581	-19.73	4.28944	25
27	5.26	17.42	5.44	15.06	4.43	14.36	10.17	17.30	15.50	8.13	4.38	14.39	13.27	1.50	12.31	22.27	9.44	18.04		
	16.247	-21.24	15.097	-14.83	14.329	-12.12	18.576	-24.35	4.712	21.43	14.312	-11.47	0.308	1.21	22.183	-11.89	18.585	-19.73	4.42086	27
29	5.28	17.41	5.39	14.60	4.49	14.33	10.15	17.29	15.42	8.04	4.31	14.31	13.19	1.42	12.23	22.20	9.37	17.56		
	16.390	-21.58	15.132	-14.91	14.489	-12.94	18.688	-24.25	4.692	21.40	14.326	-11.54	0.307	1.20	22.184	-11.88	18.589	-19.73	4.55228	29

GRUDZIEŃ 2012

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
336	1	Sob	263	16.57050	10.50	16.3160	-21.54	0.98595	6.4413	19.20	63.352	2.8	93	737	1134.9	1532	1811	126.8	934	1249	1	
337	2	Nie	264	17.01015	10.27	16.3620	-22.03	0.98580	7.3357	17.14	63.011	3.8	87	739	1135.3	1532	1915	214.5	1007	1245	2	
338	3	Pon	265	17.04581	10.04	16.4040	-22.11	0.98565	8.2253	14.20	62.544	4.8	80	740	1135.7	1531	2022	301.2	1035	1241	3	
339	4	Wto	266	17.08546	9.40	16.4500	-22.19	0.98551	9.1109	10.47	61.946	5.8	72	741	1136.1	1531	2131	347.2	1059	1237	4	
340	5	Śro	267	17.12512	9.15	16.4922	-22.27	0.98537	9.5910	6.42	61.224	6.8	62	743	1136.5	1530	2242	432.7	1121	1233	5	
341	6	Czw	268	17.16477	8.49	16.5344	-22.34	0.98524	10.4732	2.13	60.393	7.8	52	744	1136.9	1530	2355	518.3	1141	1229	6	
342	7	Pią	269	17.20443	8.24	16.5806	-22.40	0.98511	11.3659	-2.30	59.488	0.8	41	745	1137.4	1529	****	604.9	1202	1225	7	
343	8	Sob	270	17.24408	7.57	17.0229	-22.47	0.98499	12.2825	-7.14	58.558	1.8	31	746	1137.8	1529	110	653.5	1224	1221	8	
344	9	Nie	271	17.28374	7.30	17.0652	-22.52	0.98487	13.2239	-11.45	57.670	2.8	21	748	1138.2	1529	229	744.9	1250	1217	9	
345	10	Pon	272	17.32339	7.03	17.1116	-22.58	0.98476	14.2019	-15.43	56.902	3.8	12	749	1138.7	1528	351	840.1	1320	1214	10	
346	11	Wto	273	17.36305	6.35	17.1540	-23.03	0.98464	15.2131	-18.46	56.331	4.8	5	750	1139.2	1528	513	939.3	1400	1210	11	
347	12	Śro	274	17.40271	6.07	17.2005	-23.07	0.98453	16.2535	-20.33	56.025	5.8	1	751	1139.6	1528	631	1041.9	1450	1206	12	
348	13	Czw	275	17.44236	5.39	17.2430	-23.11	0.98443	17.3055	-20.52	56.022	0.1	0	752	1140.1	1528	739	1146.1	1554	1202	13	
349	14	Pią	276	17.48202	5.10	17.2855	-23.15	0.98433	18.3530	-19.38	56.327	1.1	2	753	1140.6	1528	835	1249.3	1708	1158	14	
350	15	Sob	277	17.52168	4.41	17.3321	-23.18	0.98423	19.3733	-17.04	56.911	2.1	6	754	1141.1	1528	919	1349.6	1828	1154	15	
351	16	Nie	278	17.56133	4.12	17.3747	-23.20	0.98413	20.3604	-13.28	57.711	3.1	13	754	1141.5	1529	953	1445.9	1949	1150	16	
352	17	Pon	279	18.00099	3.43	17.4213	-23.22	0.98404	21.3054	-9.13	58.647	4.1	22	755	1142.0	1529	1020	1538.2	2108	1146	17	
353	18	Wto	280	18.04064	3.13	17.4639	-23.24	0.98395	22.2233	-4.37	59.637	5.1	32	756	1142.5	1529	1043	1627.0	2224	1142	18	
354	19	Śro	281	18.08030	2.43	17.5105	-23.25	0.98387	23.1148	0.03	60.603	6.1	42	757	1143.0	1529	1104	1713.4	2336	1138	19	
355	20	Czw	282	18.11595	2.14	17.5531	-23.26	0.98379	23.5933	4.34	61.483	0.2	52	757	1143.5	1530	1123	1758.4	****	1134	20	
356	21	Pią	283	18.15561	1.44	17.5958	-23.26	0.98372	0.4636	8.46	62.234	1.2	62	758	1144.0	1530	1144	1842.8	047	1130	21	
357	22	Sob	284	18.19526	1.14	18.0424	-23.26	0.98365	1.3341	12.32	62.831	2.2	71	758	1144.5	1531	1206	1927.4	155	1126	22	
358	23	Nie	285	18.23492	0.44	18.0850	-23.25	0.98359	2.2121	15.44	63.263	3.2	80	759	1145.0	1531	1231	2012.7	302	1122	23	
359	24	Pon	286	18.27458	0.14	18.1317	-23.24	0.98353	3.0954	18.15	63.535	4.2	87	759	1145.5	1532	1300	2059.1	406	1118	24	
360	25	Wto	287	18.31423	-0.15	18.1743	-23.22	0.98348	3.5927	19.59	63.659	5.2	92	759	1146.0	1533	1335	2146.6	507	1115	25	
361	26	Śro	288	18.35389	-0.45	18.2209	-23.20	0.98343	4.4950	20.50	63.651	6.2	97	800	1146.5	1534	1417	2234.9	603	1111	26	
362	27	Czw	289	18.39354	-1.14	18.2635	-23.18	0.98339	5.4039	20.47	63.531	7.2	99	800	1147.0	1534	1507	2323.4	653	1107	27	
363	28	Pią	290	18.43320	-1.44	18.3101	-23.15	0.98336	6.3127	19.47	63.315	0.0	100	800	1147.5	1535	1604	****	735	1103	28	
364	29	Sob	291	18.47286	-2.13	18.3526	-23.11	0.98333	7.2144	17.54	63.016	1.0	99	800	1148.0	1536	1706	011.6	810	1059	29	
365	30	Nie	292	18.51251	-2.41	18.3952	-23.07	0.98331	8.1114	15.11	62.640	2.0	96	800	1148.4	1537	1812	059.1	840	1055	30	
366	31	Pon	293	18.55217	-3.10	18.4417	-23.03	0.98330	8.5955	11.48	62.190	3.0	92	800	1148.9	1538	1921	145.6	906	1051	31	

Fazy Księżyca [Dm, h.mm]: 3kw 6, 16.31 Nów 13, 9.42 1kw 20, 6.19 Pełn 28, 11.21

GRUDZIEŃ 2012 (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	5.38	14.54	4.56	14.30	10.13	17.29	15.33	7.55	4.25	14.24	13.11	1.34	12.16	22.12	9.29	17.49		
	16.533	-21.90	15.204	-15.23	14.650	-13.75	18.800	-24.14	4.673	21.37	14.340	-11.60	0.305	1.19	22.186	-11.87	18.594	-19.73	4.68370	1
3	5.33	17.39	5.39	14.50	5.02	14.27	10.11	17.29	15.24	7.46	4.18	14.17	13.04	1.26	12.08	22.04	9.21	17.41		
	16.678	-22.18	15.307	-15.73	14.812	-14.53	18.911	-24.00	4.654	21.34	14.354	-11.67	0.304	1.19	22.187	-11.86	18.599	-19.73	4.81512	3
5	5.35	17.38	5.43	14.45	5.08	14.25	10.09	17.29	15.15	7.36	4.11	14.09	12.56	1.18	11.60	21.56	9.14	17.33		
	16.823	-22.44	15.434	-16.36	14.975	-15.29	19.023	-23.85	4.634	21.30	14.368	-11.73	0.303	1.18	22.189	-11.85	18.603	-19.73	4.94654	5
7	5.37	17.38	5.48	14.42	5.15	14.22	10.06	17.29	15.06	7.27	4.05	14.02	12.48	1.10	11.52	21.49	9.06	17.26		
	16.968	-22.67	15.580	-17.08	15.140	-16.02	19.135	-23.68	4.615	21.27	14.381	-11.80	0.303	1.18	22.191	-11.84	18.608	-19.73	5.07796	7
9	5.39	17.38	5.55	14.39	5.21	14.20	10.03	17.29	14.58	7.18	3.58	13.54	12.40	1.02	11.44	21.41	8.59	17.18		
	17.115	-22.87	15.742	-17.84	15.306	-16.73	19.246	-23.50	4.596	21.24	14.394	-11.86	0.302	1.18	22.193	-11.83	18.613	-19.73	5.20938	9
11	5.41	17.38	6.02	14.36	5.28	14.18	10.01	17.30	14.49	7.09	3.51	13.47	12.32	0.54	11.36	21.33	8.51	17.11		
	17.261	-23.05	15.915	-18.62	15.473	-17.41	19.358	-23.29	4.577	21.20	14.407	-11.92	0.302	1.17	22.195	-11.82	18.617	-19.73	5.34080	11
13	5.43	17.38	6.10	14.34	5.34	14.16	9.58	17.30	14.40	6.59	3.44	13.39	12.24	0.46	11.29	21.26	8.44	17.03		
	17.408	-23.19	16.098	-19.40	15.642	-18.06	19.469	-23.07	4.558	21.17	14.420	-11.98	0.302	1.18	22.197	-11.80	18.622	-19.73	5.47222	13
15	5.44	17.39	6.19	14.33	5.40	14.14	9.55	17.31	14.31	6.50	3.38	13.32	12.16	0.38	11.21	21.18	8.36	16.55		
	17.556	-23.29	16.289	-20.15	15.812	-18.67	19.580	-22.83	4.540	21.14	14.433	-12.04	0.302	1.18	22.199	-11.79	18.627	-19.73	5.60365	15
17	5.46	17.39	6.28	14.32	5.47	14.13	9.52	17.31	14.23	6.41	3.31	13.25	12.08	0.30	11.13	21.10	8.28	16.48		
	17.704	-23.37	16.486	-20.87	15.983	-19.25	19.691	-22.57	4.522	21.11	14.445	-12.09	0.302	1.18	22.202	-11.78	18.632	-19.73	5.73507	17
19	5.47	17.40	6.37	14.31	5.53	14.11	9.48	17.32	14.14	6.32	3.24	13.17	12.00	0.23	11.05	21.03	8.21	16.40		
	17.851	-23.42	16.689	-21.54	16.155	-19.80	19.802	-22.30	4.504	21.08	14.457	-12.15	0.302	1.18	22.205	-11.76	18.637	-19.73	5.86649	19
21	5.48	17.41	6.46	14.31	5.59	14.10	9.45	17.33	14.05	6.23	3.17	13.10	11.53	0.15	10.57	20.55	8.13	16.33		
	17.999	-23.44	16.896	-22.15	16.329	-20.31	19.912	-22.01	4.487	21.04	14.469	-12.20	0.303	1.19	22.207	-11.75	18.642	-19.73	5.99791	21
23	5.49	17.42	6.55	14.32	6.05	14.10	9.42	17.34	13.57	6.14	3.10	13.02	11.45	0.07	10.50	20.48	8.06	16.25		
	18.147	-23.42	17.107	-22.71	16.504	-20.79	20.022	-21.70	4.471	21.02	14.481	-12.25	0.304	1.20	22.210	-11.73	18.647	-19.73	6.12933	23
25	5.50	17.43	7.03	14.34	6.10	14.09	9.38	17.35	13.48	6.05	3.03	12.55	11.37	23.55	10.42	20.40	7.58	16.18		
	18.295	-23.37	17.323	-23.19	16.680	-21.22	20.132	-21.38	4.455	20.99	14.492	-12.30	0.305	1.21	22.213	-11.71	18.652	-19.73	6.26075	25
27	5.51	17.45	7.11	14.36	6.16	14.09	9.34	17.36	13.40	5.56	2.56	12.47	11.29	23.48	10.34	20.32	7.51	16.10		
	18.443	-23.30	17.541	-23.60	16.857	-21.61	20.241	-21.04	4.440	20.96	14.503	-12.35	0.306	1.22	22.216	-11.70	18.657	-19.73	6.39217	27
29	5.51	17.46	7.19	14.38	6.21	14.10	9.31	17.37	13.31	5.47	2.49	12.40	11.21	23.40	10.26	20.25	7.43	16.03		
	18.591	-23.19	17.762	-23.94	17.034	-21.96	20.350	-20.68	4.425	20.93	14.514	-12.39	0.308	1.23	22.220	-11.68	18.662	-19.73	6.52359	29
31	5.51	17.48	7.27	14.42	6.26	14.10	9.27	17.38	13.23	5.38	2.42	12.32	11.13	23.32	10.19	20.17	7.35	15.55		
	18.738	-23.05	17.986	-24.20	17.213	-22.27	20.459	-20.31	4.411	20.91	14.524	-12.44	0.310	1.24	22.223	-11.66	18.667	-19.72	6.65502	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2012

Nowy Rok	Nie	1 styczeń	Zesłania Ducha Świętego	Nie	27 maj
Najświętszej Maryi Panny Rodzicielki	Nie	1 styczeń	Dzień Dziecka	Pią	1 czerwiec
Objawienia Pańskiego (Trzech Króli)	Pią	6 styczeń	Trójcy Najświętszej	Nie	3 czerwiec
Juliański Nowy Rok	Sob	14 styczeń	Dzień Dziękczynienia	Nie	3 czerwiec
Dzień Babci	Sob	21 styczeń	Boże Ciało	Czw	7 czerwiec
Dzień Dziadka	Nie	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	15 czerwiec
Ofiarowania Pańskiego	Czw	2 luty	Dzień Ojca	Sob	23 czerwiec
Matki Boskiej Gromnicznej	Czw	2 luty	Noc Świętojańska	Sob	23 czerwiec
Walentynki	Wto	14 luty	Św. Piotra i Pawła	Pią	29 czerwiec
Tłusty czwartek	Czw	16 luty	Wniebowzięcia N.M.P.	Śro	15 sierpień
Święto UMK	Nie	19 luty	Święto Wojska Polskiego	Śro	15 sierpień
Środa Popielcowa	Śro	22 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	1 kwiecień	Dzień Papieski	Nie	14 październik
Niedziela Wielkanocna	Nie	8 kwiecień	Dzień Edukacji Narodowej	Nie	14 październik
Niedziela Miłosierdzia Bożego	Nie	15 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 Adventu	Nie	2 grudzień
Dzień Polskiej Niezapominajki	Wto	15 maj	Niepokalane Poczęcie N.M.P.	Sob	8 grudzień
Wniebowstąpienia Pańskiego	Czw	17 maj	Boże Narodzenie	Wto	25 grudzień
Dzień Matki	Sob	26 maj	Sylwester	Pon	31 grudzień

Kalendarz astronomiczny 2013

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 7.10.2010 r.)

Data Wielkanocy: **2013 MARZEC 31**

Dla całego roku przyjęto: TDT – UT = 67 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 12.02**, Lato **VI 21, 6.04**, Jesień **IX 22, 21.44**, Zima **XII 21, 18.11**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 31 marca do 27 października 2013 r.**

Oznaczenia:

Dr — dzień 2013 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT
(po nagłówku: Entier(JD/1000) dla Dm = 1)

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2013

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
1	1	Wto	294	18.59182	-3.38	18.4842	-22.58	0.98329	9.4758	7.50	61.666	4.0	85	800	1149.4	1539	2031	231.3	928	1047	1	
2	2	Śro	295	19.03148	-4.06	18.5306	-22.52	0.98329	10.3551	3.29	61.067	5.0	77	759	1149.9	1540	2143	316.7	949	1043	2	
3	3	Czw	296	19.07113	-4.34	18.5730	-22.47	0.98330	11.2411	-1.06	60.400	6.0	68	759	1150.3	1542	2256	402.2	1009	1039	3	
4	4	Pią	297	19.11079	-5.01	19.0154	-22.40	0.98331	12.1345	-5.44	59.676	7.0	58	759	1150.8	1543	****	448.8	1030	1035	4	
5	5	Sob	298	19.15044	-5.28	19.0618	-22.34	0.98332	13.0521	-10.13	58.923	0.3	47	759	1151.2	1544	011	537.4	1053	1031	5	
6	6	Nie	299	19.19010	-5.54	19.1041	-22.27	0.98334	13.5944	-14.15	58.179	1.3	36	758	1151.7	1545	128	628.9	1120	1027	6	
7	7	Pon	300	19.22576	-6.20	19.1503	-22.19	0.98337	14.5722	-17.35	57.498	2.3	25	758	1152.1	1547	247	723.9	1153	1023	7	
8	8	Wto	301	19.26541	-6.46	19.1925	-22.11	0.98340	15.5812	-19.52	56.943	3.3	16	757	1152.5	1548	404	822.6	1236	1020	8	
9	9	Śro	302	19.30507	-7.11	19.2347	-22.02	0.98343	17.0126	-20.51	56.576	4.3	8	757	1152.9	1550	516	924.2	1331	1016	9	
10	10	Czw	303	19.34472	-7.35	19.2808	-21.53	0.98347	18.0532	-20.23	56.450	5.3	3	756	1153.3	1551	618	1026.9	1438	1012	10	
11	11	Pią	304	19.38438	-7.59	19.3228	-21.44	0.98351	19.0843	-18.28	56.594	6.3	0	755	1153.7	1553	708	1128.8	1555	1008	11	
12	12	Sob	305	19.42404	-8.22	19.3648	-21.34	0.98355	20.0930	-15.19	57.006	0.6	1	754	1154.1	1554	748	1227.9	1717	1004	12	
13	13	Nie	306	19.46369	-8.45	19.4107	-21.24	0.98360	21.0708	-11.17	57.656	1.6	4	754	1154.5	1556	819	1323.6	1839	1000	13	
14	14	Pon	307	19.50335	-9.07	19.4526	-21.14	0.98365	22.0134	-6.42	58.485	2.6	9	753	1154.9	1557	845	1415.7	1959	956	14	
15	15	Wto	308	19.54300	-9.28	19.4944	-21.03	0.98371	22.5317	-1.55	59.418	3.6	17	752	1155.2	1559	907	1504.8	2115	952	15	
16	16	Śro	309	19.58266	-9.49	19.5401	-20.51	0.98377	23.4300	2.47	60.375	4.6	26	751	1155.6	1601	928	1551.8	2229	948	16	
17	17	Czw	310	20.02231	-10.09	19.5817	-20.39	0.98383	0.3129	7.14	61.283	5.6	35	750	1155.9	1602	949	1637.7	2340	944	17	
18	18	Pią	311	20.06197	-10.28	20.0233	-20.27	0.98390	1.1927	11.14	62.081	6.6	45	749	1156.2	1604	1011	1723.0	****	940	18	
19	19	Sob	312	20.10162	-10.47	20.0648	-20.15	0.98397	2.0730	14.40	62.725	0.5	55	748	1156.5	1606	1035	1808.6	048	936	19	
20	20	Nie	313	20.14128	-11.04	20.1102	-20.02	0.98405	2.5603	17.25	63.188	1.5	64	747	1156.8	1608	1103	1854.9	154	932	20	
21	21	Pon	314	20.18093	-11.21	20.1516	-19.48	0.98413	3.4522	19.24	63.460	2.5	73	745	1157.1	1609	1135	1942.0	257	928	21	
22	22	Wto	315	20.22059	-11.37	20.1928	-19.35	0.98422	4.3526	20.33	63.547	3.5	81	744	1157.4	1611	1215	2029.9	355	925	22	
23	23	Śro	316	20.26025	-11.53	20.2340	-19.21	0.98431	5.2604	20.47	63.466	4.5	87	743	1157.6	1613	1301	2118.2	447	921	23	
24	24	Czw	317	20.29590	-12.07	20.2751	-19.06	0.98441	6.1654	20.06	63.242	5.5	93	741	1157.9	1615	1355	2206.7	532	917	24	
25	25	Pią	318	20.33556	-12.21	20.3202	-18.51	0.98452	7.0733	18.30	62.907	6.5	97	740	1158.1	1617	1456	2254.8	611	913	25	
26	26	Sob	319	20.37522	-12.34	20.3611	-18.36	0.98463	7.5742	16.02	62.491	7.5	99	739	1158.3	1619	1601	2342.2	643	909	26	
27	27	Nie	320	20.41487	-12.46	20.4020	-18.21	0.98475	8.4711	12.49	62.021	0.3	100	737	1158.5	1620	1710	****	710	905	27	
28	28	Pon	321	20.45453	-12.57	20.4428	-18.05	0.98487	9.3604	8.60	61.520	1.3	98	736	1158.7	1622	1820	028.9	734	901	28	
29	29	Wto	322	20.49418	-13.08	20.4835	-17.49	0.98500	10.2438	4.42	61.005	2.3	95	734	1158.9	1624	1932	115.0	756	857	29	
30	30	Śro	323	20.53384	-13.18	20.5241	-17.33	0.98513	11.1321	0.09	60.484	3.3	89	733	1159.0	1626	2045	201.1	817	853	30	
31	31	Czw	324	20.57349	-13.27	20.5647	-17.16	0.98528	12.0248	-4.30	59.961	4.3	82	731	1159.2	1628	2200	247.7	837	849	31	

Fazy Księżyca [Dm, h.mm]: 3kw 5, 4.58 Nów 11, 20.44 1kw 19, 0.45 Pełn 27, 5.38

STYCZEŃ 2013 (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	5.51	17.49	7.31	14.44	6.29	14.11	9.25	17.39	13.18	5.33	2.39	12.28	11.10	23.28	10.15	20.14	7.32	15.51		
	18.812	-22.96	18.099	-24.29	17.303	-22.41	20.513	-20.12	4.404	20.90	14.529	-12.46	0.311	1.25	22.225	-11.65	18.669	-19.72	6.72073	1
3	5.51	17.51	7.37	14.49	6.33	14.12	9.21	17.40	13.10	5.25	2.32	12.21	11.02	23.21	10.07	20.06	7.24	15.44		
	18.958	-22.78	18.326	-24.42	17.483	-22.65	20.621	-19.73	4.392	20.88	14.539	-12.50	0.313	1.26	22.228	-11.63	18.674	-19.72	6.85214	3
5	5.51	17.53	7.43	14.54	6.38	14.13	9.16	17.41	13.01	5.16	2.25	12.13	10.54	23.13	9.59	19.59	7.16	15.36		
	19.105	-22.56	18.556	-24.46	17.664	-22.84	20.728	-19.32	4.379	20.86	14.549	-12.54	0.315	1.28	22.232	-11.61	18.679	-19.72	6.98356	5
7	5.51	17.55	7.49	15.01	6.42	14.15	9.12	17.43	12.53	5.07	2.18	12.06	10.46	23.05	9.51	19.51	7.09	15.29		
	19.251	-22.32	18.787	-24.41	17.845	-22.99	20.835	-18.90	4.368	20.84	14.558	-12.58	0.318	1.30	22.235	-11.59	18.684	-19.72	7.11498	7
9	5.50	17.57	7.54	15.08	6.46	14.17	9.08	17.44	12.45	4.59	2.11	11.58	10.38	22.58	9.44	19.43	7.01	15.21		
	19.396	-22.04	19.019	-24.27	18.026	-23.09	20.942	-18.46	4.358	20.82	14.567	-12.61	0.320	1.32	22.239	-11.57	18.689	-19.71	7.24640	9
11	5.49	17.60	7.58	15.16	6.49	14.20	9.03	17.45	12.36	4.50	2.03	11.51	10.31	22.50	9.36	19.36	6.54	15.13		
	19.541	-21.74	19.253	-24.03	18.208	-23.15	21.048	-18.01	4.348	20.81	14.576	-12.65	0.323	1.34	22.243	-11.55	18.694	-19.71	7.37783	11
13	5.48	18.02	8.02	15.25	6.52	14.23	8.59	17.47	12.28	4.42	1.56	11.43	10.23	22.43	9.28	19.28	6.46	15.06		
	19.685	-21.40	19.487	-23.70	18.390	-23.16	21.154	-17.55	4.340	20.79	14.584	-12.68	0.326	1.36	22.247	-11.52	18.699	-19.71	7.50925	13
15	5.47	18.05	8.05	15.34	6.55	14.26	8.54	17.48	12.20	4.33	1.49	11.36	10.15	22.35	9.20	19.21	6.39	14.58		
	19.829	-21.04	19.723	-23.27	18.572	-23.12	21.259	-17.07	4.332	20.78	14.592	-12.71	0.329	1.38	22.251	-11.50	18.704	-19.71	7.64067	15
17	5.46	18.08	8.07	15.44	6.57	14.30	8.50	17.50	12.12	4.25	1.42	11.28	10.07	22.28	9.13	19.13	6.31	14.51		
	19.971	-20.66	19.959	-22.73	18.753	-23.03	21.364	-16.59	4.325	20.77	14.599	-12.73	0.333	1.40	22.255	-11.48	18.709	-19.70	7.77209	17
19	5.44	18.10	8.09	15.55	6.59	14.34	8.45	17.51	12.03	4.17	1.34	11.21	9.59	22.20	9.05	19.06	6.23	14.43		
	20.113	-20.24	20.195	-22.10	18.935	-22.90	21.468	-16.09	4.319	20.77	14.606	-12.76	0.336	1.43	22.259	-11.45	18.714	-19.70	7.90350	19
21	5.42	18.13	8.10	16.07	7.01	14.38	8.40	17.53	11.55	4.09	1.27	11.13	9.52	22.13	8.57	18.59	6.16	14.36		
	20.254	-19.81	20.431	-21.37	19.115	-22.72	21.572	-15.58	4.315	20.76	14.612	-12.78	0.340	1.45	22.264	-11.43	18.719	-19.70	8.03492	21
23	5.41	18.16	8.10	16.19	7.02	14.43	8.35	17.54	11.47	4.00	1.20	11.05	9.44	22.05	8.49	18.51	6.08	14.28		
	20.395	-19.34	20.667	-20.53	19.296	-22.49	21.675	-15.06	4.311	20.76	14.619	-12.80	0.344	1.48	22.268	-11.40	18.723	-19.70	8.16635	23
25	5.39	18.19	8.10	16.31	7.03	14.48	8.30	17.56	11.39	3.52	1.12	10.58	9.36	21.58	8.42	18.44	6.01	14.21		
	20.534	-18.86	20.902	-19.59	19.475	-22.22	21.778	-14.53	4.308	20.76	14.624	-12.82	0.348	1.51	22.272	-11.38	18.728	-19.69	8.29777	25
27	5.36	18.22	8.09	16.44	7.03	14.53	8.25	17.57	11.31	3.44	1.05	10.50	9.28	21.50	8.34	18.36	5.53	14.13		
	20.672	-18.35	21.135	-18.55	19.654	-21.90	21.880	-14.00	4.306	20.77	14.630	-12.84	0.353	1.54	22.277	-11.35	18.733	-19.69	8.42919	27
29	5.34	18.26	8.08	16.58	7.04	14.58	8.20	17.59	11.23	3.37	0.57	10.42	9.21	21.43	8.26	18.29	5.45	14.05		
	20.810	-17.82	21.367	-17.41	19.832	-21.54	21.981	-13.45	4.305	20.77	14.635	-12.86	0.357	1.57	22.281	-11.33	18.737	-19.69	8.56061	29
31	5.31	18.29	8.06	17.11	7.04	15.04	8.15	17.60	11.15	3.29	0.50	10.35	9.13	21.35	8.18	18.21	5.38	13.58		
	20.946	-17.27	21.597	-16.17	20.009	-21.13	22.083	-12.89	4.305	20.78	14.639	-12.87	0.362	1.60	22.286	-11.30	18.742	-19.68	8.69203	31

LUTY 2013

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
32	1	Pią	325	21.01315	-13.35	21.0051	-16.59	0.98542	12.5339	-8.59	59.442	5.3	73	729	1159.3	1630	2316	335.5	900	845	1	
33	2	Sob	326	21.05280	-13.42	21.0455	-16.42	0.98557	13.4633	-13.05	58.931	6.3	62	728	1159.4	1632	****	425.4	925	841	2	
34	3	Nie	327	21.09246	-13.48	21.0858	-16.24	0.98573	14.4159	-16.32	58.442	7.3	51	726	1159.6	1634	032	518.0	955	837	3	
35	4	Pon	328	21.13211	-13.54	21.1301	-16.06	0.98589	15.4004	-19.05	57.997	0.9	40	724	1159.7	1636	148	613.5	1033	833	4	
36	5	Wto	329	21.17177	-13.59	21.1702	-15.48	0.98605	16.4025	-20.29	57.629	1.9	29	722	1159.7	1638	300	711.7	1121	829	5	
37	6	Śro	330	21.21143	-14.03	21.2103	-15.29	0.98622	17.4207	-20.34	57.376	2.9	19	721	1159.8	1640	404	811.7	1221	826	6	
38	7	Czw	331	21.25108	-14.07	21.2503	-15.11	0.98639	18.4349	-19.17	57.277	3.9	11	719	1159.9	1642	458	912.0	1331	822	7	
39	8	Pią	332	21.29074	-14.09	21.2902	-14.52	0.98656	19.4414	-16.44	57.364	4.9	5	717	1159.9	1644	541	1011.0	1448	818	8	
40	9	Sob	333	21.33039	-14.11	21.3300	-14.32	0.98674	20.4227	-13.09	57.654	5.9	1	715	1159.9	1646	616	1107.5	1609	814	9	
41	10	Nie	334	21.37005	-14.12	21.3658	-14.13	0.98692	21.3808	-8.50	58.141	0.2	0	713	1159.9	1648	644	1201.2	1730	810	10	
42	11	Pon	335	21.40570	-14.12	21.4055	-13.53	0.98710	22.3124	-4.08	58.797	1.2	2	711	1160.0	1649	709	1252.2	1848	806	11	
43	12	Wto	336	21.44536	-14.12	21.4451	-13.33	0.98728	23.2243	0.40	59.574	2.2	6	709	1159.9	1651	731	1341.1	2005	802	12	
44	13	Śro	337	21.48501	-14.11	21.4846	-13.13	0.98747	0.1240	5.18	60.410	3.2	12	707	1159.9	1653	753	1428.6	2118	758	13	
45	14	Czw	338	21.52467	-14.09	21.5241	-12.53	0.98766	1.0151	9.33	61.237	4.2	19	705	1159.9	1655	815	1515.2	2229	754	14	
46	15	Pią	339	21.56432	-14.06	21.5634	-12.32	0.98785	1.5048	13.16	61.993	5.2	28	703	1159.8	1657	838	1601.7	2338	750	15	
47	16	Sob	340	22.00398	-14.02	22.0027	-12.11	0.98805	2.3956	16.18	62.622	6.2	37	701	1159.8	1659	905	1648.4	****	746	16	
48	17	Nie	341	22.04363	-13.58	22.0420	-11.50	0.98824	3.2928	18.35	63.082	7.2	46	659	1159.7	1701	936	1735.6	043	742	17	
49	18	Pon	342	22.08329	-13.53	22.0811	-11.29	0.98845	4.1929	20.01	63.349	0.6	56	657	1159.6	1703	1013	1823.3	143	738	18	
50	19	Wto	343	22.12294	-13.48	22.1202	-11.08	0.98865	5.0954	20.35	63.412	1.6	65	655	1159.5	1705	1056	1911.4	238	734	19	
51	20	Śro	344	22.16260	-13.41	22.1552	-10.46	0.98886	6.0030	20.13	63.279	2.6	74	653	1159.4	1707	1147	1959.6	326	730	20	
52	21	Czw	345	22.20226	-13.34	22.1942	-10.25	0.98907	6.5101	18.57	62.971	3.6	82	651	1159.3	1709	1244	2047.7	407	727	21	
53	22	Pią	346	22.24191	-13.27	22.2331	-10.03	0.98929	7.4115	16.49	62.520	4.6	88	648	1159.2	1711	1348	2135.3	442	723	22	
54	23	Sob	347	22.28157	-13.18	22.2719	-9.41	0.98951	8.3103	13.53	61.968	5.6	94	646	1159.1	1713	1455	2222.5	512	719	23	
55	24	Nie	348	22.32122	-13.09	22.3107	-9.19	0.98974	9.2030	10.15	61.358	6.6	98	644	1158.9	1715	1605	2309.4	537	715	24	
56	25	Pon	349	22.36088	-13.00	22.3454	-8.56	0.98997	10.0948	6.06	60.737	7.6	100	642	1158.7	1717	1717	2356.3	600	711	25	
57	26	Wto	350	22.40053	-12.50	22.3841	-8.34	0.99020	10.5920	1.34	60.141	0.6	100	640	1158.6	1718	1831	****	622	707	26	
58	27	Śro	351	22.44019	-12.39	22.4227	-8.11	0.99044	11.4934	-3.07	59.603	1.6	97	637	1158.4	1720	1947	043.7	643	703	27	
59	28	Czw	352	22.47584	-12.28	22.4612	-7.49	0.99068	12.4104	-7.42	59.139	2.6	92	635	1158.2	1722	2103	132.2	706	659	28	

Fazy Księżyca [Dm, h.mm]: 3kw 3, 14.56 Now 10, 8.20 1kw 17, 21.31 Pełn 25, 21.26

LUTY 2013 (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	5.30	18.30	8.05	17.18	7.03	15.07	8.13	18.01	11.11	3.25	0.46	10.31	9.09	21.32	8.15	18.18	5.34	13.54	
	21.014	-16.98	21.710	-15.52	20.098	-20.91	22.133	-12.61	4.305	20.78	14.641	-12.87	0.364	1.61	22.288	-11.29	18.744	-19.68	8.75773 1
3	5.27	18.34	8.02	17.32	7.03	15.13	8.08	18.02	11.03	3.17	0.39	10.23	9.01	21.24	8.07	18.10	5.26	13.46	
	21.150	-16.40	21.934	-14.16	20.273	-20.44	22.234	-12.04	4.306	20.80	14.645	-12.88	0.369	1.65	22.293	-11.26	18.748	-19.68	8.88915 3
5	5.24	18.37	7.59	17.45	7.02	15.19	8.03	18.04	10.56	3.09	0.31	10.15	8.53	21.17	7.59	18.03	5.19	13.39	
	21.284	-15.80	22.151	-12.73	20.447	-19.94	22.334	-11.46	4.309	20.81	14.648	-12.89	0.374	1.68	22.297	-11.24	18.752	-19.67	9.02057 5
7	5.21	18.40	7.55	17.59	7.01	15.25	7.57	18.05	10.48	3.02	0.23	10.08	8.46	21.09	7.51	17.55	5.11	13.31	
	21.417	-15.18	22.361	-11.24	20.620	-19.39	22.434	-10.88	4.312	20.82	14.651	-12.90	0.379	1.72	22.302	-11.21	18.757	-19.67	9.15199 7
9	5.18	18.44	7.51	18.11	6.59	15.31	7.52	18.06	10.40	2.54	0.16	10.00	8.38	21.02	7.44	17.48	5.03	13.24	
	21.550	-14.54	22.560	-9.71	20.792	-18.80	22.533	-10.29	4.316	20.84	14.654	-12.90	0.385	1.75	22.307	-11.19	18.761	-19.67	9.28342 9
11	5.15	18.47	7.45	18.23	6.57	15.37	7.47	18.08	10.32	2.47	0.08	9.52	8.30	20.55	7.36	17.40	4.56	13.16	
	21.682	-13.89	22.746	-8.18	20.963	-18.18	22.632	-9.69	4.321	20.86	14.656	-12.90	0.390	1.79	22.312	-11.16	18.765	-19.66	9.41483 11
13	5.11	18.51	7.39	18.33	6.56	15.44	7.41	18.09	10.25	2.40	23.56	9.45	8.22	20.47	7.28	17.33	4.48	13.08	
	21.813	-13.22	22.913	-6.69	21.132	-17.52	22.731	-9.09	4.327	20.88	14.657	-12.90	0.396	1.82	22.316	-11.13	18.769	-19.66	9.54625 13
15	5.07	18.54	7.32	18.42	6.53	15.50	7.36	18.11	10.17	2.32	23.48	9.37	8.15	20.40	7.20	17.26	4.40	13.01	
	21.943	-12.53	23.057	-5.28	21.300	-16.83	22.829	-8.48	4.334	20.91	14.659	-12.90	0.401	1.86	22.321	-11.11	18.772	-19.66	9.67767 15
17	5.04	18.58	7.25	18.48	6.51	15.57	7.31	18.12	10.09	2.25	23.40	9.29	8.07	20.33	7.13	17.18	4.33	12.53	
	22.072	-11.84	23.173	-4.01	21.467	-16.11	22.926	-7.87	4.342	20.93	14.659	-12.89	0.407	1.90	22.326	-11.08	18.776	-19.65	9.80908 17
19	4.60	19.01	7.16	18.50	6.48	16.04	7.25	18.13	10.02	2.18	23.33	9.21	7.59	20.26	7.05	17.11	4.25	12.46	
	22.201	-11.13	23.255	-2.92	21.632	-15.36	23.024	-7.25	4.351	20.96	14.659	-12.88	0.413	1.94	22.331	-11.05	18.780	-19.65	9.94051 19
21	4.56	19.05	7.06	18.50	6.46	16.10	7.20	18.15	9.54	2.11	23.25	9.13	7.52	20.18	6.57	17.03	4.17	12.38	
	22.328	-10.41	23.301	-2.08	21.796	-14.58	23.121	-6.63	4.360	20.99	14.659	-12.87	0.419	1.98	22.336	-11.02	18.783	-19.65	10.07193 21
23	4.52	19.09	6.56	18.45	6.43	16.17	7.14	18.16	9.47	2.04	23.17	9.05	7.44	20.11	6.50	16.56	4.10	12.30	
	22.455	-9.68	23.308	-1.52	21.959	-13.78	23.218	-6.01	4.371	21.02	14.658	-12.86	0.425	2.02	22.340	-11.00	18.786	-19.64	10.20335 23
25	4.47	19.12	6.45	18.37	6.40	16.24	7.09	18.17	9.40	1.57	23.09	8.58	7.36	20.04	6.42	16.48	4.02	12.23	
	22.582	-8.94	23.276	-1.28	22.120	-12.95	23.314	-5.38	4.382	21.06	14.657	-12.85	0.431	2.06	22.345	-10.97	18.790	-19.64	10.33476 25
27	4.43	19.16	6.33	18.24	6.36	16.30	7.04	18.18	9.32	1.50	23.01	8.50	7.28	19.56	6.34	16.41	3.54	12.15	
	22.707	-8.19	23.208	-1.36	22.281	-12.09	23.410	-4.75	4.394	21.09	14.656	-12.83	0.438	2.10	22.350	-10.94	18.793	-19.64	10.46618 27

MARZEC 2013

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2456																					
60	1	Pią	353	22.51550	-12.17	22.4957	-7.26	0.99093	13.3418	-11.57	58.759	3.6	85	633	1158.0	1724	2221	222.4	731	655	1
61	2	Sob	354	22.55515	-12.05	22.5341	-7.03	0.99118	14.2939	-15.36	58.461	4.6	76	631	1157.8	1726	2337	314.8	800	651	2
62	3	Nie	355	22.59481	-11.52	22.5725	-6.40	0.99143	15.2709	-18.21	58.241	5.6	66	628	1157.6	1728	****	409.7	836	647	3
63	4	Pon	356	23.03446	-11.39	23.0109	-6.17	0.99169	16.2626	-20.01	58.092	6.6	55	626	1157.4	1730	050	506.7	920	643	4
64	5	Wto	357	23.07412	-11.26	23.0452	-5.54	0.99195	17.2642	-20.26	58.015	0.5	44	624	1157.2	1732	155	605.2	1015	639	5
65	6	Śro	358	23.11378	-11.12	23.0835	-5.31	0.99221	18.2654	-19.33	58.014	1.5	33	621	1156.9	1734	251	703.8	1119	635	6
66	7	Czw	359	23.15343	-10.57	23.1217	-5.07	0.99247	19.2560	-17.27	58.102	2.5	22	619	1156.7	1735	337	801.5	1232	632	7
67	8	Pią	360	23.19309	-10.43	23.1559	-4.44	0.99274	20.2316	-14.19	58.290	3.5	14	617	1156.5	1737	414	857.1	1349	628	8
68	9	Sob	361	23.23274	-10.28	23.1941	-4.20	0.99300	21.1824	-10.22	58.593	4.5	7	614	1156.2	1739	444	950.5	1507	624	9
69	10	Nie	362	23.27240	-10.13	23.2322	-3.57	0.99327	22.1131	-5.55	59.013	5.5	2	612	1156.0	1741	510	1041.5	1625	620	10
70	11	Pon	363	23.31205	-9.57	23.2703	-3.33	0.99353	23.0259	-1.14	59.543	6.5	0	610	1155.7	1743	533	1130.7	1741	616	11
71	12	Wto	364	23.35171	-9.41	23.3043	-3.10	0.99380	23.5319	3.26	60.163	0.6	0	607	1155.4	1745	555	1218.7	1856	612	12
72	13	Śro	365	23.39136	-9.25	23.3424	-2.46	0.99407	0.4300	7.49	60.836	1.6	3	605	1155.2	1746	617	1305.9	2008	608	13
73	14	Czw	366	23.43102	-9.08	23.3804	-2.22	0.99434	1.3231	11.45	61.516	2.6	7	602	1154.9	1748	640	1353.0	2119	604	14
74	15	Pią	367	23.47067	-8.52	23.4144	-1.59	0.99461	2.2209	15.04	62.154	3.6	14	600	1154.6	1750	706	1440.2	2226	600	15
75	16	Sob	368	23.51033	-8.35	23.4523	-1.35	0.99487	3.1206	17.38	62.698	4.6	21	558	1154.3	1752	736	1527.8	2329	556	16
76	17	Nie	369	23.54598	-8.17	23.4903	-1.11	0.99514	4.0223	19.23	63.104	5.6	29	555	1154.0	1754	811	1615.7	****	552	17
77	18	Pon	370	23.58564	-8.00	23.5242	-0.47	0.99541	4.5252	20.15	63.336	6.6	38	553	1153.7	1756	851	1703.8	026	548	18
78	19	Wto	371	0.02529	-7.43	23.5621	-0.24	0.99569	5.4321	20.12	63.372	7.6	47	551	1153.5	1757	939	1751.8	117	544	19
79	20	Śro	372	0.06495	-7.25	23.5960	0.00	0.99596	6.3336	19.16	63.204	0.7	57	548	1153.2	1759	1033	1839.6	201	540	20
80	21	Czw	373	0.10460	-7.07	0.0338	0.24	0.99623	7.2329	17.27	62.839	1.7	66	546	1152.9	1801	1133	1926.9	239	536	21
81	22	Pią	374	0.14426	-6.49	0.0717	0.47	0.99651	8.1257	14.51	62.304	2.7	75	543	1152.6	1803	1238	2013.8	310	533	22
82	23	Sob	375	0.18391	-6.31	0.1055	1.11	0.99679	9.0208	11.32	61.636	3.7	83	541	1152.3	1805	1346	2100.5	337	529	23
83	24	Nie	376	0.22357	-6.13	0.1434	1.35	0.99706	9.5118	7.36	60.885	4.7	90	539	1152.0	1806	1457	2147.3	401	525	24
84	25	Pon	377	0.26322	-5.54	0.1812	1.58	0.99735	10.4052	3.14	60.109	5.7	96	536	1151.7	1808	1610	2234.7	424	521	25
85	26	Wto	378	0.30288	-5.36	0.2150	2.22	0.99763	11.3120	-1.25	59.369	6.7	99	534	1151.4	1810	1726	2323.5	446	517	26
86	27	Śro	379	0.34253	-5.18	0.2529	2.45	0.99791	12.2316	-6.07	58.719	0.1	100	531	1151.0	1812	1843	****	508	513	27
87	28	Czw	380	0.38219	-4.60	0.2907	3.09	0.99820	13.1709	-10.34	58.202	1.1	99	529	1150.7	1814	2003	014.1	533	509	28
88	29	Pią	381	0.42184	-4.42	0.3245	3.32	0.99849	14.1319	-14.29	57.845	2.1	95	527	1150.4	1815	2122	107.1	602	505	29
89	30	Sob	382	0.46150	-4.23	0.3624	3.55	0.99878	15.1144	-17.33	57.656	3.1	88	524	1150.1	1817	2238	202.7	636	501	30
90	31	Nie	383	0.50115	-4.05	0.4002	4.19	0.99907	16.1155	-19.32	57.625	4.1	80	522	1149.8	1819	2347	300.6	719	457	31
90	31	Nie	383	23.50017	-4.06	0.3953	4.18	0.99906	16.0923	-19.29	57.624	5.1	80	622	1249.8	1919	****	400.6	819	557	31

Fazy Księżyca [Dm, h.mm]: 3kw 4, 22.53 Nów 11, 20.51 1kw 19, 18.27 Pełn 27, 10.27

MARZEC 2013 (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	6.22	18.09	6.33	16.37	6.58	18.20	9.25	1.43	22.53	8.42	7.21	19.49	6.26	16.34	3.47	12.07			
	22.832	-7.43	23.112	-1.76	22.440	-11.22	23.506	-4.12	4.407	21.13	14.654	-12.82	0.444	2.14	22.355	-10.92	18.796	-19.63	10.59759	1	
3	4.34	19.24	6.11	17.50	6.30	16.44	6.52	18.21	9.17	1.37	22.44	8.34	7.13	19.42	6.19	16.26	3.39	11.60			
	22.957	-6.67	22.996	-2.42	22.598	-10.32	23.602	-3.49	4.421	21.17	14.651	-12.80	0.451	2.19	22.360	-10.89	18.799	-19.63	10.72901	3	
5	4.29	19.28	5.60	17.31	6.26	16.50	6.47	18.22	9.10	1.30	22.36	8.26	7.05	19.35	6.11	16.19	3.31	11.52			
	23.081	-5.90	22.873	-3.28	22.755	-9.40	23.697	-2.85	4.435	21.21	14.648	-12.78	0.457	2.23	22.364	-10.86	18.802	-19.63	10.86043	5	
7	4.24	19.32	5.50	17.10	6.22	16.57	6.41	18.23	9.03	1.23	22.28	8.18	6.58	19.27	6.03	16.11	3.23	11.44			
	23.205	-5.12	22.753	-4.25	22.912	-8.47	23.792	-2.22	4.451	21.25	14.645	-12.75	0.464	2.27	22.369	-10.84	18.804	-19.62	10.99185	7	
9	4.19	19.35	5.41	16.51	6.19	17.04	6.36	18.25	8.56	1.17	22.20	8.10	6.50	19.20	5.55	16.04	3.16	11.37			
	23.328	-4.34	22.647	-5.24	23.067	-7.53	23.887	-1.58	4.467	21.29	14.641	-12.73	0.470	2.32	22.374	-10.81	18.807	-19.62	11.12327	9	
11	4.14	19.40	5.33	16.33	6.15	17.10	6.30	18.26	8.49	1.10	22.12	8.02	6.42	19.13	5.48	15.56	3.08	11.29			
	23.451	-3.55	22.563	-6.19	23.222	-6.57	23.982	-0.95	4.483	21.33	14.637	-12.70	0.477	2.36	22.379	-10.78	18.809	-19.62	11.25469	11	
13	4.09	19.44	5.27	16.17	6.11	17.17	6.25	18.27	8.41	1.04	22.03	7.54	6.35	19.06	5.40	15.49	3.00	11.21			
	23.573	-2.77	22.503	-7.04	23.376	-5.60	0.077	-0.31	4.501	21.38	14.633	-12.67	0.484	2.40	22.383	-10.76	18.811	-19.62	11.38610	13	
15	4.04	19.48	5.21	16.03	6.07	17.23	6.19	18.28	8.34	0.57	21.55	7.46	6.27	18.59	5.32	15.42	2.52	11.14			
	23.695	-1.98	22.471	-7.75	23.529	-4.61	0.171	0.32	4.519	21.42	14.628	-12.64	0.491	2.45	22.388	-10.73	18.814	-19.61	11.51752	15	
17	3.59	19.52	5.16	15.52	6.03	17.30	6.14	18.29	8.27	0.51	21.47	7.38	6.19	18.51	5.24	15.34	2.45	11.06			
	23.817	-1.19	22.466	-8.31	23.682	-3.63	0.266	0.95	4.538	21.47	14.622	-12.61	0.498	2.49	22.392	-10.71	18.815	-19.61	11.64894	17	
19	3.53	19.56	5.11	15.43	5.59	17.37	6.08	18.30	8.20	0.44	21.38	7.30	6.12	18.44	5.17	15.27	2.37	10.58			
	23.939	-0.40	22.485	-8.72	23.834	-2.63	0.360	1.58	4.557	21.51	14.617	-12.58	0.505	2.54	22.397	-10.68	18.817	-19.61	11.78036	19	
21	3.48	20.01	5.07	15.36	5.55	17.43	6.02	18.32	8.13	0.38	21.30	7.22	6.04	18.37	5.09	15.19	2.29	10.50			
	0.061	0.39	22.528	-8.96	23.986	-1.63	0.454	2.21	4.577	21.56	14.611	-12.54	0.512	2.58	22.401	-10.66	18.819	-19.61	11.91178	21	
23	3.42	20.05	5.04	15.32	5.51	17.50	5.57	18.33	8.06	0.32	21.21	7.14	5.56	18.30	5.01	15.12	2.21	10.43			
	0.182	1.18	22.590	-9.05	0.138	-0.62	0.549	2.84	4.598	21.61	14.604	-12.51	0.519	2.63	22.406	-10.63	18.821	-19.61	12.04320	23	
25	3.37	20.09	5.00	15.29	5.47	17.56	5.51	18.34	7.59	0.26	21.13	7.06	5.48	18.22	4.54	15.04	2.14	10.35			
	0.303	1.97	22.672	-9.00	0.290	0.38	0.643	3.46	4.619	21.66	14.597	-12.47	0.526	2.67	22.410	-10.61	18.822	-19.60	12.17461	25	
27	3.31	20.14	4.57	15.28	5.42	18.03	5.46	18.35	7.52	0.19	21.04	6.58	5.41	18.15	4.46	14.57	2.06	10.27			
	0.425	2.75	22.768	-8.81	0.441	1.39	0.737	4.08	4.641	21.71	14.590	-12.43	0.533	2.72	22.414	-10.58	18.823	-19.60	12.30603	27	
29	3.25	20.19	4.54	15.28	5.38	18.09	5.40	18.36	7.45	0.13	20.56	6.50	5.33	18.08	4.38	14.49	1.58	10.19			
	0.546	3.53	22.879	-8.50	0.593	2.40	0.831	4.69	4.664	21.75	14.583	-12.39	0.540	2.76	22.418	-10.56	18.824	-19.60	12.43744	29	
31	3.19	20.23	4.51	15.30	5.34	18.16	5.35	18.37	7.39	0.07	20.47	6.42	5.25	18.01	4.30	14.42	1.50	10.11			
	0.667	4.31	23.002	-8.06	0.744	3.40	0.925	5.31	4.687	21.80	14.575	-12.35	0.547	2.81	22.422	-10.54	18.825	-19.60	12.56886	31	
31	4.19	21.24	5.51	16.30	6.34	19.16	6.35	19.37	8.39	1.07	21.47	7.42	6.25	19.01	5.30	15.42	2.50	11.11			
	0.665	4.29	22.999	-8.07	0.741	3.38	0.923	5.29	4.686	21.80	14.575	-12.35	0.546	2.81	22.422	-10.54	18.825	-19.60	12.56886	31	

KWIECIEŃ 2013

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
91	1	Pon	384	23.53582	-3.48	0.4332	4.41	0.99935	17.1022	-20.15	57.724	6.1	70	619	1249.6	1921	047	459.8	911	553	1	
92	2	Wto	385	23.57548	-3.31	0.4711	5.04	0.99965	18.1102	-19.42	57.935	7.1	59	617	1249.3	1923	147	559.1	1013	549	2	
93	3	Śro	386	0.01514	-3.13	0.5050	5.27	0.99994	19.1016	-17.56	58.229	0.2	47	615	1249.0	1924	236	657.0	1123	545	3	
94	4	Czw	387	0.05479	-2.55	0.5429	5.50	1.00023	20.0723	-15.06	58.584	1.2	36	612	1248.7	1926	315	752.7	1238	541	4	
95	5	Pią	388	0.09445	-2.38	0.5808	6.12	1.00053	21.0207	-11.28	58.986	2.2	26	610	1248.4	1928	347	845.7	1355	537	5	
96	6	Sob	389	0.13410	-2.21	1.0147	6.35	1.00082	21.5441	-7.16	59.428	3.2	17	608	1248.1	1930	413	936.3	1511	534	6	
97	7	Nie	390	0.17376	-2.04	1.0527	6.58	1.00111	22.4534	-2.46	59.906	4.2	10	605	1247.8	1932	437	1024.9	1625	530	7	
98	8	Pon	391	0.21341	-1.48	1.0907	7.20	1.00140	23.3519	1.49	60.416	5.2	4	603	1247.5	1933	459	1112.3	1739	526	8	
99	9	Wto	392	0.25307	-1.31	1.1247	7.43	1.00169	0.2431	6.14	60.952	6.2	1	601	1247.3	1935	520	1159.0	1851	522	9	
100	10	Śro	393	0.29272	-1.15	1.1628	8.05	1.00197	1.1340	10.17	61.500	0.0	0	558	1247.0	1937	543	1245.7	2002	518	10	
101	11	Czw	394	0.33238	-0.59	1.2009	8.27	1.00225	2.0307	13.49	62.039	1.0	1	556	1246.7	1939	608	1332.7	2110	514	11	
102	12	Pią	395	0.37203	-0.44	1.2350	8.49	1.00254	2.5303	16.39	62.538	2.0	4	554	1246.5	1941	636	1420.3	2215	510	12	
103	13	Sob	396	0.41169	-0.29	1.2731	9.11	1.00282	3.4326	18.42	62.963	3.0	9	551	1246.2	1942	709	1508.3	2315	506	13	
104	14	Nie	397	0.45134	-0.14	1.3113	9.32	1.00309	4.3405	19.53	63.280	4.0	15	549	1246.0	1944	747	1556.6	****	502	14	
105	15	Pon	398	0.49100	0.01	1.3455	9.54	1.00337	5.2441	20.10	63.453	5.0	22	547	1245.7	1946	832	1644.8	009	458	15	
106	16	Wto	399	0.53065	0.15	1.3837	10.15	1.00364	6.1457	19.34	63.455	6.0	30	544	1245.5	1948	924	1732.5	056	454	16	
107	17	Śro	400	0.57031	0.29	1.4220	10.36	1.00391	7.0438	18.05	63.268	7.0	39	542	1245.3	1950	1021	1819.6	135	450	17	
108	18	Czw	401	1.00596	0.42	1.4603	10.57	1.00418	7.5340	15.49	62.885	8.0	49	540	1245.0	1951	1123	1905.9	209	446	18	
109	19	Pią	402	1.04562	0.55	1.4946	11.18	1.00445	8.4211	12.49	62.318	0.9	59	538	1244.8	1953	1229	1951.8	237	442	19	
110	20	Sob	403	1.08528	1.08	1.5330	11.38	1.00472	9.3029	9.13	61.592	1.9	68	536	1244.6	1955	1337	2037.6	302	439	20	
111	21	Nie	404	1.12493	1.20	1.5714	11.59	1.00499	10.1903	5.05	60.750	2.9	77	533	1244.4	1957	1448	2123.9	325	435	21	
112	22	Pon	405	1.16458	1.32	2.0059	12.19	1.00526	11.0828	0.37	59.850	3.9	86	531	1244.2	1958	1601	2211.5	347	431	22	
113	23	Wto	406	1.20424	1.44	2.0444	12.39	1.00552	11.5924	-4.02	58.959	4.9	92	529	1244.0	2000	1717	2301.0	409	427	23	
114	24	Śro	407	1.24389	1.55	2.0830	12.59	1.00579	12.5232	-8.37	58.150	5.9	97	527	1243.8	2002	1836	2353.3	432	423	24	
115	25	Czw	408	1.28355	2.05	2.1216	13.18	1.00606	13.4823	-12.50	57.492	6.9	100	525	1243.7	2004	1957	*****	459	419	25	
116	26	Pią	409	1.32320	2.15	2.1602	13.38	1.00632	14.4706	-16.21	57.038	0.6	100	523	1243.5	2006	2117	048.7	532	415	26	
117	27	Sob	410	1.36286	2.25	2.1949	13.57	1.00659	15.4820	-18.51	56.818	1.6	96	521	1243.3	2007	2232	147.3	612	411	27	
118	28	Nie	411	1.40252	2.34	2.2337	14.16	1.00685	16.5105	-20.04	56.838	2.6	91	518	1243.2	2009	2338	248.1	702	407	28	
119	29	Pon	412	1.44217	2.42	2.2725	14.34	1.00711	17.5351	-19.54	57.075	3.6	83	516	1243.0	2011	****	349.6	802	403	29	
120	30	Wto	413	1.48183	2.50	2.3114	14.53	1.00737	18.5510	-18.24	57.489	4.6	73	514	1242.9	2013	032	450.0	912	359	30	

Fazy Księżyca [Dm, h.mm]: 3kw 3, 6.36 Now 10, 11.35 1kw 18, 14.31 Pełn 25, 21.57

KWIECIEŃ 2013 (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	5.50	16.31	6.32	19.19	6.32	19.37	8.35	1.04	21.43	7.38	6.22	18.57	5.26	15.38	2.46	11.08		
	0.726	4.68	23.064	-7.81	0.817	3.88	0.970	5.60	4.698	21.83	14.572	-12.33	0.550	2.83	22.424	-10.53	18.826	-19.60	12.63457	1
3	4.10	21.31	5.47	16.35	6.28	19.25	6.26	19.38	8.28	0.58	21.34	7.30	6.14	18.50	5.19	15.31	2.38	10.60		
	0.847	5.45	23.202	-7.21	0.969	4.88	1.064	6.20	4.722	21.88	14.563	-12.28	0.557	2.87	22.428	-10.51	18.827	-19.60	12.76599	3
5	4.04	21.36	5.44	16.40	6.24	19.32	6.21	19.39	8.22	0.52	21.26	7.22	6.06	18.43	5.11	15.23	2.31	10.52		
	0.969	6.21	23.348	-6.50	1.121	5.87	1.158	6.80	4.746	21.93	14.555	-12.24	0.564	2.92	22.432	-10.48	18.827	-19.60	12.89741	5
7	3.58	21.41	5.41	16.46	6.20	19.39	6.15	19.40	8.15	0.46	21.17	7.14	5.59	18.36	5.03	15.15	2.23	10.44		
	1.091	6.96	23.503	-5.70	1.274	6.85	1.252	7.40	4.771	21.98	14.547	-12.20	0.571	2.96	22.436	-10.46	18.828	-19.60	13.02883	7
9	3.51	21.47	5.38	16.52	6.16	19.45	6.10	19.41	8.08	0.40	21.08	7.05	5.51	18.28	4.55	15.08	2.15	10.36		
	1.213	7.71	23.664	-4.81	1.428	7.82	1.346	7.98	4.796	22.03	14.538	-12.15	0.578	3.01	22.440	-10.44	18.828	-19.60	13.16025	9
11	3.45	21.52	5.35	16.60	6.12	19.52	6.04	19.42	8.01	0.34	20.60	6.57	5.43	18.21	4.48	15.00	2.07	10.28		
	1.336	8.45	23.832	-3.83	1.582	8.78	1.441	8.57	4.822	22.07	14.529	-12.10	0.585	3.05	22.443	-10.42	18.828	-19.59	13.29166	11
13	3.38	21.58	5.32	17.08	6.08	19.59	5.59	19.43	7.55	0.28	20.51	6.49	5.35	18.14	4.40	14.53	1.59	10.21		
	1.459	9.18	0.007	-2.76	1.736	9.72	1.535	9.14	4.848	22.12	14.520	-12.06	0.592	3.10	22.447	-10.40	18.828	-19.59	13.42308	13
15	3.31	22.04	5.28	17.17	6.04	20.06	5.53	19.44	7.48	0.22	20.42	6.41	5.28	18.07	4.32	14.45	1.51	10.13		
	1.582	9.89	0.188	-1.61	1.892	10.65	1.630	9.71	4.875	22.17	14.510	-12.01	0.598	3.14	22.450	-10.38	18.828	-19.59	13.55450	15
17	3.25	22.10	5.25	17.27	6.00	20.12	5.48	19.45	7.42	0.16	20.34	6.33	5.20	17.60	4.24	14.38	1.43	10.05		
	1.705	10.60	0.374	-0.39	2.048	11.57	1.725	10.27	4.902	22.22	14.501	-11.96	0.605	3.18	22.453	-10.37	18.828	-19.60	13.68592	17
19	3.18	22.16	5.22	17.37	5.56	20.19	5.43	19.46	7.35	0.10	20.25	6.25	5.12	17.52	4.17	14.30	1.36	9.57		
	1.829	11.30	0.567	0.90	2.205	12.46	1.819	10.83	4.930	22.27	14.492	-11.91	0.612	3.23	22.457	-10.35	18.827	-19.60	13.81734	19
21	3.10	22.22	5.19	17.49	5.53	20.26	5.37	19.47	7.28	0.05	20.16	6.17	5.05	17.45	4.09	14.23	1.28	9.49		
	1.954	11.98	0.766	2.25	2.363	13.34	1.914	11.37	4.958	22.31	14.482	-11.87	0.619	3.27	22.460	-10.33	18.827	-19.60	13.94876	21
23	3.03	22.29	5.16	18.01	5.49	20.33	5.32	19.48	7.22	23.55	20.08	6.08	4.57	17.38	4.01	14.15	1.20	9.41		
	2.079	12.65	0.972	3.67	2.522	14.19	2.009	11.91	4.986	22.36	14.472	-11.82	0.625	3.31	22.463	-10.31	18.826	-19.60	14.08017	23
25	2.55	22.36	5.13	18.13	5.46	20.39	5.27	19.49	7.15	23.49	19.59	6.00	4.49	17.31	3.53	14.07	1.12	9.33		
	2.204	13.31	1.185	5.14	2.683	15.02	2.105	12.44	5.014	22.41	14.462	-11.77	0.632	3.35	22.466	-10.30	18.825	-19.60	14.21159	25
27	2.48	22.43	5.10	18.27	5.43	20.46	5.22	19.50	7.09	23.43	19.50	5.52	4.42	17.23	3.45	13.60	1.04	9.25		
	2.330	13.95	1.405	6.67	2.844	15.83	2.200	12.96	5.043	22.45	14.453	-11.72	0.638	3.39	22.468	-10.28	18.824	-19.60	14.34301	27
29	2.40	22.51	5.07	18.41	5.40	20.53	5.16	19.51	7.03	23.37	19.41	5.44	4.34	17.16	3.38	13.52	0.56	9.17		
	2.457	14.57	1.633	8.23	3.006	16.61	2.296	13.48	5.073	22.50	14.443	-11.67	0.645	3.43	22.471	-10.27	18.823	-19.60	14.47443	29

MAJ 2013

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2456																					
121	1	Śro	414	1.52148	2.58	2.3503	15.11	1.00763	19.5357	-15.46	58.030	5.6	62	512	1242.8	2014	115	547.9	1028	355	1
122	2	Czw	415	1.56114	3.04	2.3852	15.29	1.00789	20.4949	-12.16	58.646	6.6	51	510	1242.7	2016	150	642.5	1145	351	2
123	3	Pią	416	2.00080	3.11	2.4243	15.47	1.00815	21.4257	-8.10	59.295	0.9	40	508	1242.6	2018	218	734.0	1301	347	3
124	4	Sob	417	2.04045	3.16	2.4634	16.04	1.00840	22.3352	-3.45	59.941	1.9	29	506	1242.5	2020	242	822.9	1416	343	4
125	5	Nie	418	2.08011	3.21	2.5025	16.21	1.00865	23.2316	0.46	60.565	2.9	20	505	1242.4	2021	304	910.0	1529	340	5
126	6	Pon	419	2.11576	3.26	2.5417	16.38	1.00890	0.1152	5.09	61.153	3.9	12	503	1242.3	2023	325	956.1	1640	336	6
127	7	Wto	420	2.15542	3.30	2.5810	16.55	1.00914	1.0019	9.15	61.698	4.9	7	501	1242.2	2025	347	1042.0	1750	332	7
128	8	Śro	421	2.19507	3.33	3.0203	17.11	1.00938	1.4905	12.53	62.197	5.9	2	459	1242.2	2027	411	1128.3	1858	328	8
129	9	Czw	422	2.23473	3.36	3.0557	17.27	1.00962	2.3827	15.54	62.642	6.9	0	457	1242.1	2028	437	1215.2	2004	324	9
130	10	Pią	423	2.27438	3.38	3.0951	17.43	1.00985	3.2828	18.11	63.025	0.4	0	455	1242.1	2030	508	1302.8	2106	320	10
131	11	Sob	424	2.31404	3.40	3.1346	17.58	1.01008	4.1859	19.37	63.330	1.4	2	454	1242.1	2032	545	1351.0	2202	316	11
132	12	Nie	425	2.35369	3.41	3.1741	18.13	1.01030	5.0940	20.10	63.537	2.4	5	452	1242.1	2033	627	1439.3	2251	312	12
133	13	Pon	426	2.39335	3.42	3.2137	18.28	1.01052	6.0005	19.49	63.626	3.4	10	450	1242.1	2035	717	1527.2	2333	308	13
134	14	Wto	427	2.43300	3.42	3.2534	18.43	1.01073	6.4952	18.35	63.573	4.4	17	449	1242.1	2037	812	1614.4	****	304	14
135	15	Śro	428	2.47266	3.41	3.2931	18.57	1.01094	7.3850	16.34	63.358	5.4	24	447	1242.1	2038	912	1700.7	009	300	15
136	16	Czw	429	2.51232	3.40	3.3329	19.11	1.01115	8.2658	13.49	62.970	6.4	33	445	1242.1	2040	1015	1746.1	039	256	16
137	17	Pią	430	2.55197	3.38	3.3727	19.24	1.01135	9.1432	10.27	62.407	7.4	42	444	1242.1	2041	1121	1831.0	105	252	17
138	18	Sob	431	2.59163	3.36	3.4126	19.38	1.01155	10.0157	6.34	61.681	0.2	52	442	1242.1	2043	1230	1915.9	128	248	18
139	19	Nie	432	3.03128	3.33	3.4525	19.51	1.01175	10.4950	2.19	60.821	1.2	62	441	1242.2	2044	1340	2001.6	149	244	19
140	20	Pon	433	3.07094	3.30	3.4925	20.03	1.01194	11.3855	-2.11	59.873	2.2	72	440	1242.2	2046	1453	2048.8	211	241	20
141	21	Wto	434	3.11059	3.26	3.5325	20.15	1.01213	12.2960	-6.44	58.899	3.2	81	438	1242.3	2047	1609	2138.6	233	237	21
142	22	Śro	435	3.15025	3.22	3.5726	20.27	1.01232	13.2350	-11.04	57.974	4.2	89	437	1242.4	2049	1728	2231.7	257	233	22
143	23	Czw	436	3.18590	3.17	4.0127	20.39	1.01251	14.2057	-14.55	57.178	5.2	95	436	1242.5	2050	1848	2328.7	326	229	23
144	24	Pią	437	3.22556	3.12	4.0529	20.50	1.01269	15.2127	-17.55	56.585	6.2	99	434	1242.6	2052	2007	*****	402	225	24
145	25	Sob	438	3.26521	3.06	4.0932	21.01	1.01287	16.2440	-19.44	56.252	0.2	100	433	1242.6	2053	2119	029.2	447	221	25
146	26	Nie	439	3.30487	2.60	4.1335	21.11	1.01305	17.2911	-20.09	56.206	1.2	98	432	1242.8	2055	2221	132.0	544	217	26
147	27	Pon	440	3.34453	2.53	4.1738	21.21	1.01323	18.3310	-19.07	56.443	2.2	93	431	1242.9	2056	2311	235.1	652	213	27
148	28	Wto	441	3.38418	2.46	4.2142	21.31	1.01340	19.3459	-16.47	56.927	3.2	85	430	1243.0	2057	2350	336.4	808	209	28
149	29	Śro	442	3.42384	2.38	4.2546	21.40	1.01357	20.3340	-13.24	57.599	4.2	76	429	1243.1	2058	****	434.5	928	205	29
150	30	Czw	443	3.46350	2.30	4.2951	21.49	1.01374	21.2904	-9.21	58.392	5.2	65	428	1243.3	2100	021	528.9	1047	201	30
151	31	Pią	444	3.50315	2.21	4.3356	21.58	1.01390	22.2134	-4.54	59.237	6.2	54	427	1243.4	2101	047	619.8	1204	157	31

Fazy Księżyca [Dm, h.mm]: 3kw 2, 13.14 Nów 10, 2.28 1kw 18, 6.35 Pełn 25, 6.25 3kw 31, 20.58

CZERWIEC 2013

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
152	1	Sob	445	3.54281	2.12	4.3802	22.06	1.01407	23.1153	-0.20	60.075	0.6	43	426	1243.5	2102	110	708.2	1319	153	1	
153	2	Nie	446	3.58246	2.02	4.4208	22.14	1.01422	0.0050	4.08	60.862	1.6	33	425	1243.7	2103	132	754.9	1431	149	2	
154	3	Pon	447	4.02212	1.53	4.4614	22.21	1.01437	0.4910	8.19	61.570	2.6	24	424	1243.9	2104	153	840.7	1541	146	3	
155	4	Wto	448	4.06177	1.42	4.5021	22.28	1.01452	1.3730	12.03	62.182	3.6	16	423	1244.0	2105	216	926.5	1650	142	4	
156	5	Śro	449	4.10143	1.32	4.5428	22.35	1.01466	2.2618	15.13	62.691	4.6	9	423	1244.2	2106	241	1012.7	1756	138	5	
157	6	Czw	450	4.14108	1.21	4.5836	22.41	1.01480	3.1546	17.40	63.098	5.6	5	422	1244.4	2107	310	1059.7	1858	134	6	
158	7	Pią	451	4.18074	1.09	5.0243	22.47	1.01493	4.0552	19.20	63.405	6.6	1	421	1244.6	2108	344	1147.3	1956	130	7	
159	8	Sob	452	4.22039	0.58	5.0651	22.52	1.01506	4.5622	20.08	63.612	7.6	0	421	1244.8	2109	425	1235.5	2048	126	8	
160	9	Nie	453	4.26005	0.46	5.1060	22.57	1.01518	5.4651	20.02	63.718	8.8	1	420	1245.0	2110	511	1323.6	2133	122	9	
161	10	Pon	454	4.29571	0.34	5.1508	23.02	1.01529	6.3652	19.03	63.716	1.8	3	420	1245.2	2111	605	1411.1	2211	118	10	
162	11	Wto	455	4.33536	0.22	5.1917	23.06	1.01540	7.2606	17.14	63.597	2.8	7	420	1245.4	2111	703	1457.8	2242	114	11	
163	12	Śro	456	4.37502	0.09	5.2326	23.10	1.01550	8.1423	14.42	63.349	3.8	12	419	1245.6	2112	806	1543.4	2310	110	12	
164	13	Czw	457	4.41468	-0.03	5.2735	23.14	1.01560	9.0148	11.31	62.961	4.8	19	419	1245.8	2113	910	1628.1	2333	106	13	
165	14	Pią	458	4.45433	-0.16	5.3145	23.17	1.01569	9.4840	7.49	62.428	5.8	27	419	1246.0	2113	1017	1712.3	2355	102	14	
166	15	Sob	459	4.49399	-0.29	5.3554	23.19	1.01578	10.3531	3.44	61.752	6.8	37	419	1246.2	2114	1125	1756.6	****	058	15	
167	16	Nie	460	4.53364	-0.42	5.4003	23.21	1.01587	11.2301	-0.36	60.948	7.8	47	419	1246.4	2114	1235	1841.8	015	054	16	
168	17	Pon	461	4.57330	-0.55	5.4413	23.23	1.01594	12.1156	-5.02	60.045	0.7	57	419	1246.7	2115	1348	1928.9	036	050	17	
169	18	Wto	462	5.01295	-1.08	5.4822	23.25	1.01602	13.0307	-9.22	59.090	1.7	68	419	1246.9	2115	1503	2018.7	059	047	18	
170	19	Śro	463	5.05261	-1.21	5.5232	23.25	1.01609	13.5719	-13.21	58.146	2.7	78	419	1247.1	2116	1620	2112.1	124	043	19	
171	20	Czw	464	5.09226	-1.34	5.5642	23.26	1.01615	14.5502	-16.41	57.289	3.7	87	419	1247.3	2116	1738	2209.5	155	039	20	
172	21	Pią	465	5.13192	-1.47	6.0051	23.26	1.01622	15.5613	-19.03	56.596	4.7	94	419	1247.5	2116	1854	2310.6	235	035	21	
173	22	Sob	466	5.17158	-1.60	6.0501	23.26	1.01628	17.0004	-20.08	56.141	5.7	98	419	1247.7	2116	2002	*****	325	031	22	
174	23	Nie	467	5.21123	-2.12	6.0910	23.25	1.01633	18.0459	-19.47	55.972	6.7	100	420	1248.0	2116	2059	013.9	427	027	23	
175	24	Pon	468	5.25089	-2.25	6.1319	23.24	1.01639	19.0904	-17.59	56.110	0.9	99	420	1248.2	2116	2144	117.4	540	023	24	
176	25	Wto	469	5.29054	-2.38	6.1729	23.22	1.01644	20.1047	-14.57	56.539	1.9	94	420	1248.4	2116	2221	218.8	701	019	25	
177	26	Śro	470	5.33020	-2.50	6.2138	23.21	1.01648	21.0918	-11.01	57.210	2.9	87	421	1248.6	2116	2250	316.9	823	015	26	
178	27	Czw	471	5.36586	-3.03	6.2547	23.18	1.01653	22.0435	-6.32	58.054	3.9	79	421	1248.8	2116	2315	411.3	944	011	27	
179	28	Pią	472	5.40551	-3.15	6.2956	23.15	1.01656	22.5708	-1.51	58.993	4.9	69	422	1249.0	2116	2338	502.4	1103	007	28	
180	29	Sob	473	5.44517	-3.27	6.3404	23.12	1.01660	23.4741	2.47	59.949	5.9	58	422	1249.2	2116	****	551.1	1218	003	29	
181	30	Nie	474	5.48482	-3.39	6.3813	23.09	1.01663	0.3701	7.08	60.860	0.2	48	423	1249.4	2115	000	638.2	1330	2355	30	

Fazy Księżyca [Dm, h.mm]: 3kw 0, 20.58 Now 8, 17.56 1kw 16, 19.24 Pełn 23, 13.32 3kw 30, 6.54

CZERWIEC 2013 (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	*****	*****	5.31	22.56	5.25	22.28	3.58	20.02	5.19	22.03	17.19	3.29	2.27	15.15	1.29	11.45	22.41	7.05		
	4.634	22.10	6.132	25.60	5.851	24.29	3.902	20.37	5.591	23.06	14.297	-11.00	0.734	3.99	22.496	-10.14	18.788	-19.66	16.64286	1
3	*****	*****	5.38	23.01	5.27	22.32	3.54	20.02	5.13	21.57	17.11	3.21	2.19	15.07	1.21	11.37	22.33	6.57		
	4.771	22.35	6.355	25.46	6.029	24.38	4.002	20.68	5.624	23.08	14.290	-10.97	0.739	4.02	22.497	-10.14	18.785	-19.66	16.77427	3
5	*****	*****	5.44	23.03	5.30	22.35	3.50	20.03	5.07	21.52	17.02	3.13	2.11	14.60	1.13	11.29	22.25	6.49		
	4.908	22.58	6.563	25.22	6.208	24.41	4.101	20.98	5.657	23.10	14.283	-10.95	0.743	4.04	22.497	-10.14	18.782	-19.67	16.90569	5
7	*****	*****	5.51	23.04	5.33	22.38	3.46	20.03	5.01	21.46	16.54	3.05	2.03	14.52	1.05	11.21	22.17	6.41		
	5.045	22.78	6.754	24.87	6.387	24.41	4.200	21.26	5.690	23.12	14.277	-10.92	0.747	4.07	22.497	-10.14	18.779	-19.67	17.03711	7
9	*****	*****	5.57	23.03	5.36	22.40	3.42	20.03	4.55	21.40	16.45	2.57	1.56	14.45	0.57	11.13	22.09	6.33		
	5.183	22.96	6.928	24.45	6.566	24.35	4.300	21.53	5.724	23.14	14.271	-10.90	0.750	4.09	22.497	-10.14	18.776	-19.68	17.16854	9
11	*****	*****	6.02	23.00	5.40	22.42	3.38	20.03	4.49	21.34	16.37	2.49	1.48	14.37	0.49	11.05	22.01	6.25		
	5.321	23.11	7.085	23.95	6.745	24.24	4.399	21.79	5.757	23.15	14.265	-10.88	0.754	4.11	22.497	-10.14	18.773	-19.68	17.29996	11
13	*****	*****	6.07	22.56	5.44	22.44	3.35	20.03	4.43	21.29	16.29	2.41	1.40	14.30	0.42	10.57	21.53	6.17		
	5.460	23.23	7.224	23.41	6.922	24.09	4.499	22.03	5.790	23.17	14.260	-10.86	0.757	4.13	22.496	-10.15	18.770	-19.69	17.43138	13
15	*****	*****	6.11	22.51	5.48	22.45	3.31	20.02	4.37	21.23	16.21	2.33	1.32	14.22	0.34	10.50	21.45	6.08		
	5.598	23.32	7.344	22.83	7.100	23.89	4.599	22.26	5.823	23.18	14.255	-10.84	0.761	4.15	22.496	-10.15	18.766	-19.70	17.56280	15
17	*****	*****	6.14	22.45	5.53	22.46	3.28	20.02	4.31	21.17	16.12	2.24	1.24	14.14	0.26	10.42	21.37	6.00		
	5.737	23.39	7.445	22.22	7.276	23.65	4.698	22.47	5.857	23.19	14.250	-10.82	0.764	4.17	22.495	-10.16	18.763	-19.70	17.69422	17
19	*****	*****	6.15	22.37	5.58	22.46	3.24	20.02	4.25	21.11	16.04	2.16	1.17	14.07	0.18	10.34	21.29	5.52		
	5.876	23.42	7.525	21.60	7.452	23.36	4.798	22.67	5.890	23.20	14.246	-10.81	0.766	4.19	22.495	-10.16	18.759	-19.71	17.82564	19
21	*****	*****	6.16	22.28	6.03	22.46	3.21	20.01	4.20	21.05	15.56	2.08	1.09	13.59	0.10	10.26	21.20	5.44		
	6.014	23.44	7.585	20.99	7.627	23.02	4.898	22.86	5.923	23.21	14.242	-10.80	0.769	4.20	22.494	-10.17	18.756	-19.72	17.95706	21
23	*****	*****	6.14	22.18	6.08	22.45	3.18	20.01	4.14	20.60	15.48	2.00	1.01	13.52	0.02	10.18	21.12	5.36		
	6.153	23.42	7.623	20.39	7.801	22.64	4.998	23.03	5.956	23.21	14.239	-10.79	0.772	4.22	22.493	-10.17	18.753	-19.72	18.08848	23
25	*****	*****	6.11	22.07	6.14	22.45	3.15	20.00	4.08	20.54	15.40	1.52	0.53	13.44	23.50	10.10	21.04	5.28		
	6.291	23.37	7.639	19.82	7.973	22.22	5.098	23.19	5.990	23.22	14.236	-10.78	0.774	4.23	22.492	-10.18	18.749	-19.73	18.21991	25
27	*****	*****	6.07	21.56	6.20	22.44	3.12	19.59	4.02	20.48	15.32	1.44	0.45	13.36	23.42	10.02	20.56	5.20		
	6.430	23.30	7.634	19.29	8.145	21.75	5.198	23.33	6.023	23.22	14.233	-10.78	0.776	4.24	22.490	-10.19	18.746	-19.74	18.35133	27
29	*****	*****	6.01	21.43	6.26	22.42	3.09	19.58	3.56	20.42	15.24	1.36	0.38	13.29	23.35	9.54	20.48	5.12		
	6.568	23.20	7.609	18.81	8.315	21.25	5.298	23.46	6.056	23.22	14.231	-10.78	0.778	4.25	22.489	-10.20	18.742	-19.74	18.48275	29

LIPIEC 2013

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
182	1	Pon	475	5.52448	-3.51	6.4221	23.05	1.01666	1.2549	11.03	61.676	1.2	38	424	1249.6	2115	022	724.6	1440	2351	1	
183	2	Wto	476	5.56413	-4.02	6.4629	23.00	1.01668	2.1441	14.23	62.366	2.2	28	424	1249.8	2115	047	810.9	1547	2348	2	
184	3	Śro	477	6.00379	-4.13	6.5037	22.56	1.01669	3.0356	17.03	62.914	3.2	20	425	1250.0	2114	114	857.6	1651	2344	3	
185	4	Czw	478	6.04344	-4.24	6.5444	22.50	1.01670	3.5344	18.56	63.316	4.2	13	426	1250.1	2114	146	944.9	1751	2340	4	
186	5	Pią	479	6.08310	-4.35	6.5851	22.45	1.01671	4.4358	19.58	63.578	5.2	7	427	1250.3	2113	224	1032.7	1844	2336	5	
187	6	Sob	480	6.12276	-4.45	7.0258	22.39	1.01671	5.3421	20.07	63.710	6.2	3	428	1250.5	2112	308	1120.7	1932	2332	6	
188	7	Nie	481	6.16241	-4.55	7.0704	22.32	1.01670	6.2431	19.23	63.723	7.2	1	429	1250.7	2112	359	1208.5	2012	2328	7	
189	8	Pon	482	6.20207	-5.04	7.1110	22.26	1.01668	7.1404	17.49	63.627	0.1	0	430	1250.8	2111	456	1255.5	2046	2324	8	
190	9	Wto	483	6.24172	-5.13	7.1516	22.19	1.01666	8.0247	15.28	63.428	1.1	1	431	1251.0	2110	557	1341.7	2115	2320	9	
191	10	Śro	484	6.28138	-5.22	7.1921	22.11	1.01664	8.5036	12.27	63.129	2.1	4	432	1251.1	2109	702	1426.8	2140	2316	10	
192	11	Czw	485	6.32104	-5.30	7.2326	22.03	1.01661	9.3741	8.53	62.730	3.1	9	433	1251.3	2109	808	1511.2	2202	2312	11	
193	12	Pią	486	6.36069	-5.38	7.2730	21.55	1.01657	10.2424	4.55	62.228	4.1	15	434	1251.4	2108	915	1555.3	2223	2308	12	
194	13	Sob	487	6.40035	-5.45	7.3134	21.46	1.01653	11.1117	0.41	61.624	5.1	23	436	1251.5	2107	1024	1639.7	2243	2304	13	
195	14	Nie	488	6.44000	-5.52	7.3537	21.37	1.01648	11.5901	-3.39	60.924	6.1	32	437	1251.6	2106	1134	1725.1	2305	2300	14	
196	15	Pon	489	6.47566	-5.58	7.3940	21.28	1.01642	12.4821	-7.56	60.142	7.1	42	438	1251.7	2105	1246	1812.6	2328	2256	15	
197	16	Wto	490	6.51531	-6.04	7.4342	21.18	1.01636	13.4002	-11.56	59.307	0.3	53	439	1251.8	2103	1401	1902.8	2356	2253	16	
198	17	Śro	491	6.55497	-6.09	7.4744	21.08	1.01630	14.3442	-15.26	58.462	1.3	64	441	1251.9	2102	1516	1956.4	****	2249	17	
199	18	Czw	492	6.59462	-6.14	7.5145	20.57	1.01623	15.3241	-18.07	57.664	2.3	74	442	1252.0	2101	1631	2053.8	030	2245	18	
200	19	Pią	493	7.03428	-6.18	7.5546	20.46	1.01616	16.3344	-19.44	56.980	3.3	84	443	1252.0	2100	1741	2154.3	113	2241	19	
201	20	Sob	494	7.07394	-6.21	7.5946	20.35	1.01609	17.3656	-20.02	56.479	4.3	92	445	1252.1	2059	1843	2256.7	207	2237	20	
202	21	Nie	495	7.11359	-6.24	8.0345	20.24	1.01601	18.4046	-18.56	56.219	5.3	97	446	1252.1	2057	1934	2358.8	314	2233	21	
203	22	Pon	496	7.15325	-6.26	8.0744	20.12	1.01593	19.4337	-16.28	56.239	6.3	100	448	1252.2	2056	2015	*****	430	2229	22	
204	23	Wto	497	7.19290	-6.28	8.1143	19.60	1.01585	20.4412	-12.55	56.546	0.7	99	449	1252.2	2054	2048	059.1	552	2225	23	
205	24	Śro	498	7.23256	-6.29	8.1540	19.47	1.01576	21.4200	-8.35	57.116	1.7	96	451	1252.2	2053	2116	156.4	716	2221	24	
206	25	Czw	499	7.27221	-6.30	8.1937	19.34	1.01567	22.3704	-3.52	57.894	2.7	90	452	1252.2	2051	2141	250.5	837	2217	25	
207	26	Pią	500	7.31187	-6.30	8.2334	19.21	1.01557	23.2951	0.55	58.808	3.7	82	454	1252.2	2050	2204	341.9	956	2213	26	
208	27	Sob	501	7.35152	-6.29	8.2730	19.07	1.01547	0.2059	5.30	59.778	4.7	73	455	1252.2	2048	2227	431.2	1112	2209	27	
209	28	Nie	502	7.39118	-6.28	8.3125	18.54	1.01537	1.1110	9.40	60.730	5.7	63	457	1252.2	2047	2251	519.2	1225	2205	28	
210	29	Pon	503	7.43083	-6.26	8.3520	18.39	1.01527	2.0055	13.16	61.600	6.7	53	458	1252.2	2045	2318	606.6	1334	2201	29	
211	30	Wto	504	7.47049	-6.24	8.3914	18.25	1.01516	2.5041	16.11	62.340	0.7	43	500	1252.1	2043	2349	653.9	1441	2157	30	
212	31	Śro	505	7.51015	-6.21	8.4308	18.10	1.01505	3.4040	18.19	62.921	1.7	34	501	1252.1	2042	****	741.4	1542	2154	31	

Fazy Księżyca [Dm, h.mm]: Nów 8, 9.14 1kw 16, 5.18 Pełn 22, 20.16 3kw 29, 19.43

LIPIEC 2013 (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	(h° UT) Dm
1	*****	*****	5.53	21.30	6.32	22.41	3.06	19.57	3.50	20.36	15.16	1.28	0.30	13.21	23.27	9.46	20.40	5.03	
	6.706	23.08	7.563	18.39	8.483	20.70	5.397	23.57	6.089	23.22	14.229	-10.78	0.780	4.26	22.488	-10.21	18.739	-19.75	18.61416 1
3	*****	*****	5.44	21.16	6.38	22.39	3.03	19.56	3.44	20.30	15.08	1.20	0.22	13.13	23.19	9.38	20.32	4.55	
	6.843	22.93	7.501	18.05	8.651	20.12	5.497	23.67	6.122	23.22	14.227	-10.78	0.781	4.27	22.486	-10.22	18.735	-19.76	18.74558 3
5	*****	*****	5.33	21.02	6.45	22.36	3.01	19.55	3.38	20.24	14.60	1.13	0.14	13.05	23.11	9.30	20.24	4.47	
	6.981	22.75	7.425	17.80	8.817	19.50	5.597	23.76	6.155	23.21	14.226	-10.78	0.783	4.28	22.484	-10.23	18.732	-19.76	18.87700 5
7	*****	*****	5.21	20.48	6.51	22.34	2.58	19.54	3.32	20.18	14.52	1.05	0.06	12.58	23.03	9.22	20.16	4.39	
	7.118	22.54	7.340	17.63	8.981	18.84	5.696	23.83	6.188	23.21	14.226	-10.79	0.784	4.29	22.482	-10.24	18.728	-19.77	19.00843 7
9	*****	*****	5.08	20.34	6.58	22.31	2.56	19.52	3.27	20.12	14.44	0.57	23.55	12.50	22.55	9.14	20.08	4.31	
	7.254	22.31	7.251	17.55	9.144	18.16	5.796	23.88	6.221	23.20	14.226	-10.80	0.785	4.29	22.480	-10.25	18.725	-19.78	19.13985 9
11	*****	*****	4.55	20.21	7.04	22.28	2.53	19.51	3.21	20.06	14.36	0.49	23.47	12.42	22.47	9.06	20.00	4.23	
	7.391	22.05	7.164	17.56	9.306	17.44	5.895	23.93	6.253	23.19	14.226	-10.81	0.785	4.30	22.478	-10.27	18.721	-19.79	19.27127 11
13	*****	*****	4.42	20.09	7.11	22.25	2.51	19.49	3.15	20.00	14.29	0.41	23.39	12.34	22.39	8.58	19.52	4.15	
	7.526	21.77	7.084	17.66	9.466	16.68	5.994	23.95	6.286	23.18	14.227	-10.82	0.786	4.30	22.476	-10.28	18.718	-19.80	19.40269 13
15	*****	*****	4.29	19.58	7.17	22.22	2.49	19.47	3.09	19.54	14.21	0.33	23.31	12.26	22.31	8.49	19.44	4.07	
	7.661	21.46	7.018	17.84	9.624	15.90	6.092	23.97	6.318	23.17	14.228	-10.84	0.786	4.30	22.474	-10.29	18.714	-19.80	19.53411 15
17	*****	*****	4.16	19.49	7.24	22.18	2.47	19.45	3.03	19.48	14.13	0.25	23.23	12.19	22.23	8.41	19.36	3.59	
	7.796	21.13	6.969	18.09	9.781	15.10	6.191	23.97	6.350	23.16	14.229	-10.85	0.787	4.30	22.472	-10.31	18.711	-19.81	19.66553 17
19	*****	*****	4.05	19.42	7.30	22.15	2.45	19.43	2.57	19.42	14.06	0.17	23.15	12.11	22.15	8.33	19.28	3.50	
	7.929	20.77	6.942	18.40	9.937	14.26	6.289	23.95	6.382	23.15	14.231	-10.87	0.786	4.30	22.469	-10.32	18.707	-19.82	19.79695 19
21	*****	*****	3.55	19.36	7.37	22.11	2.44	19.41	2.52	19.36	13.58	0.09	23.07	12.03	22.08	8.25	19.20	3.42	
	8.063	20.40	6.940	18.75	10.092	13.41	6.387	23.93	6.414	23.13	14.234	-10.90	0.786	4.29	22.467	-10.34	18.704	-19.83	19.92837 21
23	*****	*****	3.46	19.32	7.43	22.07	2.42	19.39	2.46	19.30	13.50	0.02	22.60	11.55	21.60	8.17	19.12	3.34	
	8.195	19.99	6.965	19.12	10.245	12.53	6.485	23.89	6.446	23.12	14.236	-10.92	0.786	4.29	22.464	-10.36	18.701	-19.84	20.05979 23
25	*****	*****	3.38	19.30	7.50	22.03	2.40	19.36	2.40	19.24	13.43	23.50	22.52	11.47	21.52	8.09	19.04	3.26	
	8.327	19.57	7.017	19.50	10.397	11.63	6.582	23.83	6.477	23.10	14.240	-10.95	0.785	4.29	22.461	-10.37	18.698	-19.84	20.19121 25
27	*****	*****	3.33	19.30	7.56	21.59	2.39	19.33	2.34	19.18	13.35	23.42	22.44	11.39	21.44	8.01	18.56	3.18	
	8.458	19.12	7.098	19.86	10.547	10.71	6.679	23.77	6.508	23.08	14.243	-10.97	0.784	4.28	22.458	-10.39	18.695	-19.85	20.32263 27
29	1.14	0.04	3.29	19.30	8.03	21.55	2.37	19.31	2.28	19.12	13.28	23.34	22.36	11.31	21.36	7.53	18.48	3.10	
	8.589	18.66	7.207	20.19	10.697	9.77	6.776	23.68	6.539	23.06	14.247	-11.00	0.783	4.27	22.456	-10.41	18.691	-19.86	20.45405 29
31	1.36	-0.07	3.28	19.33	8.09	21.50	2.36	19.28	2.22	19.05	13.21	23.26	22.28	11.23	21.28	7.45	18.40	3.02	
	8.719	18.17	7.344	20.45	10.845	8.82	6.872	23.59	6.570	23.04	14.252	-11.04	0.782	4.26	22.453	-10.43	18.688	-19.87	20.58547 31

SIERPIEŃ 2013

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
213	1	Czw	506	7.54580	-6.18	8.4701	17.55	1.01493	4.3054	19.36	63.327	2.7	25	503	1252.0	2040	025	829.2	1638	2150	1
214	2	Pią	507	7.58546	-6.14	8.5054	17.40	1.01480	5.2115	20.02	63.560	3.7	17	505	1252.0	2038	106	917.2	1728	2146	2
215	3	Sob	508	8.02511	-6.09	8.5445	17.24	1.01468	6.1127	19.34	63.629	4.7	11	506	1251.9	2036	155	1005.0	1811	2142	3
216	4	Nie	509	8.06477	-6.04	8.5837	17.08	1.01454	7.0113	18.15	63.553	5.7	6	508	1251.8	2035	250	1052.3	1847	2138	4
217	5	Pon	510	8.10443	-5.58	9.0227	16.52	1.01440	7.5018	16.07	63.355	6.7	2	510	1251.7	2033	349	1138.9	1918	2134	5
218	6	Wto	511	8.14408	-5.51	9.0617	16.36	1.01426	8.3838	13.18	63.056	7.7	0	511	1251.6	2031	453	1224.9	1945	2130	6
219	7	Śro	512	8.18374	-5.44	9.1007	16.19	1.01411	9.2616	9.53	62.677	0.5	0	513	1251.5	2029	559	1309.8	2008	2126	7
220	8	Czw	513	8.22339	-5.37	9.1356	16.02	1.01395	10.1329	6.01	62.232	1.5	2	515	1251.4	2027	706	1354.4	2030	2122	8
221	9	Pią	514	8.26305	-5.28	9.1744	15.45	1.01379	11.0040	1.50	61.732	2.5	6	516	1251.2	2025	815	1439.0	2051	2118	9
222	10	Sob	515	8.30270	-5.20	9.2132	15.27	1.01363	11.4823	-2.29	61.185	3.5	12	518	1251.1	2023	925	1524.3	2112	2114	10
223	11	Nie	516	8.34236	-5.10	9.2519	15.09	1.01346	12.3712	-6.45	60.596	4.5	19	520	1250.9	2021	1036	1610.8	2135	2110	11
224	12	Pon	517	8.38201	-5.00	9.2906	14.51	1.01328	13.2748	-10.47	59.972	5.5	28	521	1250.7	2019	1149	1659.5	2201	2106	12
225	13	Wto	518	8.42167	-4.50	9.3252	14.33	1.01310	14.2044	-14.21	59.324	6.5	39	523	1250.6	2017	1302	1750.8	2232	2102	13
226	14	Śro	519	8.46132	-4.38	9.3637	14.15	1.01292	15.1621	-17.13	58.675	7.5	50	525	1250.4	2015	1415	1845.2	2310	2058	14
227	15	Czw	520	8.50098	-4.27	9.4022	13.56	1.01273	16.1441	-19.09	58.057	1.0	61	526	1250.2	2013	1525	1942.5	2358	2055	15
228	16	Pią	521	8.54063	-4.14	9.4406	13.37	1.01254	17.1512	-19.54	57.512	2.0	72	528	1250.0	2011	1628	2042.0	****	2051	16
229	17	Sob	522	8.58029	-4.02	9.4750	13.18	1.01235	18.1655	-19.21	57.092	3.0	82	530	1249.8	2009	1723	2142.3	057	2047	17
230	18	Nie	523	9.01594	-3.48	9.5133	12.59	1.01215	19.1835	-17.30	56.845	4.0	90	532	1249.6	2006	1808	2242.0	206	2043	18
231	19	Pon	524	9.05560	-3.35	9.5516	12.39	1.01195	20.1901	-14.29	56.813	5.0	96	533	1249.3	2004	1844	2339.9	324	2039	19
232	20	Wto	525	9.09526	-3.20	9.5858	12.19	1.01175	21.1730	-10.32	57.017	6.0	99	535	1249.1	2002	1915	*****	446	2035	20
233	21	Śro	526	9.13491	-3.05	10.0240	11.59	1.01155	22.1348	-5.60	57.456	0.3	100	537	1248.8	2000	1941	035.4	608	2031	21
234	22	Czw	527	9.17457	-2.50	10.0621	11.39	1.01134	23.0805	-1.12	58.100	1.3	98	538	1248.6	1958	2006	128.5	729	2027	22
235	23	Pią	528	9.21422	-2.35	10.1002	11.19	1.01113	0.0049	3.32	58.898	2.3	93	540	1248.3	1955	2030	219.7	847	2023	23
236	24	Sob	529	9.25388	-2.18	10.1343	10.58	1.01092	0.5228	7.56	59.783	3.3	86	542	1248.1	1953	2054	309.4	1003	2019	24
237	25	Nie	530	9.29353	-2.02	10.1723	10.38	1.01071	1.4330	11.50	60.683	4.3	78	544	1247.8	1951	2120	358.2	1116	2015	25
238	26	Pon	531	9.33319	-1.45	10.2102	10.17	1.01050	2.3417	15.03	61.530	5.3	69	545	1247.5	1949	2150	446.7	1225	2011	26
239	27	Wto	532	9.37284	-1.28	10.2442	9.56	1.01028	3.2502	17.28	62.265	6.3	60	547	1247.2	1946	2224	535.1	1330	2007	27
240	28	Śro	533	9.41250	-1.10	10.2820	9.35	1.01006	4.1545	19.04	62.846	0.0	50	549	1246.9	1944	2304	623.5	1429	2003	28
241	29	Czw	534	9.45215	-0.52	10.3159	9.13	1.00984	5.0623	19.46	63.245	1.0	40	550	1246.6	1942	2350	711.8	1521	2000	29
242	30	Pią	535	9.49181	-0.34	10.3537	8.52	1.00962	5.5644	19.35	63.449	2.0	31	552	1246.3	1939	****	759.8	1607	1956	30
243	31	Sob	536	9.53146	-0.15	10.3915	8.30	1.00939	6.4637	18.32	63.464	3.0	23	554	1246.0	1937	043	847.3	1646	1952	31

Fazy Księżyca [Dm, h.mm]: Nów 6, 23.51 1kw 14, 12.56 Pełn 21, 3.45 3kw 28, 11.35

SIERPIEŃ 2013 (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	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	1.44	23.54	3.28	19.34	8.12	21.48	2.35	19.26	2.19	19.02	13.17	23.23	22.24	11.19	21.24	7.40	18.36	2.58										
	8.784	17.92	7.423	20.55	10.919	8.34	6.920	23.54	6.585	23.02	14.254	-11.05	0.781	4.26	22.451	-10.43	18.687	-19.87	20.65	118	1							
3	1.58	23.42	3.30	19.38	8.19	21.43	2.34	19.23	2.13	18.56	13.10	23.15	22.16	11.11	21.16	7.32	18.28	2.50										
	8.913	17.40	7.599	20.67	11.066	7.36	7.016	23.43	6.616	23.00	14.259	-11.09	0.780	4.25	22.448	-10.45	18.684	-19.88	20.78	260	3							
5	2.09	23.31	3.34	19.42	8.25	21.39	2.33	19.20	2.08	18.50	13.02	23.07	22.08	11.03	21.08	7.24	18.20	2.42										
	9.041	16.87	7.799	20.67	11.212	6.37	7.111	23.30	6.646	22.98	14.264	-11.12	0.778	4.24	22.445	-10.47	18.681	-19.89	20.91	402	5							
7	2.19	23.21	3.40	19.46	8.31	21.34	2.32	19.17	2.02	18.44	12.55	22.59	22.00	10.55	21.00	7.16	18.12	2.33										
	9.169	16.31	8.020	20.53	11.357	5.37	7.206	23.16	6.676	22.95	14.270	-11.16	0.776	4.22	22.442	-10.49	18.679	-19.90	21.04	544	7							
9	2.28	23.12	3.49	19.50	8.37	21.30	2.31	19.14	1.56	18.37	12.48	22.52	21.53	10.47	20.52	7.08	18.04	2.25										
	9.296	15.74	8.260	20.22	11.502	4.37	7.301	23.02	6.705	22.93	14.276	-11.20	0.774	4.21	22.439	-10.51	18.676	-19.90	21.17	686	9							
11	2.36	23.03	3.60	19.54	8.44	21.25	2.30	19.10	1.50	18.31	12.40	22.44	21.45	10.39	20.44	6.60	17.56	2.17										
	9.422	15.16	8.514	19.73	11.646	3.35	7.395	22.85	6.734	22.90	14.283	-11.25	0.772	4.19	22.435	-10.53	18.673	-19.91	21.30	827	11							
13	2.44	22.55	4.12	19.58	8.50	21.20	2.29	19.07	1.44	18.25	12.33	22.36	21.37	10.31	20.36	6.52	17.48	2.09										
	9.548	14.55	8.778	19.07	11.789	2.33	7.489	22.68	6.763	22.87	14.290	-11.29	0.770	4.18	22.432	-10.55	18.671	-19.92	21.43	969	13							
15	2.52	22.46	4.26	20.00	8.56	21.15	2.28	19.03	1.38	18.18	12.26	22.28	21.29	10.23	20.28	6.43	17.40	2.01										
	9.673	13.93	9.048	18.23	11.932	1.30	7.582	22.50	6.792	22.84	14.297	-11.33	0.767	4.16	22.429	-10.57	18.669	-19.93	21.57	111	15							
17	2.59	22.39	4.41	20.02	9.02	21.11	2.27	18.59	1.32	18.12	12.19	22.21	21.21	10.15	20.20	6.35	17.32	1.53										
	9.797	13.30	9.320	17.23	12.074	0.27	7.675	22.30	6.820	22.81	14.305	-11.38	0.764	4.14	22.425	-10.59	18.666	-19.94	21.70	253	17							
19	3.06	22.31	4.56	20.03	9.08	21.06	2.26	18.55	1.26	18.05	12.12	22.13	21.13	10.06	20.12	6.27	17.25	1.45										
	9.921	12.65	9.590	16.10	12.216	-0.76	7.767	22.10	6.847	22.78	14.313	-11.43	0.761	4.12	22.422	-10.61	18.664	-19.94	21.83	395	19							
21	3.12	22.24	5.12	20.04	9.14	21.01	2.26	18.51	1.20	17.59	12.05	22.05	21.05	9.58	20.04	6.19	17.17	1.37										
	10.044	11.99	9.856	14.84	12.358	-1.79	7.858	21.88	6.875	22.75	14.321	-11.48	0.758	4.10	22.418	-10.63	18.662	-19.95	21.96	537	21							
23	3.18	22.17	5.28	20.03	9.20	20.56	2.25	18.47	1.14	17.52	11.58	21.58	20.57	9.50	19.56	6.11	17.09	1.29										
	10.167	11.32	10.115	13.49	12.500	-2.82	7.950	21.65	6.902	22.72	14.330	-11.53	0.755	4.08	22.415	-10.65	18.660	-19.96	22.09	679	23							
25	3.24	22.10	5.44	20.02	9.27	20.51	2.24	18.43	1.08	17.46	11.51	21.50	20.49	9.42	19.48	6.02	17.01	1.21										
	10.290	10.63	10.368	12.06	12.641	-3.85	8.040	21.42	6.928	22.69	14.339	-11.59	0.752	4.06	22.412	-10.67	18.659	-19.97	22.22	820	25							
27	3.30	22.03	5.59	19.60	9.33	20.46	2.23	18.39	1.02	17.39	11.44	21.43	20.41	9.34	19.41	5.54	16.53	1.13										
	10.412	9.93	10.613	10.57	12.783	-4.87	8.130	21.17	6.955	22.65	14.348	-11.64	0.748	4.03	22.408	-10.69	18.657	-19.98	22.35	962	27							
29	3.36	21.56	6.14	19.58	9.39	20.41	2.23	18.34	0.56	17.33	11.37	21.35	20.33	9.25	19.33	5.46	16.45	1.05										
	10.533	9.22	10.850	9.05	12.925	-5.89	8.220	20.91	6.980	22.62	14.358	-11.70	0.744	4.01	22.405	-10.71	18.655	-19.98	22.49	104	29							
31	3.41	21.49	6.29	19.55	9.45	20.37	2.22	18.30	0.50	17.26	11.30	21.27	20.25	9.17	19.25	5.38	16.37	0.57										
	10.654	8.51	11.079	7.50	13.067	-6.90	8.309	20.65	7.006	22.59	14.368	-11.76	0.741	3.99	22.401	-10.73	18.654	-19.99	22.62	246	31							

WRZESIEŃ 2013

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
244	1	Nie	537	9.57112	0.04	10.4253	8.09	1.00916	7.3552	16.41	63.305	4.0	15	555	1245.7	1935	140	934.2	1719	1948	1
245	2	Pon	538	10.01077	0.23	10.4630	7.47	1.00892	8.2427	14.06	62.999	5.0	9	557	1245.4	1932	242	1020.3	1747	1944	2
246	3	Wto	539	10.05043	0.42	10.5007	7.25	1.00869	9.1228	10.53	62.581	6.0	4	559	1245.0	1930	347	1105.8	1812	1940	3
247	4	Śro	540	10.09009	1.02	10.5344	7.03	1.00844	10.0009	7.09	62.084	7.0	1	601	1244.7	1928	454	1150.9	1835	1936	4
248	5	Czw	541	10.12574	1.22	10.5721	6.40	1.00820	10.4753	3.02	61.544	8.0	0	602	1244.4	1925	603	1236.1	1857	1932	5
249	6	Pią	542	10.16539	1.42	11.0057	6.18	1.00795	11.3606	-1.16	60.991	0.9	1	604	1244.0	1923	713	1321.8	1918	1928	6
250	7	Sob	543	10.20505	2.02	11.0434	5.56	1.00769	12.2521	-5.36	60.447	1.9	4	606	1243.7	1921	825	1408.7	1941	1924	7
251	8	Nie	544	10.24470	2.23	11.0810	5.33	1.00743	13.1607	-9.43	59.927	2.9	9	607	1243.4	1918	938	1457.3	2007	1920	8
252	9	Pon	545	10.28436	2.44	11.1145	5.11	1.00717	14.0853	-13.25	59.440	3.9	16	609	1243.0	1916	1052	1548.1	2036	1916	9
253	10	Wto	546	10.32401	3.05	11.1521	4.48	1.00691	15.0354	-16.27	58.990	4.9	25	611	1242.7	1913	1205	1641.5	2112	1912	10
254	11	Śro	547	10.36367	3.26	11.1857	4.25	1.00664	16.0108	-18.34	58.581	5.9	35	613	1242.3	1911	1315	1737.3	2156	1908	11
255	12	Czw	548	10.40333	3.47	11.2232	4.02	1.00637	17.0009	-19.36	58.220	6.9	47	614	1242.0	1909	1420	1835.0	2250	1904	12
256	13	Pią	549	10.44298	4.08	11.2607	3.39	1.00610	18.0008	-19.26	57.923	0.7	58	616	1241.6	1906	1516	1933.4	2354	1901	13
257	14	Sob	550	10.48264	4.29	11.2942	3.16	1.00583	19.0007	-18.01	57.710	1.7	69	618	1241.3	1904	1603	2031.4	****	1857	14
258	15	Nie	551	10.52229	4.51	11.3318	2.53	1.00556	19.5909	-15.27	57.607	2.7	79	619	1240.9	1901	1641	2128.2	106	1853	15
259	16	Pon	552	10.56195	5.12	11.3653	2.30	1.00528	20.5641	-11.56	57.641	3.7	88	621	1240.5	1859	1713	2223.0	224	1849	16
260	17	Wto	553	11.00160	5.34	11.4028	2.07	1.00501	21.5229	-7.44	57.834	4.7	95	623	1240.2	1856	1741	2316.0	343	1845	17
261	18	Śro	554	11.04126	5.55	11.4403	1.44	1.00473	22.4641	-3.07	58.194	5.7	99	625	1239.8	1854	1806	*****	503	1841	18
262	19	Czw	555	11.08091	6.17	11.4738	1.20	1.00445	23.3940	1.35	58.713	6.7	100	626	1239.5	1852	1830	007.4	622	1837	19
263	20	Pią	556	11.12057	6.38	11.5113	0.57	1.00418	0.3150	6.07	59.364	0.9	99	628	1239.1	1849	1855	057.7	739	1833	20
264	21	Sob	557	11.16022	6.59	11.5448	0.34	1.00390	1.2333	10.14	60.105	1.9	95	630	1238.8	1847	1921	147.3	853	1829	21
265	22	Nie	558	11.19588	7.21	11.5824	0.10	1.00363	2.1508	13.45	60.880	2.9	90	631	1238.4	1844	1950	236.6	1005	1825	22
266	23	Pon	559	11.23553	7.42	12.0159	-0.13	1.00335	3.0641	16.30	61.631	3.9	83	633	1238.0	1842	2022	325.8	1113	1821	23
267	24	Wto	560	11.27519	8.03	12.0535	-0.36	1.00308	3.5810	18.25	62.300	4.9	75	635	1237.7	1839	2100	415.0	1215	1817	24
268	25	Śro	561	11.31484	8.24	12.0910	-0.60	1.00280	4.4925	19.25	62.838	5.9	66	637	1237.4	1837	2144	504.0	1311	1813	25
269	26	Czw	562	11.35450	8.44	12.1246	-1.23	1.00252	5.4013	19.32	63.205	6.9	57	638	1237.0	1835	2234	552.6	1400	1809	26
270	27	Pią	563	11.39415	9.05	12.1622	-1.46	1.00225	6.3021	18.47	63.377	0.3	48	640	1236.7	1832	2330	640.5	1442	1805	27
271	28	Sob	564	11.43381	9.25	12.1959	-2.10	1.00197	7.1942	17.12	63.346	1.3	38	642	1236.3	1830	****	727.6	1517	1802	28
272	29	Nie	565	11.47346	9.45	12.2335	-2.33	1.00169	8.0817	14.53	63.119	2.3	29	644	1236.0	1827	030	813.8	1547	1758	29
273	30	Pon	566	11.51312	10.05	12.2712	-2.56	1.00141	8.5615	11.54	62.718	3.3	21	645	1235.7	1825	133	859.3	1614	1754	30

Fazy Księżyca [Dm, h.mm]: Nów 5, 13.36 1kw 12, 19.08 Pełn 19, 13.13 3kw 27, 5.56

WRZESIEŃ 2013 (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	6.36	19.53	9.48	20.34	2.22	18.28	0.47	17.23	11.26	21.24	20.21	9.13	19.21	5.34	16.33	0.53			
	10.715	8.15	11.191	6.72	13.138	-7.40	8.354	20.51	7.018	22.57	14.373	-11.79	0.739	3.97	22.399	-10.74	18.653	-19.99	22.688	17	1
3	3.49	21.40	6.49	19.50	9.54	20.29	2.21	18.23	0.41	17.16	11.19	21.16	20.13	9.05	19.13	5.26	16.25	0.45			
	10.835	7.41	11.410	5.15	13.280	-8.40	8.442	20.23	7.043	22.54	14.383	-11.84	0.735	3.95	22.396	-10.76	18.652	-20.00	22.819	59	3
5	3.54	21.33	7.03	19.47	10.00	20.25	2.21	18.18	0.35	17.10	11.13	21.08	20.05	8.57	19.05	5.17	16.17	0.37			
	10.956	6.67	11.622	3.59	13.423	-9.39	8.530	19.94	7.067	22.51	14.394	-11.91	0.731	3.92	22.393	-10.78	18.651	-20.01	22.951	101	5
7	3.59	21.27	7.16	19.43	10.06	20.20	2.20	18.14	0.28	17.03	11.06	21.01	19.57	8.48	18.57	5.09	16.09	0.29			
	11.076	5.93	11.828	2.03	13.566	-10.36	8.617	19.65	7.090	22.47	14.405	-11.97	0.726	3.89	22.389	-10.80	18.650	-20.02	23.082	242	7
9	4.04	21.21	7.28	19.39	10.13	20.15	2.20	18.09	0.22	16.56	10.59	20.53	19.49	8.40	18.49	5.01	16.02	0.21			
	11.196	5.18	12.029	0.49	13.709	-11.32	8.704	19.34	7.113	22.44	14.416	-12.03	0.722	3.87	22.386	-10.82	18.649	-20.02	23.213	384	9
11	4.09	21.15	7.40	19.34	10.19	20.10	2.19	18.04	0.16	16.49	10.52	20.46	19.41	8.32	18.41	4.53	15.54	0.13			
	11.316	4.42	12.225	-1.03	13.854	-12.27	8.790	19.03	7.136	22.41	14.428	-12.09	0.718	3.84	22.382	-10.84	18.648	-20.03	23.345	25	11
13	4.14	21.09	7.51	19.30	10.25	20.06	2.18	17.59	0.10	16.43	10.45	20.38	19.33	8.24	18.33	4.45	15.46	0.05			
	11.435	3.65	12.416	-2.53	13.998	-13.20	8.875	18.71	7.158	22.37	14.439	-12.16	0.713	3.81	22.379	-10.86	18.648	-20.04	23.476	668	13
15	4.18	21.03	8.03	19.26	10.31	20.01	2.18	17.54	0.03	16.36	10.38	20.31	19.25	8.15	18.25	4.37	15.38	23.53			
	11.555	2.89	12.603	-4.00	14.144	-14.11	8.960	18.38	7.179	22.34	14.452	-12.22	0.708	3.78	22.376	-10.88	18.648	-20.05	23.608	10	15
17	4.23	20.57	8.13	19.21	10.37	19.57	2.17	17.49	23.53	16.29	10.32	20.23	19.17	8.07	18.17	4.28	15.30	23.45			
	11.674	2.11	12.786	-5.44	14.290	-15.00	9.045	18.05	7.200	22.31	14.464	-12.29	0.704	3.75	22.373	-10.90	18.647	-20.05	23.739	51	17
19	4.27	20.51	8.24	19.16	10.44	19.52	2.17	17.44	23.46	16.22	10.25	20.16	19.09	7.59	18.09	4.20	15.22	23.37			
	11.794	1.34	12.966	-6.84	14.437	-15.88	9.129	17.71	7.220	22.28	14.476	-12.36	0.699	3.72	22.370	-10.91	18.647	-20.06	23.870	93	19
21	4.31	20.46	8.34	19.11	10.50	19.48	2.16	17.39	23.40	16.15	10.18	20.08	19.01	7.50	18.01	4.12	15.15	23.30			
	11.913	0.56	13.141	-8.20	14.584	-16.72	9.212	17.36	7.239	22.25	14.489	-12.43	0.694	3.69	22.367	-10.93	18.647	-20.07	0.002	35	21
23	4.35	20.40	8.44	19.07	10.56	19.44	2.15	17.34	23.33	16.08	10.12	20.01	18.53	7.42	17.53	4.04	15.07	23.22			
	12.033	-0.21	13.314	-9.52	14.732	-17.55	9.295	17.01	7.258	22.21	14.502	-12.50	0.689	3.66	22.364	-10.95	18.647	-20.07	0.133	76	23
25	4.39	20.35	8.53	19.02	11.02	19.40	2.15	17.29	23.27	16.01	10.05	19.53	18.45	7.34	17.45	3.56	14.59	23.14			
	12.153	-0.99	13.483	-10.79	14.881	-18.35	9.377	16.65	7.276	22.18	14.516	-12.56	0.685	3.63	22.361	-10.96	18.648	-20.08	0.265	18	25
27	4.43	20.29	9.02	18.57	11.08	19.36	2.14	17.23	23.20	15.54	9.58	19.46	18.38	7.25	17.37	3.48	14.51	23.06			
	12.273	-1.77	13.649	-12.01	15.031	-19.12	9.459	16.28	7.294	22.16	14.529	-12.63	0.680	3.60	22.358	-10.98	18.648	-20.08	0.396	60	27
29	4.47	20.24	9.11	18.52	11.14	19.32	2.13	17.18	23.14	15.47	9.52	19.38	18.30	7.17	17.29	3.40	14.43	22.58			
	12.393	-2.55	13.811	-13.18	15.181	-19.86	9.540	15.91	7.311	22.13	14.543	-12.71	0.675	3.56	22.355	-11.00	18.649	-20.09	0.528	02	29

PAŹDZIERNIK 2013

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									 Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2456																					
274	1	Wto	567	11.55278	10.24	12.3049	-3.20	1.00113	9.4353	8.22	62.177	4.3	13	647	1235.3	1823	239	944.4	1637	1750	1
275	2	Śro	568	11.59243	10.43	12.3427	-3.43	1.00085	10.3138	4.24	61.541	5.3	7	649	1235.0	1820	347	1029.5	1700	1746	2
276	3	Czw	569	12.03209	11.02	12.3805	-4.06	1.00056	11.1958	0.09	60.861	6.3	3	651	1234.7	1818	457	1115.3	1721	1742	3
277	4	Pią	570	12.07174	11.20	12.4143	-4.29	1.00028	12.0927	-4.13	60.186	7.3	0	652	1234.4	1815	609	1202.3	1744	1738	4
278	5	Sob	571	12.11139	11.38	12.4521	-4.52	0.99999	13.0037	-8.28	59.563	0.4	0	654	1234.1	1813	722	1251.1	1809	1734	5
279	6	Nie	572	12.15105	11.56	12.4900	-5.15	0.99970	13.5353	-12.21	59.026	1.4	2	656	1233.8	1811	837	1342.3	1838	1730	6
280	7	Pon	573	12.19070	12.13	12.5239	-5.38	0.99941	14.4928	-15.38	58.598	2.4	7	658	1233.5	1808	953	1436.1	1913	1726	7
281	8	Wto	574	12.23036	12.30	12.5619	-6.01	0.99912	15.4714	-18.01	58.287	3.4	14	659	1233.2	1806	1106	1532.3	1955	1722	8
282	9	Śro	575	12.27002	12.47	12.5959	-6.24	0.99883	16.4637	-19.20	58.089	4.4	22	701	1233.0	1804	1213	1630.2	2046	1718	9
283	10	Czw	576	12.30567	13.03	13.0340	-6.47	0.99854	17.4644	-19.26	57.995	5.4	33	703	1232.7	1801	1312	1728.6	2148	1714	10
284	11	Pią	577	12.34533	13.18	13.0721	-7.09	0.99824	18.4629	-18.18	57.989	6.4	44	705	1232.4	1759	1401	1826.4	2257	1710	11
285	12	Sob	578	12.38498	13.33	13.1102	-7.32	0.99795	19.4460	-16.02	58.063	0.5	55	707	1232.2	1757	1441	1922.7	****	1707	12
286	13	Nie	579	12.42464	13.48	13.1444	-7.54	0.99766	20.4145	-12.49	58.211	1.5	66	708	1232.0	1755	1515	2016.8	012	1703	13
287	14	Pon	580	12.46429	14.02	13.1827	-8.17	0.99737	21.3637	-8.54	58.434	2.5	77	710	1231.7	1752	1543	2108.9	129	1659	14
288	15	Wto	581	12.50395	14.15	13.2210	-8.39	0.99708	22.2954	-4.31	58.735	3.5	86	712	1231.5	1750	1609	2159.4	246	1655	15
289	16	Śro	582	12.54360	14.28	13.2553	-9.01	0.99679	23.2160	0.04	59.121	4.5	92	714	1231.3	1748	1632	2248.9	403	1651	16
290	17	Czw	583	12.58326	14.41	13.2937	-9.23	0.99651	0.1326	4.34	59.591	5.5	97	716	1231.1	1745	1656	2337.9	519	1647	17
291	18	Pią	584	13.02291	14.53	13.3322	-9.45	0.99622	1.0441	8.47	60.136	6.5	100	718	1230.9	1743	1721	*****	633	1643	18
292	19	Sob	585	13.06257	15.04	13.3707	-10.06	0.99594	1.5604	12.30	60.737	0.4	100	719	1230.7	1741	1749	026.8	746	1639	19
293	20	Nie	586	13.10222	15.15	13.4053	-10.28	0.99566	2.4743	15.32	61.364	1.4	98	721	1230.5	1739	1820	116.0	855	1635	20
294	21	Pon	587	13.14188	15.25	13.4440	-10.49	0.99539	3.3934	17.45	61.977	2.4	94	723	1230.3	1737	1856	205.5	1000	1631	21
295	22	Wto	588	13.18153	15.34	13.4827	-11.11	0.99511	4.3121	19.05	62.532	3.4	88	725	1230.2	1735	1938	255.1	1100	1627	22
296	23	Śro	589	13.22119	15.42	13.5215	-11.32	0.99484	5.2244	19.31	62.984	4.4	81	727	1230.0	1732	2026	344.3	1152	1623	23
297	24	Czw	590	13.26085	15.50	13.5604	-11.52	0.99457	6.1323	19.02	63.292	5.4	73	729	1229.9	1730	2119	432.9	1237	1619	24
298	25	Pią	591	13.30050	15.57	13.5953	-12.13	0.99431	7.0304	17.44	63.425	6.4	65	731	1229.8	1728	2217	520.4	1315	1615	25
299	26	Sob	592	13.34016	16.04	14.0343	-12.34	0.99404	7.5142	15.40	63.361	7.4	55	732	1229.7	1726	2319	606.9	1347	1611	26
300	27	Nie	593	13.37581	16.10	14.0734	-12.54	0.99378	8.3927	12.56	63.094	0.4	46	734	1229.6	1724	****	652.2	1414	1608	27
300	27	Nie	593	14.38080	16.10	14.0744	-12.55	0.99377	8.4125	12.49	63.079	0.5	45	634	1129.6	1624	2323	552.2	1314	1508	27
301	28	Pon	594	14.42045	16.15	14.1135	-13.15	0.99351	9.2834	9.29	62.610	1.5	36	636	1129.5	1622	****	636.9	1339	1504	28
302	29	Wto	595	14.46011	16.19	14.1528	-13.35	0.99325	10.1539	5.42	61.975	2.5	27	638	1129.4	1620	029	721.3	1401	1500	29
303	30	Śro	596	14.49576	16.22	14.1921	-13.54	0.99299	11.0314	1.35	61.216	3.5	18	640	1129.4	1618	137	806.2	1423	1456	30
304	31	Czw	597	14.53542	16.25	14.2315	-14.14	0.99273	11.5159	-2.44	60.388	4.5	11	642	1129.3	1616	247	852.2	1445	1452	31

Fazy Księżyca [Dm, h.mm]: Nów 5, 2.34 1kw 12, 1.02 Pełn 19, 1.38 3kw 27, 1.41 3kw 27, 0.41

PAŹDZIERNIK 2013 (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	9.19	18.47	11.20	19.28	2.13	17.13	23.07	15.40	9.45	19.31	18.22	7.09	17.21	3.31	14.36	22.50		
	12.514	-3.33	13.968	-14.29	15.333	-20.57	9.621	15.54	7.327	22.10	14.556	-12.78	0.670	3.53	22.352	-11.01	18.649	-20.10	0.65944	1
3	4.55	20.14	9.26	18.42	11.26	19.25	2.12	17.07	23.00	15.33	9.38	19.23	18.14	7.00	17.13	3.23	14.28	22.42		
	12.635	-4.10	14.121	-15.33	15.485	-21.26	9.701	15.16	7.342	22.07	14.570	-12.85	0.665	3.50	22.350	-11.03	18.650	-20.10	0.79086	3
5	4.59	20.09	9.33	18.37	11.32	19.22	2.11	17.02	22.53	15.26	9.32	19.16	18.06	6.52	17.06	3.15	14.20	22.34		
	12.756	-4.87	14.268	-16.31	15.637	-21.91	9.781	14.77	7.357	22.05	14.585	-12.92	0.660	3.47	22.347	-11.04	18.651	-20.11	0.92227	5
7	5.03	20.04	9.39	18.32	11.38	19.18	2.11	16.56	22.47	15.18	9.25	19.09	17.58	6.44	16.58	3.07	14.12	22.27		
	12.878	-5.64	14.408	-17.20	15.791	-22.52	9.860	14.38	7.371	22.03	14.599	-12.99	0.655	3.44	22.345	-11.06	18.653	-20.11	1.05369	7
9	5.06	19.59	9.44	18.27	11.44	19.15	2.10	16.51	22.40	15.11	9.19	19.01	17.50	6.35	16.50	2.59	14.05	22.19		
	13.000	-6.40	14.539	-18.01	15.945	-23.11	9.939	13.99	7.384	22.00	14.614	-13.07	0.650	3.41	22.342	-11.07	18.654	-20.12	1.18511	9
11	5.10	19.55	9.49	18.21	11.49	19.13	2.09	16.45	22.33	15.04	9.12	18.54	17.42	6.27	16.42	2.51	13.57	22.11		
	13.122	-7.16	14.660	-18.73	16.099	-23.65	10.017	13.59	7.396	21.98	14.628	-13.14	0.645	3.38	22.340	-11.08	18.655	-20.12	1.31653	11
13	5.14	19.50	9.51	18.16	11.55	19.10	2.08	16.39	22.26	14.56	9.06	18.46	17.34	6.19	16.34	2.43	13.49	22.03		
	13.246	-7.91	14.769	-19.33	16.253	-24.16	10.095	13.19	7.408	21.96	14.643	-13.21	0.640	3.34	22.338	-11.09	18.657	-20.13	1.44795	13
15	5.17	19.46	9.52	18.10	11.60	19.08	2.07	16.34	22.19	14.49	8.59	18.39	17.26	6.10	16.26	2.35	13.41	21.55		
	13.369	-8.65	14.861	-19.81	16.408	-24.63	10.172	12.79	7.419	21.95	14.658	-13.29	0.635	3.31	22.336	-11.10	18.659	-20.13	1.57937	15
17	5.21	19.41	9.51	18.05	12.05	19.06	2.06	16.28	22.11	14.42	8.53	18.32	17.18	6.02	16.18	2.27	13.34	21.48		
	13.494	-9.38	14.933	-20.14	16.563	-25.07	10.248	12.38	7.428	21.93	14.673	-13.36	0.630	3.28	22.334	-11.11	18.661	-20.14	1.71078	17
19	5.24	19.37	9.47	17.59	12.09	19.04	2.06	16.22	22.04	14.34	8.46	18.24	17.10	5.54	16.10	2.19	13.26	21.40		
	13.619	-10.11	14.982	-20.31	16.718	-25.46	10.324	11.98	7.437	21.91	14.688	-13.43	0.626	3.25	22.332	-11.12	18.663	-20.14	1.84220	19
21	5.28	19.33	9.40	17.52	12.13	19.02	2.05	16.17	21.57	14.27	8.39	18.17	17.02	5.45	16.02	2.11	13.18	21.32		
	13.744	-10.82	15.001	-20.27	16.872	-25.81	10.400	11.56	7.446	21.90	14.703	-13.50	0.621	3.22	22.331	-11.13	18.665	-20.15	1.97362	21
23	5.31	19.29	9.29	17.45	12.17	19.01	2.04	16.11	21.50	14.19	8.33	18.09	16.54	5.37	15.54	2.03	13.11	21.24		
	13.871	-11.53	14.987	-20.00	17.026	-26.12	10.475	11.15	7.453	21.89	14.719	-13.58	0.616	3.20	22.329	-11.14	18.667	-20.15	2.10504	23
25	5.35	19.25	9.15	17.38	12.21	19.00	2.03	16.05	21.42	14.12	8.26	18.02	16.46	5.29	15.46	1.55	13.03	21.17		
	13.998	-12.22	14.936	-19.47	17.180	-26.39	10.550	10.74	7.459	21.88	14.734	-13.65	0.612	3.17	22.328	-11.15	18.670	-20.15	2.23646	25
27	5.38	19.21	8.56	17.30	12.24	18.59	2.02	15.59	21.35	14.04	8.20	17.55	16.38	5.21	15.38	1.47	12.55	21.09		
	14.126	-12.90	14.847	-18.65	17.332	-26.62	10.624	10.32	7.465	21.87	14.750	-13.72	0.608	3.14	22.326	-11.16	18.672	-20.16	2.36788	27
27	4.38	18.21	7.56	16.30	11.25	17.60	1.02	14.59	20.35	13.04	7.20	16.55	15.38	4.21	14.38	0.47	11.55	20.09		
	14.129	-12.91	14.844	-18.63	17.336	-26.63	10.626	10.31	7.465	21.87	14.750	-13.73	0.607	3.14	22.326	-11.16	18.672	-20.16	2.36788	27
29	4.41	18.17	7.34	16.22	11.27	17.59	1.01	14.54	20.27	12.57	7.13	16.47	15.30	4.12	14.31	0.39	11.48	20.01		
	14.258	-13.58	14.721	-17.52	17.487	-26.82	10.699	9.89	7.470	21.87	14.766	-13.80	0.603	3.11	22.325	-11.16	18.675	-20.16	2.49930	29
31	4.45	18.14	7.08	16.14	11.30	17.59	0.59	14.48	20.20	12.49	7.07	16.40	15.22	4.04	14.23	0.31	11.40	19.53		
	14.388	-14.23	14.574	-16.17	17.638	-26.96	10.772	9.47	7.473	21.86	14.781	-13.87	0.599	3.09	22.324	-11.17	18.678	-20.16	2.63071	31

LISTOPAD 2013

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
305	1	Pią	598	14.57507	16.26	14.2710	-14.33	0.99248	12.4234	-7.02	59.554	5.5	5	644	1129.3	1614	400	940.1	1509	1448	1	
306	2	Sob	599	15.01473	16.27	14.3106	-14.52	0.99222	13.3533	-11.06	58.782	6.5	1	646	1129.3	1612	515	1030.7	1537	1444	2	
307	3	Nie	600	15.05438	16.27	14.3502	-15.11	0.99197	14.3120	-14.39	58.132	7.5	0	647	1129.3	1610	632	1124.3	1609	1440	3	
308	4	Pon	601	15.09404	16.26	14.3859	-15.29	0.99172	15.2952	-17.24	57.652	0.9	1	649	1129.3	1609	748	1221.0	1649	1436	4	
309	5	Wto	602	15.13370	16.25	14.4258	-15.48	0.99146	16.3034	-19.04	57.368	1.9	5	651	1129.3	1607	900	1320.2	1738	1432	5	
310	6	Śro	603	15.17335	16.23	14.4657	-16.06	0.99121	17.3221	-19.29	57.284	2.9	11	653	1129.4	1605	1004	1420.5	1838	1428	6	
311	7	Czw	604	15.21301	16.19	14.5056	-16.23	0.99096	18.3349	-18.37	57.384	3.9	20	655	1129.4	1603	1058	1520.3	1947	1424	7	
312	8	Pią	605	15.25266	16.15	14.5457	-16.41	0.99072	19.3346	-16.32	57.636	4.9	30	657	1129.5	1601	1142	1618.2	2101	1420	8	
313	9	Sob	606	15.29232	16.10	14.5858	-16.58	0.99047	20.3126	-13.27	58.001	5.9	41	659	1129.6	1600	1218	1713.5	2218	1416	9	
314	10	Nie	607	15.33197	16.05	15.0301	-17.15	0.99023	21.2640	-9.38	58.443	0.2	52	701	1129.7	1558	1248	1806.1	2335	1412	10	
315	11	Pon	608	15.37163	15.58	15.0704	-17.32	0.98999	22.1945	-5.22	58.929	1.2	63	703	1129.8	1556	1313	1856.4	****	1409	11	
316	12	Wto	609	15.41129	15.51	15.1108	-17.48	0.98975	23.1116	-0.53	59.440	2.2	74	704	1129.9	1555	1337	1945.2	051	1405	12	
317	13	Śro	610	15.45094	15.43	15.1512	-18.04	0.98952	0.0150	3.35	59.961	3.2	83	706	1130.0	1553	1400	2033.2	206	1401	13	
318	14	Czw	611	15.49059	15.34	15.1918	-18.20	0.98929	0.5205	7.48	60.487	4.2	90	708	1130.2	1552	1424	2121.1	319	1357	14	
319	15	Pią	612	15.53025	15.24	15.2324	-18.35	0.98906	1.4231	11.35	61.014	5.2	95	710	1130.3	1550	1450	2209.3	431	1353	15	
320	16	Sob	613	15.56590	15.13	15.2731	-18.50	0.98884	2.3324	14.46	61.537	6.2	99	712	1130.5	1549	1519	2258.1	541	1349	16	
321	17	Nie	614	16.00556	15.02	15.3140	-19.05	0.98862	3.2448	17.13	62.044	7.2	100	714	1130.7	1547	1553	2347.3	647	1345	17	
322	18	Pon	615	16.04522	14.49	15.3548	-19.19	0.98841	4.1629	18.49	62.519	0.8	99	715	1130.9	1546	1632	*****	749	1341	18	
323	19	Wto	616	16.08487	14.36	15.3958	-19.33	0.98821	5.0805	19.30	62.939	1.8	97	717	1131.1	1545	1718	036.8	844	1337	19	
324	20	Śro	617	16.12453	14.22	15.4409	-19.46	0.98800	5.5909	19.18	63.274	2.8	93	719	1131.4	1543	1809	125.8	932	1333	20	
325	21	Czw	618	16.16418	14.07	15.4820	-19.60	0.98781	6.4917	18.13	63.494	3.8	87	721	1131.6	1542	1906	214.0	1013	1329	21	
326	22	Pią	619	16.20384	13.52	15.5232	-20.13	0.98762	7.3814	16.22	63.568	4.8	80	722	1131.9	1541	2006	300.9	1047	1325	22	
327	23	Sob	620	16.24350	13.35	15.5645	-20.25	0.98743	8.2601	13.49	63.470	5.8	72	724	1132.2	1540	2109	346.6	1117	1321	23	
328	24	Nie	621	16.28315	13.18	16.0059	-20.37	0.98724	9.1252	10.43	63.185	6.8	63	726	1132.4	1539	2213	431.1	1142	1317	24	
329	25	Pon	622	16.32281	13.00	16.0514	-20.49	0.98706	9.5912	7.08	62.708	7.8	53	727	1132.7	1538	2319	514.9	1204	1314	25	
330	26	Wto	623	16.36246	12.41	16.0929	-21.01	0.98689	10.4537	3.11	62.051	0.6	44	729	1133.1	1537	****	558.6	1226	1310	26	
331	27	Śro	624	16.40212	12.22	16.1345	-21.12	0.98672	11.3248	-0.59	61.241	1.6	34	731	1133.4	1536	027	642.9	1247	1306	27	
332	28	Czw	625	16.44177	12.02	16.1802	-21.22	0.98655	12.2132	-5.13	60.325	2.6	25	732	1133.7	1535	136	728.7	1310	1302	28	
333	29	Pią	626	16.48143	11.41	16.2219	-21.32	0.98638	13.1235	-9.22	59.365	3.6	16	734	1134.1	1534	249	816.9	1334	1258	29	
334	30	Sob	627	16.52108	11.19	16.2637	-21.42	0.98622	14.0636	-13.09	58.436	4.6	9	735	1134.4	1533	404	908.3	1404	1254	30	

Fazy Księżyca [Dm, h.mm]: Nów 3, 13.50 1kw 10, 6.57 Pełn 17, 16.16 3kw 25, 20.28

LISTOPAD 2013 (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	4.46	18.12	6.55	16.10	11.31	17.59	0.59	14.45	20.16	12.45	7.04	16.36	15.18	3.60	14.19	0.27	11.36	19.50		
	14.453	-14.55	14.496	-15.45	17.712	-27.02	10.809	9.26	7.475	21.86	14.789	-13.91	0.597	3.07	22.324	-11.17	18.679	-20.16	2.69642	1
3	4.50	18.09	6.30	16.01	11.33	17.59	0.58	14.39	20.08	12.37	6.57	16.29	15.10	3.52	14.11	0.19	11.28	19.42		
	14.584	-15.18	14.345	-13.98	17.860	-27.11	10.881	8.84	7.477	21.86	14.805	-13.98	0.593	3.05	22.323	-11.17	18.682	-20.17	2.82784	3
5	4.53	18.06	6.06	15.54	11.34	17.60	0.57	14.33	20.00	12.30	6.51	16.22	15.02	3.43	14.03	0.11	11.21	19.34		
	14.716	-15.80	14.215	-12.62	18.007	-27.15	10.953	8.42	7.478	21.86	14.821	-14.05	0.589	3.02	22.322	-11.18	18.685	-20.17	2.95926	5
7	4.56	18.03	5.46	15.47	11.35	18.00	0.55	14.27	19.52	12.22	6.44	16.14	14.54	3.35	13.55	0.03	11.13	19.27		
	14.849	-16.39	14.121	-11.53	18.151	-27.16	11.025	8.00	7.479	21.87	14.836	-14.12	0.585	3.00	22.322	-11.18	18.689	-20.17	3.09068	7
9	4.59	17.60	5.31	15.40	11.35	18.01	0.54	14.21	19.44	12.14	6.38	16.07	14.46	3.27	13.47	23.51	11.05	19.19		
	14.983	-16.97	14.072	-10.78	18.293	-27.12	11.096	7.58	7.478	21.87	14.852	-14.19	0.581	2.98	22.321	-11.18	18.692	-20.18	3.22210	9
11	5.03	17.57	5.21	15.34	11.35	18.02	0.53	14.15	19.36	12.06	6.31	15.60	14.38	3.19	13.39	23.43	10.58	19.11		
	15.118	-17.53	14.069	-10.42	18.432	-27.05	11.166	7.16	7.477	21.88	14.868	-14.26	0.578	2.96	22.321	-11.18	18.696	-20.18	3.35352	11
13	5.06	17.55	5.16	15.29	11.34	18.04	0.51	14.09	19.28	11.58	6.25	15.52	14.30	3.11	13.31	23.36	10.50	19.04		
	15.253	-18.06	14.110	-10.42	18.568	-26.94	11.236	6.74	7.474	21.89	14.884	-14.33	0.574	2.94	22.321	-11.18	18.699	-20.18	3.48494	13
15	5.09	17.52	5.14	15.24	11.33	18.05	0.50	14.03	19.20	11.50	6.18	15.45	14.22	3.03	13.24	23.28	10.42	18.56		
	15.390	-18.58	14.187	-10.72	18.700	-26.80	11.306	6.32	7.471	21.90	14.899	-14.40	0.571	2.92	22.321	-11.18	18.703	-20.18	3.61635	15
17	5.12	17.50	5.16	15.19	11.31	18.06	0.48	13.57	19.12	11.42	6.12	15.38	14.14	2.54	13.16	23.20	10.35	18.48		
	15.528	-19.08	14.295	-11.27	18.829	-26.62	11.375	5.90	7.467	21.91	14.915	-14.47	0.568	2.90	22.321	-11.18	18.707	-20.18	3.74777	17
19	5.15	17.48	5.20	15.15	11.29	18.08	0.47	13.51	19.04	11.34	6.05	15.30	14.06	2.46	13.08	23.12	10.27	18.41		
	15.666	-19.55	14.427	-11.99	18.954	-26.41	11.444	5.48	7.461	21.93	14.931	-14.54	0.565	2.88	22.322	-11.18	18.711	-20.18	3.87919	19
21	5.17	17.46	5.26	15.11	11.26	18.09	0.45	13.45	18.55	11.26	5.59	15.23	13.58	2.38	12.60	23.04	10.20	18.33		
	15.806	-20.00	14.578	-12.84	19.074	-26.17	11.512	5.07	7.455	21.95	14.946	-14.60	0.563	2.87	22.322	-11.17	18.715	-20.18	4.01062	21
23	5.20	17.45	5.34	15.08	11.23	18.11	0.44	13.39	18.47	11.18	5.52	15.16	13.50	2.30	12.52	22.56	10.12	18.25		
	15.946	-20.42	14.743	-13.77	19.190	-25.90	11.579	4.66	7.448	21.97	14.962	-14.67	0.560	2.85	22.323	-11.17	18.719	-20.19	4.14204	23
25	5.23	17.43	5.42	15.05	11.19	18.12	0.42	13.33	18.38	11.10	5.46	15.08	13.42	2.22	12.44	22.49	10.04	18.18		
	16.087	-20.82	14.919	-14.75	19.301	-25.60	11.647	4.24	7.440	21.99	14.977	-14.74	0.558	2.84	22.324	-11.17	18.723	-20.19	4.27346	25
27	5.25	17.42	5.51	15.02	11.15	18.13	0.41	13.27	18.30	11.01	5.39	15.01	13.34	2.14	12.36	22.41	9.57	18.10		
	16.229	-21.19	15.104	-15.74	19.406	-25.27	11.713	3.84	7.431	22.01	14.993	-14.80	0.555	2.82	22.324	-11.16	18.727	-20.19	4.40488	27
29	5.28	17.41	6.01	14.59	11.10	18.14	0.39	13.21	18.21	10.53	5.32	14.54	13.26	2.06	12.29	22.33	9.49	18.02		
	16.372	-21.54	15.296	-16.73	19.506	-24.93	11.779	3.43	7.421	22.03	15.008	-14.86	0.553	2.81	22.326	-11.15	18.731	-20.19	4.53629	29

GRUDZIEŃ 2013

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
335	1	Nie	628	16.56074	10.57	16.3056	-21.51	0.98606	15.0358	-16.19	57.615	5.6	3	737	1134.8	1532	521	1003.5	1439	1250	1	
336	2	Pon	629	17.00040	10.34	16.3516	-22.00	0.98591	16.0431	-18.31	56.978	6.6	0	738	1135.2	1532	636	1102.2	1524	1246	2	
337	3	Wto	630	17.04005	10.10	16.3936	-22.09	0.98575	17.0721	-19.31	56.581	0.4	0	740	1135.6	1531	746	1203.5	1620	1242	3	
338	4	Śro	631	17.07571	9.46	16.4357	-22.17	0.98560	18.1100	-19.09	56.453	1.4	3	741	1136.0	1531	848	1305.8	1727	1238	4	
339	5	Czw	632	17.11536	9.21	16.4818	-22.25	0.98546	19.1347	-17.26	56.593	2.4	9	742	1136.4	1530	938	1407.0	1842	1234	5	
340	6	Pią	633	17.15502	8.56	16.5240	-22.32	0.98531	20.1421	-14.34	56.970	3.4	17	744	1136.8	1530	1018	1505.7	2002	1230	6	
341	7	Sob	634	17.19468	8.30	16.5702	-22.39	0.98517	21.1205	-10.50	57.530	4.4	26	745	1137.2	1529	1051	1601.1	2122	1226	7	
342	8	Nie	635	17.23433	8.04	17.0125	-22.45	0.98503	22.0700	-6.33	58.211	5.4	37	746	1137.7	1529	1119	1653.4	2240	1222	8	
343	9	Pon	636	17.27399	7.37	17.0548	-22.51	0.98490	22.5937	-2.02	58.953	6.4	48	747	1138.1	1529	1143	1743.3	2356	1218	9	
344	10	Wto	637	17.31364	7.10	17.1012	-22.57	0.98477	23.5036	2.29	59.702	0.8	59	748	1138.6	1528	1207	1831.6	****	1215	10	
345	11	Śro	638	17.35330	6.42	17.1436	-23.02	0.98465	0.4042	6.46	60.422	1.8	69	750	1139.0	1528	1230	1919.2	110	1211	11	
346	12	Czw	639	17.39295	6.15	17.1900	-23.06	0.98453	1.3034	10.39	61.086	2.8	78	751	1139.5	1528	1255	2006.7	221	1207	12	
347	13	Pią	640	17.43261	5.46	17.2325	-23.10	0.98442	2.2039	13.58	61.683	3.8	86	752	1140.0	1528	1322	2054.5	331	1203	13	
348	14	Sob	641	17.47226	5.18	17.2750	-23.14	0.98431	3.1113	16.37	62.208	4.8	92	753	1140.4	1528	1354	2142.9	438	1159	14	
349	15	Nie	642	17.51192	4.49	17.3216	-23.17	0.98421	4.0215	18.27	62.661	5.8	97	753	1140.9	1528	1430	2231.7	541	1155	15	
350	16	Pon	643	17.55157	4.20	17.3641	-23.20	0.98411	4.5331	19.25	63.040	6.8	99	754	1141.4	1528	1513	2320.6	638	1151	16	
351	17	Wto	644	17.59123	3.51	17.4107	-23.22	0.98402	5.4435	19.30	63.343	0.1	100	755	1141.9	1529	1602	*****	729	1147	17	
352	18	Śro	645	18.03089	3.22	17.4533	-23.24	0.98394	6.3500	18.41	63.560	1.1	99	756	1142.4	1529	1657	009.1	812	1143	18	
353	19	Czw	646	18.07055	2.52	17.4959	-23.25	0.98386	7.2424	17.05	63.680	2.1	96	756	1142.9	1529	1756	056.6	849	1139	19	
354	20	Pią	647	18.11020	2.23	17.5425	-23.26	0.98379	8.1237	14.45	63.683	3.1	92	757	1143.4	1530	1858	142.8	920	1135	20	
355	21	Sob	648	18.14586	1.53	17.5851	-23.26	0.98373	8.5940	11.48	63.552	4.1	86	758	1143.9	1530	2001	227.7	946	1131	21	
356	22	Nie	649	18.18551	1.23	18.0318	-23.26	0.98367	9.4551	8.23	63.269	5.1	79	758	1144.4	1531	2106	311.6	1010	1127	22	
357	23	Pon	650	18.22517	0.53	18.0744	-23.25	0.98361	10.3138	4.36	62.821	6.1	70	758	1144.9	1531	2212	354.7	1031	1123	23	
358	24	Wto	651	18.26482	0.23	18.1210	-23.24	0.98357	11.1737	0.35	62.207	7.1	61	759	1145.4	1532	2319	437.9	1052	1119	24	
359	25	Śro	652	18.30448	-0.06	18.1637	-23.23	0.98352	12.0432	-3.33	61.439	8.1	51	759	1145.9	1533	****	521.8	1113	1116	25	
360	26	Czw	653	18.34413	-0.36	18.2103	-23.21	0.98348	12.5310	-7.39	60.543	0.9	41	759	1146.3	1533	028	607.4	1136	1112	26	
361	27	Pią	654	18.38379	-1.06	18.2529	-23.18	0.98345	13.4420	-11.30	59.565	1.9	31	800	1146.8	1534	140	655.5	1202	1108	27	
362	28	Sob	655	18.42344	-1.35	18.2955	-23.15	0.98342	14.3840	-14.54	58.569	2.9	21	800	1147.3	1535	253	747.0	1233	1104	28	
363	29	Nie	656	18.46310	-2.04	18.3421	-23.12	0.98340	15.3632	-17.33	57.633	3.9	13	800	1147.8	1536	408	842.5	1311	1100	29	
364	30	Pon	657	18.50276	-2.33	18.3846	-23.08	0.98338	16.3741	-19.10	56.841	4.9	6	800	1148.3	1537	520	941.7	1400	1056	30	
365	31	Wto	658	18.54241	-3.02	18.4312	-23.04	0.98336	17.4110	-19.29	56.273	5.9	2	800	1148.8	1538	627	1043.6	1501	1052	31	

Fazy Księżyca [Dm, h.mm]: Nów 3, 1.22 1kw 9, 16.12 Pełn 17, 10.28 3kw 25, 14.48

GRUDZIEŃ 2013 (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	6.11	14.57	11.05	18.15	0.37	13.15	18.12	10.45	5.26	14.46	13.19	1.58	12.21	22.25	9.42	17.55		
	16.516	-21.86	15.494	-17.71	19.599	-24.56	11.845	3.03	7.411	22.06	15.023	-14.93	0.552	2.80	22.327	-11.15	18.736	-20.19	4.66771	1
3	5.33	17.39	6.22	14.55	10.59	18.15	0.35	13.09	18.04	10.36	5.19	14.39	13.11	1.50	12.13	22.18	9.34	17.47		
	16.660	-22.15	15.696	-18.64	19.685	-24.18	11.910	2.63	7.399	22.09	15.038	-14.99	0.550	2.79	22.328	-11.14	18.740	-20.19	4.79914	3
5	5.35	17.38	6.32	14.54	10.53	18.15	0.33	13.03	17.55	10.28	5.13	14.32	13.03	1.42	12.05	22.10	9.26	17.40		
	16.805	-22.41	15.903	-19.54	19.764	-23.77	11.975	2.23	7.387	22.12	15.053	-15.05	0.549	2.79	22.330	-11.13	18.745	-20.19	4.93056	5
7	5.37	17.38	6.42	14.53	10.47	18.14	0.31	12.56	17.46	10.20	5.06	14.24	12.55	1.34	11.57	22.02	9.19	17.32		
	16.951	-22.65	16.112	-20.38	19.836	-23.36	12.038	1.84	7.374	22.15	15.068	-15.11	0.547	2.78	22.331	-11.12	18.749	-20.19	5.06198	7
9	5.39	17.38	6.53	14.52	10.39	18.13	0.29	12.50	17.37	10.11	4.59	14.17	12.47	1.26	11.49	21.55	9.11	17.25		
	17.097	-22.85	16.326	-21.17	19.899	-22.94	12.102	1.45	7.360	22.18	15.083	-15.17	0.546	2.77	22.333	-11.11	18.754	-20.19	5.19340	9
11	5.41	17.38	7.03	14.52	10.31	18.12	0.27	12.44	17.28	10.03	4.53	14.10	12.39	1.18	11.42	21.47	9.04	17.17		
	17.243	-23.03	16.541	-21.89	19.953	-22.50	12.165	1.06	7.346	22.21	15.097	-15.22	0.546	2.77	22.335	-11.10	18.759	-20.18	5.32482	11
13	5.43	17.38	7.13	14.53	10.23	18.10	0.25	12.38	17.19	9.54	4.46	14.02	12.31	1.10	11.34	21.39	8.56	17.09		
	17.390	-23.17	16.760	-22.55	19.998	-22.07	12.227	0.68	7.330	22.25	15.112	-15.28	0.545	2.77	22.337	-11.08	18.764	-20.18	5.45624	13
15	5.44	17.38	7.23	14.54	10.14	18.07	0.23	12.32	17.10	9.46	4.39	13.55	12.23	1.02	11.26	21.32	8.48	17.02		
	17.538	-23.28	16.981	-23.13	20.033	-21.63	12.288	0.30	7.315	22.28	15.126	-15.34	0.545	2.77	22.339	-11.07	18.768	-20.18	5.58766	15
17	5.46	17.39	7.32	14.56	10.05	18.04	0.21	12.26	17.01	9.37	4.33	13.48	12.15	0.54	11.18	21.24	8.41	16.54		
	17.685	-23.36	17.205	-23.63	20.058	-21.19	12.349	-0.07	7.298	22.32	15.140	-15.39	0.545	2.77	22.342	-11.06	18.773	-20.18	5.71908	17
19	5.47	17.40	7.41	14.58	9.55	18.00	0.18	12.19	16.52	9.28	4.26	13.40	12.08	0.46	11.10	21.16	8.33	16.47		
	17.833	-23.42	17.431	-24.06	20.071	-20.75	12.409	-0.43	7.281	22.35	15.154	-15.44	0.545	2.77	22.344	-11.04	18.778	-20.18	5.85051	19
21	5.48	17.41	7.49	15.01	9.44	17.55	0.16	12.13	16.43	9.20	4.19	13.33	11.60	0.39	11.03	21.09	8.26	16.39		
	17.981	-23.43	17.659	-24.40	20.073	-20.32	12.469	-0.80	7.264	22.39	15.167	-15.49	0.545	2.77	22.347	-11.03	18.783	-20.18	5.98193	21
23	5.49	17.42	7.57	15.05	9.33	17.50	0.14	12.07	16.33	9.11	4.13	13.25	11.52	0.31	10.55	21.01	8.18	16.32		
	18.129	-23.42	17.889	-24.66	20.063	-19.89	12.528	-1.15	7.246	22.43	15.181	-15.54	0.545	2.78	22.349	-11.01	18.788	-20.18	6.11335	23
25	5.50	17.43	8.05	15.10	9.21	17.43	0.11	12.01	16.24	9.02	4.06	13.18	11.44	0.23	10.47	20.53	8.11	16.24		
	18.277	-23.38	18.120	-24.83	20.042	-19.48	12.586	-1.50	7.228	22.46	15.194	-15.59	0.546	2.78	22.352	-11.00	18.793	-20.17	6.24476	25
27	5.50	17.44	8.11	15.15	9.08	17.36	0.08	11.54	16.15	8.54	3.59	13.11	11.36	0.15	10.39	20.46	8.03	16.16		
	18.425	-23.31	18.354	-24.91	20.009	-19.08	12.644	-1.85	7.209	22.50	15.207	-15.64	0.547	2.79	22.355	-10.98	18.798	-20.17	6.37618	27
29	5.51	17.46	8.17	15.21	8.55	17.28	0.06	11.48	16.06	8.45	3.52	13.03	11.28	0.08	10.32	20.38	7.55	16.09		
	18.572	-23.20	18.589	-24.89	19.965	-18.69	12.700	-2.18	7.191	22.54	15.219	-15.69	0.548	2.80	22.358	-10.96	18.803	-20.17	6.50760	29
31	5.51	17.48	8.23	15.28	8.41	17.20	0.03	11.42	15.56	8.36	3.45	12.56	11.20	23.56	10.24	20.31	7.48	16.01		
	18.720	-23.06	18.824	-24.78	19.910	-18.32	12.756	-2.51	7.172	22.57	15.232	-15.73	0.549	2.81	22.361	-10.94	18.808	-20.17	6.63903	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2013

Nowy Rok	Wto	1 styczeń	Trójcy Najświętszej	Nie	26 maj
Najświętszej Maryi Panny Rodzicielki	Wto	1 styczeń	Dzień Matki	Nie	26 maj
Objawienia Pańskiego (Trzech Króli)	Nie	6 styczeń	Boże Ciało	Czw	30 maj
Juliański Nowy Rok	Pon	14 styczeń	Dzień Dziecka	Sob	1 czerwiec
Dzień Babci	Pon	21 styczeń	Dzień Dzięczynienia	Nie	2 czerwiec
Dzień Dziadka	Wto	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	7 czerwiec
Ofiarowania Pańskiego	Sob	2 luty	Dzień Ojca	Nie	23 czerwiec
Matki Boskiej Gromnicznej	Sob	2 luty	Noc Świętojańska	Nie	23 czerwiec
Tłusty czwartek	Czw	7 luty	Św. Piotra i Pawła	Sob	29 czerwiec
Środa Popielcowa	Śro	13 luty	Wniebowzięcia N.M.P.	Czw	15 sierpień
Walentynki	Czw	14 luty	Święto Wojska Polskiego	Czw	15 sierpień
Święto UMK	Wto	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 Adventu	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 2014

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 7.10.2010 r.)

Data Wielkanocy: **2014 KWIECIEŃ 20**

Dla całego roku przyjęto: TDT – UT = 68 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 17.57**, Lato **VI 21, 11.52**, Jesień **IX 23, 3.29**, Zima **XII 22, 0.03**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 30 marca do 26 października 2014 r.**

Oznaczenia:

Dr — dzień 2014 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2014

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2456																		
1	1	Śro	659	18.58207	-3.31	18.4737	-22.59	0.98335	18.4524	-18.25	55.988	6.9	0	800	1149.3	1539	724	1146.6	1613	1048	1
2	2	Czw	660	19.02172	-3.59	18.5202	-22.54	0.98334	19.4839	-16.02	56.013	1.0	2	800	1149.7	1540	811	1248.4	1733	1044	2
3	3	Pią	661	19.06138	-4.27	18.5626	-22.48	0.98333	20.4939	-12.33	56.342	2.0	6	759	1150.2	1541	849	1347.6	1856	1040	3
4	4	Sob	662	19.10104	-4.54	19.0050	-22.42	0.98333	21.4749	-8.19	56.931	3.0	13	759	1150.6	1543	921	1443.7	2018	1036	4
5	5	Nie	663	19.14069	-5.21	19.0514	-22.35	0.98333	22.4314	-3.42	57.712	4.0	22	759	1151.1	1544	948	1536.7	2139	1032	5
6	6	Pon	664	19.18035	-5.48	19.0937	-22.28	0.98334	23.3624	0.59	58.607	5.0	32	758	1151.5	1545	1012	1627.3	2256	1028	6
7	7	Wto	665	19.22000	-6.14	19.1359	-22.21	0.98335	0.2759	5.27	59.540	6.0	43	758	1152.0	1546	1036	1716.4	****	1024	7
8	8	Śro	666	19.25566	-6.39	19.1821	-22.13	0.98337	1.1841	9.32	60.444	0.3	53	757	1152.4	1548	1101	1804.6	010	1021	8
9	9	Czw	667	19.29531	-7.04	19.2243	-22.04	0.98339	2.0903	13.03	61.271	1.3	63	757	1152.8	1549	1128	1852.5	121	1017	9
10	10	Pią	668	19.33497	-7.29	19.2704	-21.56	0.98341	2.5929	15.53	61.988	2.3	73	756	1153.2	1551	1157	1940.6	229	1013	10
11	11	Sob	669	19.37462	-7.53	19.3124	-21.46	0.98345	3.5008	17.56	62.581	3.3	81	755	1153.6	1552	1232	2029.0	333	1009	11
12	12	Nie	670	19.41428	-8.16	19.3544	-21.37	0.98348	4.4058	19.09	63.045	4.3	88	755	1154.0	1554	1312	2117.4	432	1005	12
13	13	Pon	671	19.45394	-8.39	19.4003	-21.27	0.98353	5.3144	19.30	63.383	5.3	93	754	1154.4	1555	1358	2205.7	525	1001	13
14	14	Wto	672	19.49359	-9.01	19.4422	-21.16	0.98358	6.2206	18.58	63.605	6.3	97	753	1154.8	1557	1451	2253.4	611	957	14
15	15	Śro	673	19.53325	-9.22	19.4840	-21.05	0.98363	7.1142	17.36	63.719	7.3	100	752	1155.1	1559	1548	2340.0	650	953	15
16	16	Czw	674	19.57290	-9.43	19.5257	-20.54	0.98369	8.0018	15.29	63.731	0.3	100	751	1155.5	1600	1649	*****	723	949	16
17	17	Pią	675	20.01256	-10.02	19.5714	-20.42	0.98376	8.4750	12.44	63.643	1.3	99	750	1155.8	1602	1752	025.6	751	945	17
18	18	Sob	676	20.05222	-10.22	20.0129	-20.30	0.98384	9.3424	9.27	63.452	2.3	95	749	1156.1	1604	1856	109.9	816	941	18
19	19	Nie	677	20.09187	-10.40	20.0544	-20.18	0.98392	10.2020	5.47	63.150	3.3	91	748	1156.4	1605	2002	153.4	838	937	19
20	20	Pon	678	20.13153	-10.58	20.0959	-20.05	0.98401	11.0606	1.51	62.729	4.3	84	747	1156.7	1607	2108	236.5	859	933	20
21	21	Wto	679	20.17118	-11.15	20.1412	-19.52	0.98410	11.5216	-2.13	62.185	5.3	77	746	1157.0	1609	2215	319.8	920	929	21
22	22	Śro	680	20.21084	-11.32	20.1825	-19.38	0.98420	12.3931	-6.15	61.517	6.3	68	744	1157.3	1611	2324	403.9	942	925	22
23	23	Czw	681	20.25049	-11.47	20.2238	-19.24	0.98430	13.2834	-10.06	60.735	7.3	58	743	1157.5	1613	****	449.8	1006	922	23
24	24	Pią	682	20.29015	-12.02	20.2649	-19.10	0.98441	14.2006	-13.34	59.865	0.2	47	742	1157.8	1614	035	538.2	1033	918	24
25	25	Sob	683	20.32580	-12.16	20.3060	-18.55	0.98452	15.1438	-16.25	58.948	1.2	37	740	1158.0	1616	146	629.8	1107	914	25
26	26	Nie	684	20.36546	-12.29	20.3509	-18.40	0.98464	16.1222	-18.26	58.041	2.2	26	739	1158.2	1618	257	725.0	1149	910	26
27	27	Pon	685	20.40511	-12.42	20.3918	-18.25	0.98476	17.1258	-19.21	57.217	3.2	17	738	1158.4	1620	405	823.5	1241	906	27
28	28	Wto	686	20.44477	-12.54	20.4327	-18.09	0.98488	18.1531	-18.60	56.554	4.2	9	736	1158.6	1622	506	924.4	1345	902	28
29	29	Śro	687	20.48443	-13.04	20.4734	-17.53	0.98501	19.1837	-17.18	56.126	5.2	3	735	1158.8	1624	558	1026.1	1500	858	29
30	30	Czw	688	20.52408	-13.15	20.5141	-17.37	0.98514	20.2052	-14.22	55.985	6.2	0	733	1159.0	1626	641	1126.9	1622	854	30
31	31	Pią	689	20.56374	-13.24	20.5547	-17.20	0.98527	21.2116	-10.27	56.154	0.6	0	731	1159.1	1628	717	1225.6	1746	850	31

Fazy Księżyca [Dm, h.mm]: Nów 1, 12.14 1kw 8, 4.39 Pełn 16, 5.52 3kw 24, 6.19 Nów 30, 22.38

STYCZEŃ 2014 (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 Zach (0^h UT) Dm	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach		
1	5.51	17.49	8.25	15.32	8.34	17.15	0.02	11.39	15.52	8.32	3.42	12.52	11.16	23.52	10.20	20.27	7.44	15.58		
	18.794	-22.98	18.943	-24.69	19.879	-18.14	12.784	-2.68	7.162	22.59	15.238	-15.75	0.550	2.81	22.363	-10.93	18.810	-20.17	6.70474	1
3	5.51	17.50	8.29	15.41	8.20	17.05	23.55	11.32	15.42	8.23	3.35	12.45	11.09	23.44	10.12	20.19	7.36	15.50		
	18.941	-22.80	19.180	-24.43	19.809	-17.79	12.838	-3.00	7.143	22.63	15.250	-15.79	0.552	2.83	22.366	-10.91	18.815	-20.16	6.83616	3
5	5.51	17.53	8.33	15.50	8.06	16.55	23.52	11.26	15.33	8.15	3.28	12.37	11.01	23.37	10.04	20.12	7.29	15.43		
	19.087	-22.59	19.417	-24.07	19.732	-17.47	12.892	-3.31	7.123	22.67	15.261	-15.84	0.554	2.84	22.370	-10.89	18.820	-20.16	6.96758	5
7	5.51	17.55	8.36	15.60	7.51	16.44	23.49	11.20	15.24	8.06	3.21	12.30	10.53	23.29	9.57	20.04	7.21	15.35		
	19.233	-22.35	19.654	-23.61	19.649	-17.17	12.944	-3.61	7.104	22.70	15.273	-15.88	0.556	2.85	22.373	-10.87	18.825	-20.16	7.09900	7
9	5.50	17.57	8.38	16.10	7.36	16.32	23.46	11.13	15.15	7.57	3.14	12.23	10.45	23.21	9.49	19.57	7.14	15.27		
	19.379	-22.07	19.891	-23.04	19.562	-16.89	12.996	-3.91	7.085	22.74	15.284	-15.91	0.558	2.87	22.377	-10.85	18.830	-20.15	7.23042	9
11	5.49	17.59	8.39	16.22	7.21	16.21	23.42	11.07	15.05	7.48	3.07	12.15	10.37	23.14	9.41	19.49	7.06	15.20		
	19.523	-21.77	20.126	-22.37	19.474	-16.65	13.046	-4.20	7.065	22.77	15.294	-15.95	0.560	2.89	22.381	-10.83	18.835	-20.15	7.36184	11
13	5.48	18.02	8.39	16.33	7.07	16.09	23.39	11.01	14.56	7.40	3.00	12.08	10.30	23.06	9.33	19.42	6.58	15.12		
	19.668	-21.45	20.360	-21.59	19.386	-16.43	13.096	-4.48	7.046	22.80	15.305	-15.98	0.563	2.90	22.384	-10.81	18.840	-20.15	7.49326	13
15	5.47	18.05	8.39	16.45	6.53	15.57	23.35	10.54	14.47	7.31	2.53	12.00	10.22	22.59	9.26	19.34	6.51	15.05		
	19.811	-21.09	20.591	-20.72	19.301	-16.24	13.144	-4.75	7.027	22.84	15.315	-16.02	0.566	2.92	22.388	-10.79	18.845	-20.14	7.62468	15
17	5.46	18.07	8.38	16.58	6.39	15.46	23.32	10.48	14.38	7.22	2.46	11.53	10.14	22.51	9.18	19.27	6.43	14.57		
	19.954	-20.71	20.819	-19.74	19.222	-16.09	13.191	-5.02	7.009	22.87	15.325	-16.05	0.569	2.95	22.392	-10.76	18.850	-20.14	7.75610	17
19	5.44	18.10	8.37	17.10	6.26	15.34	23.28	10.41	14.28	7.13	2.39	11.45	10.06	22.43	9.10	19.19	6.36	14.50		
	20.096	-20.30	21.041	-18.68	19.149	-15.96	13.237	-5.27	6.991	22.90	15.334	-16.08	0.572	2.97	22.396	-10.74	18.855	-20.14	7.88752	19
21	5.43	18.13	8.34	17.23	6.14	15.23	23.24	10.35	14.19	7.05	2.32	11.38	9.58	22.36	9.02	19.12	6.28	14.42		
	20.237	-19.86	21.257	-17.53	19.086	-15.87	13.282	-5.52	6.973	22.93	15.343	-16.11	0.576	2.99	22.401	-10.72	18.859	-20.13	8.01894	21
23	5.41	18.16	8.31	17.35	6.03	15.12	23.20	10.28	14.10	6.56	2.24	11.30	9.51	22.28	8.54	19.04	6.20	14.35		
	20.377	-19.40	21.463	-16.31	19.033	-15.81	13.325	-5.75	6.955	22.96	15.352	-16.13	0.579	3.02	22.405	-10.69	18.864	-20.13	8.15036	23
25	5.39	18.19	8.27	17.46	5.52	15.02	23.16	10.22	14.01	6.47	2.17	11.23	9.43	22.21	8.47	18.57	6.13	14.27		
	20.517	-18.92	21.657	-15.05	18.991	-15.78	13.367	-5.98	6.939	22.98	15.360	-16.16	0.583	3.04	22.409	-10.67	18.869	-20.13	8.28178	25
27	5.37	18.22	8.22	17.57	5.42	14.53	23.12	10.15	13.52	6.39	2.10	11.15	9.35	22.13	8.39	18.49	6.05	14.19		
	20.655	-18.41	21.835	-13.76	18.960	-15.78	13.407	-6.19	6.922	23.01	15.368	-16.18	0.587	3.07	22.413	-10.64	18.874	-20.12	8.41320	27
29	5.34	18.25	8.16	18.06	5.34	14.43	23.07	10.08	13.43	6.30	2.03	11.08	9.27	22.06	8.31	18.42	5.58	14.12		
	20.793	-17.88	21.992	-12.48	18.941	-15.80	13.445	-6.40	6.906	23.03	15.375	-16.20	0.591	3.10	22.418	-10.62	18.878	-20.12	8.54462	29
31	5.32	18.28	8.09	18.13	5.25	14.35	23.03	10.02	13.34	6.21	1.55	11.00	9.20	21.58	8.24	18.34	5.50	14.04		
	20.930	-17.33	22.123	-11.26	18.933	-15.84	13.482	-6.59	6.891	23.06	15.383	-16.22	0.595	3.12	22.422	-10.59	18.883	-20.11	8.67604	31

LUTY 2014

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
32	1	Sob	690	21.00339	-13.32	20.5952	-17.03	0.98541	22.1922	-5.55	56.619	1.6	4	730	1159.3	1630	747	1321.9	1909	846	1	
33	2	Nie	691	21.04305	-13.40	21.0356	-16.46	0.98555	23.1515	-1.07	57.333	2.6	9	728	1159.4	1631	814	1415.6	2031	842	2	
34	3	Pon	692	21.08270	-13.47	21.0759	-16.28	0.98570	0.0919	3.36	58.222	3.6	17	726	1159.5	1633	839	1507.3	2149	838	3	
35	4	Wto	693	21.12236	-13.53	21.1202	-16.10	0.98584	1.0205	7.58	59.204	4.6	26	725	1159.6	1635	905	1557.7	2304	834	4	
36	5	Śro	694	21.16201	-13.58	21.1604	-15.52	0.98599	1.5403	11.47	60.197	5.6	36	723	1159.7	1637	931	1647.3	****	830	5	
37	6	Czw	695	21.20167	-14.02	21.2004	-15.34	0.98615	2.4534	14.54	61.131	6.6	46	721	1159.8	1639	1001	1736.4	016	827	6	
38	7	Pią	696	21.24132	-14.06	21.2404	-15.15	0.98630	3.3653	17.13	61.952	0.7	56	719	1159.8	1641	1034	1825.4	123	823	7	
39	8	Sob	697	21.28098	-14.08	21.2804	-14.56	0.98647	4.2802	18.42	62.626	1.7	66	717	1159.9	1643	1112	1914.1	224	819	8	
40	9	Nie	698	21.32063	-14.10	21.3202	-14.37	0.98663	5.1854	19.17	63.134	2.7	75	715	1159.9	1645	1156	2002.4	320	815	9	
41	10	Pon	699	21.36029	-14.11	21.3560	-14.18	0.98680	6.0916	19.01	63.474	3.7	83	714	1159.9	1647	1246	2050.2	408	811	10	
42	11	Wto	700	21.39595	-14.12	21.3957	-13.58	0.98698	6.5856	17.55	63.653	4.7	89	712	1159.9	1649	1342	2137.0	450	807	11	
43	12	Śro	701	21.43560	-14.11	21.4353	-13.38	0.98716	7.4743	16.02	63.688	5.7	94	710	1159.9	1651	1441	2222.9	525	803	12	
44	13	Czw	702	21.47526	-14.10	21.4748	-13.18	0.98735	8.3534	13.29	63.597	6.7	98	708	1159.9	1653	1543	2307.8	555	759	13	
45	14	Pią	703	21.51491	-14.08	21.5143	-12.58	0.98754	9.2235	10.22	63.402	7.7	100	706	1159.9	1655	1647	2351.8	621	755	14	
46	15	Sob	704	21.55457	-14.05	21.5537	-12.37	0.98773	10.0860	6.49	63.116	0.5	100	704	1159.8	1657	1753	*****	644	751	15	
47	16	Nie	705	21.59422	-14.02	21.5930	-12.16	0.98794	10.5509	2.57	62.753	1.5	98	702	1159.8	1659	1859	035.4	706	747	16	
48	17	Pon	706	22.03388	-13.58	22.0322	-11.56	0.98814	11.4132	-1.05	62.318	2.5	94	700	1159.7	1701	2006	119.0	727	743	17	
49	18	Wto	707	22.07353	-13.53	22.0714	-11.34	0.98835	12.2840	-5.07	61.815	3.5	89	657	1159.6	1703	2115	203.1	749	739	18	
50	19	Śro	708	22.11319	-13.47	22.1105	-11.13	0.98857	13.1708	-8.59	61.245	4.5	82	655	1159.5	1705	2224	248.4	812	735	19	
51	20	Czw	709	22.15284	-13.41	22.1455	-10.52	0.98879	14.0729	-12.31	60.610	5.5	73	653	1159.4	1706	2334	335.6	839	731	20	
52	21	Pią	710	22.19250	-13.35	22.1845	-10.30	0.98901	15.0010	-15.29	59.920	6.5	64	651	1159.3	1708	****	425.1	909	728	21	
53	22	Sob	711	22.23215	-13.27	22.2234	-10.08	0.98924	15.5525	-17.42	59.193	7.5	53	649	1159.2	1710	043	517.5	947	724	22	
54	23	Nie	712	22.27181	-13.19	22.2623	-9.46	0.98947	16.5308	-18.57	58.463	0.7	42	647	1159.1	1712	150	612.7	1033	720	23	
55	24	Pon	713	22.31147	-13.11	22.3011	-9.24	0.98970	17.5248	-19.04	57.773	1.7	31	645	1158.9	1714	252	710.3	1129	716	24	
56	25	Wto	714	22.35112	-13.01	22.3358	-9.02	0.98994	18.5333	-17.58	57.181	2.7	21	642	1158.8	1716	346	809.3	1237	712	25	
57	26	Śro	715	22.39078	-12.52	22.3745	-8.39	0.99017	19.5419	-15.39	56.748	3.7	12	640	1158.6	1718	432	908.5	1352	708	26	
58	27	Czw	716	22.43043	-12.41	22.4131	-8.17	0.99041	20.5415	-12.16	56.530	4.7	5	638	1158.4	1720	510	1006.9	1513	704	27	
59	28	Pią	717	22.47009	-12.31	22.4517	-7.54	0.99065	21.5246	-8.05	56.565	5.7	1	636	1158.3	1722	543	1103.7	1636	700	28	

Fazy Księżyca [Dm, h.mm]: 1kw 6, 20.22 Pełn 15, 0.53 3kw 22, 18.15

LUTY 2014 (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	18.30	8.05	18.15	5.22	14.31	23.00	9.58	13.30	6.17	1.52	10.56	9.16	21.55	8.20	18.31	5.46	14.01		
	20.998	-17.05	22.177	-10.69	18.933	-15.87	13.500	-6.68	6.884	23.07	15.386	-16.23	0.598	3.14	22.425	-10.58	18.885	-20.11	8.74175	1
3	5.28	18.33	7.57	18.18	5.15	14.23	22.55	9.51	13.21	6.09	1.44	10.49	9.08	21.47	8.12	18.23	5.39	13.53		
	21.133	-16.47	22.259	-9.66	18.943	-15.93	13.534	-6.86	6.870	23.09	15.392	-16.25	0.602	3.17	22.429	-10.55	18.889	-20.11	8.87317	3
5	5.25	18.37	7.47	18.17	5.09	14.16	22.50	9.45	13.12	6.00	1.37	10.41	9.00	21.40	8.04	18.16	5.31	13.45		
	21.268	-15.87	22.299	-8.83	18.962	-16.01	13.567	-7.02	6.856	23.11	15.398	-16.27	0.607	3.20	22.434	-10.52	18.894	-20.10	9.00458	5
7	5.22	18.40	7.35	18.12	5.03	14.09	22.45	9.38	13.03	5.52	1.30	10.33	8.52	21.32	7.56	18.08	5.23	13.38		
	21.401	-15.25	22.295	-8.25	18.993	-16.10	13.597	-7.17	6.844	23.13	15.404	-16.28	0.612	3.23	22.438	-10.50	18.898	-20.10	9.13600	7
9	5.18	18.43	7.23	18.03	4.58	14.03	22.40	9.31	12.54	5.43	1.22	10.26	8.45	21.25	7.49	18.01	5.16	13.30		
	21.534	-14.62	22.247	-7.96	19.032	-16.19	13.625	-7.31	6.832	23.15	15.409	-16.29	0.617	3.27	22.443	-10.47	18.902	-20.10	9.26742	9
11	5.15	18.47	7.10	17.50	4.54	13.58	22.34	9.24	12.46	5.35	1.15	10.18	8.37	21.18	7.41	17.54	5.08	13.23		
	21.666	-13.97	22.158	-7.99	19.081	-16.28	13.651	-7.44	6.821	23.16	15.414	-16.30	0.622	3.30	22.448	-10.44	18.906	-20.09	9.39885	11
13	5.11	18.50	6.57	17.33	4.50	13.53	22.28	9.17	12.37	5.26	1.07	10.11	8.29	21.10	7.33	17.46	5.00	13.15		
	21.797	-13.30	22.036	-8.31	19.139	-16.37	13.675	-7.55	6.811	23.18	15.418	-16.31	0.627	3.33	22.453	-10.42	18.910	-20.09	9.53027	13
15	5.08	18.54	6.43	17.13	4.47	13.48	22.22	9.10	12.29	5.18	0.59	10.03	8.22	21.03	7.26	17.39	4.53	13.07		
	21.927	-12.62	21.895	-8.88	19.204	-16.45	13.697	-7.66	6.801	23.19	15.422	-16.32	0.633	3.37	22.457	-10.39	18.914	-20.09	9.66168	15
17	5.04	18.57	6.31	16.53	4.43	13.44	22.16	9.02	12.20	5.10	0.52	9.55	8.14	20.56	7.18	17.31	4.45	12.60		
	22.056	-11.93	21.748	-9.62	19.277	-16.52	13.716	-7.74	6.793	23.20	15.425	-16.32	0.638	3.41	22.462	-10.36	18.918	-20.08	9.79310	17
19	5.00	19.01	6.19	16.32	4.41	13.41	22.09	8.55	12.12	5.02	0.44	9.47	8.06	20.48	7.10	17.24	4.37	12.52		
	22.185	-11.22	21.612	-10.44	19.357	-16.58	13.732	-7.82	6.785	23.22	15.428	-16.33	0.644	3.44	22.467	-10.33	18.921	-20.08	9.92451	19
21	4.56	19.05	6.09	16.13	4.38	13.38	22.03	8.48	12.03	4.53	0.36	9.40	7.58	20.41	7.02	17.16	4.30	12.45		
	22.313	-10.50	21.496	-11.27	19.443	-16.62	13.746	-7.88	6.779	23.23	15.431	-16.33	0.650	3.48	22.472	-10.31	18.925	-20.07	10.05593	21
23	4.52	19.08	6.01	15.55	4.36	13.35	21.56	8.40	11.55	4.45	0.29	9.32	7.51	20.34	6.55	17.09	4.22	12.37		
	22.440	-9.77	21.409	-12.05	19.534	-16.64	13.757	-7.92	6.773	23.24	15.433	-16.33	0.656	3.52	22.476	-10.28	18.929	-20.07	10.18735	23
25	4.48	19.12	5.54	15.40	4.34	13.33	21.49	8.33	11.47	4.37	0.21	9.24	7.43	20.26	6.47	17.02	4.14	12.29		
	22.566	-9.03	21.354	-12.73	19.632	-16.65	13.765	-7.95	6.768	23.24	15.434	-16.33	0.662	3.56	22.481	-10.25	18.932	-20.07	10.31878	25
27	4.43	19.16	5.48	15.27	4.32	13.32	21.41	8.25	11.39	4.29	0.13	9.16	7.35	20.19	6.39	16.54	4.07	12.22		
	22.692	-8.28	21.332	-13.30	19.734	-16.63	13.771	-7.96	6.764	23.25	15.436	-16.33	0.668	3.60	22.486	-10.22	18.935	-20.06	10.45020	27

MARZEC 2014

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]							
..... Dzień				ST	Δα	α _☉	δ _☉	R _☉	α _☾	δ _☾	R _☾	Faza ☾	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ _☉	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2456																					
60	1	Sob	718	22.50574	-12.19	22.4902	-7.31	0.99089	22.4944	-3.25	56.867	0.1	0	633	1158.1	1724	612	1158.8	1759	656	1
61	2	Nie	719	22.54540	-12.07	22.5247	-7.09	0.99114	23.4518	1.23	57.418	1.1	2	631	1157.9	1726	638	1252.3	1920	652	2
62	3	Pon	720	22.58505	-11.55	22.5631	-6.46	0.99138	0.3946	5.59	58.172	2.1	6	629	1157.7	1727	704	1344.6	2039	648	3
63	4	Wto	721	23.02471	-11.42	23.0015	-6.23	0.99163	1.3329	10.08	59.061	3.1	13	627	1157.5	1729	731	1436.1	2154	644	4
64	5	Śro	722	23.06436	-11.29	23.0358	-5.59	0.99187	2.2640	13.36	60.010	4.1	21	624	1157.2	1731	801	1527.0	2305	640	5
65	6	Czw	723	23.10402	-11.15	23.0741	-5.36	0.99212	3.1927	16.17	60.941	5.1	30	622	1157.0	1733	833	1617.5	****	636	6
66	7	Pią	724	23.14367	-11.01	23.1123	-5.13	0.99237	4.1149	18.05	61.788	6.1	39	620	1156.8	1735	910	1707.5	011	632	7
67	8	Sob	725	23.18333	-10.47	23.1505	-4.49	0.99262	5.0335	18.58	62.498	7.1	49	617	1156.5	1737	953	1756.8	110	629	8
68	9	Nie	726	23.22298	-10.32	23.1847	-4.26	0.99288	5.5436	18.58	63.037	0.9	59	615	1156.3	1739	1041	1845.2	202	625	9
69	10	Pon	727	23.26264	-10.16	23.2228	-4.03	0.99313	6.4440	18.07	63.386	1.9	68	613	1156.0	1740	1135	1932.6	246	621	10
70	11	Wto	728	23.30230	-10.01	23.2609	-3.39	0.99339	7.3343	16.29	63.544	2.9	76	610	1155.8	1742	1233	2018.8	324	617	11
71	12	Śro	729	23.34195	-9.45	23.2950	-3.15	0.99365	8.2147	14.10	63.522	3.9	84	608	1155.5	1744	1334	2103.9	356	613	12
72	13	Czw	730	23.38161	-9.29	23.3330	-2.52	0.99392	9.0901	11.14	63.342	4.9	90	605	1155.2	1746	1437	2148.3	424	609	13
73	14	Pią	731	23.42126	-9.12	23.3710	-2.28	0.99419	9.5540	7.49	63.034	5.9	95	603	1154.9	1748	1542	2232.2	448	605	14
74	15	Sob	732	23.46092	-8.55	23.4050	-2.04	0.99446	10.4209	4.03	62.630	6.9	98	601	1154.7	1750	1648	2316.1	511	601	15
75	16	Nie	733	23.50057	-8.38	23.4429	-1.41	0.99473	11.2853	0.03	62.159	7.9	100	558	1154.4	1751	1755	*****	533	557	16
76	17	Pon	734	23.54022	-8.21	23.4809	-1.17	0.99500	12.1623	-4.01	61.650	0.7	99	556	1154.1	1753	1904	000.5	555	553	17
77	18	Wto	735	23.57588	-8.03	23.5148	-0.53	0.99528	13.0508	-7.58	61.122	1.7	97	554	1153.8	1755	2014	046.0	618	549	18
78	19	Śro	736	0.01553	-7.46	23.5527	-0.30	0.99556	13.5536	-11.36	60.591	2.7	92	551	1153.5	1757	2124	133.2	643	545	19
79	20	Czw	737	0.05519	-7.28	23.5906	-0.06	0.99585	14.4807	-14.43	60.065	3.7	86	549	1153.2	1759	2234	222.6	713	541	20
80	21	Pią	738	0.09484	-7.10	0.0244	0.18	0.99613	15.4249	-17.07	59.547	4.7	77	546	1152.9	1801	2342	314.3	748	537	21
81	22	Sob	739	0.13450	-6.52	0.0623	0.41	0.99642	16.3932	-18.35	59.043	5.7	68	544	1152.6	1802	****	408.4	832	534	22
82	23	Nie	740	0.17416	-6.34	0.1002	1.05	0.99671	17.3746	-18.59	58.564	6.7	57	542	1152.3	1804	044	504.3	924	530	23
83	24	Pon	741	0.21381	-6.16	0.1340	1.29	0.99700	18.3645	-18.14	58.125	0.4	46	539	1152.0	1806	140	601.4	1026	526	24
84	25	Wto	742	0.25347	-5.58	0.1718	1.52	0.99729	19.3542	-16.20	57.753	1.4	34	537	1151.7	1808	227	658.7	1136	522	25
85	26	Śro	743	0.29312	-5.40	0.2057	2.16	0.99758	20.3357	-13.24	57.482	2.4	24	534	1151.4	1810	307	755.3	1252	518	26
86	27	Czw	744	0.33278	-5.22	0.2435	2.39	0.99787	21.3106	-9.37	57.346	3.4	14	532	1151.1	1811	341	850.8	1411	514	27
87	28	Pią	745	0.37243	-5.04	0.2814	3.03	0.99816	22.2707	-5.16	57.381	4.4	7	530	1150.8	1813	410	944.9	1532	510	28
88	29	Sob	746	0.41209	-4.46	0.3152	3.26	0.99844	23.2210	-0.36	57.605	5.4	2	527	1150.5	1815	437	1038.0	1652	506	29
89	30	Nie	747	0.45174	-4.28	0.3531	3.50	0.99873	0.1634	4.02	58.024	6.4	0	525	1150.2	1817	503	1130.4	1811	502	30
89	30	Nie	747	23.45076	-4.29	0.3522	3.49	0.99872	0.1418	3.51	58.003	7.4	0	625	1250.2	1917	603	1230.3	1911	602	30
90	31	Pon	748	23.49041	-4.11	0.3901	4.12	0.99901	1.0822	8.12	58.590	0.6	1	622	1249.9	1919	630	1322.2	2028	558	31

Fazy Księżyca [Dm, h.mm]: Nów 1, 9.00 1kw 8, 14.27 Pełn 16, 18.08 3kw 24, 2.46 Nów 30, 20.45

MARZEC 2014 (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	4.39	19.19	5.43	15.17	4.30	13.31	21.33	8.17	11.31	4.21	0.05	9.09	7.27	20.12	6.31	16.47	3.59	12.14		
	22.817	-7.52	21.339	-13.74	19.840	-16.58	13.773	-7.96	6.762	23.26	15.436	-16.32	0.674	3.64	22.491	-10.20	18.938	-20.06	10.58161	1
3	4.34	19.23	5.39	15.10	4.29	13.30	21.25	8.10	11.23	4.13	23.53	9.01	7.20	20.05	6.24	16.39	3.51	12.06		
	22.942	-6.76	21.374	-14.04	19.951	-16.51	13.772	-7.94	6.760	23.26	15.436	-16.32	0.680	3.68	22.496	-10.17	18.941	-20.06	10.71303	3
5	4.30	19.27	5.36	15.04	4.27	13.29	21.17	8.02	11.15	4.05	23.45	8.53	7.12	19.57	6.16	16.32	3.44	11.59		
	23.066	-5.99	21.433	-14.22	20.065	-16.42	13.768	-7.91	6.759	23.27	15.436	-16.31	0.687	3.72	22.500	-10.14	18.944	-20.05	10.84444	5
7	4.25	19.31	5.33	15.01	4.25	13.29	21.09	7.54	11.07	3.58	23.37	8.45	7.04	19.50	6.08	16.24	3.36	11.51		
	23.190	-5.21	21.513	-14.28	20.182	-16.29	13.761	-7.86	6.759	23.27	15.435	-16.30	0.693	3.77	22.505	-10.12	18.947	-20.05	10.97586	7
9	4.20	19.35	5.30	14.59	4.24	13.29	20.60	7.46	10.59	3.50	23.29	8.37	6.57	19.43	6.00	16.17	3.28	11.43		
	23.313	-4.43	21.611	-14.21	20.302	-16.14	13.750	-7.79	6.760	23.27	15.434	-16.29	0.700	3.81	22.510	-10.09	18.950	-20.05	11.10728	9
11	4.15	19.39	5.28	14.59	4.22	13.30	20.51	7.37	10.51	3.42	23.21	8.29	6.49	19.36	5.53	16.10	3.20	11.36		
	23.436	-3.65	21.724	-14.03	20.425	-15.96	13.736	-7.71	6.762	23.27	15.432	-16.27	0.707	3.85	22.514	-10.06	18.952	-20.05	11.23870	11
13	4.10	19.43	5.26	15.01	4.21	13.31	20.41	7.29	10.44	3.34	23.13	8.21	6.41	19.28	5.45	16.02	3.13	11.28		
	23.558	-2.86	21.851	-13.74	20.551	-15.75	13.719	-7.61	6.765	23.27	15.430	-16.26	0.713	3.89	22.519	-10.03	18.955	-20.04	11.37012	13
15	4.05	19.47	5.24	15.04	4.19	13.32	20.31	7.20	10.36	3.27	23.05	8.14	6.34	19.21	5.37	15.55	3.05	11.20		
	23.681	-2.07	21.988	-13.34	20.678	-15.50	13.699	-7.50	6.768	23.27	15.428	-16.24	0.720	3.94	22.524	-10.01	18.957	-20.04	11.50154	15
17	3.59	19.51	5.22	15.07	4.17	13.34	20.21	7.12	10.28	3.19	22.57	8.06	6.26	19.14	5.30	15.47	2.57	11.12		
	23.802	-1.28	22.135	-12.84	20.808	-15.23	13.675	-7.37	6.773	23.27	15.425	-16.23	0.727	3.98	22.528	-9.98	18.959	-20.04	11.63295	17
19	3.54	19.56	5.20	15.12	4.15	13.36	20.11	7.03	10.21	3.11	22.49	7.58	6.18	19.07	5.22	15.40	2.49	11.05		
	23.924	-0.49	22.290	-12.25	20.939	-14.92	13.648	-7.23	6.779	23.26	15.421	-16.21	0.734	4.02	22.533	-9.96	18.961	-20.04	11.76437	19
21	3.49	19.60	5.18	15.18	4.13	13.38	20.01	6.54	10.13	3.04	22.41	7.50	6.11	18.60	5.14	15.32	2.42	10.57		
	0.046	0.30	22.452	-11.56	21.072	-14.59	13.618	-7.07	6.785	23.26	15.417	-16.19	0.741	4.07	22.537	-9.93	18.963	-20.03	11.89578	21
23	3.43	20.04	5.16	15.25	4.11	13.40	19.50	6.46	10.06	2.56	22.32	7.42	6.03	18.52	5.06	15.25	2.34	10.49		
	0.167	1.09	22.621	-10.78	21.206	-14.22	13.585	-6.90	6.793	23.25	15.413	-16.16	0.748	4.11	22.542	-9.91	18.964	-20.03	12.02720	23
25	3.37	20.09	5.14	15.32	4.09	13.43	19.39	6.37	9.59	2.49	22.24	7.34	5.55	18.45	4.59	15.17	2.26	10.41		
	0.288	1.87	22.795	-9.91	21.342	-13.82	13.549	-6.72	6.801	23.24	15.408	-16.14	0.755	4.16	22.546	-9.88	18.966	-20.03	12.15863	25
27	3.32	20.13	5.11	15.40	4.07	13.46	19.28	6.27	9.51	2.42	22.16	7.26	5.47	18.38	4.51	15.10	2.18	10.34		
	0.410	2.66	22.974	-8.96	21.478	-13.39	13.511	-6.52	6.810	23.23	15.403	-16.12	0.762	4.20	22.550	-9.86	18.967	-20.03	12.29004	27
29	3.26	20.18	5.09	15.49	4.05	13.49	19.16	6.18	9.44	2.34	22.07	7.18	5.40	18.31	4.43	15.02	2.10	10.26		
	0.531	3.44	23.158	-7.92	21.615	-12.93	13.470	-6.32	6.820	23.23	15.398	-16.09	0.769	4.25	22.555	-9.83	18.969	-20.03	12.42146	29
31	4.20	21.23	6.06	16.58	5.02	14.52	20.05	7.09	10.37	3.27	22.59	8.10	6.32	19.23	5.35	15.55	3.03	11.18		
	0.650	4.20	23.343	-6.83	21.750	-12.45	13.428	-6.11	6.830	23.21	15.392	-16.07	0.775	4.29	22.559	-9.81	18.970	-20.03	12.55287	31

KWIECIEŃ 2014

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2456																		
91	1	Wto	749	23.53007	-3.53	0.4239	4.35	0.99929	2.0217	12.01	59.314	1.6	3	620	1249.6	1920	658	1414.0	2142	554	1
92	2	Śro	750	23.56572	-3.35	0.4618	4.58	0.99958	2.5607	15.06	60.121	2.6	8	618	1249.3	1922	730	1505.6	2252	550	2
93	3	Czw	751	24.00538	-3.18	0.4957	5.21	0.99986	3.4942	17.19	60.947	3.6	15	615	1249.0	1924	805	1557.0	2355	546	3
94	4	Pią	752	0.04503	-3.00	0.5336	5.44	1.00014	4.4246	18.36	61.727	4.6	23	613	1248.8	1926	847	1647.7	****	542	4
95	5	Sob	753	0.08469	-2.43	0.5716	6.07	1.00042	5.3459	18.57	62.404	5.6	32	610	1248.5	1928	933	1737.4	052	538	5
96	6	Nie	754	0.12434	-2.26	1.0055	6.30	1.00070	6.2604	18.25	62.930	6.6	41	608	1248.2	1929	1025	1825.8	140	535	6
97	7	Pon	755	0.16400	-2.09	1.0435	6.52	1.00098	7.1552	17.03	63.273	0.1	51	606	1247.9	1931	1122	1912.8	221	531	7
98	8	Wto	756	0.20365	-1.52	1.0814	7.15	1.00126	8.0424	14.59	63.415	1.1	60	603	1247.6	1933	1222	1958.4	255	527	8
99	9	Śro	757	0.24331	-1.36	1.1155	7.37	1.00154	8.5150	12.16	63.357	2.1	69	601	1247.3	1935	1324	2042.9	325	523	9
100	10	Czw	758	0.28297	-1.20	1.1535	7.59	1.00182	9.3831	9.03	63.112	3.1	78	559	1247.1	1937	1428	2126.8	350	519	10
101	11	Pią	759	0.32262	-1.04	1.1915	8.22	1.00210	10.2453	5.25	62.709	4.1	85	556	1246.8	1938	1534	2210.5	414	515	11
102	12	Sob	760	0.36228	-0.48	1.2256	8.43	1.00238	11.1129	1.30	62.184	5.1	91	554	1246.5	1940	1640	2254.7	436	511	12
103	13	Nie	761	0.40193	-0.32	1.2637	9.05	1.00266	11.5851	-2.33	61.581	6.1	96	552	1246.3	1942	1749	2340.1	458	507	13
104	14	Pon	762	0.44158	-0.17	1.3019	9.27	1.00294	12.4733	-6.35	60.946	7.1	99	550	1246.0	1944	1859	*****	521	503	14
105	15	Wto	763	0.48124	-0.02	1.3401	9.48	1.00322	13.3807	-10.23	60.321	0.1	100	547	1245.8	1945	2011	027.3	546	459	15
106	16	Śro	764	0.52089	0.12	1.3743	10.10	1.00351	14.3053	-13.45	59.742	1.1	99	545	1245.5	1947	2123	116.7	614	455	16
107	17	Czw	765	0.56055	0.26	1.4125	10.31	1.00379	15.2559	-16.26	59.235	2.1	95	543	1245.3	1949	2232	208.7	648	451	17
108	18	Pią	766	1.00021	0.40	1.4508	10.52	1.00407	16.2310	-18.13	58.814	3.1	89	541	1245.1	1951	2338	303.1	730	447	18
109	19	Sob	767	1.03586	0.53	1.4851	11.13	1.00435	17.2148	-18.56	58.482	4.1	81	538	1244.9	1953	****	359.5	820	443	19
110	20	Nie	768	1.07552	1.06	1.5235	11.33	1.00463	18.2101	-18.30	58.237	5.1	71	536	1244.7	1954	036	456.9	919	439	20
111	21	Pon	769	1.11517	1.18	1.5619	11.54	1.00491	19.1953	-16.54	58.074	6.1	60	534	1244.4	1956	126	554.2	1027	436	21
112	22	Wto	770	1.15483	1.30	2.0004	12.14	1.00519	20.1739	-14.16	57.988	0.1	49	532	1244.2	1958	208	650.4	1141	432	22
113	23	Śro	771	1.19448	1.41	2.0349	12.34	1.00547	21.1360	-10.48	57.980	1.1	38	530	1244.1	2000	242	745.1	1257	428	23
114	24	Czw	772	1.23414	1.52	2.0735	12.54	1.00574	22.0855	-6.42	58.058	2.1	27	527	1243.9	2002	312	838.2	1415	424	24
115	25	Pią	773	1.27379	2.03	2.1121	13.14	1.00601	23.0245	-2.15	58.231	3.1	17	525	1243.7	2003	339	930.0	1533	420	25
116	26	Sob	774	1.31345	2.13	2.1507	13.33	1.00628	23.5556	2.18	58.510	4.1	10	523	1243.5	2005	405	1021.0	1650	416	26
117	27	Nie	775	1.35310	2.22	2.1855	13.52	1.00655	0.4855	6.41	58.902	5.1	4	521	1243.4	2007	430	1111.8	1807	412	27
118	28	Pon	776	1.39276	2.31	2.2242	14.11	1.00681	1.4204	10.40	59.402	6.1	1	519	1243.2	2009	457	1202.7	1921	408	28
119	29	Wto	777	1.43241	2.40	2.2630	14.30	1.00707	2.3532	14.01	59.994	0.2	0	517	1243.1	2010	527	1254.0	2033	404	29
120	30	Śro	778	1.47207	2.48	2.3019	14.48	1.00733	3.2914	16.34	60.648	1.2	2	515	1243.0	2012	600	1345.6	2139	400	30

Fazy Księżyca [Dm, h.mm]: 1kw 7, 10.31 Pełn 15, 9.42 3kw 22, 9.52 Nów 29, 8.14

KWIECIEŃ 2014 (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	6.04	17.03	5.01	14.53	19.59	7.04	10.34	3.23	22.55	8.06	6.28	19.20	5.31	15.51	2.59	11.14			
	0.711	4.59	23.439	-6.24	21.819	-12.20	13.405	-5.99	6.836	23.21	15.389	-16.05	0.779	4.31	22.561	-9.80	18.970	-20.03	12.61858	1	
3	4.11	21.30	6.02	17.14	4.58	14.57	19.47	6.55	10.27	3.16	22.46	7.58	6.21	19.13	5.24	15.44	2.51	11.06			
	0.833	5.35	23.635	-5.01	21.958	-11.67	13.360	-5.77	6.848	23.20	15.383	-16.02	0.786	4.36	22.565	-9.77	18.971	-20.02	12.75000	3	
5	4.05	21.35	5.59	17.25	4.55	15.00	19.35	6.45	10.20	3.09	22.38	7.49	6.13	19.05	5.16	15.36	2.43	10.59			
	0.954	6.12	23.834	-3.70	22.097	-11.11	13.312	-5.54	6.861	23.18	15.376	-15.99	0.793	4.40	22.569	-9.75	18.972	-20.02	12.88142	5	
7	3.58	21.41	5.56	17.37	4.53	15.04	19.23	6.36	10.13	3.02	22.30	7.41	6.05	18.58	5.08	15.29	2.35	10.51			
	1.076	6.87	0.039	-2.32	22.236	-10.53	13.264	-5.31	6.874	23.17	15.369	-15.96	0.800	4.45	22.573	-9.73	18.973	-20.02	13.01284	7	
9	3.52	21.46	5.53	17.49	4.50	15.08	19.11	6.26	10.06	2.55	22.21	7.33	5.58	18.51	5.00	15.21	2.27	10.43			
	1.198	7.62	0.248	-0.88	22.375	-9.93	13.215	-5.07	6.889	23.15	15.361	-15.93	0.807	4.49	22.576	-9.71	18.973	-20.02	13.14426	9	
11	3.46	21.51	5.50	18.02	4.47	15.12	18.59	6.17	9.59	2.48	22.13	7.25	5.50	18.44	4.53	15.14	2.20	10.35			
	1.321	8.36	0.463	0.63	22.515	-9.30	13.166	-4.84	6.904	23.13	15.354	-15.90	0.814	4.54	22.580	-9.69	18.973	-20.02	13.27568	11	
13	3.39	21.57	5.47	18.16	4.44	15.16	18.47	6.07	9.52	2.40	22.04	7.17	5.42	18.37	4.45	15.06	2.12	10.27			
	1.444	9.09	0.683	2.20	22.655	-8.64	13.117	-4.61	6.920	23.12	15.346	-15.86	0.821	4.58	22.584	-9.67	18.974	-20.02	13.40709	13	
15	3.32	22.03	5.44	18.30	4.40	15.20	18.35	5.58	9.45	2.33	21.55	7.09	5.34	18.29	4.37	14.59	2.04	10.19			
	1.567	9.81	0.910	3.83	22.795	-7.97	13.069	-4.39	6.936	23.10	15.338	-15.83	0.828	4.62	22.587	-9.65	18.974	-20.02	13.53851	15	
17	3.25	22.09	5.41	18.45	4.37	15.25	18.23	5.48	9.39	2.26	21.47	7.01	5.27	18.22	4.29	14.51	1.56	10.12			
	1.690	10.52	1.143	5.51	22.936	-7.27	13.021	-4.17	6.953	23.08	15.329	-15.79	0.835	4.67	22.591	-9.63	18.974	-20.03	13.66992	17	
19	3.18	22.15	5.38	19.01	4.34	15.29	18.11	5.39	9.32	2.19	21.38	6.53	5.19	18.15	4.22	14.44	1.48	10.04			
	1.814	11.21	1.383	7.22	23.076	-6.56	12.974	-3.97	6.971	23.05	15.320	-15.76	0.842	4.71	22.594	-9.61	18.973	-20.03	13.80134	19	
21	3.11	22.21	5.35	19.18	4.30	15.34	17.60	5.29	9.26	2.13	21.30	6.44	5.11	18.08	4.14	14.36	1.40	9.56			
	1.939	11.90	1.630	8.97	23.217	-5.82	12.929	-3.77	6.989	23.03	15.311	-15.72	0.849	4.75	22.597	-9.59	18.973	-20.03	13.93277	21	
23	3.04	22.28	5.32	19.35	4.27	15.38	17.48	5.20	9.19	2.06	21.21	6.36	5.04	18.01	4.06	14.28	1.32	9.48			
	2.064	12.57	1.885	10.73	23.357	-5.07	12.885	-3.59	7.008	23.00	15.302	-15.68	0.855	4.79	22.600	-9.57	18.973	-20.03	14.06419	23	
25	2.56	22.35	5.30	19.53	4.23	15.43	17.37	5.10	9.12	1.59	21.12	6.28	4.56	17.53	3.58	14.21	1.25	9.40			
	2.189	13.23	2.147	12.48	23.498	-4.30	12.844	-3.42	7.028	22.98	15.293	-15.65	0.862	4.84	22.603	-9.56	18.972	-20.03	14.19560	25	
27	2.49	22.42	5.28	20.12	4.20	15.48	17.26	5.01	9.06	1.52	21.04	6.20	4.48	17.46	3.51	14.13	1.17	9.32			
	2.315	13.87	2.416	14.21	23.639	-3.52	12.805	-3.27	7.048	22.95	15.283	-15.61	0.869	4.88	22.606	-9.54	18.971	-20.03	14.32702	27	
29	2.41	22.50	5.26	20.30	4.16	15.52	17.15	4.51	8.60	1.45	20.55	6.12	4.41	17.39	3.43	14.06	1.09	9.24			
	2.442	14.50	2.690	15.89	23.780	-2.73	12.768	-3.13	7.069	22.92	15.274	-15.57	0.875	4.92	22.609	-9.53	18.970	-20.03	14.45844	29	

MAJ 2014

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
2456																						
121	1	Czw	779	1.51172	2.55	2.3408	15.07	1.00758	4.2252	18.13	61.323	2.2	5	513	1242.8	2014	639	1437.0	2240	356	1	
122	2	Pią	780	1.55138	3.02	2.3758	15.25	1.00783	5.1559	18.56	61.973	3.2	10	511	1242.7	2016	724	1527.8	2332	352	2	
123	3	Sob	781	1.59104	3.08	2.4148	15.42	1.00808	6.0806	18.42	62.546	4.2	17	509	1242.6	2017	814	1617.4	****	348	3	
124	4	Nie	782	2.03069	3.14	2.4539	15.60	1.00832	6.5852	17.37	62.998	5.2	25	507	1242.5	2019	910	1705.5	017	344	4	
125	5	Pon	783	2.07035	3.19	2.4930	16.17	1.00856	7.4808	15.46	63.288	6.2	34	505	1242.4	2021	1009	1752.0	054	341	5	
126	6	Wto	784	2.11000	3.24	2.5322	16.34	1.00880	8.3600	13.16	63.391	7.2	43	503	1242.4	2023	1111	1836.9	125	337	6	
127	7	Śro	785	2.14566	3.28	2.5714	16.51	1.00903	9.2246	10.13	63.293	0.3	53	501	1242.3	2024	1214	1920.8	153	333	7	
128	8	Czw	786	2.18531	3.32	3.0107	17.07	1.00926	10.0853	6.44	62.995	1.3	62	459	1242.2	2026	1318	2004.2	217	329	8	
129	9	Pią	787	2.22497	3.35	3.0501	17.23	1.00949	10.5456	2.56	62.516	2.3	71	458	1242.2	2028	1424	2047.7	239	325	9	
130	10	Sob	788	2.26462	3.37	3.0855	17.39	1.00972	11.4133	-1.03	61.889	3.3	80	456	1242.1	2030	1531	2132.1	300	321	10	
131	11	Nie	789	2.30428	3.39	3.1249	17.55	1.00994	12.2926	-5.06	61.158	4.3	87	454	1242.1	2031	1640	2218.2	322	317	11	
132	12	Pon	790	2.34393	3.40	3.1645	18.10	1.01017	13.1914	-9.01	60.380	5.3	93	452	1242.1	2033	1751	2306.7	346	313	12	
133	13	Wto	791	2.38359	3.41	3.2040	18.25	1.01039	14.1128	-12.36	59.612	6.3	98	451	1242.1	2034	1904	2358.0	413	309	13	
134	14	Śro	792	2.42325	3.41	3.2437	18.39	1.01061	15.0628	-15.36	58.914	7.3	100	449	1242.1	2036	2016	*****	445	305	14	
135	15	Czw	793	2.46290	3.41	3.2834	18.54	1.01082	16.0407	-17.46	58.334	0.6	100	447	1242.1	2038	2125	052.5	524	301	15	
136	16	Pią	794	2.50256	3.40	3.3231	19.07	1.01104	17.0349	-18.53	57.906	1.6	97	446	1242.1	2039	2229	149.6	611	257	16	
137	17	Sob	795	2.54221	3.39	3.3629	19.21	1.01126	18.0432	-18.47	57.648	2.6	91	444	1242.1	2041	2323	248.4	709	253	17	
138	18	Nie	796	2.58187	3.37	3.4028	19.34	1.01147	19.0500	-17.29	57.557	3.6	83	443	1242.1	2042	****	347.5	816	249	18	
139	19	Pon	797	3.02153	3.34	3.4427	19.47	1.01168	20.0412	-15.03	57.616	4.6	74	441	1242.2	2044	008	445.5	929	245	19	
140	20	Wto	798	3.06118	3.31	3.4827	20.00	1.01188	21.0131	-11.43	57.799	5.6	63	440	1242.2	2046	046	541.5	1046	242	20	
141	21	Śro	799	3.10084	3.27	3.5227	20.12	1.01209	21.5650	-7.44	58.080	6.6	51	439	1242.3	2047	117	635.3	1204	238	21	
142	22	Czw	800	3.14049	3.23	3.5628	20.24	1.01229	22.5029	-3.22	58.432	0.9	40	437	1242.4	2049	145	727.1	1322	234	22	
143	23	Pią	801	3.18015	3.18	4.0029	20.36	1.01248	23.4260	1.08	58.838	1.9	29	436	1242.4	2050	210	817.6	1438	230	23	
144	24	Sob	802	3.21580	3.13	4.0431	20.47	1.01267	0.3458	5.30	59.287	2.9	20	435	1242.5	2051	235	907.3	1553	226	24	
145	25	Nie	803	3.25546	3.07	4.0833	20.58	1.01286	1.2656	9.33	59.771	3.9	12	433	1242.6	2053	300	957.0	1707	222	25	
146	26	Pon	804	3.29511	3.01	4.1236	21.09	1.01305	2.1916	13.03	60.287	4.9	6	432	1242.7	2054	328	1047.0	1818	218	26	
147	27	Wto	805	3.33477	2.54	4.1640	21.19	1.01322	3.1205	15.51	60.828	5.9	2	431	1242.9	2056	359	1137.5	1926	214	27	
148	28	Śro	806	3.37442	2.46	4.2044	21.29	1.01340	4.0513	17.49	61.380	6.9	0	430	1243.0	2057	435	1228.6	2028	210	28	
149	29	Czw	807	3.41408	2.39	4.2448	21.38	1.01356	4.5819	18.51	61.926	0.6	0	429	1243.1	2058	517	1319.4	2124	206	29	
150	30	Pią	808	3.45374	2.30	4.2853	21.47	1.01373	5.5049	18.57	62.438	1.6	3	428	1243.2	2059	605	1409.6	2212	202	30	
151	31	Sob	809	3.49339	2.22	4.3258	21.56	1.01388	6.4215	18.10	62.884	2.6	7	427	1243.4	2101	658	1458.5	2253	158	31	

Fazy Księżyca [Dm, h.mm]: 1kw 7, 5.15 Pełn 14, 21.16 3kw 21, 14.59 Now 28, 20.40

MAJ 2014 (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	2.32	22.58	5.25	20.49	4.12	15.57	17.05	4.42	8.53	1.38	20.46	6.03	4.33	17.32	3.35	13.58	1.01	9.16		
	2.569	15.11	2.969	17.49	23.921	-1.93	12.735	-3.01	7.090	22.89	15.264	-15.53	0.882	4.96	22.612	-9.51	18.969	-20.04	14.58985	1
3	2.23	23.07	5.24	21.08	4.08	16.02	16.55	4.33	8.47	1.31	20.38	5.55	4.25	17.24	3.27	13.50	0.53	9.08		
	2.697	15.71	3.249	18.98	0.062	-1.11	12.704	-2.91	7.112	22.86	15.254	-15.49	0.888	5.00	22.614	-9.50	18.968	-20.04	14.72128	3
5	2.14	23.16	5.23	21.27	4.05	16.07	16.45	4.24	8.41	1.25	20.29	5.47	4.18	17.17	3.19	13.43	0.45	9.00		
	2.825	16.29	3.528	20.35	0.203	-0.29	12.676	-2.83	7.135	22.82	15.244	-15.45	0.895	5.04	22.617	-9.48	18.967	-20.04	14.85270	5
7	2.04	23.26	5.23	21.44	4.01	16.12	16.35	4.15	8.35	1.18	20.20	5.39	4.10	17.10	3.12	13.35	0.37	8.52		
	2.954	16.85	3.803	21.56	0.345	0.54	12.652	-2.77	7.157	22.79	15.234	-15.41	0.901	5.08	22.619	-9.47	18.965	-20.04	14.98412	7
9	1.53	23.38	5.23	22.00	3.57	16.17	16.26	4.06	8.28	1.11	20.12	5.30	4.02	17.02	3.04	13.27	0.29	8.44		
	3.084	17.39	4.073	22.61	0.487	1.37	12.631	-2.73	7.181	22.75	15.224	-15.37	0.907	5.12	22.621	-9.46	18.964	-20.05	15.11553	9
11	1.41	23.51	5.24	22.15	3.53	16.22	16.17	3.57	8.22	1.04	20.03	5.22	3.54	16.55	2.56	13.20	0.21	8.36		
	3.214	17.91	4.333	23.49	0.629	2.21	12.613	-2.71	7.205	22.71	15.214	-15.34	0.913	5.15	22.623	-9.45	18.962	-20.05	15.24695	11
13	1.26	0.18	5.26	22.27	3.49	16.28	16.08	3.48	8.16	0.58	19.54	5.14	3.47	16.48	2.48	13.12	0.13	8.28		
	3.345	18.41	4.582	24.20	0.772	3.05	12.598	-2.71	7.229	22.67	15.204	-15.30	0.919	5.19	22.625	-9.44	18.960	-20.05	15.37837	13
15	1.17	2.08	5.27	22.38	3.46	16.33	15.59	3.40	8.10	0.51	19.45	5.06	3.39	16.41	2.40	13.04	0.05	8.20		
	3.476	18.89	4.819	24.76	0.915	3.90	12.587	-2.73	7.254	22.63	15.194	-15.26	0.925	5.23	22.627	-9.43	18.958	-20.06	15.50979	15
17	*****	*****	5.29	22.47	3.42	16.38	15.51	3.31	8.04	0.44	19.37	4.58	3.31	16.33	2.33	12.57	23.53	8.12		
	3.608	19.35	5.040	25.15	1.058	4.74	12.579	-2.77	7.279	22.58	15.184	-15.22	0.931	5.26	22.629	-9.42	18.956	-20.06	15.64121	17
19	*****	*****	5.32	22.54	3.38	16.43	15.43	3.23	7.58	0.38	19.28	4.49	3.24	16.26	2.25	12.49	23.45	8.04		
	3.741	19.79	5.246	25.41	1.203	5.59	12.575	-2.83	7.304	22.54	15.174	-15.18	0.936	5.30	22.630	-9.41	18.954	-20.07	15.77263	19
21	*****	*****	5.34	22.58	3.34	16.49	15.36	3.14	7.52	0.31	19.19	4.41	3.16	16.19	2.17	12.41	23.37	7.56		
	3.874	20.21	5.435	25.53	1.347	6.42	12.573	-2.90	7.330	22.49	15.164	-15.15	0.942	5.33	22.632	-9.40	18.952	-20.07	15.90405	21
23	*****	*****	5.36	23.00	3.31	16.54	15.29	3.06	7.46	0.24	19.11	4.33	3.08	16.11	2.09	12.33	23.29	7.48		
	4.008	20.60	5.606	25.53	1.493	7.26	12.575	-3.00	7.356	22.44	15.155	-15.11	0.947	5.36	22.633	-9.40	18.949	-20.08	16.03547	23
25	*****	*****	5.39	23.01	3.27	16.60	15.22	2.58	7.40	0.18	19.02	4.25	3.00	16.04	2.01	12.26	23.21	7.40		
	4.143	20.97	5.758	25.42	1.639	8.09	12.579	-3.11	7.383	22.39	15.145	-15.08	0.952	5.40	22.634	-9.39	18.947	-20.08	16.16689	25
27	*****	*****	5.40	22.59	3.23	17.05	15.15	2.50	7.34	0.11	18.53	4.16	2.53	15.56	1.53	12.18	23.14	7.32		
	4.278	21.31	5.890	25.22	1.786	8.91	12.587	-3.24	7.410	22.34	15.136	-15.04	0.958	5.43	22.635	-9.39	18.944	-20.09	16.29831	27
29	*****	*****	5.42	22.55	3.20	17.11	15.08	2.42	7.29	0.04	18.45	4.08	2.45	15.49	1.46	12.10	23.06	7.24		
	4.413	21.63	6.001	24.93	1.934	9.72	12.598	-3.39	7.437	22.29	15.126	-15.01	0.963	5.46	22.636	-9.38	18.942	-20.09	16.42973	29
31	*****	*****	5.42	22.50	3.16	17.16	15.02	2.34	7.23	23.54	18.36	3.60	2.37	15.42	1.38	12.02	22.58	7.16		
	4.549	21.93	6.091	24.57	2.083	10.53	12.612	-3.55	7.465	22.23	15.117	-14.98	0.967	5.49	22.637	-9.38	18.939	-20.10	16.56115	31

CZERWIEC 2014

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
152	1	Nie	810	3.53305	2.13	4.3704	22.04	1.01403	7.3216	16.34	63.229	3.6	12	426	1243.5	2102	756	1545.9	2326	154	1	
153	2	Pon	811	3.57270	2.03	4.4110	22.12	1.01418	8.2045	14.16	63.439	4.6	19	425	1243.7	2103	857	1631.6	2355	150	2	
154	3	Wto	812	4.01236	1.53	4.4516	22.19	1.01432	9.0751	11.23	63.486	5.6	27	424	1243.9	2104	1000	1715.8	****	146	3	
155	4	Śro	813	4.05202	1.43	4.4923	22.27	1.01446	9.5356	8.03	63.349	6.6	36	424	1244.0	2105	1103	1759.0	020	143	4	
156	5	Czw	814	4.09167	1.33	4.5330	22.33	1.01459	10.3932	4.23	63.019	7.6	46	423	1244.2	2106	1208	1841.9	043	139	5	
157	6	Pią	815	4.13133	1.22	4.5737	22.40	1.01472	11.2516	0.30	62.500	0.6	55	422	1244.4	2107	1313	1925.1	104	135	6	
158	7	Sob	816	4.17098	1.11	5.0145	22.46	1.01484	12.1151	-3.29	61.815	1.6	65	422	1244.6	2108	1420	2009.6	126	131	7	
159	8	Nie	817	4.21064	0.60	5.0553	22.51	1.01496	13.0003	-7.26	61.000	2.6	74	421	1244.8	2109	1530	2056.0	148	127	8	
160	9	Pon	818	4.25029	0.48	5.1001	22.56	1.01508	13.5035	-11.09	60.109	3.6	83	421	1244.9	2110	1641	2145.3	213	123	9	
161	10	Wto	819	4.28595	0.36	5.1409	23.01	1.01520	14.4400	-14.25	59.207	4.6	90	420	1245.1	2111	1753	2238.0	242	119	10	
162	11	Śro	820	4.32560	0.24	5.1818	23.05	1.01531	15.4035	-16.59	58.364	5.6	96	420	1245.3	2111	1905	2334.1	316	115	11	
163	12	Czw	821	4.36526	0.12	5.2226	23.09	1.01541	16.4004	-18.35	57.651	6.6	99	419	1245.5	2112	2012	*****	400	111	12	
164	13	Pią	822	4.40492	0.00	5.2635	23.13	1.01552	17.4137	-19.01	57.127	0.2	100	419	1245.8	2113	2113	033.2	453	107	13	
165	14	Sob	823	4.44457	-0.13	5.3044	23.16	1.01562	18.4353	-18.10	56.830	1.2	98	419	1246.0	2113	2204	133.8	557	103	14	
166	15	Nie	824	4.48423	-0.26	5.3454	23.19	1.01572	19.4526	-16.04	56.775	2.2	93	419	1246.2	2114	2246	234.3	711	059	15	
167	16	Pon	825	4.52388	-0.38	5.3903	23.21	1.01581	20.4512	-12.55	56.948	3.2	85	419	1246.4	2114	2320	333.2	829	055	16	
168	17	Wto	826	4.56354	-0.51	5.4312	23.23	1.01590	21.4240	-8.60	57.313	4.2	76	419	1246.6	2115	2350	429.6	949	051	17	
169	18	Śro	827	5.00320	-1.04	5.4722	23.24	1.01599	22.3754	-4.37	57.824	5.2	65	419	1246.8	2115	****	523.5	1109	048	18	
170	19	Czw	828	5.04285	-1.17	5.5132	23.25	1.01608	23.3121	-0.04	58.428	6.2	54	419	1247.0	2115	016	615.2	1227	044	19	
171	20	Pią	829	5.08251	-1.30	5.5541	23.26	1.01615	0.2338	4.23	59.080	0.6	43	419	1247.3	2116	041	705.4	1343	040	20	
172	21	Sob	830	5.12216	-1.44	5.5951	23.26	1.01623	1.1521	8.31	59.740	1.6	32	419	1247.5	2116	106	754.9	1457	036	21	
173	22	Nie	831	5.16182	-1.57	6.0401	23.26	1.01630	2.0703	12.10	60.384	2.6	23	419	1247.7	2116	133	844.3	1608	032	22	
174	23	Pon	832	5.20147	-2.10	6.0810	23.25	1.01636	2.5902	15.08	60.994	3.6	15	419	1247.9	2116	202	933.9	1716	028	23	
175	24	Wto	833	5.24113	-2.23	6.1220	23.24	1.01642	3.5121	17.19	61.563	4.6	8	420	1248.1	2116	236	1024.0	1820	024	24	
176	25	Śro	834	5.28078	-2.36	6.1629	23.23	1.01647	4.4349	18.38	62.083	5.6	4	420	1248.3	2116	315	1114.2	1918	020	25	
177	26	Czw	835	5.32044	-2.48	6.2038	23.21	1.01652	5.3603	19.02	62.549	6.6	1	421	1248.6	2116	400	1204.2	2008	016	26	
178	27	Pią	836	5.36010	-3.01	6.2448	23.19	1.01656	6.2733	18.32	62.953	0.1	0	421	1248.8	2116	451	1253.3	2052	012	27	
179	28	Sob	837	5.39575	-3.14	6.2857	23.16	1.01660	7.1755	17.12	63.281	1.1	1	422	1249.0	2116	547	1341.2	2128	008	28	
180	29	Nie	838	5.43541	-3.26	6.3306	23.13	1.01662	8.0653	15.08	63.515	2.1	4	422	1249.2	2116	646	1427.6	2159	004	29	
181	30	Pon	839	5.47506	-3.38	6.3714	23.10	1.01665	8.5427	12.26	63.634	3.1	9	423	1249.4	2116	748	1512.4	2225	000	30	

Fazy Księżyca [Dm, h.mm]: 1kw 5, 22.39 Pełn 13, 6.11 3kw 19, 20.39 Now 27, 10.08

CZERWIEC 2014 (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	*****	*****	5.42	22.47	3.14	17.19	14.59	2.30	7.20	23.50	18.32	3.56	2.33	15.38	1.34	11.58	22.54	7.12		
	4.618	22.07	6.128	24.37	2.158	10.92	12.619	-3.64	7.479	22.21	15.113	-14.96	0.970	5.50	22.637	-9.38	18.937	-20.10	16.62686	1
3	*****	*****	5.41	22.38	3.11	17.25	14.53	2.22	7.14	23.44	18.23	3.48	2.26	15.30	1.26	11.50	22.46	7.04		
	4.754	22.32	6.184	23.93	2.308	11.71	12.637	-3.83	7.507	22.15	15.104	-14.93	0.974	5.53	22.637	-9.38	18.935	-20.11	16.75829	3
5	*****	*****	5.39	22.29	3.08	17.30	14.48	2.15	7.08	23.37	18.15	3.39	2.18	15.23	1.18	11.43	22.38	6.56		
	4.892	22.56	6.218	23.44	2.459	12.48	12.658	-4.03	7.535	22.09	15.096	-14.90	0.979	5.55	22.638	-9.38	18.932	-20.11	16.88970	5
7	*****	*****	5.36	22.17	3.04	17.36	14.43	2.07	7.03	23.31	18.06	3.31	2.10	15.16	1.10	11.35	22.30	6.48		
	5.029	22.76	6.229	22.91	2.611	13.23	12.681	-4.24	7.563	22.03	15.087	-14.87	0.983	5.58	22.638	-9.38	18.929	-20.12	17.02112	7
9	*****	*****	5.32	22.05	3.01	17.42	14.37	1.59	6.57	23.24	17.58	3.23	2.02	15.08	1.02	11.27	22.22	6.40		
	5.167	22.94	6.218	22.37	2.764	13.97	12.706	-4.47	7.592	21.97	15.079	-14.84	0.987	5.61	22.638	-9.38	18.926	-20.12	17.15254	9
11	*****	*****	5.26	21.51	2.58	17.48	14.33	1.52	6.51	23.17	17.49	3.15	1.55	15.01	0.55	11.19	22.14	6.32		
	5.305	23.09	6.187	21.81	2.919	14.68	12.734	-4.71	7.621	21.90	15.071	-14.82	0.991	5.63	22.638	-9.38	18.922	-20.13	17.28396	11
13	*****	*****	5.19	21.36	2.55	17.53	14.28	1.44	6.46	23.11	17.41	3.07	1.47	14.53	0.47	11.11	22.06	6.23		
	5.443	23.21	6.137	21.25	3.074	15.38	12.764	-4.97	7.650	21.83	15.064	-14.79	0.995	5.65	22.638	-9.38	18.919	-20.14	17.41538	13
15	*****	*****	5.12	21.20	2.53	17.59	14.23	1.37	6.40	23.04	17.32	2.59	1.39	14.45	0.39	11.03	21.58	6.15		
	5.582	23.31	6.074	20.72	3.231	16.05	12.797	-5.23	7.680	21.77	15.057	-14.77	0.999	5.67	22.638	-9.38	18.916	-20.14	17.54681	15
17	*****	*****	5.03	21.04	2.50	18.05	14.19	1.30	6.35	22.57	17.24	2.50	1.31	14.38	0.31	10.55	21.49	6.07		
	5.720	23.38	5.999	20.21	3.389	16.71	12.831	-5.51	7.709	21.70	15.050	-14.75	1.002	5.69	22.637	-9.39	18.913	-20.15	17.67823	17
19	*****	*****	4.54	20.49	2.48	18.11	14.15	1.23	6.29	22.51	17.16	2.42	1.24	14.30	0.23	10.47	21.41	5.59		
	5.859	23.42	5.920	19.75	3.548	17.33	12.868	-5.80	7.739	21.63	15.043	-14.72	1.005	5.71	22.637	-9.39	18.909	-20.16	17.80965	19
21	*****	*****	4.44	20.33	2.46	18.16	14.11	1.15	6.23	22.44	17.07	2.34	1.16	14.23	0.15	10.40	21.33	5.51		
	5.997	23.43	5.840	19.36	3.709	17.93	12.906	-6.09	7.769	21.56	15.037	-14.71	1.008	5.73	22.636	-9.40	18.906	-20.17	17.94106	21
23	*****	*****	4.33	20.19	2.44	18.22	14.07	1.08	6.18	22.38	16.59	2.26	1.08	14.15	0.07	10.32	21.25	5.43		
	6.136	23.42	5.765	19.05	3.871	18.50	12.947	-6.40	7.799	21.48	15.031	-14.69	1.011	5.75	22.635	-9.40	18.902	-20.17	18.07248	23
25	*****	*****	4.23	20.06	2.42	18.27	14.04	1.01	6.12	22.31	16.51	2.18	1.00	14.08	23.56	10.24	21.17	5.35		
	6.275	23.38	5.700	18.83	4.034	19.04	12.989	-6.72	7.829	21.41	15.026	-14.67	1.014	5.77	22.634	-9.41	18.899	-20.18	18.20391	25
27	*****	*****	4.13	19.54	2.40	18.33	14.00	0.54	6.07	22.24	16.42	2.10	0.52	13.60	23.48	10.16	21.09	5.27		
	6.413	23.31	5.650	18.72	4.198	19.56	13.033	-7.04	7.860	21.33	15.020	-14.66	1.017	5.78	22.633	-9.42	18.896	-20.19	18.33533	27
29	*****	*****	4.03	19.44	2.39	18.38	13.57	0.47	6.01	22.18	16.34	2.02	0.45	13.52	23.40	10.08	21.01	5.18		
	6.552	23.22	5.617	18.70	4.364	20.03	13.079	-7.38	7.890	21.25	15.016	-14.65	1.019	5.79	22.632	-9.43	18.892	-20.20	18.46675	29

LIPIEC 2014

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2456																		
182	1	Wto	840	5.51472	-3.50	6.4122	23.06	1.01666	9.4047	9.15	63.616	4.1	15	424	1249.6	2115	852	1555.9	2249	2352	1
183	2	Śro	841	5.55438	-4.01	6.4531	23.01	1.01667	10.2618	5.42	63.441	5.1	22	424	1249.8	2115	955	1638.6	2310	2349	2
184	3	Czw	842	5.59403	-4.12	6.4938	22.57	1.01668	11.1132	1.55	63.096	6.1	30	425	1250.0	2114	1100	1721.1	2331	2345	3
185	4	Pią	843	6.03369	-4.23	6.5346	22.52	1.01668	11.5708	-1.60	62.575	7.1	39	426	1250.1	2114	1205	1804.2	2353	2341	4
186	5	Sob	844	6.07334	-4.34	6.5753	22.46	1.01667	12.4348	-5.54	61.888	8.1	49	427	1250.3	2113	1312	1848.7	****	2337	5
187	6	Nie	845	6.11300	-4.44	7.0160	22.40	1.01667	13.3217	-9.38	61.059	0.9	59	428	1250.5	2113	1420	1935.4	016	2333	6
188	7	Pon	846	6.15265	-4.54	7.0606	22.34	1.01665	14.2318	-13.02	60.128	1.9	69	429	1250.6	2112	1531	2025.1	042	2329	7
189	8	Wto	847	6.19231	-5.03	7.1012	22.27	1.01663	15.1722	-15.53	59.153	2.9	79	430	1250.8	2111	1641	2118.4	112	2325	8
190	9	Śro	848	6.23196	-5.12	7.1417	22.20	1.01661	16.1442	-17.55	58.206	3.9	87	431	1250.9	2111	1750	2215.2	150	2321	9
191	10	Czw	849	6.27162	-5.21	7.1823	22.13	1.01659	17.1457	-18.55	57.366	4.9	94	432	1251.1	2110	1855	2314.9	237	2317	10
192	11	Pią	850	6.31128	-5.29	7.2227	22.05	1.01656	18.1710	-18.40	56.709	5.9	98	433	1251.2	2109	1951	*****	336	2313	11
193	12	Sob	851	6.35093	-5.37	7.2632	21.57	1.01653	19.1958	-17.08	56.299	6.9	100	434	1251.4	2108	2039	016.1	445	2309	12
194	13	Nie	852	6.39059	-5.44	7.3035	21.48	1.01649	20.2156	-14.22	56.171	0.9	99	435	1251.5	2107	2118	117.2	603	2305	13
195	14	Pon	853	6.43024	-5.51	7.3439	21.39	1.01645	21.2206	-10.39	56.331	1.9	94	436	1251.6	2106	2151	216.6	725	2301	14
196	15	Wto	854	6.46590	-5.57	7.3841	21.30	1.01641	22.2000	-6.18	56.752	2.9	87	438	1251.7	2105	2220	313.6	848	2257	15
197	16	Śro	855	6.50555	-6.03	7.4244	21.20	1.01636	23.1547	-1.39	57.381	3.9	78	439	1251.8	2104	2246	408.1	1009	2253	16
198	17	Czw	856	6.54521	-6.08	7.4646	21.10	1.01631	0.0953	2.58	58.151	4.9	68	440	1251.9	2103	2312	500.6	1128	2250	17
199	18	Pią	857	6.58486	-6.13	7.5047	20.60	1.01626	1.0251	7.18	58.992	5.9	57	442	1252.0	2101	2339	551.6	1245	2246	18
200	19	Sob	858	7.02452	-6.17	7.5448	20.49	1.01620	1.5513	11.08	59.843	0.3	46	443	1252.0	2100	****	641.8	1358	2242	19
201	20	Nie	859	7.06417	-6.20	7.5848	20.38	1.01614	2.4723	14.19	60.654	1.3	36	444	1252.1	2059	007	731.8	1508	2238	20
202	21	Pon	860	7.10383	-6.24	8.0248	20.26	1.01607	3.3933	16.43	61.392	2.3	27	446	1252.1	2058	039	821.6	1613	2234	21
203	22	Wto	861	7.14349	-6.26	8.0647	20.15	1.01600	4.3141	18.15	62.036	3.3	18	447	1252.2	2056	116	911.5	1712	2230	22
204	23	Śro	862	7.18314	-6.28	8.1045	20.03	1.01592	5.2334	18.55	62.578	4.3	11	449	1252.2	2055	158	1001.1	1805	2226	23
205	24	Czw	863	7.22280	-6.30	8.1443	19.50	1.01584	6.1452	18.40	63.015	5.3	6	450	1252.2	2053	247	1050.2	1851	2222	24
206	25	Pią	864	7.26245	-6.31	8.1841	19.37	1.01575	7.0515	17.36	63.349	6.3	2	452	1252.3	2052	341	1138.1	1929	2218	25
207	26	Sob	865	7.30211	-6.31	8.2238	19.24	1.01566	7.5426	15.45	63.583	7.3	0	453	1252.3	2050	439	1225.0	2002	2214	26
208	27	Nie	866	7.34177	-6.31	8.2634	19.11	1.01555	8.4220	13.16	63.714	0.5	0	455	1252.3	2049	540	1310.2	2030	2210	27
209	28	Pon	867	7.38142	-6.30	8.3030	18.57	1.01545	9.2902	10.14	63.739	1.5	2	456	1252.2	2047	642	1354.2	2055	2206	28
210	29	Wto	868	7.42108	-6.28	8.3425	18.43	1.01534	10.1448	6.48	63.649	2.5	5	458	1252.2	2045	746	1437.2	2117	2202	29
211	30	Śro	869	7.46073	-6.26	8.3819	18.28	1.01522	11.0002	3.06	63.434	3.5	11	459	1252.2	2044	850	1519.7	2138	2158	30
212	31	Czw	870	7.50039	-6.24	8.4213	18.14	1.01509	11.4517	-0.45	63.082	4.5	17	501	1252.1	2042	954	1602.2	2159	2155	31

Fazy Księżyca [Dm, h.mm]: 1kw 5, 13.59 Pełn 12, 13.25 3kw 19, 4.08 Nów 27, 0.42

LIPIEC 2014 (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	*****	*****	3.54	19.36	2.38	18.43	13.54	0.40	5.56	22.11	16.26	1.54	0.37	13.45	23.32	9.60	20.53	5.10	
	6.690	23.09	5.605	18.79	4.530	20.48	13.127	-7.72	7.921	21.17	15.011	-14.64	1.021	5.81	22.631	-9.43	18.889	-20.20	18.59817 1
3	*****	*****	3.46	19.30	2.37	18.48	13.51	0.34	5.51	22.05	16.18	1.46	0.29	13.37	23.24	9.52	20.45	5.02	
	6.827	22.94	5.615	18.97	4.698	20.89	13.176	-8.06	7.951	21.09	15.007	-14.63	1.023	5.82	22.629	-9.44	18.885	-20.21	18.72959 3
5	*****	*****	3.38	19.26	2.37	18.53	13.48	0.27	5.45	21.58	16.10	1.38	0.21	13.29	23.16	9.44	20.37	4.54	
	6.965	22.77	5.647	19.23	4.867	21.26	13.227	-8.42	7.982	21.00	15.004	-14.62	1.025	5.83	22.628	-9.45	18.882	-20.22	18.86101 5
7	*****	*****	3.31	19.24	2.37	18.58	13.45	0.20	5.40	21.51	16.02	1.30	0.13	13.22	23.08	9.36	20.29	4.46	
	7.102	22.57	5.703	19.56	5.037	21.60	13.280	-8.78	8.013	20.92	15.000	-14.62	1.027	5.84	22.626	-9.47	18.878	-20.23	18.99243 7
9	*****	*****	3.25	19.23	2.37	19.03	13.43	0.14	5.34	21.45	15.54	1.22	0.06	13.14	23.00	9.28	20.21	4.38	
	7.238	22.34	5.783	19.94	5.208	21.90	13.334	-9.14	8.043	20.83	14.998	-14.61	1.028	5.84	22.624	-9.48	18.875	-20.24	19.12385 9
11	*****	*****	3.21	19.24	2.37	19.07	13.40	0.07	5.29	21.38	15.45	1.14	23.54	13.06	22.52	9.20	20.13	4.30	
	7.374	22.08	5.887	20.36	5.379	22.15	13.390	-9.52	8.074	20.75	14.995	-14.61	1.029	5.85	22.622	-9.49	18.871	-20.24	19.25527 11
13	*****	*****	3.18	19.27	2.38	19.11	13.38	23.56	5.24	21.31	15.38	1.06	23.46	12.58	22.44	9.11	20.05	4.22	
	7.510	21.80	6.015	20.79	5.552	22.37	13.446	-9.89	8.105	20.66	14.993	-14.61	1.030	5.85	22.620	-9.50	18.868	-20.25	19.38670 13
15	*****	*****	3.16	19.31	2.39	19.15	13.35	23.50	5.18	21.25	15.30	0.58	23.38	12.50	22.37	9.03	19.57	4.13	
	7.645	21.50	6.166	21.21	5.725	22.55	13.505	-10.27	8.136	20.57	14.992	-14.61	1.031	5.86	22.618	-9.52	18.864	-20.26	19.51812 15
17	*****	*****	3.15	19.37	2.41	19.19	13.33	23.43	5.13	21.18	15.22	0.50	23.30	12.43	22.29	8.55	19.49	4.05	
	7.779	21.17	6.340	21.61	5.898	22.68	13.564	-10.65	8.167	20.48	14.991	-14.62	1.031	5.86	22.616	-9.53	18.861	-20.27	19.64953 17
19	*****	*****	3.17	19.43	2.43	19.22	13.31	23.37	5.07	21.11	15.14	0.42	23.23	12.35	22.21	8.47	19.41	3.57	
	7.913	20.82	6.537	21.94	6.073	22.78	13.625	-11.04	8.198	20.38	14.990	-14.62	1.032	5.86	22.614	-9.55	18.857	-20.28	19.78095 19
21	*****	*****	3.20	19.50	2.45	19.25	13.29	23.31	5.02	21.05	15.06	0.34	23.15	12.27	22.13	8.39	19.33	3.49	
	8.047	20.44	6.754	22.20	6.247	22.83	13.688	-11.43	8.229	20.29	14.990	-14.63	1.032	5.86	22.611	-9.56	18.854	-20.29	19.91237 21
23	*****	*****	3.25	19.58	2.47	19.27	13.28	23.24	4.57	20.58	14.58	0.26	23.07	12.19	22.05	8.31	19.25	3.41	
	8.179	20.04	6.992	22.34	6.422	22.83	13.751	-11.82	8.259	20.19	14.990	-14.64	1.032	5.86	22.609	-9.58	18.851	-20.29	20.04379 23
25	*****	*****	3.33	20.05	2.50	19.30	13.26	23.18	4.51	20.51	14.50	0.18	22.59	12.11	21.57	8.23	19.17	3.33	
	8.311	19.62	7.247	22.36	6.597	22.79	13.816	-12.22	8.290	20.10	14.991	-14.65	1.032	5.86	22.606	-9.59	18.848	-20.30	20.17521 25
27	*****	*****	3.42	20.13	2.54	19.32	13.24	23.12	4.46	20.45	14.43	0.10	22.51	12.03	21.49	8.15	19.09	3.25	
	8.443	19.18	7.517	22.22	6.772	22.71	13.882	-12.62	8.321	20.00	14.992	-14.67	1.031	5.86	22.603	-9.61	18.844	-20.31	20.30664 27
29	1.10	0.05	3.53	20.19	2.57	19.33	13.23	23.06	4.41	20.38	14.35	0.02	22.43	11.55	21.41	8.07	19.01	3.17	
	8.574	18.71	7.798	21.90	6.947	22.59	13.950	-13.01	8.352	19.90	14.993	-14.68	1.031	5.85	22.601	-9.63	18.841	-20.32	20.43806 29
31	1.34	-0.06	4.06	20.25	3.01	19.35	13.21	22.60	4.35	20.31	14.27	23.51	22.35	11.47	21.33	7.59	18.53	3.09	
	8.704	18.23	8.086	21.42	7.122	22.42	14.019	-13.41	8.383	19.80	14.995	-14.70	1.030	5.84	22.598	-9.64	18.838	-20.33	20.56947 31

SIERPIEŃ 2014

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
2456																					
213	1	Pią	871	7.54004	-6.20	8.4606	17.59	1.01497	12.3108	-4.36	62.585	5.5	25	503	1252.1	2040	1100	1645.6	2221	2151	1
214	2	Sob	872	7.57570	-6.16	8.4959	17.43	1.01483	13.1814	-8.20	61.945	6.5	34	504	1252.0	2039	1206	1730.5	2246	2147	2
215	3	Nie	873	8.01535	-6.12	8.5351	17.28	1.01469	14.0716	-11.46	61.172	7.5	44	506	1251.9	2037	1314	1817.6	2313	2143	3
216	4	Pon	874	8.05501	-6.06	8.5742	17.12	1.01455	14.5849	-14.45	60.291	0.4	54	508	1251.9	2035	1423	1907.7	2347	2139	4
217	5	Wto	875	8.09466	-6.01	9.0133	16.56	1.01441	15.5317	-17.04	59.344	1.4	65	509	1251.8	2033	1530	2001.1	****	2135	5
218	6	Śro	876	8.13432	-5.54	9.0523	16.40	1.01426	16.5043	-18.28	58.389	2.4	75	511	1251.6	2031	1635	2057.7	028	2131	6
219	7	Czw	877	8.17398	-5.47	9.0912	16.23	1.01410	17.5041	-18.48	57.499	3.4	84	513	1251.5	2029	1735	2156.8	119	2127	7
220	8	Pią	878	8.21363	-5.39	9.1301	16.06	1.01395	18.5218	-17.53	56.752	4.4	92	514	1251.4	2027	1826	2257.3	221	2123	8
221	9	Sob	879	8.25329	-5.31	9.1650	15.49	1.01379	19.5420	-15.43	56.224	5.4	97	516	1251.3	2025	1910	2357.6	334	2119	9
222	10	Nie	880	8.29294	-5.22	9.2037	15.31	1.01363	20.5541	-12.26	55.973	6.4	100	518	1251.1	2024	1947	*****	453	2115	10
223	11	Pon	881	8.33260	-5.13	9.2424	15.14	1.01346	21.5532	-8.19	56.028	0.7	99	519	1251.0	2022	2019	056.6	617	2111	11
224	12	Wto	882	8.37225	-5.03	9.2811	14.56	1.01329	22.5339	-3.41	56.382	1.7	96	521	1250.8	2019	2047	153.7	741	2107	12
225	13	Śro	883	8.41191	-4.52	9.3157	14.37	1.01313	23.5005	1.05	56.997	2.7	90	523	1250.6	2017	2114	248.9	904	2103	13
226	14	Czw	884	8.45156	-4.41	9.3542	14.19	1.01295	0.4512	5.40	57.807	3.7	81	524	1250.4	2015	2142	342.4	1024	2059	14
227	15	Pią	885	8.49122	-4.29	9.3927	14.00	1.01278	1.3924	9.47	58.734	4.7	72	526	1250.2	2013	2210	434.8	1141	2056	15
228	16	Sob	886	8.53087	-4.17	9.4312	13.42	1.01260	2.3259	13.15	59.698	5.7	62	528	1250.0	2011	2242	526.4	1255	2052	16
229	17	Nie	887	8.57053	-4.05	9.4656	13.23	1.01242	3.2609	15.56	60.632	6.7	51	529	1249.8	2009	2318	617.4	1403	2048	17
230	18	Pon	888	9.01018	-3.52	9.5039	13.03	1.01224	4.1855	17.44	61.481	0.9	41	531	1249.6	2007	2358	708.1	1505	2044	18
231	19	Wto	889	9.04584	-3.38	9.5422	12.44	1.01205	5.1109	18.38	62.210	1.9	31	533	1249.4	2005	0**	758.2	1601	2040	19
232	20	Śro	890	9.08549	-3.24	9.5805	12.24	1.01186	6.0238	18.39	62.798	2.9	23	535	1249.1	2003	045	847.5	1648	2036	20
233	21	Czw	891	9.12515	-3.09	10.0147	12.04	1.01166	6.5307	17.48	63.238	3.9	15	536	1248.9	2000	137	935.7	1729	2032	21
234	22	Pią	892	9.16481	-2.54	10.0528	11.44	1.01146	7.4226	16.11	63.534	4.9	9	538	1248.7	1958	233	1022.7	1804	2028	22
235	23	Sob	893	9.20446	-2.39	10.0909	11.24	1.01126	8.3033	13.53	63.696	5.9	4	540	1248.4	1956	333	1108.3	1834	2024	23
236	24	Nie	894	9.24412	-2.23	10.1250	11.03	1.01105	9.1732	11.01	63.735	6.9	1	541	1248.1	1954	435	1152.6	1900	2020	24
237	25	Pon	895	9.28377	-2.07	10.1630	10.43	1.01083	10.0337	7.43	63.664	7.9	0	543	1247.9	1951	538	1236.1	1923	2016	25
238	26	Wto	896	9.32343	-1.50	10.2010	10.22	1.01062	10.4908	4.06	63.489	0.8	1	545	1247.6	1949	642	1318.9	1945	2012	26
239	27	Śro	897	9.36308	-1.33	10.2350	10.01	1.01039	11.3433	0.18	63.217	1.8	3	547	1247.3	1947	746	1401.6	2006	2008	27
240	28	Czw	898	9.40274	-1.16	10.2729	9.40	1.01017	12.2020	-3.33	62.845	2.8	7	548	1247.0	1945	851	1444.7	2028	2004	28
241	29	Pią	899	9.44239	-0.58	10.3107	9.19	1.00994	13.0702	-7.17	62.374	3.8	13	550	1246.7	1942	957	1529.0	2052	2000	29
242	30	Sob	900	9.48205	-0.40	10.3446	8.57	1.00970	13.5512	-10.46	61.802	4.8	20	552	1246.4	1940	1104	1614.9	2118	1957	30
243	31	Nie	901	9.52170	-0.21	10.3824	8.36	1.00946	14.4520	-13.50	61.133	5.8	29	553	1246.1	1938	1211	1703.1	2149	1953	31

Fazy Księżyca [Dm, h.mm]: 1kw 4, 2.50 Pełn 10, 20.09 3kw 17, 14.26 Now 25, 16.13

SIERPIEŃ 2014 (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	1.43	23.56	4.13	20.27	3.03	19.35	13.21	22.57	4.33	20.28	14.24	23.47	22.31	11.43	21.29	7.54	18.49	3.04		
	8.768	17.98	8.231	21.11	7.209	22.32	14.053	-13.61	8.398	19.75	14.996	-14.71	1.029	5.84	22.596	-9.65	18.837	-20.33	20.63518	1
3	1.56	23.43	4.28	20.32	3.07	19.36	13.19	22.51	4.27	20.21	14.16	23.39	22.23	11.35	21.21	7.46	18.41	2.56		
	8.897	17.46	8.523	20.36	7.384	22.09	14.124	-14.01	8.428	19.65	14.999	-14.73	1.028	5.83	22.593	-9.67	18.834	-20.34	20.76660	3
5	2.08	23.32	4.44	20.35	3.12	19.37	13.18	22.45	4.22	20.14	14.08	23.31	22.16	11.27	21.13	7.38	18.33	2.48		
	9.026	16.93	8.812	19.45	7.558	21.81	14.195	-14.41	8.459	19.55	15.002	-14.75	1.027	5.82	22.590	-9.69	18.831	-20.35	20.89802	5
7	2.18	23.22	5.00	20.37	3.17	19.37	13.17	22.39	4.17	20.08	14.01	23.23	22.08	11.19	21.05	7.30	18.25	2.40		
	9.153	16.38	9.095	18.40	7.731	21.49	14.268	-14.81	8.489	19.44	15.005	-14.78	1.026	5.81	22.587	-9.71	18.828	-20.36	21.02944	7
9	2.27	23.13	5.16	20.38	3.22	19.37	13.16	22.33	4.11	20.01	13.53	23.15	21.60	11.11	20.57	7.22	18.17	2.32		
	9.280	15.81	9.371	17.23	7.904	21.13	14.342	-15.20	8.519	19.34	15.009	-14.80	1.024	5.80	22.584	-9.73	18.825	-20.37	21.16086	9
11	2.35	23.04	5.33	20.38	3.27	19.36	13.15	22.27	4.06	19.54	13.46	23.08	21.52	11.03	20.49	7.14	18.09	2.24		
	9.407	15.23	9.639	15.96	8.075	20.73	14.417	-15.60	8.549	19.24	15.013	-14.83	1.022	5.79	22.581	-9.75	18.823	-20.37	21.29228	11
13	2.43	22.55	5.49	20.37	3.33	19.35	13.14	22.22	4.01	19.47	13.39	22.60	21.44	10.55	20.41	7.06	18.01	2.16		
	9.532	14.62	9.897	14.62	8.247	20.29	14.493	-15.99	8.579	19.13	15.018	-14.86	1.020	5.78	22.578	-9.77	18.820	-20.38	21.42370	13
15	2.51	22.47	6.04	20.36	3.38	19.34	13.13	22.16	3.55	19.40	13.31	22.52	21.36	10.47	20.34	6.57	17.53	2.08		
	9.658	14.01	10.145	13.21	8.417	19.81	14.570	-16.38	8.609	19.03	15.023	-14.89	1.018	5.76	22.574	-9.79	18.818	-20.39	21.55511	15
17	2.58	22.40	6.19	20.33	3.44	19.33	13.12	22.10	3.50	19.34	13.24	22.44	21.28	10.39	20.26	6.49	17.46	1.60		
	9.782	13.38	10.384	11.76	8.586	19.29	14.649	-16.77	8.639	18.92	15.028	-14.92	1.015	5.75	22.571	-9.81	18.815	-20.40	21.68653	17
19	3.05	22.32	6.33	20.31	3.50	19.31	13.12	22.05	3.45	19.27	13.17	22.37	21.20	10.31	20.18	6.41	17.38	1.52		
	9.906	12.73	10.614	10.27	8.755	18.73	14.728	-17.15	8.668	18.81	15.034	-14.95	1.013	5.73	22.568	-9.83	18.813	-20.41	21.81795	19
21	3.11	22.25	6.47	20.28	3.56	19.30	13.11	21.59	3.39	19.20	13.09	22.29	21.12	10.23	20.10	6.33	17.30	1.44		
	10.030	12.07	10.836	8.76	8.922	18.14	14.808	-17.53	8.698	18.71	15.040	-14.99	1.010	5.71	22.564	-9.85	18.811	-20.41	21.94937	21
23	3.18	22.17	7.01	20.24	4.03	19.28	13.11	21.54	3.34	19.13	13.02	22.21	21.04	10.15	20.02	6.25	17.22	1.36		
	10.153	11.40	11.049	7.25	9.089	17.52	14.890	-17.91	8.727	18.60	15.047	-15.02	1.007	5.69	22.561	-9.87	18.809	-20.42	22.08079	23
25	3.24	22.10	7.13	20.20	4.09	19.25	13.10	21.49	3.28	19.06	12.55	22.14	20.56	10.07	19.54	6.16	17.14	1.28		
	10.275	10.71	11.255	5.73	9.254	16.86	14.973	-18.28	8.756	18.49	15.054	-15.06	1.004	5.67	22.557	-9.89	18.807	-20.43	22.21221	25
27	3.30	22.04	7.26	20.16	4.15	19.23	13.10	21.43	3.23	18.59	12.48	22.06	20.48	9.58	19.46	6.08	17.06	1.20		
	10.397	10.02	11.454	4.22	9.418	16.17	15.057	-18.65	8.785	18.38	15.061	-15.10	1.001	5.65	22.554	-9.91	18.805	-20.44	22.34363	27
29	3.35	21.57	7.37	20.12	4.22	19.20	13.09	21.38	3.18	18.53	12.40	21.58	20.41	9.50	19.38	6.00	16.58	1.12		
	10.519	9.31	11.647	2.72	9.582	15.45	15.141	-19.01	8.813	18.28	15.069	-15.14	0.997	5.63	22.551	-9.93	18.803	-20.45	22.47504	29
31	3.41	21.50	7.49	20.07	4.28	19.18	13.09	21.33	3.12	18.46	12.33	21.51	20.33	9.42	19.30	5.52	16.50	1.04		
	10.640	8.59	11.833	1.24	9.744	14.70	15.227	-19.36	8.841	18.17	15.077	-15.18	0.994	5.61	22.547	-9.95	18.802	-20.45	22.60646	31

WRZESIEŃ 2014

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
244	1	Pon	902	9.56136	-0.02	10.4202	8.14	1.00922	15.3748	-16.17	60.376	6.8	39	555	1245.8	1935	1317	1753.9	2226	1949	1
245	2	Wto	903	10.00101	0.17	10.4539	7.52	1.00898	16.3244	-17.56	59.557	7.8	49	557	1245.5	1933	1422	1847.5	2311	1945	2
246	3	Śro	904	10.04067	0.36	10.4916	7.30	1.00873	17.3000	-18.38	58.712	0.9	60	559	1245.1	1931	1521	1943.5	****	1941	3
247	4	Czw	905	10.08033	0.56	10.5253	7.08	1.00848	18.2903	-18.12	57.895	1.9	71	600	1244.8	1928	1615	2041.3	006	1937	4
248	5	Pią	906	10.11598	1.16	10.5629	6.46	1.00823	19.2907	-16.37	57.169	2.9	81	602	1244.5	1926	1701	2139.8	112	1933	5
249	6	Sob	907	10.15564	1.36	11.0006	6.23	1.00797	20.2918	-13.54	56.606	3.9	90	604	1244.1	1923	1740	2238.2	226	1929	6
250	7	Nie	908	10.19529	1.57	11.0342	6.01	1.00772	21.2854	-10.13	56.268	4.9	96	605	1243.8	1921	1814	2335.6	346	1925	7
251	8	Pon	909	10.23495	2.18	11.0718	5.39	1.00747	22.2732	-5.50	56.201	5.9	99	607	1243.5	1919	1844	*****	509	1921	8
252	9	Wto	910	10.27460	2.38	11.1053	5.16	1.00721	23.2506	-1.06	56.425	0.3	100	609	1243.1	1916	1913	031.9	632	1917	9
253	10	Śro	911	10.31426	2.59	11.1429	4.53	1.00695	0.2144	3.38	56.924	1.3	97	610	1242.8	1914	1941	127.0	755	1913	10
254	11	Czw	912	10.35391	3.21	11.1804	4.31	1.00669	1.1739	8.03	57.652	2.3	92	612	1242.4	1911	2010	221.2	916	1909	11
255	12	Pią	913	10.39357	3.42	11.2140	4.08	1.00644	2.1302	11.53	58.540	3.3	85	614	1242.1	1909	2041	314.8	1033	1905	12
256	13	Sob	914	10.43322	4.03	11.2515	3.45	1.00618	3.0757	14.56	59.508	4.3	76	616	1241.7	1907	2116	407.8	1146	1902	13
257	14	Nie	915	10.47287	4.24	11.2850	3.22	1.00592	4.0216	17.05	60.478	5.3	67	617	1241.3	1904	2156	500.2	1253	1858	14
258	15	Pon	916	10.51253	4.46	11.3225	2.59	1.00566	4.5549	18.17	61.381	6.3	57	619	1241.0	1902	2241	551.8	1352	1854	15
259	16	Wto	917	10.55219	5.07	11.3600	2.36	1.00539	5.4819	18.34	62.165	0.3	47	621	1240.6	1859	2332	642.4	1444	1850	16
260	17	Śro	918	10.59184	5.29	11.3935	2.12	1.00513	6.3932	17.57	62.793	1.3	37	622	1240.3	1857	****	731.6	1527	1846	17
261	18	Czw	919	11.03150	5.50	11.4311	1.49	1.00486	7.2923	16.33	63.246	2.3	28	624	1239.9	1855	027	819.2	1604	1842	18
262	19	Pią	920	11.07115	6.11	11.4646	1.26	1.00460	8.1750	14.27	63.522	3.3	20	626	1239.6	1852	125	905.4	1636	1838	19
263	20	Sob	921	11.11081	6.33	11.5021	1.03	1.00433	9.0505	11.45	63.628	4.3	13	628	1239.2	1850	227	950.1	1703	1834	20
264	21	Nie	922	11.15046	6.54	11.5356	0.39	1.00405	9.5124	8.35	63.583	5.3	7	629	1238.8	1847	329	1033.8	1727	1830	21
265	22	Pon	923	11.19012	7.15	11.5732	0.16	1.00378	10.3709	5.03	63.410	6.3	3	631	1238.5	1845	433	1116.9	1750	1826	22
266	23	Wto	924	11.22577	7.36	12.0107	-0.07	1.00350	11.2247	1.18	63.131	7.3	1	633	1238.1	1842	537	1159.9	1812	1822	23
267	24	Śro	925	11.26543	7.57	12.0443	-0.31	1.00322	12.0847	-2.33	62.769	0.2	0	634	1237.8	1840	642	1243.2	1834	1818	24
268	25	Czw	926	11.30508	8.18	12.0819	-0.54	1.00294	12.5539	-6.21	62.342	1.2	1	636	1237.4	1838	748	1327.5	1857	1814	25
269	26	Pią	927	11.34474	8.38	12.1155	-1.17	1.00265	13.4350	-9.55	61.862	2.2	4	638	1237.1	1835	855	1413.3	1923	1810	26
270	27	Sob	928	11.38439	8.59	12.1531	-1.41	1.00237	14.3345	-13.05	61.337	3.2	10	640	1236.8	1833	1003	1501.0	1952	1806	27
271	28	Nie	929	11.42405	9.19	12.1907	-2.04	1.00208	15.2540	-15.41	60.771	4.2	16	641	1236.4	1830	1110	1550.9	2027	1803	28
272	29	Pon	930	11.46370	9.39	12.2244	-2.27	1.00179	16.1939	-17.31	60.169	5.2	25	643	1236.1	1828	1214	1643.1	2109	1759	29
273	30	Wto	931	11.50336	9.59	12.2621	-2.51	1.00150	17.1529	-18.27	59.540	6.2	35	645	1235.8	1826	1314	1737.4	2200	1755	30

Fazy Księżyca [Dm, h.mm]: 1kw 2, 13.11 Pełn 9, 3.38 3kw 16, 4.05 Nów 24, 8.14

PAŹDZIERNIK 2014

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
				2456																	
274	1	Śro	932	11.54301	10.18	12.2958	-3.14	1.00121	18.1245	-18.20	58.901	7.2	46	647	1235.4	1823	1408	1833.0	2300	1751	1
275	2	Czw	933	11.58267	10.38	12.3335	-3.37	1.00091	19.1047	-17.07	58.279	0.6	57	648	1235.1	1821	1456	1929.3	****	1747	2
276	3	Pią	934	12.02233	10.56	12.3713	-4.00	1.00062	20.0858	-14.51	57.712	1.6	68	650	1234.8	1818	1536	2025.6	008	1743	3
277	4	Sob	935	12.06198	11.15	12.4051	-4.24	1.00033	21.0649	-11.36	57.249	2.6	78	652	1234.5	1816	1611	2121.4	123	1739	4
278	5	Nie	936	12.10164	11.33	12.4429	-4.47	1.00004	22.0403	-7.37	56.940	3.6	87	654	1234.2	1814	1642	2216.4	242	1735	5
279	6	Pon	937	12.14129	11.51	12.4807	-5.10	0.99975	23.0041	-3.07	56.831	4.6	94	655	1233.9	1811	1710	2310.9	403	1731	6
280	7	Wto	938	12.18095	12.09	12.5146	-5.33	0.99946	23.5655	1.35	56.953	5.6	98	657	1233.6	1809	1738	*****	525	1727	7
281	8	Śro	939	12.22060	12.26	12.5526	-5.56	0.99917	0.5257	6.08	57.313	6.6	100	659	1233.3	1807	1806	005.1	646	1723	8
282	9	Czw	940	12.26025	12.43	12.5906	-6.18	0.99888	1.4859	10.16	57.892	1.0	99	701	1233.0	1804	1837	059.1	806	1719	9
283	10	Pią	941	12.29591	12.59	13.0246	-6.41	0.99860	2.4459	13.42	58.645	2.0	95	703	1232.8	1802	1911	153.1	922	1715	10
284	11	Sob	942	12.33556	13.15	13.0627	-7.04	0.99831	3.4046	16.17	59.510	3.0	89	704	1232.5	1800	1949	247.0	1034	1711	11
285	12	Nie	943	12.37522	13.30	13.1008	-7.26	0.99803	4.3558	17.53	60.415	4.0	81	706	1232.2	1757	2033	340.5	1138	1708	12
286	13	Pon	944	12.41488	13.45	13.1350	-7.49	0.99775	5.3007	18.30	61.288	5.0	73	708	1232.0	1755	2123	432.9	1235	1704	13
287	14	Wto	945	12.45453	13.59	13.1732	-8.11	0.99747	6.2249	18.11	62.066	6.0	63	710	1231.8	1753	2217	523.9	1323	1700	14
288	15	Śro	946	12.49419	14.13	13.2115	-8.33	0.99719	7.1350	17.01	62.699	7.0	54	712	1231.5	1751	2315	613.0	1403	1656	15
289	16	Czw	947	12.53384	14.26	13.2458	-8.56	0.99692	8.0309	15.07	63.155	0.6	44	713	1231.3	1748	****	700.2	1436	1652	16
290	17	Pią	948	12.57350	14.38	13.2842	-9.18	0.99664	8.5055	12.35	63.415	1.6	35	715	1231.1	1746	016	745.7	1505	1648	17
291	18	Sob	949	13.01315	14.50	13.3227	-9.39	0.99637	9.3730	9.33	63.480	2.6	26	717	1230.9	1744	118	829.8	1531	1644	18
292	19	Nie	950	13.05281	15.02	13.3612	-10.01	0.99609	10.2319	6.07	63.362	3.6	18	719	1230.7	1742	221	913.1	1554	1640	19
293	20	Pon	951	13.09246	15.12	13.3958	-10.23	0.99582	11.0856	2.26	63.087	4.6	11	721	1230.5	1739	325	956.0	1616	1636	20
294	21	Wto	952	13.13212	15.22	13.4345	-10.44	0.99554	11.5452	-1.25	62.688	5.6	6	723	1230.4	1737	430	1039.2	1638	1632	21
295	22	Śro	953	13.17177	15.32	13.4732	-11.05	0.99527	12.4143	-5.15	62.201	6.6	2	725	1230.2	1735	536	1123.3	1700	1628	22
296	23	Czw	954	13.21143	15.40	13.5120	-11.26	0.99499	13.2958	-8.56	61.664	7.6	0	726	1230.1	1733	644	1209.1	1725	1624	23
297	24	Pią	955	13.25108	15.48	13.5509	-11.47	0.99472	14.2004	-12.17	61.110	0.5	0	728	1229.9	1731	752	1256.8	1754	1620	24
298	25	Sob	956	13.29074	15.55	13.5858	-12.08	0.99444	15.1215	-15.05	60.564	1.5	2	730	1229.8	1729	900	1346.8	1827	1616	25
299	26	Nie	957	13.33039	16.02	14.0248	-12.29	0.99417	16.0631	-17.10	60.046	2.5	7	732	1229.7	1727	1007	1439.2	1908	1612	26
299	26	Nie	957	14.33138	16.02	14.0258	-12.30	0.99416	16.0849	-17.14	60.025	3.5	7	632	1129.7	1627	907	1339.2	1808	1512	26
300	27	Pon	958	14.37104	16.08	14.0648	-12.50	0.99388	17.0456	-18.21	59.545	4.5	13	634	1129.6	1625	1009	1433.5	1856	1509	27
301	28	Wto	959	14.41069	16.13	14.1040	-13.10	0.99361	18.0213	-18.27	59.104	5.5	22	636	1129.5	1623	1106	1528.9	1954	1505	28
302	29	Śro	960	14.45035	16.17	14.1432	-13.30	0.99334	18.5955	-17.27	58.706	6.5	32	638	1129.5	1621	1155	1624.8	2059	1501	29
303	30	Czw	961	14.49000	16.21	14.1825	-13.50	0.99307	19.5720	-15.24	58.353	7.5	42	639	1129.4	1619	1236	1720.2	2211	1457	30
304	31	Pią	962	14.52566	16.24	14.2219	-14.09	0.99280	20.5360	-12.26	58.055	0.3	54	641	1129.4	1617	1312	1814.7	2326	1453	31

Fazy Księżyca [Dm, h.mm]: 1kw 1, 21.32 Pełn 8, 12.51 3kw 15, 21.12 Now 23, 23.57 1kw 31, 3.48

PAŹDZIERNIK 2014 (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	20.20	9.21	18.36	6.10	18.21	13.05	20.28	1.45	16.57	10.46	19.54	18.29	7.34	17.27	3.45	14.48	22.57		
	12.499	-3.23	13.885	-15.39	12.156	0.53	16.684	-23.71	9.242	16.54	15.245	-15.96	0.925	5.17	22.497	-10.24	18.795	-20.55	0.64344	1
3	4.55	20.15	9.17	18.29	6.16	18.17	13.05	20.24	1.39	16.50	10.39	19.47	18.21	7.25	17.19	3.37	14.41	22.49		
	12.620	-4.01	13.916	-15.61	12.308	-0.47	16.786	-23.90	9.265	16.45	15.258	-16.02	0.920	5.14	22.495	-10.26	18.796	-20.56	0.77486	3
5	4.58	20.10	9.09	18.21	6.23	18.13	13.04	20.21	1.33	16.43	10.33	19.39	18.13	7.17	17.11	3.29	14.33	22.41		
	12.741	-4.78	13.921	-15.62	12.461	-1.47	16.888	-24.07	9.287	16.35	15.271	-16.08	0.915	5.11	22.492	-10.27	18.797	-20.56	0.90628	5
7	5.02	20.05	8.58	18.13	6.29	18.09	13.04	20.18	1.27	16.36	10.26	19.32	18.05	7.09	17.03	3.21	14.25	22.33		
	12.863	-5.55	13.896	-15.37	12.613	-2.47	16.991	-24.23	9.309	16.26	15.285	-16.14	0.910	5.08	22.490	-10.29	18.798	-20.57	1.03769	7
9	5.06	19.60	8.44	18.05	6.36	18.05	13.03	20.15	1.21	16.29	10.19	19.24	17.57	7.00	16.55	3.13	14.17	22.25		
	12.985	-6.31	13.840	-14.85	12.766	-3.47	17.095	-24.37	9.330	16.16	15.299	-16.19	0.905	5.05	22.487	-10.30	18.799	-20.57	1.16911	9
11	5.10	19.55	8.26	17.57	6.43	18.01	13.03	20.13	1.15	16.21	10.13	19.17	17.49	6.52	16.47	3.05	14.10	22.18		
	13.107	-7.06	13.752	-14.02	12.919	-4.47	17.199	-24.50	9.351	16.07	15.313	-16.25	0.900	5.02	22.485	-10.32	18.800	-20.57	1.30052	11
13	5.13	19.51	8.05	17.49	6.49	17.57	13.02	20.10	1.09	16.14	10.06	19.10	17.41	6.44	16.39	2.57	14.02	22.10		
	13.230	-7.81	13.638	-12.90	13.073	-5.46	17.304	-24.61	9.372	15.98	15.327	-16.31	0.895	4.99	22.483	-10.33	18.801	-20.58	1.43194	13
15	5.17	19.46	7.41	17.41	6.56	17.53	13.01	20.08	1.03	16.07	9.59	19.02	17.33	6.35	16.31	2.49	13.54	22.02		
	13.354	-8.56	13.505	-11.54	13.227	-6.45	17.409	-24.71	9.392	15.90	15.341	-16.37	0.890	4.96	22.480	-10.34	18.803	-20.58	1.56336	15
17	5.20	19.42	7.16	17.34	7.03	17.49	13.00	20.06	0.57	15.60	9.53	18.55	17.25	6.27	16.23	2.41	13.46	21.54		
	13.478	-9.29	13.368	-10.04	13.382	-7.42	17.515	-24.79	9.411	15.81	15.356	-16.43	0.885	4.93	22.478	-10.35	18.805	-20.59	1.69478	17
19	5.24	19.37	6.53	17.26	7.09	17.45	12.59	20.04	0.50	15.53	9.46	18.48	17.17	6.19	16.15	2.33	13.39	21.46		
	13.603	-10.02	13.242	-8.54	13.537	-8.39	17.622	-24.86	9.430	15.73	15.371	-16.49	0.880	4.90	22.476	-10.36	18.807	-20.59	1.82620	19
21	5.27	19.33	6.32	17.20	7.16	17.41	12.58	20.02	0.44	15.45	9.40	18.40	17.09	6.10	16.07	2.25	13.31	21.39		
	13.729	-10.74	13.142	-7.21	13.693	-9.34	17.729	-24.91	9.448	15.65	15.386	-16.55	0.876	4.87	22.475	-10.37	18.809	-20.59	1.95762	21
23	5.31	19.29	6.14	17.14	7.23	17.37	12.57	20.00	0.38	15.38	9.33	18.33	17.01	6.02	15.60	2.17	13.23	21.31		
	13.856	-11.44	13.080	-6.16	13.851	-10.28	17.837	-24.94	9.466	15.57	15.401	-16.61	0.871	4.84	22.473	-10.38	18.811	-20.60	2.08903	23
25	5.34	19.25	6.02	17.09	7.30	17.34	12.56	19.59	0.31	15.31	9.26	18.26	16.53	5.54	15.52	2.09	13.15	21.23		
	13.983	-12.14	13.061	-5.48	14.009	-11.20	17.945	-24.95	9.483	15.50	15.416	-16.67	0.866	4.81	22.471	-10.39	18.813	-20.60	2.22045	25
27	4.38	18.22	4.54	16.04	6.37	16.30	11.55	18.58	23.21	14.23	8.20	17.18	15.45	4.46	14.44	1.01	12.08	20.15		
	14.113	-12.83	13.086	-5.20	14.171	-12.13	18.056	-24.95	9.500	15.42	15.432	-16.73	0.861	4.78	22.470	-10.40	18.816	-20.60	2.35187	27
29	4.41	18.18	4.50	15.59	6.44	16.27	11.53	18.56	23.15	14.16	8.13	17.11	15.37	4.37	14.36	0.53	12.00	20.08		
	14.242	-13.50	13.151	-5.28	14.331	-13.01	18.165	-24.93	9.516	15.35	15.447	-16.79	0.857	4.75	22.469	-10.41	18.818	-20.60	2.48329	29
31	4.44	18.14	4.50	15.55	6.51	16.24	11.51	18.55	23.08	14.09	8.07	17.04	15.29	4.29	14.28	0.45	11.52	19.60		
	14.372	-14.15	13.250	-5.69	14.493	-13.88	18.274	-24.89	9.531	15.29	15.463	-16.85	0.852	4.72	22.467	-10.41	18.821	-20.61	2.61471	31

LISTOPAD 2014

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
305	1	Sob	963	14.56532	16.26	14.2614	-14.29	0.99253	21.4945	-8.42	57.829	1.3	65	643	1129.3	1615	1343	1908.2	****	1449	1	
306	2	Nie	964	15.00497	16.27	14.3009	-14.48	0.99227	22.4444	-4.26	57.699	2.3	76	645	1129.3	1613	1411	2000.9	044	1445	2	
307	3	Pon	965	15.04462	16.27	14.3405	-15.06	0.99201	23.3918	0.05	57.692	3.3	85	647	1129.3	1611	1438	2053.3	203	1441	3	
308	4	Wto	966	15.08428	16.27	14.3802	-15.25	0.99175	0.3351	4.36	57.831	4.3	92	649	1129.3	1609	1505	2145.8	322	1437	4	
309	5	Śro	967	15.12393	16.26	14.4160	-15.43	0.99150	1.2844	8.50	58.131	5.3	97	651	1129.3	1607	1534	2238.9	440	1433	5	
310	6	Czw	968	15.16359	16.24	14.4558	-16.01	0.99125	2.2407	12.32	58.593	6.3	100	653	1129.4	1605	1605	2332.5	557	1429	6	
311	7	Pią	969	15.20324	16.21	14.4958	-16.19	0.99100	3.1956	15.27	59.196	0.5	100	655	1129.4	1604	1641	*****	711	1425	7	
312	8	Sob	970	15.24290	16.17	14.5358	-16.37	0.99076	4.1547	17.27	59.905	1.5	97	656	1129.5	1602	1723	026.4	820	1421	8	
313	9	Nie	971	15.28256	16.13	14.5759	-16.54	0.99052	5.1105	18.27	60.668	2.5	93	658	1129.5	1600	1811	120.0	921	1417	9	
314	10	Pon	972	15.32221	16.07	15.0201	-17.11	0.99029	6.0514	18.28	61.427	3.5	86	700	1129.6	1558	1904	212.6	1014	1413	10	
315	11	Wto	973	15.36187	16.01	15.0604	-17.27	0.99006	6.5743	17.33	62.124	4.5	79	702	1129.7	1557	2002	303.6	1059	1410	11	
316	12	Śro	974	15.40152	15.54	15.1007	-17.44	0.98983	7.4818	15.51	62.704	5.5	70	704	1129.8	1555	2102	352.5	1136	1406	12	
317	13	Czw	975	15.44118	15.46	15.1412	-17.60	0.98961	8.3701	13.28	63.124	6.5	61	706	1130.0	1554	2204	439.3	1207	1402	13	
318	14	Pią	976	15.48084	15.37	15.1817	-18.16	0.98939	9.2407	10.34	63.354	7.5	52	708	1130.1	1552	2307	524.3	1233	1358	14	
319	15	Sob	977	15.52049	15.27	15.2223	-18.31	0.98917	10.1006	7.14	63.380	0.8	42	709	1130.3	1551	****	607.9	1257	1354	15	
320	16	Nie	978	15.56015	15.17	15.2630	-18.46	0.98896	10.5531	3.37	63.202	1.8	33	711	1130.5	1549	011	650.6	1319	1350	16	
321	17	Pon	979	15.59580	15.05	15.3038	-19.01	0.98875	11.4102	-0.11	62.840	2.8	24	713	1130.7	1548	115	733.4	1341	1346	17	
322	18	Wto	980	16.03546	14.53	15.3447	-19.15	0.98854	12.2717	-4.02	62.323	3.8	17	715	1130.9	1546	220	816.8	1403	1342	18	
323	19	Śro	981	16.07511	14.40	15.3857	-19.29	0.98834	13.1457	-7.47	61.696	4.8	10	717	1131.1	1545	327	901.6	1427	1338	19	
324	20	Czw	982	16.11477	14.26	15.4307	-19.43	0.98814	14.0436	-11.18	61.008	5.8	5	718	1131.3	1544	435	948.6	1454	1334	20	
325	21	Pią	983	16.15442	14.11	15.4719	-19.57	0.98794	14.5638	-14.20	60.313	6.8	1	720	1131.6	1542	544	1038.1	1525	1330	21	
326	22	Sob	984	16.19408	13.56	15.5131	-20.10	0.98774	15.5111	-16.42	59.660	7.8	0	722	1131.8	1541	653	1130.5	1603	1326	22	
327	23	Nie	985	16.23373	13.39	15.5544	-20.22	0.98754	16.4760	-18.11	59.092	0.9	1	724	1132.1	1540	759	1225.3	1649	1322	23	
328	24	Pon	986	16.27339	13.22	15.5957	-20.34	0.98735	17.4623	-18.37	58.634	1.9	5	725	1132.4	1539	900	1322.0	1745	1318	24	
329	25	Wto	987	16.31305	13.04	16.0412	-20.46	0.98716	18.4524	-17.55	58.302	2.9	10	727	1132.7	1538	953	1419.3	1849	1315	25	
330	26	Śro	988	16.35270	12.46	16.0827	-20.58	0.98697	19.4402	-16.06	58.093	3.9	18	729	1133.0	1537	1038	1516.0	2000	1311	26	
331	27	Czw	989	16.39236	12.26	16.1243	-21.09	0.98678	20.4132	-13.18	57.995	4.9	28	730	1133.3	1536	1116	1611.4	2116	1307	27	
332	28	Pią	990	16.43201	12.06	16.1660	-21.20	0.98660	21.3734	-9.44	57.994	5.9	39	732	1133.6	1535	1148	1705.1	2233	1303	28	
333	29	Sob	991	16.47167	11.46	16.2117	-21.30	0.98643	22.3213	-5.36	58.073	0.0	50	733	1134.0	1534	1216	1757.4	2350	1259	29	
334	30	Nie	992	16.51132	11.24	16.2535	-21.40	0.98625	23.2552	-1.11	58.223	1.0	62	735	1134.3	1533	1243	1848.7	****	1255	30	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 23.23 3kw 14, 16.15 Now 22, 13.32 1kw 29, 11.06

LISTOPAD 2014 (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	4.46	18.13	4.52	15.53	6.54	16.22	11.51	18.55	23.05	14.05	8.04	16.60	15.25	4.25	14.24	0.41	11.49	19.56		
	14.437	-14.48	13.310	-5.99	14.574	-14.30	18.329	-24.87	9.538	15.25	15.470	-16.88	0.850	4.71	22.467	-10.42	18.822	-20.61	2.68042	1
3	4.49	18.09	4.56	15.49	7.01	16.19	11.49	18.54	22.58	13.58	7.57	16.53	15.17	4.17	14.16	0.33	11.41	19.48		
	14.568	-15.11	13.448	-6.76	14.737	-15.13	18.438	-24.80	9.553	15.19	15.486	-16.94	0.846	4.68	22.466	-10.42	18.825	-20.61	2.81184	3
5	4.53	18.06	5.03	15.46	7.08	16.16	11.47	18.54	22.51	13.50	7.50	16.45	15.09	4.08	14.08	0.25	11.33	19.41		
	14.700	-15.72	13.604	-7.69	14.901	-15.94	18.548	-24.72	9.566	15.13	15.502	-17.00	0.842	4.66	22.465	-10.43	18.828	-20.61	2.94325	5
7	4.56	18.03	5.11	15.42	7.15	16.13	11.45	18.53	22.45	13.43	7.44	16.38	15.01	4.00	14.00	0.17	11.26	19.33		
	14.833	-16.32	13.774	-8.74	15.067	-16.71	18.658	-24.62	9.579	15.08	15.518	-17.06	0.837	4.63	22.464	-10.43	18.831	-20.61	3.07467	7
9	4.59	18.00	5.20	15.39	7.22	16.11	11.42	18.53	22.38	13.35	7.37	16.31	14.53	3.52	13.52	0.09	11.18	19.25		
	14.966	-16.90	13.954	-9.86	15.234	-17.46	18.768	-24.50	9.591	15.02	15.534	-17.12	0.834	4.61	22.464	-10.43	18.834	-20.61	3.20609	9
11	5.02	17.58	5.30	15.36	7.28	16.08	11.40	18.53	22.31	13.28	7.31	16.24	14.45	3.44	13.45	23.57	11.10	19.18		
	15.101	-17.46	14.143	-11.03	15.403	-18.18	18.878	-24.37	9.603	14.98	15.550	-17.18	0.830	4.58	22.463	-10.43	18.838	-20.61	3.33752	11
13	5.05	17.55	5.41	15.33	7.35	16.06	11.38	18.52	22.24	13.20	7.24	16.16	14.37	3.35	13.37	23.49	11.03	19.10		
	15.237	-18.00	14.337	-12.22	15.572	-18.86	18.988	-24.21	9.614	14.93	15.566	-17.23	0.826	4.56	22.463	-10.43	18.841	-20.62	3.46894	13
15	5.08	17.53	5.52	15.30	7.42	16.04	11.35	18.52	22.17	13.13	7.18	16.09	14.29	3.27	13.29	23.41	10.55	19.02		
	15.373	-18.52	14.536	-13.41	15.744	-19.51	19.098	-24.04	9.624	14.89	15.582	-17.29	0.822	4.54	22.463	-10.43	18.845	-20.62	3.60036	15
17	5.11	17.50	6.03	15.27	7.48	16.03	11.32	18.53	22.10	13.05	7.11	16.02	14.21	3.19	13.21	23.34	10.47	18.55		
	15.511	-19.02	14.738	-14.58	15.916	-20.13	19.208	-23.85	9.633	14.85	15.598	-17.35	0.819	4.52	22.463	-10.43	18.848	-20.62	3.73177	17
19	5.14	17.48	6.14	15.25	7.55	16.01	11.29	18.53	22.03	12.58	7.05	15.55	14.13	3.11	13.13	23.26	10.40	18.47		
	15.649	-19.49	14.943	-15.72	16.090	-20.70	19.318	-23.65	9.642	14.82	15.614	-17.41	0.816	4.50	22.463	-10.43	18.852	-20.62	3.86319	19
21	5.17	17.47	6.25	15.23	8.01	16.00	11.26	18.53	21.56	12.50	6.58	15.47	14.05	3.03	13.05	23.18	10.32	18.39		
	15.789	-19.94	15.151	-16.82	16.265	-21.24	19.428	-23.42	9.649	14.78	15.631	-17.46	0.813	4.48	22.463	-10.43	18.856	-20.62	3.99461	21
23	5.20	17.45	6.37	15.21	8.08	15.59	11.23	18.54	21.48	12.42	6.52	15.40	13.57	2.55	12.57	23.10	10.24	18.32		
	15.929	-20.37	15.360	-17.87	16.442	-21.74	19.538	-23.18	9.656	14.76	15.647	-17.52	0.810	4.47	22.464	-10.43	18.860	-20.62	4.12603	23
25	5.23	17.43	6.48	15.19	8.14	15.59	11.20	18.55	21.41	12.35	6.45	15.33	13.50	2.47	12.49	23.02	10.17	18.24		
	16.070	-20.77	15.572	-18.87	16.619	-22.19	19.647	-22.93	9.662	14.74	15.663	-17.57	0.807	4.45	22.465	-10.42	18.864	-20.62	4.25746	25
27	5.25	17.42	6.59	15.18	8.19	15.59	11.17	18.55	21.34	12.27	6.39	15.26	13.42	2.38	12.42	22.54	10.09	18.17		
	16.212	-21.15	15.787	-19.81	16.798	-22.60	19.757	-22.65	9.668	14.72	15.679	-17.63	0.804	4.43	22.465	-10.42	18.868	-20.62	4.38888	27
29	5.28	17.41	7.10	15.17	8.25	15.59	11.13	18.56	21.26	12.19	6.32	15.18	13.34	2.30	12.34	22.47	10.02	18.09		
	16.355	-21.50	16.003	-20.69	16.978	-22.97	19.866	-22.36	9.672	14.70	15.695	-17.68	0.802	4.42	22.466	-10.41	18.872	-20.62	4.52030	29

GRUDZIEŃ 2014

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2456																			
335	1	Pon	993	16.55098	11.02	16.2953	-21.49	0.98608	0.1903	3.16	58.440	2.0	72	736	1134.7	1533	1309	1939.6	107	1251	1	
336	2	Wto	994	16.59063	10.40	16.3413	-21.58	0.98592	1.1218	7.31	58.726	3.0	82	738	1135.1	1532	1336	2030.8	224	1247	2	
337	3	Śro	995	17.03029	10.16	16.3832	-22.07	0.98576	2.0604	11.20	59.086	4.0	89	739	1135.5	1531	1405	2122.7	339	1243	3	
338	4	Czw	996	17.06594	9.52	16.4253	-22.15	0.98560	3.0029	14.30	59.523	5.0	95	741	1135.9	1531	1438	2215.3	453	1239	4	
339	5	Pią	997	17.10560	9.28	16.4714	-22.23	0.98545	3.5528	16.51	60.033	6.0	99	742	1136.3	1530	1516	2308.4	603	1235	5	
340	6	Sob	998	17.14526	9.03	16.5135	-22.30	0.98531	4.5035	18.15	60.604	7.0	100	743	1136.7	1530	1600	*****	707	1231	6	
341	7	Nie	999	17.18491	8.38	16.5557	-22.37	0.98517	5.4511	18.39	61.210	0.9	99	745	1137.1	1529	1651	001.2	804	1227	7	
342	8	Pon	000	17.22457	8.12	17.0020	-22.44	0.98504	6.3838	18.07	61.817	1.9	96	746	1137.6	1529	1747	053.2	853	1223	8	
343	9	Wto	001	17.26423	7.45	17.0443	-22.50	0.98492	7.3024	16.42	62.383	2.9	91	747	1138.0	1529	1847	143.5	933	1219	9	
344	10	Śro	002	17.30388	7.18	17.0907	-22.55	0.98480	8.2016	14.33	62.864	3.9	85	748	1138.4	1528	1949	231.8	1007	1216	10	
345	11	Czw	003	17.34354	6.51	17.1330	-23.00	0.98468	9.0818	11.48	63.218	4.9	77	749	1138.9	1528	2052	318.0	1036	1212	11	
346	12	Pią	004	17.38319	6.23	17.1755	-23.05	0.98457	9.5449	8.36	63.408	5.9	69	750	1139.4	1528	2156	402.4	1101	1208	12	
347	13	Sob	005	17.42285	5.55	17.2219	-23.09	0.98447	10.4019	5.05	63.408	6.9	60	751	1139.8	1528	2259	445.4	1124	1204	13	
348	14	Nie	006	17.46250	5.27	17.2644	-23.13	0.98437	11.2524	1.22	63.205	7.9	51	752	1140.3	1528	****	527.8	1145	1200	14	
349	15	Pon	007	17.50216	4.58	17.3110	-23.16	0.98428	12.1047	-2.27	62.802	0.9	41	753	1140.8	1528	003	610.3	1207	1156	15	
350	16	Wto	008	17.54181	4.29	17.3535	-23.19	0.98419	12.5711	-6.14	62.219	1.9	32	754	1141.3	1528	108	653.8	1229	1152	16	
351	17	Śro	009	17.58147	3.60	17.4001	-23.21	0.98411	13.4519	-9.50	61.490	2.9	23	755	1141.8	1529	215	738.9	1254	1148	17	
352	18	Czw	010	18.02113	3.30	17.4427	-23.23	0.98402	14.3549	-13.05	60.667	3.9	15	756	1142.2	1529	323	826.6	1322	1144	18	
353	19	Pią	011	18.06078	3.00	17.4853	-23.25	0.98395	15.2906	-15.47	59.812	4.9	8	756	1142.7	1529	432	917.3	1357	1140	19	
354	20	Sob	012	18.10044	2.31	17.5320	-23.26	0.98387	16.2515	-17.41	58.992	5.9	3	757	1143.2	1530	540	1011.2	1439	1136	20	
355	21	Nie	013	18.14009	2.01	17.5746	-23.26	0.98380	17.2354	-18.37	58.274	6.9	0	757	1143.7	1530	645	1107.9	1530	1132	21	
356	22	Pon	014	18.17575	1.31	18.0213	-23.26	0.98374	18.2407	-18.23	57.715	0.4	0	758	1144.2	1531	743	1206.4	1632	1128	22	
357	23	Wto	015	18.21541	1.01	18.0639	-23.26	0.98368	19.2442	-16.57	57.352	1.4	3	758	1144.7	1531	834	1305.4	1742	1124	23	
358	24	Śro	016	18.25506	0.31	18.1105	-23.25	0.98362	20.2431	-14.25	57.200	2.4	8	759	1145.2	1532	916	1403.5	1859	1120	24	
359	25	Czw	017	18.29472	0.01	18.1532	-23.23	0.98356	21.2247	-10.58	57.250	3.4	15	759	1145.7	1532	951	1459.7	2018	1117	25	
360	26	Pią	018	18.33437	-0.29	18.1958	-23.21	0.98351	22.1913	-6.53	57.474	4.4	25	759	1146.2	1533	1022	1553.9	2138	1113	26	
361	27	Sob	019	18.37403	-0.58	18.2424	-23.19	0.98346	23.1360	-2.27	57.831	5.4	35	800	1146.7	1534	1049	1646.3	2256	1109	27	
362	28	Nie	020	18.41368	-1.28	18.2850	-23.16	0.98342	0.0736	2.04	58.280	6.4	46	800	1147.2	1535	1115	1737.6	****	1105	28	
363	29	Pon	021	18.45334	-1.57	18.3316	-23.13	0.98338	1.0037	6.23	58.782	0.7	58	800	1147.7	1536	1142	1828.3	013	1101	29	
364	30	Wto	022	18.49299	-2.26	18.3742	-23.09	0.98335	1.5333	10.18	59.311	1.7	68	800	1148.2	1537	1209	1919.1	128	1057	30	
365	31	Śro	023	18.53265	-2.55	18.4207	-23.05	0.98332	2.4649	13.37	59.847	2.7	78	800	1148.7	1538	1240	2010.3	241	1053	31	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 13.27 3kw 14, 13.51 Now 22, 2.36 1kw 28, 19.31

GRUDZIEŃ 2014 (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	7.21	15.16	8.30	15.59	11.10	18.57	21.18	12.12	6.25	15.11	13.26	2.22	12.26	22.39	9.54	18.01		
	16.498	-21.82	16.221	-21.51	17.158	-23.29	19.975	-22.05	9.676	14.69	15.711	-17.73	0.800	4.41	22.467	-10.41	18.877	-20.61	4.65171	1
3	5.32	17.39	7.32	15.16	8.35	16.00	11.06	18.58	21.11	12.04	6.19	15.04	13.18	2.14	12.18	22.31	9.46	17.54		
	16.642	-22.12	16.441	-22.25	17.339	-23.56	20.083	-21.73	9.679	14.69	15.727	-17.79	0.798	4.40	22.468	-10.40	18.881	-20.61	4.78313	3
5	5.35	17.39	7.42	15.17	8.40	16.01	11.02	18.59	21.03	11.56	6.12	14.57	13.10	2.06	12.10	22.23	9.39	17.46		
	16.787	-22.38	16.663	-22.92	17.522	-23.79	20.192	-21.39	9.681	14.68	15.743	-17.84	0.796	4.39	22.470	-10.39	18.885	-20.61	4.91455	5
7	5.37	17.38	7.52	15.18	8.45	16.03	10.58	18.60	20.55	11.49	6.06	14.49	13.02	1.58	12.02	22.16	9.31	17.39		
	16.933	-22.62	16.887	-23.51	17.704	-23.97	20.299	-21.03	9.682	14.69	15.759	-17.89	0.794	4.38	22.471	-10.38	18.890	-20.61	5.04597	7
9	5.39	17.38	8.02	15.19	8.49	16.05	10.54	19.01	20.47	11.41	5.59	14.42	12.54	1.50	11.55	22.08	9.23	17.31		
	17.079	-22.83	17.113	-24.03	17.887	-24.10	20.407	-20.66	9.682	14.69	15.775	-17.94	0.793	4.37	22.473	-10.37	18.894	-20.61	5.17740	9
11	5.41	17.38	8.11	15.22	8.52	16.08	10.50	19.02	20.39	11.33	5.52	14.35	12.46	1.42	11.47	22.00	9.16	17.23		
	17.225	-23.00	17.341	-24.46	18.071	-24.17	20.514	-20.28	9.682	14.70	15.790	-17.99	0.792	4.36	22.474	-10.36	18.899	-20.61	5.30882	11
13	5.42	17.38	8.20	15.25	8.56	16.11	10.46	19.04	20.31	11.25	5.46	14.28	12.38	1.34	11.39	21.53	9.08	17.16		
	17.372	-23.15	17.571	-24.80	18.254	-24.20	20.621	-19.88	9.681	14.72	15.806	-18.04	0.791	4.36	22.476	-10.35	18.904	-20.61	5.44024	13
15	5.44	17.38	8.28	15.29	8.59	16.14	10.42	19.05	20.23	11.17	5.39	14.20	12.30	1.26	11.31	21.45	9.01	17.08		
	17.519	-23.27	17.802	-25.06	18.437	-24.18	20.727	-19.46	9.678	14.74	15.821	-18.08	0.790	4.35	22.478	-10.34	18.909	-20.60	5.57166	15
17	5.46	17.39	8.35	15.34	9.01	16.18	10.37	19.06	20.15	11.09	5.33	14.13	12.22	1.18	11.23	21.37	8.53	17.01		
	17.667	-23.36	18.035	-25.22	18.621	-24.11	20.833	-19.04	9.675	14.76	15.837	-18.13	0.789	4.35	22.480	-10.32	18.913	-20.60	5.70307	17
19	5.47	17.40	8.42	15.39	9.03	16.22	10.33	19.07	20.07	11.01	5.26	14.06	12.15	1.11	11.16	21.30	8.45	16.53		
	17.815	-23.41	18.269	-25.29	18.804	-23.99	20.938	-18.60	9.671	14.79	15.852	-18.18	0.789	4.35	22.483	-10.31	18.918	-20.60	5.83450	19
21	5.48	17.40	8.48	15.46	9.05	16.26	10.28	19.09	19.58	10.53	5.19	13.59	12.07	1.03	11.08	21.22	8.38	16.46		
	17.963	-23.43	18.503	-25.27	18.986	-23.82	21.043	-18.14	9.667	14.82	15.867	-18.22	0.789	4.35	22.485	-10.30	18.923	-20.60	5.96592	21
23	5.49	17.42	8.53	15.53	9.06	16.31	10.24	19.10	19.50	10.45	5.13	13.51	11.59	0.55	10.60	21.14	8.30	16.38		
	18.111	-23.43	18.738	-25.14	19.168	-23.60	21.147	-17.68	9.661	14.86	15.882	-18.26	0.789	4.35	22.488	-10.28	18.928	-20.59	6.09734	23
25	5.50	17.43	8.57	16.01	9.07	16.36	10.19	19.12	19.42	10.37	5.06	13.44	11.51	0.47	10.52	21.07	8.23	16.30		
	18.259	-23.39	18.972	-24.92	19.350	-23.34	21.251	-17.20	9.654	14.90	15.897	-18.31	0.789	4.35	22.490	-10.27	18.933	-20.59	6.22876	25
27	5.50	17.44	9.01	16.10	9.08	16.41	10.14	19.13	19.33	10.29	4.59	13.37	11.43	0.39	10.44	20.59	8.15	16.23		
	18.407	-23.32	19.206	-24.59	19.530	-23.02	21.355	-16.71	9.647	14.94	15.911	-18.35	0.789	4.36	22.493	-10.25	18.938	-20.59	6.36018	27
29	5.51	17.46	9.03	16.19	9.08	16.46	10.10	19.14	19.24	10.21	4.52	13.30	11.35	0.31	10.37	20.52	8.08	16.15		
	18.554	-23.21	19.438	-24.16	19.710	-22.66	21.458	-16.21	9.639	14.99	15.925	-18.39	0.790	4.36	22.496	-10.23	18.943	-20.58	6.49160	29
31	5.51	17.47	9.05	16.29	9.08	16.52	10.05	19.16	19.16	10.13	4.46	13.22	11.27	0.24	10.29	20.44	7.60	16.08		
	18.702	-23.08	19.667	-23.62	19.888	-22.26	21.561	-15.69	9.630	15.04	15.939	-18.43	0.791	4.37	22.499	-10.21	18.948	-20.58	6.62302	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2014

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 2015

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 7.10.2010 r.)

Data Wielkanocy: **2015 KWIECIEŃ 5**

Dla całego roku przyjęto: TDT – UT = 69 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 23.45**, Lato **VI 21, 17.38**, Jesień **IX 23, 9.20**, Zima **XII 22, 5.48**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 29 marca do 25 października 2015 r.**

Oznaczenia:

Dr — dzień 2015 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2015

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
1	1	Czw	024	18.57231	-3.23	18.4632	-23.00	0.98330	3.4032	16.10	60.381	3.7	86	800	1149.1	1539	1315	2102.0	351	1049	1
2	2	Pią	025	19.01196	-3.51	18.5057	-22.55	0.98329	4.3434	17.52	60.908	4.7	92	800	1149.6	1540	1356	2153.9	457	1045	2
3	3	Sob	026	19.05162	-4.19	18.5521	-22.50	0.98328	5.2829	18.37	61.425	5.7	97	759	1150.1	1541	1443	2245.5	556	1041	3
4	4	Nie	027	19.09127	-4.46	18.5945	-22.43	0.98328	6.2146	18.25	61.926	6.7	99	759	1150.5	1542	1536	2336.0	647	1037	4
5	5	Pon	028	19.13093	-5.13	19.0408	-22.37	0.98328	7.1351	17.19	62.398	0.3	100	759	1151.0	1543	1634	*****	731	1033	5
6	6	Wto	029	19.17059	-5.40	19.0831	-22.30	0.98329	8.0422	15.27	62.823	1.3	98	758	1151.4	1545	1736	025.1	808	1029	6
7	7	Śro	030	19.21024	-6.06	19.1254	-22.23	0.98331	8.5310	12.55	63.177	2.3	95	758	1151.8	1546	1839	112.2	839	1025	7
8	8	Czw	031	19.24590	-6.31	19.1716	-22.15	0.98333	9.4021	9.52	63.431	3.3	90	757	1152.3	1547	1942	157.5	905	1022	8
9	9	Pią	032	19.28555	-6.57	19.2138	-22.07	0.98336	10.2616	6.27	63.555	4.3	84	757	1152.7	1549	2046	241.2	929	1018	9
10	10	Sob	033	19.32521	-7.21	19.2559	-21.58	0.98340	11.1123	2.49	63.521	5.3	77	756	1153.1	1550	2149	323.9	951	1014	10
11	11	Nie	034	19.36486	-7.45	19.3020	-21.49	0.98344	11.5617	-0.57	63.310	6.3	68	756	1153.5	1552	2253	406.0	1012	1010	11
12	12	Pon	035	19.40452	-8.09	19.3440	-21.39	0.98349	12.4140	-4.42	62.909	7.3	59	755	1153.9	1553	2358	448.5	1034	1006	12
13	13	Wto	036	19.44417	-8.31	19.3859	-21.29	0.98354	13.2814	-8.19	62.324	0.1	50	754	1154.3	1555	****	531.9	1057	1002	13
14	14	Śro	037	19.48383	-8.54	19.4318	-21.19	0.98360	14.1639	-11.39	61.572	1.1	40	753	1154.6	1557	104	617.3	1123	958	14
15	15	Czw	038	19.52349	-9.15	19.4736	-21.08	0.98366	15.0732	-14.33	60.693	2.1	30	752	1155.0	1558	210	705.2	1153	954	15
16	16	Pią	039	19.56314	-9.36	19.5153	-20.57	0.98372	16.0119	-16.48	59.739	3.1	21	751	1155.4	1600	318	756.2	1230	950	16
17	17	Sob	040	20.00280	-9.57	19.5610	-20.45	0.98379	16.5802	-18.12	58.780	4.1	13	750	1155.7	1601	423	850.5	1315	946	17
18	18	Nie	041	20.04245	-10.16	20.0027	-20.33	0.98387	17.5716	-18.33	57.896	5.1	6	749	1156.0	1603	525	947.8	1411	942	18
19	19	Pon	042	20.08211	-10.35	20.0442	-20.21	0.98395	18.5807	-17.43	57.164	6.1	2	748	1156.3	1605	620	1046.9	1517	938	19
20	20	Wto	043	20.12177	-10.53	20.0857	-20.08	0.98403	19.5923	-15.40	56.653	7.1	0	747	1156.6	1607	708	1146.7	1632	934	20
21	21	Śro	044	20.16142	-11.11	20.1311	-19.55	0.98411	20.5958	-12.33	56.407	0.9	1	746	1156.9	1608	748	1245.5	1753	930	21
22	22	Czw	045	20.20108	-11.27	20.1724	-19.41	0.98420	21.5906	-8.35	56.439	1.9	5	745	1157.2	1610	822	1342.8	1915	926	22
23	23	Pią	046	20.24073	-11.43	20.2136	-19.28	0.98429	22.5632	-4.07	56.731	2.9	12	743	1157.5	1612	852	1438.2	2037	923	23
24	24	Sob	047	20.28039	-11.58	20.2548	-19.13	0.98439	23.5225	0.31	57.237	3.9	21	742	1157.7	1614	920	1531.9	2157	919	24
25	25	Nie	048	20.32004	-12.13	20.2959	-18.59	0.98448	0.4709	5.02	57.897	4.9	31	741	1158.0	1616	947	1624.4	2316	915	25
26	26	Pon	049	20.35570	-12.26	20.3409	-18.44	0.98459	1.4112	9.09	58.644	5.9	42	739	1158.2	1618	1015	1716.2	****	911	26
27	27	Wto	050	20.39535	-12.39	20.3818	-18.28	0.98470	2.3456	12.40	59.420	0.3	53	738	1158.4	1620	1045	1807.8	031	907	27
28	28	Śro	051	20.43501	-12.51	20.4226	-18.13	0.98481	3.2837	15.26	60.178	1.3	63	736	1158.6	1621	1118	1859.3	142	903	28
29	29	Czw	052	20.47466	-13.02	20.4634	-17.57	0.98492	4.2214	17.21	60.883	2.3	73	735	1158.8	1623	1157	1950.7	249	859	29
30	30	Pią	053	20.51432	-13.12	20.5041	-17.41	0.98505	5.1537	18.21	61.519	3.3	82	733	1158.9	1625	1241	2041.7	350	855	30
31	31	Sob	054	20.55398	-13.21	20.5447	-17.24	0.98517	6.0823	18.26	62.075	4.3	89	732	1159.1	1627	1331	2131.9	443	851	31

Fazy Księżyca [Dm, h.mm]: Pełn 5, 5.53 3kw 13, 10.47 Nów 20, 14.14 1kw 27, 5.48

STYCZEŃ 2015 (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 ^h UT)	Dm
1	5.51	17.48	9.06	16.34	9.08	16.55	10.02	19.17	19.11	10.09	4.42	13.19	11.23	0.20	10.25	20.40	7.56	16.04		
	18.776	-23.00	19.780	-23.32	19.977	-22.04	21.612	-15.43	9.626	15.07	15.946	-18.45	0.791	4.38	22.501	-10.20	18.950	-20.58	6.68873	1
3	5.51	17.50	9.06	16.45	9.07	17.01	9.57	19.18	19.02	10.01	4.35	13.11	11.16	0.12	10.17	20.33	7.49	15.57		
	18.922	-22.83	20.003	-22.64	20.153	-21.56	21.713	-14.91	9.616	15.13	15.960	-18.49	0.793	4.38	22.504	-10.19	18.955	-20.57	6.82015	3
5	5.51	17.52	9.05	16.55	9.06	17.08	9.52	19.19	18.54	9.53	4.29	13.04	11.08	0.04	10.09	20.25	7.41	15.49		
	19.069	-22.62	20.219	-21.86	20.329	-21.05	21.815	-14.37	9.605	15.19	15.974	-18.52	0.794	4.40	22.507	-10.17	18.960	-20.57	6.95158	5
7	5.51	17.54	9.04	17.06	9.05	17.14	9.47	19.21	18.45	9.45	4.22	12.57	10.60	23.53	10.02	20.18	7.33	15.41		
	19.215	-22.38	20.426	-21.00	20.503	-20.49	21.916	-13.82	9.594	15.25	15.987	-18.56	0.796	4.41	22.511	-10.15	18.965	-20.57	7.08300	7
9	5.50	17.57	9.01	17.16	9.03	17.21	9.42	19.22	18.36	9.37	4.15	12.49	10.52	23.45	9.54	20.10	7.26	15.34		
	19.361	-22.11	20.622	-20.07	20.675	-19.89	22.016	-13.27	9.581	15.32	16.000	-18.59	0.798	4.42	22.514	-10.12	18.970	-20.56	7.21442	9
11	5.49	17.59	8.58	17.26	9.01	17.27	9.37	19.24	18.27	9.28	4.08	12.42	10.44	23.37	9.46	20.02	7.18	15.26		
	19.505	-21.81	20.802	-19.09	20.847	-19.26	22.116	-12.70	9.569	15.39	16.013	-18.63	0.800	4.43	22.518	-10.10	18.975	-20.56	7.34583	11
13	5.48	18.02	8.53	17.34	8.59	17.34	9.32	19.25	18.17	9.20	4.01	12.35	10.37	23.30	9.38	19.55	7.11	15.19		
	19.650	-21.49	20.962	-18.07	21.016	-18.59	22.215	-12.13	9.555	15.46	16.025	-18.66	0.802	4.45	22.521	-10.08	18.980	-20.55	7.47725	13
15	5.47	18.04	8.46	17.40	8.57	17.41	9.26	19.26	18.08	9.12	3.54	12.27	10.29	23.22	9.31	19.47	7.03	15.11		
	19.793	-21.13	21.096	-17.07	21.185	-17.88	22.314	-11.55	9.541	15.54	16.037	-18.69	0.804	4.47	22.525	-10.06	18.985	-20.55	7.60867	15
17	5.46	18.07	8.39	17.45	8.54	17.47	9.21	19.28	17.59	9.04	3.47	12.20	10.21	23.14	9.23	19.40	6.55	15.04		
	19.936	-20.75	21.197	-16.11	21.351	-17.14	22.413	-10.97	9.527	15.61	16.049	-18.72	0.807	4.48	22.529	-10.04	18.990	-20.55	7.74009	17
19	5.44	18.10	8.29	17.46	8.52	17.54	9.16	19.29	17.50	8.55	3.40	12.13	10.13	23.07	9.15	19.32	6.48	14.56		
	20.078	-20.35	21.260	-15.26	21.517	-16.37	22.511	-10.38	9.512	15.69	16.061	-18.75	0.810	4.50	22.533	-10.01	18.994	-20.54	7.87152	19
21	5.43	18.13	8.18	17.43	8.49	18.01	9.10	19.30	17.40	8.47	3.33	12.05	10.05	22.59	9.07	19.25	6.40	14.49		
	20.220	-19.92	21.277	-14.57	21.681	-15.57	22.609	-9.78	9.496	15.77	16.072	-18.78	0.813	4.52	22.537	-9.99	18.999	-20.54	8.00294	21
23	5.41	18.16	8.06	17.36	8.45	18.08	9.05	19.32	17.31	8.39	3.26	11.58	9.58	22.52	8.60	19.17	6.33	14.41		
	20.360	-19.46	21.244	-14.08	21.843	-14.74	22.707	-9.18	9.481	15.85	16.083	-18.80	0.816	4.55	22.541	-9.96	19.004	-20.53	8.13436	23
25	5.39	18.19	7.51	17.25	8.42	18.15	8.60	19.33	17.22	8.31	3.19	11.51	9.50	22.44	8.52	19.10	6.25	14.34		
	20.500	-18.98	21.162	-13.84	22.004	-13.88	22.804	-8.57	9.464	15.94	16.094	-18.83	0.819	4.57	22.545	-9.94	19.009	-20.53	8.26577	25
27	5.37	18.22	7.36	17.09	8.39	18.22	8.54	19.34	17.12	8.22	3.12	11.43	9.42	22.37	8.44	19.03	6.17	14.26		
	20.638	-18.47	21.037	-13.86	22.164	-13.00	22.900	-7.95	9.448	16.02	16.104	-18.85	0.823	4.59	22.550	-9.91	19.013	-20.52	8.39719	27
29	5.34	18.25	7.20	16.51	8.35	18.29	8.49	19.36	17.03	8.14	3.05	11.36	9.34	22.29	8.36	18.55	6.10	14.18		
	20.776	-17.95	20.881	-14.10	22.322	-12.10	22.997	-7.34	9.431	16.11	16.114	-18.87	0.827	4.62	22.554	-9.89	19.018	-20.52	8.52861	29
31	5.32	18.28	7.05	16.30	8.31	18.36	8.43	19.37	16.54	8.06	2.58	11.28	9.26	22.22	8.29	18.48	6.02	14.11		
	20.913	-17.40	20.713	-14.52	22.480	-11.17	23.093	-6.72	9.414	16.19	16.123	-18.90	0.831	4.64	22.558	-9.86	19.022	-20.52	8.66003	31

LUTY 2015

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
32	1	Nie	055	20.59363	-13.30	20.5852	-17.07	0.98531	7.0011	17.38	62.552	5.3	94	730	1159.2	1629	1427	2220.8	529	847	1	
33	2	Pon	056	21.03329	-13.37	21.0256	-16.50	0.98545	7.5040	16.01	62.949	6.3	98	728	1159.4	1631	1526	2308.2	608	843	2	
34	3	Wto	057	21.07294	-13.44	21.0659	-16.33	0.98559	8.3941	13.43	63.266	7.3	100	727	1159.5	1633	1628	2354.0	641	839	3	
35	4	Śro	058	21.11260	-13.50	21.1102	-16.15	0.98574	9.2715	10.51	63.499	0.5	100	725	1159.6	1635	1731	*****	709	835	4	
36	5	Czw	059	21.15225	-13.55	21.1504	-15.57	0.98590	10.1333	7.34	63.641	1.5	98	723	1159.7	1637	1835	038.3	734	831	5	
37	6	Pią	060	21.19191	-13.60	21.1905	-15.38	0.98606	10.5858	4.01	63.676	2.5	95	721	1159.7	1639	1938	121.4	757	828	6	
38	7	Sob	061	21.23156	-14.03	21.2305	-15.20	0.98622	11.4355	0.18	63.589	3.5	89	720	1159.8	1641	2042	203.7	818	824	7	
39	8	Nie	062	21.27122	-14.06	21.2704	-15.01	0.98640	12.2859	-3.26	63.362	4.5	83	718	1159.9	1643	2146	246.0	840	820	8	
40	9	Pon	063	21.31087	-14.08	21.3103	-14.42	0.98657	13.1444	-7.03	62.981	5.5	75	716	1159.9	1645	2250	328.7	902	816	9	
41	10	Wto	064	21.35053	-14.10	21.3501	-14.22	0.98675	14.0147	-10.26	62.440	6.5	67	714	1159.9	1647	2355	412.6	927	812	10	
42	11	Śro	065	21.39018	-14.10	21.3858	-14.03	0.98694	14.5041	-13.25	61.742	7.5	57	712	1159.9	1648	****	458.3	954	808	11	
43	12	Czw	066	21.42584	-14.10	21.4254	-13.43	0.98713	15.4157	-15.51	60.906	0.3	47	710	1159.9	1650	100	546.5	1027	804	12	
44	13	Pią	067	21.46549	-14.09	21.4650	-13.23	0.98732	16.3550	-17.34	59.969	1.3	37	708	1159.9	1652	205	637.5	1107	800	13	
45	14	Sob	068	21.50515	-14.08	21.5045	-13.03	0.98752	17.3219	-18.22	58.985	2.3	27	706	1159.9	1654	307	731.5	1155	756	14	
46	15	Nie	069	21.54481	-14.05	21.5439	-12.42	0.98772	18.3058	-18.05	58.023	3.3	17	704	1159.8	1656	404	828.1	1254	752	15	
47	16	Pon	070	21.58446	-14.02	21.5833	-12.22	0.98792	19.3103	-16.40	57.167	4.3	9	702	1159.8	1658	454	926.3	1403	748	16	
48	17	Wto	071	22.02412	-13.58	22.0225	-12.01	0.98813	20.3136	-14.06	56.498	5.3	4	700	1159.7	1700	538	1025.2	1520	744	17	
49	18	Śro	072	22.06377	-13.54	22.0617	-11.40	0.98833	21.3148	-10.32	56.085	6.3	0	658	1159.6	1702	616	1123.8	1642	740	18	
50	19	Czw	073	22.10343	-13.49	22.1009	-11.18	0.98854	22.3105	-6.15	55.974	0.5	0	656	1159.6	1704	649	1221.3	1806	736	19	
51	20	Pią	074	22.14308	-13.43	22.1359	-10.57	0.98875	23.2915	-1.33	56.174	1.5	3	654	1159.5	1706	719	1317.7	1930	732	20	
52	21	Sob	075	22.18274	-13.36	22.1749	-10.35	0.98897	0.2624	3.10	56.657	2.5	9	652	1159.4	1708	747	1412.8	2052	729	21	
53	22	Nie	076	22.22239	-13.29	22.2139	-10.13	0.98918	1.2244	7.35	57.365	3.5	17	649	1159.2	1710	816	1507.1	2212	725	22	
54	23	Pon	077	22.26205	-13.21	22.2528	-9.52	0.98940	2.1830	11.26	58.225	4.5	26	647	1159.1	1712	846	1600.8	2328	721	23	
55	24	Wto	078	22.30170	-13.13	22.2916	-9.29	0.98962	3.1348	14.32	59.156	5.5	37	645	1159.0	1714	920	1654.0	****	717	24	
56	25	Śro	079	22.34136	-13.04	22.3303	-9.07	0.98984	4.0837	16.44	60.086	6.5	47	643	1158.8	1716	958	1746.6	038	713	25	
57	26	Czw	080	22.38101	-12.54	22.3650	-8.45	0.99007	5.0246	18.00	60.958	0.7	58	641	1158.6	1718	1041	1838.4	142	709	26	
58	27	Pią	081	22.42067	-12.44	22.4036	-8.22	0.99029	5.5558	18.19	61.730	1.7	68	638	1158.5	1719	1129	1929.0	239	705	27	
59	28	Sob	082	22.46033	-12.33	22.4422	-7.60	0.99053	6.4756	17.45	62.378	2.7	76	636	1158.3	1721	1223	2018.2	327	701	28	

Fazy Księżyca [Dm, h.mm]: Pełn 4, 0.09 3kw 12, 4.50 Now 19, 0.47 1kw 25, 18.14

LUTY 2015 (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	6.58	16.20	8.29	18.39	8.40	19.38	16.49	8.01	2.54	11.25	9.23	22.18	8.25	18.44	5.58	14.07		
	20.981	-17.12	20.629	-14.78	22.558	-10.70	23.140	-6.40	9.405	16.23	16.128	-18.91	0.833	4.66	22.560	-9.85	19.025	-20.51	8.72574	1
3	5.28	18.33	6.44	15.59	8.25	18.46	8.35	19.39	16.39	7.53	2.47	11.17	9.15	22.10	8.17	18.36	5.51	13.60		
	21.116	-16.54	20.476	-15.34	22.713	-9.75	23.236	-5.78	9.388	16.32	16.137	-18.92	0.837	4.69	22.565	-9.82	19.029	-20.51	8.85717	3
5	5.25	18.36	6.32	15.41	8.21	18.52	8.29	19.40	16.30	7.45	2.40	11.10	9.07	22.03	8.09	18.29	5.43	13.52		
	21.251	-15.95	20.351	-15.92	22.868	-8.78	23.331	-5.15	9.370	16.41	16.145	-18.94	0.841	4.71	22.569	-9.80	19.034	-20.50	8.98858	5
7	5.22	18.40	6.22	15.24	8.17	18.59	8.24	19.41	16.21	7.36	2.32	11.02	8.59	21.56	8.01	18.22	5.35	13.44		
	21.385	-15.33	20.262	-16.48	23.021	-7.80	23.426	-4.52	9.353	16.49	16.153	-18.96	0.846	4.74	22.574	-9.77	19.038	-20.50	9.12000	7
9	5.19	18.43	6.15	15.10	8.13	19.06	8.18	19.42	16.11	7.28	2.25	10.55	8.52	21.48	7.54	18.14	5.28	13.37		
	21.517	-14.70	20.211	-16.98	23.173	-6.80	23.521	-3.89	9.335	16.57	16.161	-18.98	0.851	4.78	22.579	-9.74	19.042	-20.50	9.25142	9
11	5.15	18.46	6.09	14.58	8.09	19.13	8.13	19.44	16.02	7.20	2.18	10.47	8.44	21.41	7.46	18.07	5.20	13.29		
	21.649	-14.05	20.196	-17.41	23.325	-5.79	23.615	-3.26	9.318	16.66	16.169	-18.99	0.856	4.81	22.583	-9.72	19.046	-20.49	9.38283	11
13	5.12	18.50	6.04	14.49	8.04	19.19	8.07	19.45	15.52	7.11	2.10	10.40	8.36	21.33	7.38	17.59	5.12	13.22		
	21.781	-13.38	20.216	-17.76	23.476	-4.77	23.709	-2.62	9.300	16.74	16.176	-19.00	0.861	4.84	22.588	-9.69	19.050	-20.49	9.51425	13
15	5.08	18.53	6.01	14.43	8.00	19.26	8.01	19.46	15.43	7.03	2.03	10.32	8.28	21.26	7.30	17.52	5.05	13.14		
	21.911	-12.70	20.265	-18.02	23.626	-3.74	23.803	-1.99	9.283	16.82	16.182	-19.01	0.866	4.87	22.593	-9.66	19.054	-20.48	9.64568	15
17	5.05	18.57	5.59	14.38	7.56	19.32	7.56	19.47	15.33	6.54	1.56	10.24	8.21	21.19	7.23	17.44	4.57	13.06		
	22.040	-12.01	20.339	-18.19	23.776	-2.70	23.897	-1.35	9.266	16.90	16.188	-19.03	0.871	4.91	22.597	-9.63	19.058	-20.48	9.77710	17
19	5.01	19.01	5.57	14.36	7.51	19.39	7.50	19.48	15.24	6.46	1.48	10.17	8.13	21.11	7.15	17.37	4.49	12.59		
	22.169	-11.30	20.435	-18.27	23.925	-1.66	23.991	-0.72	9.249	16.98	16.194	-19.03	0.877	4.94	22.602	-9.61	19.062	-20.47	9.90851	19
21	4.57	19.04	5.56	14.35	7.47	19.46	7.44	19.49	15.15	6.38	1.41	10.09	8.05	21.04	7.07	17.30	4.42	12.51		
	22.297	-10.59	20.548	-18.26	0.074	-0.62	0.084	-0.09	9.233	17.05	16.199	-19.04	0.882	4.98	22.607	-9.58	19.066	-20.47	10.03993	21
23	4.53	19.08	5.55	14.35	7.42	19.52	7.39	19.50	15.05	6.29	1.33	10.02	7.57	20.57	6.60	17.22	4.34	12.44		
	22.424	-9.86	20.677	-18.15	0.222	0.43	0.177	0.55	9.217	17.13	16.204	-19.05	0.888	5.02	22.612	-9.55	19.069	-20.47	10.17134	23
25	4.48	19.12	5.54	14.37	7.38	19.59	7.33	19.51	14.56	6.21	1.26	9.54	7.50	20.49	6.52	17.15	4.26	12.36		
	22.551	-9.12	20.818	-17.95	0.371	1.47	0.271	1.18	9.201	17.20	16.208	-19.06	0.894	5.05	22.616	-9.52	19.073	-20.46	10.30276	25
27	4.44	19.15	5.54	14.40	7.33	20.05	7.28	19.52	14.47	6.13	1.18	9.46	7.42	20.42	6.44	17.07	4.19	12.28		
	22.677	-8.37	20.969	-17.67	0.519	2.52	0.364	1.81	9.186	17.27	16.212	-19.06	0.900	5.09	22.621	-9.49	19.076	-20.46	10.43418	27

MARZEC 2015

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
60	1	Nie	083	22.49598	-12.22	22.4808	-7.37	0.99076	7.3830	16.22	62.894	3.7	84	634	1158.1	1723	1320	2105.8	408	657	1	
61	2	Pon	084	22.53564	-12.10	22.5152	-7.14	0.99100	8.2734	14.16	63.277	4.7	91	632	1157.9	1725	1421	2151.8	443	653	2	
62	3	Wto	085	22.57529	-11.58	22.5536	-6.51	0.99124	9.1513	11.35	63.535	5.7	95	629	1157.7	1727	1523	2236.3	513	649	3	
63	4	Śro	086	23.01495	-11.45	22.5920	-6.28	0.99149	10.0142	8.27	63.678	6.7	99	627	1157.5	1729	1626	2319.6	539	645	4	
64	5	Czw	087	23.05460	-11.32	23.0303	-6.05	0.99174	10.4718	4.59	63.714	7.7	100	625	1157.3	1731	1729	*****	602	641	5	
65	6	Pią	088	23.09426	-11.18	23.0646	-5.42	0.99199	11.3227	1.19	63.650	0.7	100	622	1157.0	1733	1833	002.3	624	637	6	
66	7	Sob	089	23.13391	-11.04	23.1029	-5.19	0.99225	12.1737	-2.24	63.485	1.7	97	620	1156.8	1734	1937	044.6	646	633	7	
67	8	Nie	090	23.17356	-10.49	23.1411	-4.55	0.99251	13.0316	-6.03	63.217	2.7	94	618	1156.6	1736	2041	127.3	708	630	8	
68	9	Pon	091	23.21322	-10.34	23.1752	-4.32	0.99278	13.4955	-9.29	62.838	3.7	88	615	1156.3	1738	2146	210.8	732	626	9	
69	10	Wto	092	23.25288	-10.19	23.2134	-4.08	0.99304	14.3801	-12.33	62.344	4.7	81	613	1156.1	1740	2250	255.7	758	622	10	
70	11	Śro	093	23.29253	-10.03	23.2515	-3.45	0.99331	15.2757	-15.07	61.732	5.7	73	611	1155.8	1742	2354	342.5	829	618	11	
71	12	Czw	094	23.33219	-9.48	23.2855	-3.21	0.99359	16.1959	-17.00	61.008	6.7	63	608	1155.5	1744	****	431.5	905	614	12	
72	13	Pią	095	23.37184	-9.31	23.3236	-2.58	0.99386	17.1409	-18.04	60.189	7.7	53	606	1155.3	1746	055	522.8	949	610	13	
73	14	Sob	096	23.41150	-9.15	23.3616	-2.34	0.99414	18.1013	-18.11	59.308	0.7	42	604	1155.0	1747	152	616.4	1041	606	14	
74	15	Nie	097	23.45115	-8.59	23.3956	-2.10	0.99441	19.0746	-17.14	58.414	1.7	32	601	1154.7	1749	244	711.8	1143	602	15	
75	16	Pon	098	23.49081	-8.42	23.4336	-1.47	0.99469	20.0612	-15.13	57.572	2.7	21	559	1154.4	1751	329	808.3	1254	558	16	
76	17	Wto	099	23.53046	-8.25	23.4715	-1.23	0.99497	21.0457	-12.10	56.855	3.7	13	556	1154.2	1753	408	905.3	1411	554	17	
77	18	Śro	100	23.57012	-8.07	23.5054	-0.59	0.99525	22.0334	-8.17	56.338	4.7	6	554	1153.9	1755	443	1002.1	1532	550	18	
78	19	Czw	101	24.00577	-7.50	23.5434	-0.35	0.99553	23.0151	-3.48	56.083	5.7	1	552	1153.6	1757	514	1058.6	1656	546	19	
79	20	Pią	102	0.04543	-7.32	23.5813	-0.12	0.99581	23.5947	0.57	56.126	0.1	0	549	1153.3	1758	544	1154.7	1820	542	20	
80	21	Sob	103	0.08508	-7.15	0.0152	0.12	0.99609	0.5728	5.36	56.469	1.1	2	547	1153.0	1800	613	1250.5	1942	538	21	
81	22	Nie	104	0.12474	-6.57	0.0530	0.36	0.99637	1.5459	9.49	57.078	2.1	6	545	1152.7	1802	643	1346.2	2103	535	22	
82	23	Pon	105	0.16439	-6.39	0.0909	0.59	0.99664	2.5219	13.20	57.893	3.1	13	542	1152.4	1804	716	1441.6	2218	531	23	
83	24	Wto	106	0.20405	-6.21	0.1247	1.23	0.99692	3.4913	15.58	58.834	4.1	21	540	1152.1	1806	753	1536.5	2328	527	24	
84	25	Śro	107	0.24370	-6.03	0.1626	1.47	0.99720	4.4522	17.36	59.820	5.1	31	537	1151.8	1807	836	1630.5	****	523	25	
85	26	Czw	108	0.28336	-5.45	0.2004	2.10	0.99748	5.4018	18.14	60.775	6.1	41	535	1151.5	1809	923	1723.0	029	519	26	
86	27	Pią	109	0.32301	-5.27	0.2343	2.34	0.99776	6.3339	17.54	61.639	0.1	51	533	1151.2	1811	1016	1813.7	122	515	27	
87	28	Sob	110	0.36267	-5.09	0.2721	2.57	0.99804	7.2513	16.44	62.369	1.1	61	530	1150.9	1813	1113	1902.4	207	511	28	
88	29	Nie	111	0.40233	-4.51	0.3060	3.21	0.99832	8.1457	14.48	62.939	2.1	70	528	1150.6	1815	1213	1949.1	244	507	29	
88	29	Nie	111	23.40134	-4.51	0.3051	3.20	0.99831	8.1254	14.54	62.918	2.1	70	628	1250.6	1915	1313	2049.1	344	607	29	
89	30	Pon	112	23.44100	-4.33	0.3429	3.43	0.99859	9.0102	12.23	63.326	3.1	78	625	1250.3	1916	1415	2134.1	415	603	30	
90	31	Wto	113	23.48065	-4.15	0.3808	4.06	0.99887	9.4745	9.23	63.568	4.1	86	623	1250.0	1918	1518	2217.7	442	559	31	

Fazy Księżyca [Dm, h.mm]: Pełn 5, 19.05 3kw 13, 18.48 Now 20, 10.36 1kw 27, 8.42 1kw 27, 9.42

MARZEC 2015 (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	4.39	19.19	5.53	14.44	7.28	20.12	7.22	19.53	14.38	6.04	1.10	9.39	7.34	20.35	6.36	16.60	4.11	12.21		
	22.802	-7.62	21.130	-17.29	0.667	3.56	0.457	2.43	9.171	17.33	16.215	-19.06	0.906	5.13	22.626	-9.47	19.079	-20.46	10.56560	1
3	4.35	19.23	5.52	14.49	7.24	20.19	7.16	19.54	14.29	5.56	1.03	9.31	7.27	20.27	6.29	16.52	4.03	12.13		
	22.927	-6.85	21.298	-16.82	0.815	4.59	0.550	3.06	9.157	17.39	16.218	-19.06	0.912	5.17	22.631	-9.44	19.082	-20.45	10.69702	3
5	4.30	19.27	5.51	14.55	7.19	20.25	7.11	19.55	14.20	5.48	0.55	9.23	7.19	20.20	6.21	16.45	3.56	12.05		
	23.051	-6.08	21.472	-16.27	0.963	5.62	0.643	3.68	9.143	17.45	16.220	-19.07	0.918	5.21	22.635	-9.41	19.085	-20.45	10.82844	5
7	4.25	19.31	5.50	15.02	7.15	20.32	7.05	19.56	14.11	5.39	0.47	9.16	7.11	20.13	6.13	16.38	3.48	11.58		
	23.175	-5.31	21.651	-15.62	1.112	6.64	0.736	4.29	9.130	17.51	16.222	-19.07	0.925	5.25	22.640	-9.38	19.088	-20.45	10.95986	7
9	4.21	19.35	5.49	15.10	7.10	20.38	6.59	19.57	14.02	5.31	0.39	9.08	7.03	20.06	6.05	16.30	3.40	11.50		
	23.298	-4.53	21.835	-14.90	1.261	7.66	0.828	4.90	9.118	17.56	16.224	-19.06	0.931	5.29	22.645	-9.36	19.091	-20.44	11.09127	9
11	4.16	19.39	5.47	15.18	7.06	20.45	6.54	19.58	13.53	5.23	0.32	8.60	6.56	19.58	5.58	16.23	3.32	11.42		
	23.421	-3.75	22.024	-14.08	1.410	8.66	0.921	5.51	9.106	17.61	16.225	-19.06	0.937	5.33	22.650	-9.33	19.094	-20.44	11.22269	11
13	4.10	19.43	5.46	15.27	7.01	20.52	6.48	19.59	13.44	5.15	0.24	8.52	6.48	19.51	5.50	16.15	3.25	11.35		
	23.543	-2.96	22.216	-13.18	1.560	9.64	1.014	6.12	9.095	17.66	16.226	-19.06	0.944	5.37	22.654	-9.30	19.096	-20.44	11.35411	13
15	4.05	19.47	5.44	15.36	6.57	20.58	6.43	20.00	13.35	5.07	0.16	8.44	6.40	19.44	5.42	16.08	3.17	11.27		
	23.666	-2.17	22.412	-12.20	1.710	10.62	1.107	6.72	9.085	17.70	16.226	-19.05	0.951	5.42	22.659	-9.27	19.099	-20.43	11.48553	15
17	4.00	19.51	5.42	15.47	6.53	21.05	6.37	20.01	13.26	4.58	0.08	8.36	6.33	19.37	5.34	16.00	3.09	11.19		
	23.788	-1.38	22.610	-11.14	1.861	11.57	1.200	7.31	9.075	17.74	16.225	-19.05	0.957	5.46	22.664	-9.25	19.101	-20.43	11.61695	17
19	3.55	19.55	5.40	15.57	6.48	21.12	6.32	20.02	13.18	4.50	23.56	8.29	6.25	19.29	5.27	15.53	3.02	11.12		
	23.909	-0.59	22.813	-9.99	2.013	12.51	1.293	7.90	9.066	17.78	16.224	-19.04	0.964	5.50	22.668	-9.22	19.103	-20.43	11.74836	19
21	3.49	19.59	5.37	16.09	6.44	21.18	6.26	20.03	13.09	4.42	23.48	8.21	6.17	19.22	5.19	15.46	2.54	11.04		
	0.031	0.20	23.018	-8.77	2.165	13.43	1.386	8.48	9.058	17.81	16.223	-19.03	0.971	5.54	22.673	-9.19	19.105	-20.43	11.87978	21
23	3.44	20.04	5.35	16.20	6.40	21.25	6.21	20.04	13.01	4.34	23.40	8.13	6.10	19.15	5.11	15.38	2.46	10.56		
	0.152	0.99	23.226	-7.46	2.318	14.33	1.480	9.06	9.051	17.84	16.221	-19.02	0.978	5.59	22.677	-9.17	19.107	-20.43	12.01119	23
25	3.38	20.08	5.32	16.33	6.36	21.32	6.15	20.05	12.52	4.26	23.32	8.05	6.02	19.08	5.04	15.31	2.38	10.48		
	0.274	1.78	23.438	-6.08	2.472	15.21	1.573	9.62	9.044	17.87	16.219	-19.01	0.985	5.63	22.681	-9.14	19.109	-20.42	12.14261	25
27	3.32	20.13	5.29	16.45	6.32	21.38	6.10	20.06	12.44	4.18	23.24	7.57	5.54	19.01	4.56	15.23	2.30	10.41		
	0.395	2.56	23.654	-4.63	2.627	16.06	1.666	10.19	9.039	17.89	16.216	-19.00	0.992	5.68	22.686	-9.12	19.110	-20.42	12.27403	27
29	3.26	20.18	5.26	16.59	6.28	21.45	6.04	20.07	12.36	4.10	23.16	7.49	5.47	18.53	4.48	15.16	2.23	10.33		
	0.517	3.34	23.873	-3.10	2.783	16.89	1.760	10.74	9.034	17.91	16.213	-18.98	0.999	5.72	22.690	-9.09	19.112	-20.42	12.40545	29
29	4.26	21.18	6.26	17.58	7.28	22.45	7.04	21.07	13.36	5.10	0.20	8.49	6.47	19.53	5.48	16.16	3.23	11.33		
	0.514	3.33	23.868	-3.13	2.779	16.87	1.758	10.73	9.034	17.91	16.213	-18.98	0.999	5.72	22.690	-9.09	19.112	-20.42	12.40545	29
31	4.21	21.22	6.23	18.12	7.24	22.52	6.59	21.08	13.28	5.02	0.11	8.41	6.39	19.46	5.40	16.08	3.15	11.25		
	0.635	4.11	0.092	-1.54	2.936	17.68	1.852	11.28	9.030	17.92	16.210	-18.97	1.006	5.76	22.694	-9.07	19.113	-20.42	12.53687	31

KWIECIEŃ 2015

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
91	1	Śro	114	23.52031	-3.57	0.4146	4.30	0.99915	10.3330	6.02	63.656	5.1	92	621	1249.7	1920	1621	2300.4	507	555	1
92	2	Czw	115	23.55596	-3.39	0.4525	4.53	0.99944	11.1844	2.25	63.608	6.1	96	618	1249.4	1922	1724	2342.9	529	551	2
93	3	Pią	116	23.59562	-3.22	0.4904	5.16	0.99972	12.0356	-1.17	63.445	7.1	99	616	1249.1	1924	1828	*****	551	547	3
94	4	Sob	117	0.03527	-3.04	0.5243	5.39	1.00001	12.4937	-4.59	63.185	8.1	100	613	1248.8	1925	1933	025.6	613	543	4
95	5	Nie	118	0.07492	-2.47	0.5622	6.01	1.00030	13.3614	-8.31	62.844	0.9	99	611	1248.5	1927	2038	109.0	636	539	5
96	6	Pon	119	0.11458	-2.29	1.0001	6.24	1.00059	14.2414	-11.43	62.431	1.9	97	609	1248.2	1929	2143	153.8	702	536	6
97	7	Wto	120	0.15423	-2.12	1.0341	6.47	1.00088	15.1354	-14.27	61.951	2.9	92	606	1248.0	1931	2247	240.3	731	532	7
98	8	Śro	121	0.19389	-1.55	1.0720	7.09	1.00117	16.0524	-16.33	61.409	3.9	86	604	1247.7	1933	2349	328.7	806	528	8
99	9	Czw	122	0.23355	-1.39	1.1100	7.32	1.00146	16.5842	-17.51	60.806	4.9	78	602	1247.4	1934	****	419.2	847	524	9
100	10	Pią	123	0.27320	-1.23	1.1441	7.54	1.00175	17.5332	-18.15	60.150	5.9	69	559	1247.1	1936	047	511.5	936	520	10
101	11	Sob	124	0.31286	-1.07	1.1821	8.16	1.00204	18.4929	-17.39	59.454	6.9	58	557	1246.9	1938	139	605.2	1033	516	11
102	12	Nie	125	0.35251	-0.51	1.2202	8.38	1.00233	19.4603	-16.02	58.744	0.3	47	555	1246.6	1940	225	659.7	1139	512	12
103	13	Pon	126	0.39217	-0.35	1.2543	8.60	1.00262	20.4248	-13.26	58.058	1.3	36	552	1246.3	1941	306	754.5	1251	508	13
104	14	Wto	127	0.43182	-0.20	1.2925	9.22	1.00291	21.3927	-9.58	57.446	2.3	25	550	1246.1	1943	340	849.2	1408	504	14
105	15	Śro	128	0.47148	-0.06	1.3306	9.43	1.00320	22.3559	-5.51	56.965	3.3	16	548	1245.8	1945	412	943.8	1527	500	15
106	16	Czw	129	0.51113	0.09	1.3649	10.05	1.00348	23.3231	-1.18	56.672	4.3	8	546	1245.6	1947	441	1038.4	1649	456	16
107	17	Pią	130	0.55079	0.23	1.4031	10.26	1.00377	0.2918	3.21	56.612	5.3	3	543	1245.4	1949	509	1133.3	1811	452	17
108	18	Sob	131	0.59044	0.36	1.4414	10.47	1.00405	1.2631	7.48	56.808	6.3	0	541	1245.1	1950	539	1228.4	1933	448	18
109	19	Nie	132	1.03010	0.49	1.4758	11.08	1.00432	2.2415	11.44	57.255	0.6	1	539	1244.9	1952	610	1324.4	2052	444	19
110	20	Pon	133	1.06575	1.02	1.5141	11.28	1.00460	3.2217	14.52	57.921	1.6	4	537	1244.7	1954	646	1420.6	2206	440	20
111	21	Wto	134	1.10541	1.15	1.5526	11.49	1.00487	4.2008	17.01	58.746	2.6	9	534	1244.5	1956	726	1516.6	2314	437	21
112	22	Śro	135	1.14506	1.26	1.5910	12.09	1.00514	5.1709	18.07	59.661	3.6	16	532	1244.3	1958	812	1611.5	****	433	22
113	23	Czw	136	1.18472	1.38	2.0255	12.29	1.00540	6.1242	18.11	60.588	4.6	25	530	1244.1	1959	905	1704.6	012	429	23
114	24	Pią	137	1.22438	1.49	2.0641	12.49	1.00567	7.0616	17.18	61.459	5.6	35	528	1243.9	2001	1002	1755.5	102	425	24
115	25	Sob	138	1.26403	1.60	2.1027	13.09	1.00593	7.5739	15.37	62.215	6.6	44	526	1243.8	2003	1102	1843.9	143	421	25
116	26	Nie	139	1.30369	2.10	2.1413	13.28	1.00619	8.4655	13.15	62.815	0.4	54	524	1243.6	2005	1204	1930.1	217	417	26
117	27	Pon	140	1.34334	2.19	2.1800	13.48	1.00645	9.3422	10.21	63.233	1.4	64	522	1243.4	2006	1307	2014.4	246	413	27
118	28	Wto	141	1.38300	2.29	2.2147	14.07	1.00670	10.2029	7.04	63.461	2.4	72	519	1243.3	2008	1410	2057.5	311	409	28
119	29	Śro	142	1.42265	2.37	2.2535	14.25	1.00696	11.0548	3.31	63.505	3.4	80	517	1243.1	2010	1513	2140.0	334	405	29
120	30	Czw	143	1.46231	2.46	2.2924	14.44	1.00721	11.5055	-0.11	63.383	4.4	87	515	1243.0	2012	1617	2222.4	356	401	30

Fazy Księżyca [Dm, h.mm]: Pełn 4, 14.06 3kw 12, 5.44 Now 18, 20.57 1kw 26, 1.55

MAJ 2015

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
121	1	Pią	144	1.50196	2.53	2.3312	15.02	1.00747	12.3625	-3.55	63.120	5.4	93	513	1242.9	2014	1722	2305.6	417	357	1	
122	2	Sob	145	1.54162	3.00	2.3702	15.20	1.00772	13.2252	-7.32	62.747	6.4	97	511	1242.7	2015	1827	2350.1	440	353	2	
123	3	Nie	146	1.58127	3.07	2.4052	15.38	1.00797	14.1046	-10.53	62.295	7.4	99	509	1242.6	2017	1933	*****	505	349	3	
124	4	Pon	147	2.02093	3.13	2.4442	15.56	1.00822	15.0027	-13.49	61.794	0.3	100	507	1242.5	2019	2038	036.4	533	345	4	
125	5	Wto	148	2.06058	3.19	2.4833	16.13	1.00847	15.5207	-16.08	61.267	1.3	98	506	1242.4	2021	2142	124.8	606	342	5	
126	6	Śro	149	2.10024	3.23	2.5225	16.30	1.00871	16.4539	-17.41	60.733	2.3	95	504	1242.4	2022	2242	215.3	645	338	6	
127	7	Czw	150	2.13589	3.28	2.5617	16.47	1.00896	17.4043	-18.20	60.204	3.3	89	502	1242.3	2024	2337	307.7	732	334	7	
128	8	Pią	151	2.17555	3.32	3.0010	17.03	1.00920	18.3645	-17.59	59.685	4.3	81	500	1242.2	2026	****	401.5	827	330	8	
129	9	Sob	152	2.21521	3.35	3.0403	17.19	1.00944	19.3306	-16.36	59.182	5.3	72	458	1242.2	2027	026	455.8	930	326	9	
130	10	Nie	153	2.25486	3.37	3.0757	17.35	1.00968	20.2915	-14.15	58.703	6.3	62	456	1242.1	2029	107	550.1	1039	322	10	
131	11	Pon	154	2.29452	3.39	3.1152	17.51	1.00992	21.2451	-11.04	58.263	7.3	50	455	1242.1	2031	143	643.9	1153	318	11	
132	12	Wto	155	2.33417	3.41	3.1547	18.06	1.01015	22.1956	-7.12	57.881	1.0	39	453	1242.1	2032	214	737.0	1310	314	12	
133	13	Śro	156	2.37383	3.42	3.1943	18.21	1.01039	23.1442	-2.52	57.588	2.0	28	451	1242.1	2034	243	829.7	1429	310	13	
134	14	Czw	157	2.41348	3.42	3.2339	18.36	1.01061	0.0935	1.40	57.417	3.0	18	449	1242.0	2036	310	922.5	1548	306	14	
135	15	Pią	158	2.45314	3.42	3.2736	18.50	1.01083	1.0459	6.08	57.402	4.0	10	448	1242.1	2037	338	1015.7	1707	302	15	
136	16	Sob	159	2.49279	3.41	3.3133	19.04	1.01105	2.0112	10.14	57.565	5.0	4	446	1242.1	2039	407	1110.0	1826	258	16	
137	17	Nie	160	2.53245	3.39	3.3531	19.18	1.01127	2.5820	13.42	57.917	6.0	1	445	1242.1	2041	440	1205.1	1942	254	17	
138	18	Pon	161	2.57210	3.37	3.3930	19.31	1.01148	3.5605	16.18	58.447	0.2	0	443	1242.1	2042	517	1301.1	2054	250	18	
139	19	Wto	162	3.01176	3.35	3.4329	19.44	1.01168	4.5349	17.53	59.123	1.2	2	442	1242.2	2044	600	1356.9	2158	246	19	
140	20	Śro	163	3.05142	3.31	3.4729	19.57	1.01188	5.5046	18.23	59.896	2.2	6	440	1242.2	2045	650	1451.8	2253	243	20	
141	21	Czw	164	3.09107	3.28	3.5129	20.09	1.01208	6.4608	17.53	60.707	3.2	12	439	1242.3	2047	746	1544.8	2338	239	21	
142	22	Pią	165	3.13073	3.23	3.5530	20.21	1.01227	7.3923	16.28	61.492	4.2	20	437	1242.4	2048	846	1635.5	****	235	22	
143	23	Sob	166	3.17038	3.19	3.5931	20.33	1.01245	8.3018	14.17	62.192	5.2	28	436	1242.4	2050	949	1723.5	016	231	23	
144	24	Nie	167	3.21004	3.14	4.0333	20.44	1.01263	9.1902	11.32	62.758	6.2	38	435	1242.5	2051	1053	1809.2	048	227	24	
145	25	Pon	168	3.24570	3.08	4.0735	20.55	1.01281	10.0559	8.19	63.152	7.2	47	434	1242.6	2053	1157	1853.1	115	223	25	
146	26	Wto	169	3.28535	3.02	4.1138	21.06	1.01299	10.5141	4.49	63.354	0.7	57	432	1242.7	2054	1300	1935.9	138	219	26	
147	27	Śro	170	3.32501	2.55	4.1541	21.16	1.01316	11.3648	1.08	63.356	1.7	66	431	1242.8	2055	1404	2018.2	201	215	27	
148	28	Czw	171	3.36466	2.48	4.1945	21.26	1.01332	12.2159	-2.36	63.168	2.7	74	430	1242.9	2057	1508	2100.9	222	211	28	
149	29	Pią	172	3.40432	2.40	4.2349	21.36	1.01349	13.0754	-6.17	62.813	3.7	82	429	1243.1	2058	1613	2144.6	244	207	29	
150	30	Sob	173	3.44397	2.32	4.2753	21.45	1.01365	13.5510	-9.46	62.325	4.7	89	428	1243.2	2059	1718	2230.1	308	203	30	
151	31	Nie	174	3.48363	2.24	4.3158	21.54	1.01380	14.4419	-12.53	61.744	5.7	95	427	1243.3	2100	1824	2317.8	334	159	31	

Fazy Księżyca [Dm, h.mm]: Pełn 4, 5.42 3kw 11, 12.36 Now 18, 6.13 1kw 25, 19.19

MAJ 2015 (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	2.33	22.57	5.42	22.19	6.55	0.24	5.40	21.19	11.30	3.01	21.57	6.35	4.40	17.54	3.40	14.11	1.13	9.23		
	2.553	15.04	3.851	22.63	5.461	25.60	3.329	18.57	9.075	17.68	16.106	-18.64	1.114	6.43	22.749	-8.75	19.115	-20.44	14.57385	1
3	2.25	23.06	5.41	22.28	6.55	0.27	5.36	21.20	11.23	2.53	21.49	6.27	4.32	17.47	3.32	14.04	1.05	9.15		
	2.681	15.64	4.037	23.28	5.627	25.78	3.426	18.95	9.084	17.64	16.097	-18.62	1.120	6.47	22.752	-8.74	19.114	-20.44	14.70526	3
5	2.15	23.15	5.39	22.34	6.56	0.31	5.31	21.20	11.16	2.46	21.40	6.19	4.24	17.40	3.24	13.56	0.57	9.07		
	2.809	16.22	4.206	23.78	5.792	25.91	3.523	19.31	9.095	17.59	16.088	-18.59	1.127	6.51	22.754	-8.73	19.112	-20.44	14.83668	5
7	2.05	23.25	5.37	22.38	6.57	0.33	5.27	21.21	11.09	2.38	21.31	6.10	4.17	17.33	3.17	13.48	0.49	8.59		
	2.938	16.78	4.354	24.12	5.956	25.99	3.621	19.67	9.105	17.54	16.078	-18.56	1.133	6.55	22.757	-8.71	19.111	-20.45	14.96810	7
9	1.55	23.36	5.35	22.39	6.59	0.36	5.22	21.21	11.02	2.31	21.23	6.02	4.09	17.25	3.09	13.41	0.42	8.51		
	3.068	17.32	4.481	24.32	6.119	26.03	3.719	20.01	9.117	17.49	16.068	-18.54	1.140	6.59	22.759	-8.70	19.110	-20.45	15.09953	9
11	1.42	23.49	5.33	22.38	7.01	0.37	5.18	21.21	10.55	2.23	21.14	5.54	4.01	17.18	3.01	13.33	0.34	8.43		
	3.198	17.85	4.585	24.38	6.282	26.03	3.816	20.34	9.129	17.44	16.058	-18.51	1.146	6.63	22.761	-8.69	19.108	-20.45	15.23095	11
13	1.28	0.15	5.31	22.34	7.03	0.39	5.14	21.21	10.49	2.16	21.06	5.46	3.54	17.11	2.53	13.25	0.26	8.35		
	3.329	18.35	4.667	24.31	6.444	25.98	3.914	20.66	9.142	17.38	16.048	-18.48	1.152	6.66	22.763	-8.68	19.106	-20.46	15.36236	13
15	1.09	1.06	5.28	22.28	7.05	0.40	5.09	21.22	10.42	2.08	20.57	5.37	3.46	17.04	2.45	13.18	0.18	8.27		
	3.460	18.83	4.725	24.12	6.604	25.90	4.013	20.97	9.156	17.31	16.038	-18.45	1.159	6.70	22.765	-8.66	19.105	-20.46	15.49378	15
17	*****	*****	5.25	22.20	7.08	0.40	5.05	21.22	10.35	2.01	20.48	5.29	3.38	16.56	2.38	13.10	0.10	8.19		
	3.592	19.30	4.760	23.81	6.763	25.77	4.111	21.26	9.170	17.25	16.028	-18.42	1.165	6.74	22.767	-8.65	19.103	-20.47	15.62520	17
19	*****	*****	5.21	22.10	7.11	0.40	5.01	21.22	10.29	1.54	20.40	5.21	3.31	16.49	2.30	13.02	0.02	8.11		
	3.725	19.74	4.772	23.39	6.920	25.59	4.210	21.53	9.185	17.18	16.018	-18.39	1.170	6.77	22.769	-8.65	19.101	-20.47	15.75662	19
21	*****	*****	5.16	21.57	7.14	0.40	4.57	21.22	10.22	1.46	20.31	5.12	3.23	16.42	2.22	12.55	23.50	8.03		
	3.858	20.16	4.761	22.88	7.075	25.38	4.308	21.80	9.200	17.11	16.008	-18.37	1.176	6.81	22.770	-8.64	19.099	-20.48	15.88804	21
23	*****	*****	5.11	21.43	7.18	0.39	4.54	21.22	10.16	1.39	20.22	5.04	3.15	16.34	2.14	12.47	23.42	7.55		
	3.992	20.55	4.731	22.29	7.229	25.13	4.407	22.05	9.216	17.04	15.997	-18.34	1.182	6.84	22.772	-8.63	19.096	-20.48	16.01946	23
25	*****	*****	5.05	21.27	7.22	0.38	4.50	21.22	10.10	1.31	20.14	4.56	3.07	16.27	2.06	12.39	23.34	7.47		
	4.126	20.92	4.683	21.63	7.380	24.84	4.506	22.28	9.233	16.96	15.987	-18.31	1.188	6.88	22.773	-8.62	19.094	-20.49	16.15088	25
27	*****	*****	4.59	21.11	7.25	0.36	4.46	21.21	10.03	1.24	20.05	4.47	2.60	16.20	1.58	12.31	23.26	7.39		
	4.261	21.27	4.622	20.92	7.529	24.52	4.605	22.51	9.250	16.88	15.977	-18.28	1.193	6.91	22.774	-8.62	19.092	-20.49	16.28230	27
29	*****	*****	4.52	20.53	7.29	0.34	4.43	21.21	9.57	1.17	19.56	4.39	2.52	16.12	1.51	12.24	23.18	7.31		
	4.397	21.60	4.553	20.19	7.676	24.16	4.704	22.72	9.267	16.80	15.967	-18.26	1.198	6.94	22.775	-8.61	19.089	-20.50	16.41372	29
31	*****	*****	4.45	20.36	7.33	0.32	4.39	21.21	9.51	1.09	19.48	4.31	2.44	16.05	1.43	12.16	23.10	7.23		
	4.533	21.89	4.480	19.48	7.820	23.77	4.804	22.91	9.285	16.72	15.956	-18.23	1.203	6.97	22.776	-8.61	19.086	-20.51	16.54514	31

CZERWIEC 2015

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
152	1	Pon	175	3.52328	2.15	4.3604	22.02	1.01396	15.3541	-15.29	61.116	6.7	98	426	1243.5	2102	1930	*****	405	155	1	
153	2	Wto	176	3.56294	2.06	4.4009	22.10	1.01411	16.2918	-17.21	60.484	7.7	100	425	1243.6	2103	2033	008.0	441	151	2	
154	3	Śro	177	4.00259	1.57	4.4415	22.18	1.01426	17.2452	-18.19	59.887	0.7	99	425	1243.8	2104	2132	100.6	526	147	3	
155	4	Czw	178	4.04225	1.47	4.4822	22.25	1.01441	18.2147	-18.17	59.355	1.7	96	424	1244.0	2105	2224	155.1	619	144	4	
156	5	Pią	179	4.08191	1.36	4.5229	22.32	1.01455	19.1913	-17.11	58.905	2.7	91	423	1244.1	2106	2309	250.5	720	140	5	
157	6	Sob	180	4.12156	1.26	4.5636	22.38	1.01469	20.1621	-15.04	58.546	3.7	84	422	1244.3	2107	2347	346.0	829	136	6	
158	7	Nie	181	4.16122	1.15	5.0044	22.44	1.01483	21.1239	-12.02	58.277	4.7	75	422	1244.5	2108	****	440.6	943	132	7	
159	8	Pon	182	4.20087	1.03	5.0451	22.50	1.01496	22.0754	-8.18	58.093	5.7	64	421	1244.7	2109	019	534.1	1059	128	8	
160	9	Wto	183	4.24053	0.52	5.0859	22.55	1.01509	23.0217	-4.06	57.991	6.7	53	421	1244.9	2110	049	626.6	1216	124	9	
161	10	Śro	184	4.28018	0.40	5.1308	22.60	1.01522	23.5611	0.21	57.968	0.8	41	420	1245.1	2110	116	718.4	1334	120	10	
162	11	Czw	185	4.31584	0.28	5.1716	23.04	1.01534	0.5008	4.47	58.029	1.8	30	420	1245.3	2111	142	810.2	1452	116	11	
163	12	Pią	186	4.35549	0.16	5.2125	23.08	1.01546	1.4438	8.56	58.183	2.8	20	419	1245.5	2112	210	902.5	1609	112	12	
164	13	Sob	187	4.39515	0.03	5.2534	23.12	1.01557	2.3959	12.34	58.438	3.8	12	419	1245.7	2113	240	955.7	1724	108	13	
165	14	Nie	188	4.43481	-0.09	5.2944	23.15	1.01567	3.3614	15.28	58.803	4.8	6	419	1245.9	2113	314	1049.9	1836	104	14	
166	15	Pon	189	4.47446	-0.22	5.3353	23.18	1.01577	4.3305	17.26	59.274	5.8	2	419	1246.1	2114	353	1144.8	1943	100	15	
167	16	Wto	190	4.51412	-0.35	5.3802	23.20	1.01587	5.2952	18.22	59.840	6.8	0	419	1246.3	2114	439	1239.7	2042	056	16	
168	17	Śro	191	4.55377	-0.48	5.4212	23.22	1.01595	6.2547	18.17	60.475	0.8	1	419	1246.6	2115	532	1333.5	2132	052	17	
169	18	Czw	192	4.59343	-1.01	5.4622	23.24	1.01604	7.2008	17.13	61.141	1.8	4	419	1246.8	2115	631	1425.6	2214	049	18	
170	19	Pią	193	5.03309	-1.15	5.5031	23.25	1.01611	8.1224	15.19	61.793	2.8	9	419	1247.0	2115	733	1515.3	2248	045	19	
171	20	Sob	194	5.07274	-1.28	5.5441	23.26	1.01618	9.0227	12.45	62.384	3.8	15	419	1247.2	2116	837	1602.6	2317	041	20	
172	21	Nie	195	5.11240	-1.41	5.5851	23.26	1.01625	9.5028	9.40	62.866	4.8	23	419	1247.4	2116	941	1647.7	2343	037	21	
173	22	Pon	196	5.15205	-1.54	6.0300	23.26	1.01630	10.3653	6.14	63.200	5.8	31	419	1247.6	2116	1046	1731.2	****	033	22	
174	23	Wto	197	5.19171	-2.07	6.0710	23.25	1.01636	11.2216	2.36	63.354	6.8	40	419	1247.9	2116	1149	1813.7	006	029	23	
175	24	Śro	198	5.23136	-2.20	6.1120	23.25	1.01641	12.0716	-1.08	63.312	7.8	50	420	1248.1	2116	1253	1855.9	027	025	24	
176	25	Czw	199	5.27102	-2.33	6.1529	23.23	1.01645	12.5234	-4.51	63.072	1.0	59	420	1248.3	2116	1357	1938.8	049	021	25	
177	26	Pią	200	5.31067	-2.45	6.1938	23.21	1.01649	13.3854	-8.24	62.645	2.0	68	421	1248.5	2116	1502	2023.0	111	017	26	
178	27	Sob	201	5.35033	-2.58	6.2347	23.19	1.01653	14.2653	-11.40	62.060	3.0	77	421	1248.7	2116	1607	2109.2	136	013	27	
179	28	Nie	202	5.38599	-3.10	6.2756	23.17	1.01656	15.1702	-14.29	61.359	4.0	85	422	1248.9	2116	1713	2158.0	204	009	28	
180	29	Pon	203	5.42564	-3.22	6.3205	23.14	1.01659	16.0941	-16.40	60.593	5.0	92	422	1249.1	2116	1818	2249.6	237	005	29	
181	30	Wto	204	5.46530	-3.34	6.3613	23.10	1.01661	17.0447	-18.03	59.821	6.0	97	423	1249.3	2116	1919	2343.7	318	001	30	

Fazy Księżyca [Dm, h.mm]: Pełn 2, 18.19 3kw 9, 17.42 Nów 16, 16.05 1kw 24, 13.03

CZERWIEC 2015 (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	****	****	4.41	20.28	7.35	0.30	4.38	21.20	9.48	1.06	19.43	4.27	2.40	16.01	1.39	12.12	23.06	7.19		
	4.601	22.03	4.444	19.13	7.891	23.56	4.853	23.00	9.295	16.67	15.951	-18.22	1.206	6.98	22.777	-8.61	19.085	-20.51	16.61085	1
3	****	****	4.34	20.12	7.39	0.27	4.34	21.20	9.41	0.58	19.35	4.18	2.33	15.54	1.31	12.04	22.58	7.11		
	4.738	22.29	4.376	18.50	8.031	23.12	4.953	23.18	9.313	16.58	15.941	-18.19	1.211	7.01	22.777	-8.60	19.082	-20.52	16.74227	3
5	****	****	4.26	19.56	7.43	0.24	4.31	21.19	9.35	0.51	19.26	4.10	2.25	15.46	1.23	11.56	22.50	7.03		
	4.875	22.53	4.317	17.94	8.168	22.65	5.052	23.33	9.333	16.49	15.932	-18.16	1.216	7.04	22.778	-8.60	19.079	-20.52	16.87369	5
7	****	****	4.18	19.43	7.47	0.21	4.28	21.18	9.29	0.44	19.17	4.02	2.17	15.39	1.15	11.48	22.42	6.55		
	5.012	22.74	4.270	17.49	8.301	22.15	5.151	23.48	9.353	16.40	15.922	-18.14	1.220	7.07	22.778	-8.60	19.077	-20.53	17.00512	7
9	****	****	4.11	19.31	7.51	0.17	4.25	21.17	9.23	0.37	19.09	3.54	2.09	15.31	1.07	11.41	22.34	6.47		
	5.150	22.92	4.239	17.16	8.432	21.63	5.250	23.61	9.373	16.30	15.912	-18.11	1.225	7.10	22.779	-8.60	19.074	-20.54	17.13653	9
11	****	****	4.03	19.21	7.54	0.12	4.22	21.16	9.17	0.29	19.00	3.45	2.02	15.24	0.60	11.33	22.26	6.39		
	5.288	23.07	4.226	16.97	8.559	21.08	5.350	23.73	9.393	16.21	15.903	-18.09	1.229	7.12	22.779	-8.60	19.071	-20.54	17.26795	11
13	****	****	3.56	19.13	7.58	0.08	4.20	21.15	9.11	0.22	18.52	3.37	1.54	15.16	0.52	11.25	22.18	6.30		
	5.426	23.20	4.232	16.91	8.683	20.51	5.449	23.83	9.415	16.11	15.894	-18.07	1.233	7.15	22.779	-8.60	19.067	-20.55	17.39937	13
15	****	****	3.49	19.07	8.02	0.03	4.17	21.14	9.05	0.15	18.43	3.29	1.46	15.09	0.44	11.17	22.10	6.22		
	5.565	23.30	4.258	16.98	8.804	19.93	5.548	23.92	9.436	16.00	15.885	-18.04	1.238	7.17	22.779	-8.60	19.064	-20.56	17.53079	15
17	****	****	3.43	19.03	8.05	23.54	4.14	21.13	8.59	0.08	18.35	3.21	1.38	15.01	0.36	11.09	22.02	6.14		
	5.703	23.37	4.303	17.17	8.920	19.32	5.647	23.99	9.458	15.90	15.876	-18.02	1.241	7.19	22.778	-8.61	19.061	-20.57	17.66221	17
19	****	****	3.37	19.01	8.08	23.49	4.12	21.11	8.54	23.57	18.26	3.12	1.31	14.54	0.28	11.01	21.54	6.06		
	5.842	23.42	4.369	17.47	9.033	18.70	5.746	24.05	9.480	15.79	15.867	-18.00	1.245	7.22	22.778	-8.61	19.058	-20.57	17.79364	19
21	****	****	3.32	19.01	8.11	23.43	4.10	21.10	8.48	23.49	18.18	3.04	1.23	14.46	0.20	10.53	21.46	5.58		
	5.981	23.43	4.454	17.87	9.141	18.06	5.845	24.09	9.503	15.68	15.859	-17.98	1.249	7.24	22.778	-8.61	19.054	-20.58	17.92506	21
23	****	****	3.27	19.03	8.13	23.37	4.08	21.08	8.42	23.42	18.09	2.56	1.15	14.39	0.12	10.45	21.38	5.50		
	6.119	23.42	4.559	18.35	9.245	17.41	5.944	24.12	9.526	15.57	15.851	-17.96	1.252	7.25	22.777	-8.62	19.051	-20.59	18.05648	23
25	****	****	3.23	19.06	8.16	23.31	4.05	21.06	8.36	23.35	18.01	2.48	1.07	14.31	0.05	10.37	21.30	5.42		
	6.258	23.39	4.683	18.89	9.345	16.75	6.043	24.14	9.549	15.45	15.843	-17.94	1.255	7.27	22.776	-8.63	19.048	-20.60	18.18789	25
27	****	****	3.19	19.11	8.18	23.25	4.03	21.04	8.30	23.28	17.52	2.39	0.60	14.24	23.53	10.29	21.22	5.34		
	6.396	23.32	4.826	19.48	9.440	16.09	6.141	24.14	9.573	15.34	15.836	-17.93	1.258	7.29	22.775	-8.63	19.044	-20.61	18.31931	27
29	****	****	3.17	19.17	8.20	23.18	4.02	21.02	8.25	23.21	17.44	2.31	0.52	14.16	23.45	10.21	21.14	5.25		
	6.535	23.23	4.988	20.10	9.530	15.42	6.239	24.13	9.596	15.22	15.829	-17.91	1.261	7.31	22.774	-8.64	19.041	-20.62	18.45074	29

LIPIEC 2015

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
182	1	Śro	205	5.50495	-3.46	6.4021	23.07	1.01663	18.0155	-18.26	59.100	7.0	99	423	1249.5	2115	2016	*****	407	2353	1
183	2	Czw	206	5.54461	-3.57	6.4429	23.02	1.01665	19.0018	-17.44	58.484	0.3	100	424	1249.7	2115	2105	039.8	506	2350	2
184	3	Pią	207	5.58427	-4.08	6.4837	22.58	1.01666	19.5858	-15.56	58.011	1.3	98	425	1249.9	2114	2147	136.6	613	2346	3
185	4	Sob	208	6.02392	-4.19	6.5245	22.53	1.01667	20.5702	-13.08	57.703	2.3	93	426	1250.1	2114	2222	233.2	727	2342	4
186	5	Nie	209	6.06358	-4.30	6.5652	22.47	1.01668	21.5359	-9.31	57.565	3.3	86	427	1250.2	2113	2254	328.8	845	2338	5
187	6	Pon	210	6.10323	-4.40	7.0058	22.42	1.01668	22.4941	-5.21	57.583	4.3	77	427	1250.4	2113	2322	422.9	1003	2334	6
188	7	Wto	211	6.14289	-4.50	7.0505	22.36	1.01668	23.4422	-0.53	57.735	5.3	66	428	1250.6	2112	2349	515.8	1122	2330	7
189	8	Śro	212	6.18254	-4.60	7.0911	22.29	1.01668	0.3828	3.35	57.992	6.3	55	429	1250.7	2111	****	607.9	1240	2326	8
190	9	Czw	213	6.22220	-5.09	7.1317	22.22	1.01667	1.3231	7.49	58.328	0.6	44	430	1250.9	2111	016	659.7	1357	2322	9
191	10	Pią	214	6.26185	-5.17	7.1722	22.15	1.01665	2.2655	11.34	58.722	1.6	33	432	1251.0	2110	044	751.9	1512	2318	10
192	11	Sob	215	6.30151	-5.26	7.2127	22.07	1.01663	3.2156	14.38	59.162	2.6	23	433	1251.2	2109	116	844.8	1624	2314	11
193	12	Nie	216	6.34117	-5.34	7.2531	21.59	1.01661	4.1729	16.51	59.638	3.6	14	434	1251.3	2108	152	938.2	1732	2310	12
194	13	Pon	217	6.38082	-5.41	7.2935	21.50	1.01658	5.1314	18.07	60.146	4.6	8	435	1251.4	2107	235	1032.0	1833	2306	13
195	14	Wto	218	6.42048	-5.48	7.3339	21.41	1.01654	6.0835	18.23	60.679	5.6	3	436	1251.6	2106	324	1125.3	1926	2302	14
196	15	Śro	219	6.46013	-5.55	7.3742	21.32	1.01650	7.0253	17.41	61.227	6.6	0	437	1251.7	2105	419	1217.6	2010	2258	15
197	16	Czw	220	6.49579	-6.01	7.4145	21.23	1.01645	7.5535	16.06	61.773	0.4	0	439	1251.8	2104	519	1307.9	2048	2254	16
198	17	Pią	221	6.53545	-6.06	7.4547	21.13	1.01640	8.4621	13.46	62.294	1.4	2	440	1251.9	2103	623	1356.2	2119	2251	17
199	18	Sob	222	6.57510	-6.11	7.4948	21.02	1.01633	9.3511	10.52	62.757	2.4	5	441	1251.9	2102	727	1442.3	2146	2247	18
200	19	Nie	223	7.01476	-6.16	7.5349	20.52	1.01627	10.2218	7.34	63.130	3.4	11	443	1252.0	2100	831	1526.6	2210	2243	19
201	20	Pon	224	7.05441	-6.20	7.5750	20.41	1.01620	11.0807	3.59	63.379	4.4	17	444	1252.1	2059	936	1609.6	2233	2239	20
202	21	Wto	225	7.09407	-6.23	8.0150	20.29	1.01612	11.5313	0.17	63.473	5.4	25	445	1252.1	2058	1039	1651.9	2254	2235	21
203	22	Śro	226	7.13372	-6.26	8.0549	20.18	1.01603	12.3811	-3.26	63.388	6.4	34	447	1252.2	2056	1143	1734.2	2316	2231	22
204	23	Czw	227	7.17338	-6.28	8.0948	20.05	1.01594	13.2343	-7.01	63.114	7.4	43	448	1252.2	2055	1246	1817.2	2339	2227	23
205	24	Pią	228	7.21303	-6.29	8.1346	19.53	1.01585	14.1026	-10.21	62.649	0.2	52	450	1252.2	2054	1351	1901.8	****	2223	24
206	25	Sob	229	7.25269	-6.30	8.1743	19.40	1.01575	14.5858	-13.19	62.010	1.2	62	451	1252.3	2052	1455	1948.5	005	2219	25
207	26	Nie	230	7.29234	-6.31	8.2140	19.27	1.01565	15.4947	-15.45	61.231	2.2	72	453	1252.3	2051	1600	2037.9	035	2215	26
208	27	Pon	231	7.33200	-6.30	8.2536	19.14	1.01555	16.4308	-17.28	60.359	3.2	80	454	1252.3	2049	1702	2130.1	112	2211	27
209	28	Wto	232	7.37166	-6.29	8.2932	19.00	1.01544	17.3858	-18.18	59.456	4.2	88	456	1252.2	2047	1801	2224.9	156	2207	28
210	29	Śro	233	7.41131	-6.28	8.3327	18.46	1.01533	18.3648	-18.05	58.593	5.2	94	457	1252.2	2046	1854	2321.6	249	2203	29
211	30	Czw	234	7.45097	-6.26	8.3721	18.32	1.01521	19.3550	-16.46	57.839	6.2	99	459	1252.2	2044	1940	*****	353	2159	30
212	31	Pią	235	7.49062	-6.23	8.4115	18.17	1.01509	20.3509	-14.21	57.259	7.2	100	501	1252.1	2043	2020	019.2	504	2156	31

Fazy Księżyca [Dm, h.mm]: Pełn 2, 4.20 3kw 8, 22.24 Nów 16, 3.24 1kw 24, 6.04 Pełn 31, 12.43

LIPIEC 2015 (c.d.)

Światy, 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	****	****	3.15	19.24	8.21	23.11	3.60	20.60	8.19	23.14	17.36	2.23	0.44	14.08	23.37	10.13	21.06	5.17		
	6.673	23.11	5.170	20.73	9.615	14.75	6.337	24.11	9.621	15.10	15.822	-17.90	1.263	7.32	22.773	-8.65	19.037	-20.62	18.58216	1
3	****	****	3.15	19.33	8.22	23.04	3.58	20.58	8.13	23.06	17.27	2.15	0.36	14.01	23.29	10.06	20.58	5.09		
	6.810	22.96	5.370	21.35	9.694	14.08	6.435	24.07	9.645	14.98	15.815	-17.88	1.266	7.33	22.772	-8.66	19.034	-20.63	18.71358	3
5	****	****	3.16	19.43	8.22	22.56	3.56	20.55	8.08	22.59	17.19	2.07	0.28	13.53	23.21	9.58	20.50	5.01		
	6.948	22.79	5.590	21.93	9.767	13.42	6.532	24.02	9.670	14.85	15.809	-17.87	1.268	7.35	22.770	-8.67	19.030	-20.64	18.84500	5
7	****	****	3.19	19.53	8.22	22.49	3.55	20.53	8.02	22.52	17.11	1.59	0.21	13.45	23.13	9.49	20.42	4.53		
	7.085	22.59	5.828	22.45	9.834	12.76	6.629	23.95	9.695	14.73	15.804	-17.86	1.270	7.36	22.769	-8.68	19.027	-20.65	18.97642	7
9	****	****	3.23	20.04	8.22	22.41	3.53	20.50	7.57	22.45	17.02	1.50	0.13	13.38	23.05	9.41	20.34	4.45		
	7.221	22.37	6.083	22.89	9.895	12.11	6.726	23.87	9.720	14.60	15.798	-17.85	1.272	7.37	22.767	-8.69	19.023	-20.66	19.10784	9
11	****	****	3.29	20.14	8.21	22.32	3.52	20.47	7.51	22.38	16.54	1.42	0.05	13.30	22.58	9.33	20.26	4.37		
	7.357	22.12	6.354	23.21	9.948	11.48	6.823	23.78	9.745	14.47	15.793	-17.84	1.274	7.38	22.765	-8.70	19.020	-20.67	19.23926	11
13	****	****	3.36	20.25	8.19	22.24	3.51	20.44	7.46	22.31	16.46	1.34	23.53	13.22	22.50	9.25	20.18	4.29		
	7.493	21.84	6.639	23.39	9.995	10.86	6.919	23.67	9.771	14.34	15.789	-17.84	1.275	7.38	22.763	-8.71	19.016	-20.68	19.37068	13
15	****	****	3.46	20.35	8.17	22.15	3.50	20.41	7.40	22.24	16.38	1.26	23.45	13.15	22.42	9.17	20.10	4.20		
	7.628	21.54	6.936	23.41	10.034	10.26	7.015	23.56	9.797	14.21	15.785	-17.83	1.276	7.39	22.762	-8.73	19.013	-20.68	19.50210	15
17	****	****	3.58	20.44	8.15	22.05	3.49	20.38	7.35	22.16	16.30	1.18	23.38	13.07	22.34	9.09	20.02	4.12		
	7.763	21.21	7.239	23.26	10.065	9.69	7.111	23.42	9.823	14.07	15.781	-17.83	1.277	7.40	22.759	-8.74	19.010	-20.69	19.63353	17
19	****	****	4.11	20.52	8.11	21.56	3.48	20.35	7.29	22.09	16.22	1.10	23.30	12.59	22.26	9.01	19.54	4.04		
	7.897	20.86	7.547	22.92	10.087	9.14	7.206	23.28	9.849	13.94	15.778	-17.82	1.278	7.40	22.757	-8.75	19.006	-20.70	19.76495	19
21	****	****	4.25	20.59	8.07	21.46	3.47	20.31	7.24	22.02	16.14	1.02	23.22	12.51	22.18	8.53	19.46	3.56		
	8.030	20.49	7.853	22.41	10.101	8.62	7.301	23.13	9.875	13.80	15.775	-17.82	1.279	7.40	22.755	-8.77	19.003	-20.71	19.89636	21
23	****	****	4.40	21.04	8.02	21.35	3.46	20.28	7.18	21.55	16.06	0.54	23.14	12.43	22.10	8.45	19.38	3.48		
	8.163	20.09	8.156	21.73	10.105	8.14	7.395	22.96	9.902	13.66	15.772	-17.82	1.279	7.40	22.753	-8.78	18.999	-20.72	20.02778	23
25	****	****	4.56	21.08	7.56	21.25	3.45	20.24	7.13	21.48	15.58	0.46	23.06	12.35	22.02	8.37	19.30	3.40		
	8.295	19.67	8.452	20.89	10.099	7.71	7.489	22.78	9.929	13.52	15.770	-17.82	1.279	7.40	22.750	-8.80	18.996	-20.73	20.15920	25
27	****	****	5.13	21.10	7.50	21.14	3.44	20.20	7.07	21.41	15.50	0.38	22.58	12.28	21.54	8.29	19.22	3.32		
	8.427	19.23	8.739	19.92	10.084	7.31	7.583	22.59	9.955	13.38	15.769	-17.83	1.279	7.40	22.747	-8.82	18.993	-20.74	20.29062	27
29	1.05	0.04	5.29	21.11	7.42	21.03	3.43	20.16	7.02	21.34	15.42	0.30	22.51	12.20	21.46	8.21	19.14	3.24		
	8.558	18.77	9.016	18.83	10.058	6.97	7.676	22.38	9.982	13.24	15.767	-17.83	1.279	7.40	22.745	-8.83	18.990	-20.75	20.42204	29
31	1.32	-0.04	5.45	21.11	7.34	20.51	3.43	20.13	6.57	21.27	15.34	0.22	22.43	12.12	21.38	8.13	19.06	3.15		
	8.688	18.29	9.283	17.65	10.022	6.69	7.769	22.17	10.009	13.09	15.767	-17.84	1.279	7.40	22.742	-8.85	18.987	-20.76	20.55346	31

SIERPIEŃ 2015

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
213	1	Sob	236	7.53028	-6.20	8.4509	18.02	1.01497	21.3356	-10.59	56.898	1.0	99	502	1252.1	2041	2054	116.5	622	2152	1	
214	2	Nie	237	7.56593	-6.16	8.4901	17.47	1.01485	22.3143	-6.54	56.777	2.0	94	504	1252.0	2039	2124	213.0	743	2148	2	
215	3	Pon	238	8.00559	-6.11	8.5253	17.32	1.01472	23.2825	-2.24	56.890	3.0	88	505	1251.9	2037	2153	308.2	904	2144	3	
216	4	Wto	239	8.04524	-6.06	8.5645	17.16	1.01459	0.2413	2.12	57.207	4.0	79	507	1251.8	2035	2221	402.3	1025	2140	4	
217	5	Śro	240	8.08490	-6.00	9.0035	16.60	1.01445	1.1929	6.36	57.684	5.0	69	509	1251.8	2034	2249	455.6	1144	2136	5	
218	6	Czw	241	8.12455	-5.54	9.0426	16.44	1.01432	2.1435	10.32	58.267	6.0	58	510	1251.6	2032	2320	548.7	1301	2132	6	
219	7	Pią	242	8.16421	-5.47	9.0815	16.27	1.01418	3.0946	13.48	58.908	0.3	46	512	1251.5	2030	2355	641.8	1415	2128	7	
220	8	Sob	243	8.20387	-5.40	9.1204	16.10	1.01403	4.0505	16.15	59.568	1.3	35	514	1251.4	2028	****	735.0	1524	2124	8	
221	9	Nie	244	8.24352	-5.32	9.1553	15.53	1.01388	5.0019	17.45	60.215	2.3	26	515	1251.3	2026	035	828.3	1626	2120	9	
222	10	Pon	245	8.28318	-5.23	9.1941	15.36	1.01373	5.5507	18.17	60.831	3.3	17	517	1251.1	2024	121	921.1	1721	2116	10	
223	11	Wto	246	8.32283	-5.14	9.2328	15.18	1.01357	6.4858	17.52	61.407	4.3	10	519	1251.0	2022	214	1012.9	1808	2112	11	
224	12	Śro	247	8.36249	-5.04	9.2715	15.00	1.01340	7.4127	16.33	61.936	5.3	5	520	1250.8	2020	311	1103.2	1848	2108	12	
225	13	Czw	248	8.40214	-4.54	9.3101	14.42	1.01324	8.3217	14.29	62.414	6.3	1	522	1250.6	2018	413	1151.7	1921	2104	13	
226	14	Pią	249	8.44180	-4.43	9.3447	14.24	1.01306	9.2122	11.47	62.832	7.3	0	524	1250.5	2016	516	1238.3	1950	2100	14	
227	15	Sob	250	8.48146	-4.32	9.3832	14.05	1.01288	10.0851	8.38	63.181	0.8	1	526	1250.3	2014	620	1323.1	2015	2057	15	
228	16	Nie	251	8.52111	-4.20	9.4217	13.46	1.01270	10.5501	5.09	63.443	1.8	3	527	1250.1	2012	724	1406.5	2038	2053	16	
229	17	Pon	252	8.56077	-4.08	9.4601	13.27	1.01251	11.4020	1.29	63.598	2.8	7	529	1249.9	2010	828	1449.1	2100	2049	17	
230	18	Wto	253	9.00042	-3.55	9.4945	13.08	1.01231	12.2517	-2.12	63.624	3.8	13	531	1249.7	2007	931	1531.3	2121	2045	18	
231	19	Śro	254	9.04007	-3.41	9.5328	12.48	1.01212	13.1025	-5.48	63.500	4.8	19	532	1249.4	2005	1035	1613.8	2144	2041	19	
232	20	Czw	255	9.07573	-3.27	9.5711	12.29	1.01191	13.5620	-9.12	63.210	5.8	27	534	1249.2	2003	1138	1657.2	2208	2037	20	
233	21	Pią	256	9.11539	-3.13	10.0053	12.09	1.01171	14.4335	-12.15	62.745	6.8	36	536	1249.0	2001	1241	1742.3	2236	2033	21	
234	22	Sob	257	9.15504	-2.58	10.0434	11.49	1.01149	15.3239	-14.49	62.109	7.8	46	538	1248.7	1959	1345	1829.4	2309	2029	22	
235	23	Nie	258	9.19470	-2.42	10.0815	11.29	1.01128	16.2353	-16.46	61.321	0.6	56	539	1248.5	1956	1446	1919.0	2348	2025	23	
236	24	Pon	259	9.23435	-2.27	10.1156	11.08	1.01106	17.1728	-17.56	60.416	1.6	66	541	1248.2	1954	1546	2011.2	****	2021	24	
237	25	Wto	260	9.27401	-2.10	10.1536	10.48	1.01084	18.1314	-18.10	59.448	2.6	76	543	1247.9	1952	1640	2105.7	036	2017	25	
238	26	Śro	261	9.31366	-1.54	10.1916	10.27	1.01062	19.1046	-17.22	58.484	3.6	85	544	1247.6	1950	1729	2202.0	133	2013	26	
239	27	Czw	262	9.35332	-1.36	10.2256	10.06	1.01040	20.0924	-15.28	57.603	4.6	92	546	1247.4	1947	1812	2259.1	240	2009	27	
240	28	Pią	263	9.39297	-1.19	10.2635	9.45	1.01017	21.0826	-12.32	56.884	5.6	97	548	1247.1	1945	1849	2356.3	354	2005	28	
241	29	Sob	264	9.43263	-1.01	10.3013	9.24	1.00994	22.0715	-8.44	56.395	6.6	100	550	1246.8	1943	1922	*****	514	2001	29	
242	30	Nie	265	9.47228	-0.43	10.3352	9.02	1.00971	23.0533	-4.19	56.182	0.6	99	551	1246.5	1940	1952	053.1	636	1958	30	
243	31	Pon	266	9.51194	-0.24	10.3730	8.41	1.00948	0.0316	0.22	56.261	1.6	96	553	1246.2	1938	2021	149.3	800	1954	31	

Fazy Księżyca [Dm, h.mm]: Pełn 0, 12.43 3kw 7, 4.03 Now 14, 16.53 1kw 22, 21.31 Pełn 29, 20.35

WRZESIEŃ 2015

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
244	1	Wto	267	9.55159	-0.05	10.4107	8.19	1.00925	1.0032	4.60	56.613	2.6	90	555	1245.8	1936	2050	244.8	922	1950	1	
245	2	Śro	268	9.59125	0.14	10.4445	7.57	1.00901	1.5732	9.14	57.191	3.6	82	556	1245.5	1933	2122	340.0	1043	1946	2	
246	3	Czw	269	10.03090	0.33	10.4822	7.36	1.00878	2.5422	12.49	57.930	4.6	72	558	1245.2	1931	2156	434.9	1201	1942	3	
247	4	Pią	270	10.07056	0.53	10.5159	7.13	1.00854	3.5059	15.34	58.759	5.6	61	600	1244.9	1929	2235	529.7	1313	1938	4	
248	5	Sob	271	10.11021	1.13	10.5535	6.51	1.00830	4.4709	17.20	59.613	0.0	50	601	1244.5	1926	2320	624.0	1419	1934	5	
249	6	Nie	272	10.14587	1.33	10.5912	6.29	1.00806	5.4231	18.07	60.438	1.0	39	603	1244.2	1924	****	717.6	1517	1930	6	
250	7	Pon	273	10.18552	1.53	11.0248	6.07	1.00782	6.3640	17.56	61.195	2.0	29	605	1243.9	1922	011	809.9	1607	1926	7	
251	8	Wto	274	10.22518	2.14	11.0624	5.44	1.00757	7.2916	16.51	61.862	3.0	21	607	1243.5	1919	106	900.5	1648	1922	8	
252	9	Śro	275	10.26484	2.35	11.0960	5.22	1.00732	8.2007	14.59	62.428	4.0	13	608	1243.2	1917	206	949.2	1723	1918	9	
253	10	Czw	276	10.30449	2.55	11.1336	4.59	1.00707	9.0914	12.28	62.889	5.0	7	610	1242.8	1914	308	1035.9	1753	1914	10	
254	11	Pią	277	10.34415	3.16	11.1711	4.36	1.00681	9.5648	9.27	63.247	6.0	3	612	1242.5	1912	412	1121.0	1819	1910	11	
255	12	Sob	278	10.38380	3.37	11.2047	4.13	1.00655	10.4305	6.04	63.507	7.0	1	613	1242.1	1910	515	1204.6	1843	1906	12	
256	13	Nie	279	10.42346	3.58	11.2422	3.50	1.00629	11.2831	2.29	63.667	0.1	0	615	1241.8	1907	619	1247.3	1905	1903	13	
257	14	Pon	280	10.46311	4.20	11.2758	3.27	1.00602	12.1332	-1.12	63.727	1.1	1	617	1241.4	1905	722	1329.6	1927	1859	14	
258	15	Wto	281	10.50277	4.41	11.3133	3.04	1.00575	12.5838	-4.50	63.678	2.1	4	619	1241.1	1902	826	1412.0	1949	1855	15	
259	16	Śro	282	10.54242	5.02	11.3508	2.41	1.00548	13.4417	-8.17	63.509	3.1	9	620	1240.7	1900	929	1455.0	2013	1851	16	
260	17	Czw	283	10.58208	5.24	11.3843	2.18	1.00520	14.3057	-11.25	63.209	4.1	15	622	1240.4	1858	1032	1539.3	2039	1847	17	
261	18	Pią	284	11.02173	5.45	11.4218	1.55	1.00493	15.1903	-14.06	62.768	5.1	22	624	1240.0	1855	1135	1625.1	2110	1843	18	
262	19	Sob	285	11.06139	6.06	11.4554	1.32	1.00465	16.0852	-16.12	62.181	6.1	31	625	1239.6	1853	1236	1712.9	2146	1839	19	
263	20	Nie	286	11.10104	6.28	11.4929	1.08	1.00436	17.0035	-17.35	61.456	7.1	40	627	1239.3	1850	1335	1802.8	2229	1835	20	
264	21	Pon	287	11.14070	6.49	11.5304	0.45	1.00408	17.5410	-18.08	60.610	0.0	50	629	1238.9	1848	1430	1854.7	2320	1831	21	
265	22	Wto	288	11.18035	7.10	11.5639	0.22	1.00380	18.4925	-17.43	59.680	1.0	61	631	1238.6	1845	1519	1948.4	****	1827	22	
266	23	Śro	289	11.22001	7.31	12.0015	-0.02	1.00351	19.4555	-16.18	58.718	2.0	71	632	1238.2	1843	1604	2043.3	020	1823	23	
267	24	Czw	290	11.25566	7.53	12.0350	-0.25	1.00323	20.4314	-13.52	57.794	3.0	81	634	1237.9	1841	1642	2138.9	129	1819	24	
268	25	Pią	291	11.29532	8.13	12.0726	-0.48	1.00294	21.4058	-10.30	56.986	4.0	89	636	1237.5	1838	1717	2234.9	244	1815	25	
269	26	Sob	292	11.33497	8.34	12.1102	-1.12	1.00265	22.3852	-6.23	56.373	5.0	96	638	1237.2	1836	1748	2331.0	404	1811	26	
270	27	Nie	293	11.37463	8.55	12.1438	-1.35	1.00237	23.3652	-1.48	56.021	6.0	99	639	1236.8	1833	1817	*****	527	1807	27	
271	28	Pon	294	11.41428	9.15	12.1814	-1.58	1.00208	0.3501	2.57	55.972	0.3	100	641	1236.5	1831	1847	027.3	651	1804	28	
272	29	Wto	295	11.45394	9.35	12.2150	-2.22	1.00180	1.3325	7.29	56.231	1.3	97	643	1236.2	1829	1918	123.7	815	1800	29	
273	30	Śro	296	11.49359	9.55	12.2527	-2.45	1.00152	2.3203	11.29	56.769	2.3	92	644	1235.8	1826	1952	220.5	937	1756	30	

Fazy Księżyca [Dm, h.mm]: 3kw 5, 11.54 Nów 13, 8.41 1kw 21, 10.59 Pełn 28, 4.51

WRZESIEŃ 2015 (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
	Swit	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0^h UT)	
1	3.43	21.48	8.41	20.04	4.14	17.58	3.35	18.59	5.31	19.33	13.33	22.13	20.36	10.03	19.31	6.02	16.59	1.06		
	10.685	8.32	12.287	-4.00	9.005	9.10	9.191	17.41	10.449	10.66	15.815	-18.12	1.247	7.19	22.691	-9.17	18.948	-20.89	22.65615	1
3	3.48	21.41	8.46	19.57	4.03	17.51	3.35	18.53	5.26	19.26	13.26	22.06	20.28	9.55	19.23	5.54	16.51	0.58		
	10.806	7.59	12.407	-5.10	8.989	9.41	9.276	17.04	10.477	10.50	15.821	-18.15	1.243	7.17	22.687	-9.19	18.946	-20.89	22.78757	3
5	3.53	21.35	8.50	19.50	3.53	17.44	3.34	18.48	5.21	19.19	13.18	21.58	20.20	9.47	19.15	5.46	16.43	0.50		
	10.926	6.86	12.517	-6.13	8.984	9.70	9.361	16.66	10.504	10.34	15.828	-18.18	1.240	7.15	22.684	-9.21	18.945	-20.90	22.91899	5
7	3.58	21.28	8.53	19.43	3.44	17.38	3.34	18.43	5.15	19.12	13.11	21.51	20.12	9.38	19.07	5.37	16.35	0.42		
	11.047	6.11	12.615	-7.08	8.990	9.96	9.445	16.28	10.532	10.19	15.836	-18.21	1.236	7.12	22.680	-9.23	18.944	-20.91	23.05041	7
9	4.03	21.22	8.55	19.36	3.36	17.33	3.33	18.38	5.10	19.04	13.04	21.43	20.04	9.30	18.59	5.29	16.27	0.34		
	11.167	5.36	12.701	-7.92	9.006	10.19	9.529	15.89	10.559	10.03	15.843	-18.24	1.232	7.10	22.677	-9.25	18.943	-20.91	23.18183	9
11	4.08	21.16	8.55	19.28	3.29	17.27	3.33	18.32	5.05	18.57	12.57	21.35	19.56	9.22	18.51	5.21	16.19	0.26		
	11.286	4.60	12.772	-8.64	9.032	10.40	9.612	15.49	10.586	9.87	15.852	-18.28	1.228	7.07	22.674	-9.27	18.942	-20.92	23.31325	11
13	4.12	21.10	8.54	19.20	3.22	17.23	3.33	18.27	4.59	18.50	12.50	21.28	19.48	9.14	18.43	5.13	16.11	0.19		
	11.406	3.84	12.826	-9.22	9.067	10.57	9.695	15.09	10.613	9.71	15.860	-18.31	1.224	7.05	22.670	-9.29	18.941	-20.93	23.44466	13
15	4.17	21.04	8.51	19.12	3.16	17.18	3.32	18.21	4.54	18.43	12.42	21.20	19.40	9.05	18.36	5.05	16.04	0.11		
	11.526	3.07	12.862	-9.64	9.110	10.70	9.777	14.68	10.640	9.56	15.869	-18.34	1.220	7.02	22.667	-9.31	18.940	-20.93	23.57608	15
17	4.21	20.58	8.45	19.04	3.10	17.14	3.32	18.16	4.48	18.36	12.35	21.13	19.32	8.57	18.28	4.56	15.56	0.03		
	11.645	2.30	12.875	-9.87	9.162	10.80	9.859	14.27	10.667	9.40	15.878	-18.38	1.215	7.00	22.664	-9.33	18.939	-20.94	23.70750	17
19	4.26	20.53	8.36	18.55	3.06	17.10	3.31	18.10	4.43	18.29	12.28	21.05	19.24	8.49	18.20	4.48	15.48	23.51		
	11.765	1.53	12.864	-9.87	9.222	10.86	9.941	13.85	10.694	9.24	15.888	-18.42	1.211	6.97	22.660	-9.35	18.939	-20.94	23.83891	19
21	4.30	20.47	8.25	18.47	3.02	17.06	3.31	18.05	4.38	18.22	12.21	20.58	19.16	8.40	18.12	4.40	15.40	23.43		
	11.884	0.75	12.827	-9.63	9.288	10.89	10.022	13.43	10.720	9.09	15.898	-18.45	1.206	6.94	22.657	-9.37	18.939	-20.95	23.97034	21
23	4.34	20.42	8.10	18.38	2.58	17.03	3.30	17.59	4.32	18.15	12.14	20.50	19.08	8.32	18.04	4.32	15.32	23.35		
	12.004	-0.03	12.764	-9.11	9.362	10.88	10.102	13.00	10.747	8.93	15.908	-18.49	1.202	6.91	22.654	-9.39	18.939	-20.95	0.10176	23
25	4.38	20.36	7.53	18.29	2.56	16.59	3.30	17.54	4.27	18.07	12.07	20.43	19.00	8.24	17.56	4.24	15.24	23.27		
	12.124	-0.81	12.675	-8.30	9.441	10.83	10.183	12.57	10.773	8.78	15.919	-18.53	1.197	6.88	22.651	-9.41	18.939	-20.96	0.23318	25
27	4.42	20.31	7.32	18.21	2.53	16.56	3.29	17.48	4.21	18.00	12.00	20.35	18.52	8.16	17.48	4.16	15.17	23.19		
	12.244	-1.58	12.566	-7.22	9.525	10.74	10.263	12.13	10.799	8.63	15.930	-18.57	1.192	6.85	22.648	-9.43	18.939	-20.96	0.36459	27
29	4.46	20.25	7.10	18.13	2.51	16.53	3.29	17.42	4.16	17.53	11.53	20.28	18.44	8.07	17.40	4.08	15.09	23.11		
	12.364	-2.36	12.444	-5.92	9.615	10.61	10.342	11.69	10.825	8.47	15.941	-18.61	1.187	6.82	22.645	-9.44	18.939	-20.97	0.49600	29

PAŹDZIERNIK 2015

Piwnice, CA UMK ← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →												Czas strefowy [hhmm.]									
..... Dzień			ST	Δα	α _☉	δ _☉	R _☉	α _☿	δ _☿	R _☿	Faza ☿	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ _⊕	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2457																					
274	1	Czw	297	11.53325	10.15	12.2904	-3.08	1.00124	3.3044	14.39	57.528	3.3	85	646	1235.5	1824	2031	317.4	1054	1752	1
275	2	Pią	298	11.57290	10.34	12.3241	-3.32	1.00095	4.2901	16.51	58.430	4.3	76	648	1235.2	1821	2115	414.1	1206	1748	2
276	3	Sob	299	12.01256	10.53	12.3618	-3.55	1.00067	5.2620	17.58	59.394	5.3	65	650	1234.9	1819	2205	509.9	1309	1744	3
277	4	Nie	300	12.05221	11.12	12.3956	-4.18	1.00039	6.2209	18.03	60.347	6.3	55	651	1234.5	1817	2300	604.2	1403	1740	4
278	5	Pon	301	12.09187	11.30	12.4335	-4.41	1.00011	7.1601	17.11	61.228	0.5	44	653	1234.2	1814	****	656.4	1448	1736	5
279	6	Wto	302	12.13153	11.48	12.4713	-5.04	0.99983	8.0746	15.30	61.997	1.5	35	655	1233.9	1812	000	746.3	1525	1732	6
280	7	Śro	303	12.17118	12.06	12.5052	-5.27	0.99955	8.5725	13.07	62.627	2.5	26	657	1233.6	1810	101	833.8	1557	1728	7
281	8	Czw	304	12.21084	12.23	12.5432	-5.50	0.99927	9.4516	10.13	63.109	3.5	18	659	1233.4	1807	204	919.3	1624	1724	8
282	9	Pią	305	12.25049	12.40	12.5811	-6.13	0.99899	10.3140	6.56	63.444	4.5	11	700	1233.1	1805	307	1003.2	1648	1720	9
283	10	Sob	306	12.29015	12.56	13.0152	-6.36	0.99870	11.1708	3.23	63.641	5.5	6	702	1232.8	1803	411	1046.0	1710	1716	10
284	11	Nie	307	12.32580	13.12	13.0533	-6.58	0.99842	12.0208	-0.17	63.714	6.5	2	704	1232.6	1800	514	1128.3	1732	1712	11
285	12	Pon	308	12.36546	13.27	13.0914	-7.21	0.99813	12.4712	-3.56	63.676	7.5	0	706	1232.3	1758	617	1210.7	1754	1708	12
286	13	Wto	309	12.40511	13.42	13.1256	-7.43	0.99785	13.3248	-7.27	63.536	0.4	0	708	1232.1	1756	721	1253.6	1817	1705	13
287	14	Śro	310	12.44477	13.56	13.1638	-8.06	0.99756	14.1923	-10.42	63.301	1.4	2	709	1231.8	1753	824	1337.5	1843	1701	14
288	15	Czw	311	12.48442	14.10	13.2021	-8.28	0.99728	15.0715	-13.32	62.972	2.4	5	711	1231.6	1751	928	1423.0	1912	1657	15
289	16	Pią	312	12.52408	14.23	13.2404	-8.50	0.99699	15.5640	-15.48	62.546	3.4	10	713	1231.4	1749	1030	1510.1	1946	1653	16
290	17	Sob	313	12.56373	14.35	13.2748	-9.12	0.99670	16.4741	-17.22	62.022	4.4	17	715	1231.2	1747	1129	1559.1	2026	1649	17
291	18	Nie	314	13.00339	14.47	13.3133	-9.34	0.99641	17.4013	-18.08	61.399	5.4	25	717	1231.0	1744	1225	1649.6	2114	1645	18
292	19	Pon	315	13.04304	14.59	13.3518	-9.56	0.99613	18.3360	-17.60	60.683	6.4	35	719	1230.8	1742	1315	1741.5	2210	1641	19
293	20	Wto	316	13.08270	15.10	13.3904	-10.17	0.99584	19.2842	-16.54	59.892	7.4	45	720	1230.6	1740	1400	1834.3	2313	1637	20
294	21	Śro	317	13.12236	15.20	13.4250	-10.39	0.99555	20.2359	-14.51	59.057	0.6	56	722	1230.4	1738	1439	1927.7	****	1633	21
295	22	Czw	318	13.16201	15.29	13.4637	-11.00	0.99527	21.1936	-11.54	58.224	1.6	67	724	1230.3	1736	1514	2021.4	023	1629	22
296	23	Pią	319	13.20167	15.38	13.5025	-11.21	0.99499	22.1528	-8.10	57.455	2.6	77	726	1230.1	1733	1545	2115.3	138	1625	23
297	24	Sob	320	13.24132	15.46	13.5413	-11.42	0.99471	23.1142	-3.52	56.818	3.6	86	728	1230.0	1731	1614	2209.8	257	1621	24
298	25	Nie	321	13.28098	15.54	13.5802	-12.03	0.99443	0.0830	0.46	56.382	4.6	94	730	1229.8	1729	1643	2305.1	418	1617	25
298	25	Nie	321	14.28196	15.54	13.5812	-12.04	0.99442	0.1053	0.58	56.370	5.6	94	630	1129.8	1629	1543	2205.1	318	1517	25
299	26	Pon	322	14.32162	16.01	14.0201	-12.25	0.99414	1.0834	5.37	56.203	6.6	98	632	1129.7	1627	1613	2301.3	441	1513	26
300	27	Wto	323	14.36127	16.07	14.0552	-12.45	0.99387	2.0714	9.54	56.324	7.6	100	633	1129.6	1625	1645	2358.7	604	1510	27
301	28	Śro	324	14.40093	16.13	14.0943	-13.05	0.99361	3.0645	13.31	56.732	1.0	99	635	1129.5	1623	1722	****	726	1506	28
302	29	Czw	325	14.44058	16.17	14.1335	-13.25	0.99334	4.0638	16.12	57.389	2.0	95	637	1129.5	1621	1804	056.8	843	1502	29
303	30	Pią	326	14.48024	16.21	14.1728	-13.45	0.99308	5.0609	17.47	58.234	3.0	88	639	1129.4	1619	1852	154.9	953	1458	30
304	31	Sob	327	14.51589	16.24	14.2121	-14.04	0.99282	6.0422	18.14	59.186	4.0	80	641	1129.3	1617	1947	252.0	1053	1454	31

Fazy Księżyca [Dm, h.mm]: 3kw 4, 23.06 Now 13, 2.06 1kw 20, 22.31 Pełn 27, 13.05

PAŹDZIERNIK 2015 (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	4.50	20.20	6.47	18.05	2.50	16.50	3.28	17.37	4.10	17.46	11.47	20.20	18.36	7.59	17.32	3.59	15.01	23.03		
	12.484	-3.14	12.322	-4.49	9.710	10.45	10.422	11.25	10.851	8.32	15.953	-18.65	1.182	6.79	22.642	-9.46	18.939	-20.97	0.62742	1
3	4.54	20.15	6.25	17.58	2.49	16.46	3.28	17.31	4.05	17.39	11.40	20.13	18.28	7.51	17.24	3.51	14.53	22.56		
	12.605	-3.91	12.211	-3.07	9.809	10.25	10.501	10.80	10.876	8.17	15.965	-18.69	1.177	6.76	22.639	-9.48	18.940	-20.98	0.75884	3
5	4.58	20.10	6.05	17.52	2.49	16.43	3.27	17.25	3.59	17.31	11.33	20.06	18.20	7.42	17.16	3.43	14.45	22.48		
	12.726	-4.68	12.126	-1.77	9.912	10.01	10.579	10.35	10.901	8.02	15.977	-18.73	1.172	6.73	22.637	-9.49	18.941	-20.98	0.89026	5
7	5.02	20.05	5.49	17.47	2.49	16.40	3.26	17.20	3.54	17.24	11.26	19.58	18.12	7.34	17.08	3.35	14.38	22.40		
	12.848	-5.45	12.076	-0.72	10.018	9.73	10.657	9.89	10.927	7.87	15.989	-18.77	1.167	6.70	22.634	-9.51	18.941	-20.99	1.02168	7
9	5.05	20.00	5.37	17.42	2.50	16.37	3.26	17.14	3.48	17.17	11.19	19.51	18.04	7.26	17.00	3.27	14.30	22.32		
	12.970	-6.21	12.065	0.00	10.128	9.42	10.735	9.43	10.951	7.72	16.002	-18.82	1.162	6.67	22.631	-9.52	18.942	-20.99	1.15310	9
11	5.09	19.56	5.29	17.38	2.50	16.34	3.25	17.08	3.43	17.10	11.12	19.43	17.56	7.17	16.52	3.19	14.22	22.24		
	13.092	-6.97	12.096	0.36	10.241	9.07	10.813	8.97	10.976	7.57	16.015	-18.86	1.157	6.64	22.629	-9.54	18.944	-20.99	1.28451	11
13	5.13	19.51	5.25	17.34	2.52	16.31	3.25	17.02	3.37	17.03	11.06	19.36	17.48	7.09	16.44	3.11	14.14	22.16		
	13.215	-7.72	12.166	0.36	10.356	8.69	10.890	8.51	11.000	7.43	16.028	-18.90	1.152	6.61	22.627	-9.55	18.945	-21.00	1.41593	13
15	5.16	19.47	5.25	17.31	2.53	16.28	3.24	16.56	3.32	16.55	10.59	19.29	17.40	7.01	16.36	3.03	14.06	22.09		
	13.339	-8.47	12.270	0.03	10.474	8.27	10.967	8.04	11.024	7.28	16.042	-18.95	1.147	6.58	22.624	-9.56	18.946	-21.00	1.54735	15
17	5.20	19.42	5.28	17.28	2.55	16.25	3.23	16.50	3.26	16.48	10.52	19.21	17.32	6.52	16.28	2.55	13.59	22.01		
	13.463	-9.20	12.402	-0.59	10.593	7.82	11.044	7.58	11.048	7.14	16.056	-18.99	1.142	6.55	22.622	-9.58	18.948	-21.00	1.67877	17
19	5.23	19.38	5.34	17.25	2.57	16.22	3.23	16.45	3.20	16.41	10.45	19.14	17.24	6.44	16.21	2.47	13.51	21.53		
	13.588	-9.93	12.557	-1.44	10.715	7.34	11.121	7.11	11.072	7.00	16.070	-19.03	1.137	6.52	22.620	-9.59	18.950	-21.01	1.81019	19
21	5.27	19.34	5.42	17.21	2.59	16.18	3.22	16.39	3.15	16.34	10.39	19.07	17.16	6.36	16.13	2.39	13.43	21.45		
	13.714	-10.65	12.727	-2.47	10.839	6.84	11.197	6.64	11.095	6.86	16.084	-19.08	1.132	6.49	22.618	-9.60	18.951	-21.01	1.94161	21
23	5.30	19.30	5.51	17.18	3.02	16.15	3.21	16.33	3.09	16.27	10.32	18.59	17.08	6.27	16.05	2.31	13.36	21.37		
	13.840	-11.36	12.910	-3.63	10.964	6.30	11.273	6.17	11.118	6.72	16.098	-19.12	1.127	6.46	22.616	-9.61	18.953	-21.01	2.07303	23
25	5.34	19.26	6.02	17.15	3.05	16.12	3.20	16.27	3.03	16.19	10.25	18.52	17.00	6.19	15.57	2.23	13.28	21.30		
	13.967	-12.05	13.101	-4.88	11.091	5.73	11.348	5.69	11.140	6.59	16.113	-19.17	1.122	6.43	22.615	-9.62	18.955	-21.01	2.20444	25
25	4.34	18.26	5.02	16.15	2.05	15.12	2.20	15.27	2.03	15.19	9.25	17.52	16.00	5.19	14.57	1.23	12.28	20.30		
	13.970	-12.07	13.105	-4.91	11.094	5.72	11.350	5.68	11.141	6.59	16.113	-19.17	1.122	6.43	22.615	-9.62	18.956	-21.01	2.20444	25
27	4.37	18.22	5.13	16.12	2.08	15.08	2.20	15.21	1.57	15.12	9.19	17.45	15.52	5.11	14.49	1.15	12.20	20.22		
	14.098	-12.75	13.302	-6.22	11.222	5.13	11.426	5.21	11.163	6.45	16.128	-19.21	1.117	6.40	22.613	-9.63	18.958	-21.02	2.33586	27
29	4.41	18.18	5.25	16.09	2.11	15.05	2.19	15.15	1.51	15.05	9.12	17.38	15.44	5.02	14.41	1.07	12.12	20.14		
	14.226	-13.42	13.503	-7.56	11.352	4.51	11.501	4.73	11.185	6.32	16.143	-19.26	1.113	6.37	22.612	-9.64	18.960	-21.02	2.46727	29
31	4.44	18.15	5.36	16.06	2.15	15.01	2.18	15.09	1.46	14.57	9.05	17.30	15.37	4.54	14.33	0.59	12.05	20.07		
	14.356	-14.07	13.706	-8.91	11.483	3.87	11.576	4.26	11.206	6.19	16.158	-19.30	1.108	6.34	22.610	-9.64	18.963	-21.02	2.59870	31

LISTOPAD 2015

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
305	1	Nie	328	14.55555	16.26	14.2516	-14.24	0.99257	7.0034	17.38	60.167	5.0	71	643	1129.3	1615	2047	347.1	1143	1450	1	
306	2	Pon	329	14.59520	16.28	14.2911	-14.43	0.99231	7.5418	16.08	61.100	6.0	61	645	1129.3	1613	2150	439.5	1225	1446	2	
307	3	Wto	330	15.03486	16.28	14.3307	-15.02	0.99206	8.4528	13.53	61.928	7.0	51	647	1129.3	1611	2254	529.1	1259	1442	3	
308	4	Śro	331	15.07452	16.28	14.3703	-15.20	0.99182	9.3419	11.03	62.609	0.9	41	648	1129.3	1609	2358	616.1	1328	1438	4	
309	5	Czw	332	15.11417	16.27	14.4101	-15.39	0.99157	10.2118	7.49	63.116	1.9	32	650	1129.3	1608	****	700.8	1353	1434	5	
310	6	Pią	333	15.15383	16.25	14.4460	-15.57	0.99133	11.0659	4.18	63.444	2.9	23	652	1129.3	1606	101	744.0	1416	1430	6	
311	7	Sob	334	15.19348	16.22	14.4859	-16.15	0.99109	11.5200	0.38	63.596	3.9	16	654	1129.4	1604	205	826.4	1438	1426	7	
312	8	Nie	335	15.23314	16.19	14.5259	-16.32	0.99085	12.3657	-3.04	63.590	4.9	10	656	1129.4	1602	308	908.6	1459	1422	8	
313	9	Pon	336	15.27279	16.14	14.5700	-16.50	0.99061	13.2223	-6.39	63.447	5.9	5	658	1129.5	1601	411	951.2	1522	1418	9	
314	10	Wto	337	15.31245	16.09	15.0102	-17.07	0.99038	14.0851	-10.01	63.194	6.9	2	700	1129.6	1559	515	1034.9	1546	1414	10	
315	11	Śro	338	15.35210	16.03	15.0505	-17.23	0.99014	14.5643	-12.59	62.853	7.9	0	702	1129.7	1557	619	1120.2	1614	1411	11	
316	12	Czw	339	15.39176	15.55	15.0908	-17.40	0.98991	15.4614	-15.27	62.447	0.7	0	703	1129.8	1556	723	1207.2	1647	1407	12	
317	13	Pią	340	15.43141	15.48	15.1313	-17.56	0.98968	16.3726	-17.13	61.988	1.7	3	705	1130.0	1554	824	1256.1	1725	1403	13	
318	14	Sob	341	15.47107	15.39	15.1718	-18.12	0.98945	17.3008	-18.11	61.488	2.7	7	707	1130.1	1552	922	1346.6	1810	1359	14	
319	15	Nie	342	15.51073	15.29	15.2124	-18.27	0.98922	18.2357	-18.15	60.949	3.7	13	709	1130.3	1551	1014	1438.4	1904	1355	15	
320	16	Pon	343	15.55038	15.19	15.2531	-18.43	0.98899	19.1823	-17.21	60.376	4.7	21	711	1130.4	1549	1101	1530.8	2004	1351	16	
321	17	Wto	344	15.59004	15.08	15.2939	-18.57	0.98877	20.1259	-15.31	59.774	5.7	31	713	1130.6	1548	1141	1623.3	2111	1347	17	
322	18	Śro	345	16.02569	14.56	15.3348	-19.12	0.98855	21.0727	-12.49	59.154	6.7	41	714	1130.8	1547	1216	1715.6	2223	1343	18	
323	19	Czw	346	16.06535	14.43	15.3757	-19.26	0.98834	22.0141	-9.21	58.538	0.2	52	716	1131.0	1545	1247	1807.7	2338	1339	19	
324	20	Pią	347	16.10500	14.29	15.4207	-19.40	0.98812	22.5554	-5.18	57.959	1.2	63	718	1131.3	1544	1316	1859.8	****	1335	20	
325	21	Sob	348	16.14466	14.15	15.4618	-19.53	0.98791	23.5026	-0.52	57.459	2.2	74	720	1131.5	1543	1343	1952.4	056	1331	21	
326	22	Nie	349	16.18431	13.59	15.5030	-20.06	0.98771	0.4547	3.41	57.090	3.2	84	721	1131.8	1542	1411	2046.2	215	1327	22	
327	23	Pon	350	16.22397	13.43	15.5443	-20.19	0.98751	1.4219	8.05	56.901	4.2	91	723	1132.0	1540	1441	2141.3	335	1323	23	
328	24	Wto	351	16.26362	13.27	15.5856	-20.31	0.98731	2.4017	11.60	56.929	5.2	97	725	1132.3	1539	1514	2238.1	456	1319	24	
329	25	Śro	352	16.30328	13.09	16.0310	-20.43	0.98712	3.3933	15.09	57.193	6.2	100	727	1132.6	1538	1552	2336.1	615	1315	25	
330	26	Czw	353	16.34294	12.51	16.0725	-20.55	0.98694	4.3930	17.17	57.685	0.5	100	728	1132.9	1537	1637	****	729	1312	26	
331	27	Pią	354	16.38259	12.32	16.1141	-21.06	0.98676	5.3912	18.18	58.372	1.5	97	730	1133.2	1536	1730	034.4	836	1308	27	
332	28	Sob	355	16.42225	12.12	16.1557	-21.17	0.98659	6.3736	18.10	59.196	2.5	92	731	1133.5	1535	1828	131.7	933	1304	28	
333	29	Nie	356	16.46190	11.51	16.2014	-21.27	0.98642	7.3348	17.01	60.089	3.5	85	733	1133.9	1534	1932	227.0	1020	1300	29	
334	30	Pon	357	16.50156	11.30	16.2432	-21.37	0.98625	8.2720	14.59	60.978	4.5	77	735	1134.2	1534	2037	319.5	1058	1256	30	

Fazy Księżyca [Dm, h.mm]: 3kw 3, 13.24 Now 11, 18.47 1kw 19, 7.27 Pełn 25, 23.44

LISTOPAD 2015 (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	4.46	18.13	5.42	16.04	2.16	14.60	2.18	15.06	1.43	14.54	9.02	17.27	15.33	4.50	14.29	0.55	12.01	20.03		
	14.421	-14.40	13.809	-9.58	11.549	3.54	11.613	4.02	11.217	6.13	16.166	-19.32	1.106	6.33	22.610	-9.65	18.964	-21.02	2.66441	1
3	4.49	18.10	5.54	16.01	2.20	14.56	2.17	15.00	1.37	14.47	8.55	17.20	15.25	4.42	14.21	0.47	11.53	19.55		
	14.552	-15.03	14.015	-10.92	11.681	2.87	11.688	3.54	11.238	6.00	16.181	-19.37	1.101	6.30	22.608	-9.65	18.967	-21.02	2.79583	3
5	4.52	18.07	6.06	15.58	2.24	14.53	2.16	14.54	1.31	14.39	8.49	17.12	15.17	4.33	14.13	0.39	11.45	19.47		
	14.684	-15.65	14.222	-12.23	11.815	2.18	11.762	3.07	11.258	5.88	16.197	-19.41	1.097	6.28	22.607	-9.66	18.969	-21.02	2.92725	5
7	4.55	18.04	6.18	15.56	2.28	14.49	2.15	14.48	1.25	14.32	8.42	17.05	15.09	4.25	14.05	0.31	11.38	19.40		
	14.816	-16.25	14.430	-13.50	11.950	1.47	11.837	2.59	11.278	5.76	16.213	-19.46	1.092	6.25	22.607	-9.66	18.972	-21.02	3.05866	7
9	4.59	18.01	6.30	15.53	2.32	14.45	2.14	14.42	1.19	14.25	8.35	16.58	15.01	4.17	13.58	0.23	11.30	19.32		
	14.950	-16.83	14.639	-14.74	12.085	0.74	11.911	2.12	11.298	5.64	16.228	-19.50	1.088	6.22	22.606	-9.67	18.976	-21.02	3.19008	9
11	5.02	17.58	6.42	15.50	2.36	14.42	2.13	14.36	1.13	14.17	8.29	16.51	14.53	4.09	13.50	0.15	11.22	19.24		
	15.085	-17.39	14.848	-15.93	12.222	-0.01	11.985	1.64	11.317	5.53	16.244	-19.54	1.084	6.20	22.605	-9.67	18.979	-21.02	3.32150	11
13	5.05	17.55	6.54	15.48	2.41	14.38	2.12	14.30	1.06	14.10	8.22	16.43	14.45	4.00	13.42	0.07	11.15	19.17		
	15.220	-17.93	15.059	-17.06	12.359	-0.76	12.059	1.17	11.336	5.42	16.260	-19.59	1.080	6.18	22.605	-9.67	18.982	-21.02	3.45292	13
15	5.08	17.53	7.06	15.46	2.45	14.34	2.11	14.24	1.00	14.03	8.16	16.36	14.37	3.52	13.34	23.55	11.07	19.09		
	15.357	-18.46	15.271	-18.14	12.498	-1.53	12.132	0.70	11.354	5.31	16.277	-19.63	1.076	6.15	22.604	-9.67	18.985	-21.02	3.58434	15
17	5.11	17.51	7.17	15.44	2.50	14.31	2.10	14.18	0.54	13.55	8.09	16.29	14.29	3.44	13.26	23.47	10.59	19.01		
	15.494	-18.96	15.484	-19.16	12.637	-2.31	12.206	0.22	11.372	5.20	16.293	-19.67	1.072	6.13	22.604	-9.67	18.989	-21.02	3.71576	17
19	5.14	17.49	7.28	15.43	2.54	14.27	2.09	14.12	0.48	13.48	8.02	16.22	14.21	3.36	13.18	23.39	10.52	18.54		
	15.633	-19.43	15.699	-20.12	12.777	-3.10	12.279	-0.25	11.390	5.10	16.309	-19.72	1.069	6.11	22.604	-9.67	18.993	-21.02	3.84718	19
21	5.17	17.47	7.40	15.42	2.59	14.23	2.08	14.06	0.41	13.40	7.56	16.15	14.13	3.28	13.10	23.32	10.44	18.46		
	15.772	-19.89	15.915	-21.01	12.918	-3.89	12.352	-0.71	11.406	5.00	16.326	-19.76	1.065	6.09	22.604	-9.67	18.996	-21.02	3.97860	21
23	5.19	17.45	7.51	15.41	3.04	14.20	2.07	14.00	0.35	13.33	7.49	16.08	14.05	3.19	13.02	23.24	10.36	18.38		
	15.912	-20.32	16.133	-21.83	13.061	-4.69	12.425	-1.18	11.423	4.90	16.342	-19.80	1.062	6.07	22.605	-9.67	19.000	-21.02	4.11002	23
25	5.22	17.43	8.01	15.41	3.09	14.16	2.06	13.55	0.29	13.26	7.43	16.00	13.57	3.11	12.55	23.16	10.29	18.31		
	16.053	-20.72	16.352	-22.58	13.204	-5.49	12.498	-1.64	11.438	4.81	16.359	-19.84	1.059	6.05	22.605	-9.67	19.004	-21.02	4.24144	25
27	5.25	17.42	8.12	15.41	3.14	14.13	2.05	13.49	0.22	13.18	7.36	15.53	13.49	3.03	12.47	23.08	10.21	18.23		
	16.195	-21.10	16.573	-23.25	13.348	-6.29	12.571	-2.11	11.454	4.72	16.375	-19.88	1.056	6.03	22.606	-9.66	19.008	-21.02	4.37286	27
29	5.27	17.41	8.22	15.42	3.20	14.09	2.04	13.43	0.16	13.11	7.29	15.46	13.41	2.55	12.39	23.00	10.14	18.15		
	16.337	-21.46	16.796	-23.85	13.493	-7.10	12.643	-2.57	11.468	4.64	16.392	-19.92	1.053	6.02	22.606	-9.66	19.012	-21.01	4.50428	29

GRUDZIEŃ 2015

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce				Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
335	1	Wto	358	16.54122	11.08	16.2850	-21.47	0.98610	9.1809	12.17	61.795	5.5	68	736	1134.6	1533	2143	408.9	1130	1252	1	
336	2	Śro	359	16.58087	10.46	16.3309	-21.56	0.98594	10.0635	9.07	62.484	6.5	58	737	1135.0	1532	2248	455.6	1157	1248	2	
337	3	Czw	360	17.02053	10.23	16.3729	-22.05	0.98579	10.5311	5.37	63.006	0.1	49	739	1135.4	1531	2352	540.0	1221	1244	3	
338	4	Pią	361	17.06018	9.59	16.4149	-22.13	0.98565	11.3835	1.57	63.335	1.1	39	740	1135.8	1531	****	623.0	1243	1240	4	
339	5	Sob	362	17.09584	9.34	16.4610	-22.21	0.98551	12.2331	-1.46	63.465	2.1	30	742	1136.2	1530	055	705.2	1304	1236	5	
340	6	Nie	363	17.13549	9.09	16.5032	-22.28	0.98537	13.0838	-5.25	63.403	3.1	22	743	1136.6	1530	159	747.5	1326	1232	6	
341	7	Pon	364	17.17515	8.44	16.5454	-22.35	0.98524	13.5436	-8.54	63.172	4.1	15	744	1137.0	1529	303	830.6	1350	1228	7	
342	8	Wto	365	17.21480	8.18	16.5916	-22.42	0.98511	14.4157	-12.03	62.802	5.1	9	746	1137.4	1529	407	915.1	1416	1224	8	
343	9	Śro	366	17.25446	7.51	17.0340	-22.48	0.98498	15.3105	-14.44	62.330	6.1	4	747	1137.9	1529	511	1001.6	1446	1220	9	
344	10	Czw	367	17.29412	7.24	17.0803	-22.54	0.98486	16.2212	-16.47	61.797	7.1	1	748	1138.3	1529	614	1050.2	1522	1217	10	
345	11	Pią	368	17.33377	6.57	17.1227	-22.59	0.98474	17.1510	-18.04	61.239	0.0	0	749	1138.8	1528	714	1140.9	1605	1213	11	
346	12	Sob	369	17.37343	6.29	17.1651	-23.04	0.98462	18.0938	-18.26	60.686	1.0	1	750	1139.3	1528	810	1233.3	1657	1209	12	
347	13	Nie	370	17.41308	6.01	17.2116	-23.08	0.98451	19.0456	-17.49	60.161	2.0	4	751	1139.7	1528	900	1326.6	1756	1205	13	
348	14	Pon	371	17.45274	5.32	17.2541	-23.12	0.98440	20.0026	-16.13	59.676	3.0	10	752	1140.2	1528	944	1420.0	1902	1201	14	
349	15	Wto	372	17.49240	5.04	17.3007	-23.15	0.98430	20.5532	-13.43	59.237	4.0	17	753	1140.7	1528	1021	1513.0	2013	1157	15	
350	16	Śro	373	17.53205	4.35	17.3432	-23.18	0.98419	21.4957	-10.25	58.844	5.0	26	754	1141.2	1528	1053	1605.2	2127	1153	16	
351	17	Czw	374	17.57171	4.05	17.3858	-23.21	0.98410	22.4344	-6.31	58.498	6.0	37	755	1141.7	1529	1122	1656.7	2243	1149	17	
352	18	Pią	375	18.01136	3.36	17.4324	-23.23	0.98400	23.3712	-2.14	58.202	7.0	48	755	1142.1	1529	1149	1748.0	****	1145	18	
353	19	Sob	376	18.05102	3.07	17.4750	-23.24	0.98391	0.3049	2.13	57.968	0.8	59	756	1142.6	1529	1215	1839.6	000	1141	19	
354	20	Nie	377	18.09067	2.37	17.5216	-23.25	0.98383	1.2510	6.35	57.814	1.8	70	757	1143.1	1530	1243	1932.2	117	1137	20	
355	21	Pon	378	18.13033	2.07	17.5642	-23.26	0.98375	2.2043	10.35	57.764	2.8	80	757	1143.6	1530	1313	2026.2	235	1133	21	
356	22	Wto	379	18.16598	1.37	18.0109	-23.26	0.98368	3.1740	13.59	57.843	3.8	89	758	1144.1	1530	1347	2121.8	353	1129	22	
357	23	Śro	380	18.20564	1.08	18.0535	-23.26	0.98362	4.1554	16.32	58.070	4.8	95	758	1144.6	1531	1427	2218.6	507	1125	23	
358	24	Czw	381	18.24529	0.38	18.1001	-23.25	0.98356	5.1448	18.02	58.455	5.8	99	759	1145.1	1532	1515	2315.7	617	1121	24	
359	25	Pią	382	18.28495	0.08	18.1428	-23.24	0.98350	6.1328	18.26	58.987	6.8	100	759	1145.6	1532	1610	*****	718	1118	25	
360	26	Sob	383	18.32461	-0.21	18.1854	-23.22	0.98346	7.1051	17.44	59.640	1.0	99	759	1146.1	1533	1711	012.1	811	1114	26	
361	27	Nie	384	18.36426	-0.51	18.2320	-23.20	0.98342	8.0608	16.04	60.371	2.0	95	800	1146.6	1534	1817	106.5	854	1110	27	
362	28	Pon	385	18.40392	-1.20	18.2746	-23.17	0.98338	8.5853	13.37	61.126	3.0	90	800	1147.1	1535	1924	158.2	929	1106	28	
363	29	Wto	386	18.44357	-1.50	18.3211	-23.14	0.98335	9.4907	10.35	61.846	4.0	83	800	1147.6	1535	2030	247.1	959	1102	29	
364	30	Śro	387	18.48323	-2.19	18.3637	-23.10	0.98333	10.3707	7.09	62.474	5.0	75	800	1148.1	1536	2136	333.3	1025	1058	30	
365	31	Czw	388	18.52289	-2.47	18.4102	-23.06	0.98332	11.2328	3.29	62.962	6.0	66	800	1148.5	1537	2240	417.6	1048	1054	31	

Fazy Księżyca [Dm, h.mm]: 3kw 3, 8.40 Nów 11, 11.29 1kw 18, 16.14 Pełn 25, 12.12

GRUDZIEŃ 2015 (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 Zach (0^h UT) Dm	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch			
1	5.30	17.40	8.31	15.44	3.25	14.06	2.03	13.37	0.09	13.03	7.23	15.39	13.33	2.47	12.31	22.53	10.06	18.08		
	16.481	-21.78	17.020	-24.36	13.639	-7.90	12.716	-3.02	11.482	4.56	16.408	-19.96	1.050	6.00	22.607	-9.65	19.016	-21.01	4.63570	1
3	5.32	17.39	8.40	15.46	3.30	14.02	2.02	13.31	0.02	12.56	7.16	15.32	13.25	2.39	12.23	22.45	9.58	18.00		
	16.625	-22.08	17.245	-24.79	13.786	-8.70	12.788	-3.48	11.496	4.48	16.425	-20.00	1.048	5.99	22.608	-9.65	19.021	-21.01	4.76712	3
5	5.34	17.39	8.49	15.49	3.36	13.59	2.01	13.25	23.52	12.48	7.09	15.25	13.17	2.31	12.15	22.37	9.51	17.53		
	16.770	-22.35	17.472	-25.14	13.935	-9.49	12.860	-3.93	11.508	4.40	16.441	-20.04	1.046	5.98	22.609	-9.64	19.025	-21.01	4.89854	5
7	5.37	17.38	8.57	15.52	3.41	13.55	1.60	13.19	23.45	12.41	7.03	15.18	13.09	2.23	12.08	22.29	9.43	17.45		
	16.915	-22.59	17.699	-25.39	14.085	-10.28	12.932	-4.38	11.521	4.34	16.458	-20.08	1.044	5.97	22.611	-9.63	19.029	-21.01	5.02996	7
9	5.39	17.38	9.04	15.57	3.47	13.52	1.59	13.13	23.38	12.33	6.56	15.11	13.01	2.15	11.60	22.22	9.35	17.38		
	17.061	-22.80	17.927	-25.55	14.235	-11.05	13.004	-4.83	11.532	4.27	16.475	-20.12	1.042	5.95	22.612	-9.62	19.034	-21.00	5.16138	9
11	5.41	17.38	9.10	16.02	3.52	13.49	1.57	13.07	23.31	12.26	6.50	15.03	12.53	2.07	11.52	22.14	9.28	17.30		
	17.208	-22.98	18.154	-25.61	14.388	-11.82	13.076	-5.27	11.543	4.21	16.491	-20.15	1.040	5.95	22.614	-9.61	19.038	-21.00	5.29280	11
13	5.42	17.38	9.15	16.08	3.58	13.46	1.56	13.01	23.24	12.18	6.43	14.56	12.45	1.59	11.44	22.06	9.20	17.22		
	17.354	-23.14	18.380	-25.58	14.541	-12.57	13.148	-5.71	11.553	4.15	16.507	-20.19	1.039	5.94	22.615	-9.60	19.043	-21.00	5.42423	13
15	5.44	17.38	9.20	16.15	4.04	13.43	1.55	12.55	23.17	12.11	6.36	14.49	12.38	1.51	11.36	21.58	9.13	17.15		
	17.502	-23.26	18.604	-25.45	14.695	-13.31	13.219	-6.14	11.563	4.10	16.524	-20.23	1.037	5.93	22.617	-9.59	19.048	-20.99	5.55565	15
17	5.45	17.39	9.23	16.22	4.09	13.40	1.54	12.49	23.10	12.03	6.30	14.42	12.30	1.43	11.28	21.51	9.05	17.07		
	17.649	-23.35	18.825	-25.22	14.851	-14.03	13.291	-6.57	11.572	4.05	16.540	-20.26	1.036	5.93	22.619	-9.58	19.052	-20.99	5.68707	17
19	5.47	17.40	9.26	16.30	4.15	13.38	1.52	12.43	23.03	11.55	6.23	14.35	12.22	1.35	11.21	21.43	8.57	16.60		
	17.797	-23.41	19.042	-24.89	15.009	-14.73	13.362	-7.00	11.580	4.01	16.556	-20.30	1.035	5.92	22.621	-9.56	19.057	-20.99	5.81848	19
21	5.48	17.40	9.27	16.38	4.21	13.35	1.51	12.37	22.56	11.48	6.16	14.28	12.14	1.27	11.13	21.35	8.50	16.52		
	17.945	-23.43	19.251	-24.47	15.167	-15.42	13.433	-7.42	11.587	3.97	16.572	-20.33	1.035	5.92	22.623	-9.55	19.062	-20.98	5.94990	21
23	5.49	17.41	9.27	16.46	4.26	13.33	1.50	12.31	22.49	11.40	6.10	14.21	12.06	1.19	11.05	21.28	8.42	16.45		
	18.093	-23.43	19.451	-23.95	15.327	-16.08	13.504	-7.83	11.594	3.94	16.588	-20.36	1.034	5.92	22.626	-9.54	19.067	-20.98	6.08132	23
25	5.50	17.43	9.26	16.54	4.32	13.31	1.48	12.25	22.41	11.32	6.03	14.13	11.58	1.11	10.57	21.20	8.35	16.37		
	18.241	-23.39	19.639	-23.36	15.489	-16.72	13.575	-8.25	11.600	3.91	16.604	-20.39	1.034	5.92	22.628	-9.52	19.071	-20.98	6.21275	25
27	5.50	17.44	9.23	17.01	4.38	13.29	1.47	12.20	22.34	11.25	5.56	14.06	11.50	1.03	10.49	21.13	8.27	16.30		
	18.389	-23.33	19.810	-22.69	15.651	-17.33	13.646	-8.65	11.605	3.89	16.620	-20.43	1.034	5.92	22.631	-9.50	19.076	-20.97	6.34417	27
29	5.51	17.46	9.19	17.07	4.44	13.27	1.46	12.14	22.26	11.17	5.50	13.59	11.42	0.55	10.42	21.05	8.19	16.22		
	18.537	-23.23	19.959	-21.98	15.815	-17.92	13.716	-9.06	11.609	3.87	16.636	-20.46	1.034	5.92	22.634	-9.49	19.081	-20.97	6.47559	29
31	5.51	17.47	9.13	17.12	4.49	13.25	1.44	12.08	22.19	11.09	5.43	13.52	11.35	0.48	10.34	20.57	8.12	16.14		
	18.684	-23.10	20.079	-21.25	15.981	-18.47	13.787	-9.45	11.613	3.86	16.651	-20.49	1.035	5.93	22.636	-9.47	19.086	-20.96	6.60701	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2015

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 Dzięczynienia	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 Adventu	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 2016

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 7.10.2010 r.)

Data Wielkanocy: **2016 MARZEC 27**

Dla całego roku przyjęto: TDT – UT = 70 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 5.30**, Lato **VI 20, 23.34**, Jesień **IX 22, 15.21**, Zima **XII 21, 11.44**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 27 marca do 30 października 2016 r.**

Oznaczenia:

Dr — dzień 2016 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j_{astr} — jednostka astronomiczna

ρ_{\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 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
1	1	Pią	389	18.56254	-3.16	18.4527	-23.01	0.98331	12.0849	-0.15	63.273	7.0	57	800	1149.0	1538	2344	500.4	1110	1050	1	
2	2	Sob	390	19.00220	-3.44	18.4952	-22.56	0.98330	12.5350	-3.58	63.385	0.2	48	800	1149.5	1540	****	542.7	1131	1046	2	
3	3	Nie	391	19.04185	-4.12	18.5417	-22.51	0.98330	13.3916	-7.31	63.290	1.2	39	759	1149.9	1541	048	625.3	1154	1042	3	
4	4	Pon	392	19.08151	-4.40	18.5841	-22.45	0.98331	14.2544	-10.48	62.998	2.2	30	759	1150.4	1542	151	708.8	1218	1038	4	
5	5	Wto	393	19.12116	-5.07	19.0305	-22.39	0.98332	15.1349	-13.40	62.534	3.2	21	759	1150.9	1543	255	754.0	1246	1034	5	
6	6	Śro	394	19.16082	-5.34	19.0728	-22.32	0.98333	16.0355	-16.00	61.937	4.2	14	758	1151.3	1544	358	841.3	1319	1030	6	
7	7	Czw	395	19.20047	-6.00	19.1151	-22.24	0.98335	16.5611	-17.37	61.256	5.2	8	758	1151.7	1546	500	931.1	1359	1026	7	
8	8	Pią	396	19.24013	-6.26	19.1613	-22.17	0.98337	17.5029	-18.23	60.543	6.2	3	758	1152.2	1547	559	1023.1	1446	1023	8	
9	9	Sob	397	19.27579	-6.51	19.2035	-22.09	0.98340	18.4618	-18.10	59.854	7.2	0	757	1152.6	1549	653	1116.8	1543	1019	9	
10	10	Nie	398	19.31544	-7.16	19.2457	-21.60	0.98343	19.4255	-16.55	59.236	0.4	0	756	1153.0	1550	740	1211.5	1647	1015	10	
11	11	Pon	399	19.35510	-7.40	19.2918	-21.51	0.98346	20.3934	-14.40	58.726	1.4	2	756	1153.4	1552	821	1306.2	1758	1011	11	
12	12	Wto	400	19.39475	-8.04	19.3338	-21.42	0.98350	21.3538	-11.33	58.344	2.4	7	755	1153.8	1553	856	1400.2	1913	1007	12	
13	13	Śro	401	19.43441	-8.27	19.3758	-21.32	0.98354	22.3052	-7.44	58.095	3.4	14	754	1154.2	1555	927	1453.3	2031	1003	13	
14	14	Czw	402	19.47406	-8.50	19.4217	-21.21	0.98358	23.2518	-3.28	57.972	4.4	23	753	1154.6	1556	955	1545.5	2148	959	14	
15	15	Pią	403	19.51372	-9.11	19.4635	-21.11	0.98363	0.1917	0.60	57.958	5.4	33	752	1154.9	1558	1022	1637.3	2306	955	15	
16	16	Sob	404	19.55338	-9.33	19.5052	-20.60	0.98368	1.1317	5.23	58.034	6.4	44	752	1155.3	1559	1049	1729.3	****	951	16	
17	17	Nie	405	19.59303	-9.53	19.5509	-20.48	0.98374	2.0748	9.27	58.184	0.5	55	751	1155.6	1601	1117	1821.9	023	947	17	
18	18	Pon	406	20.03269	-10.13	19.5926	-20.36	0.98380	3.0312	12.59	58.398	1.5	67	750	1156.0	1603	1149	1915.5	140	943	18	
19	19	Wto	407	20.07234	-10.32	20.0341	-20.24	0.98387	3.5935	15.44	58.674	2.5	77	748	1156.3	1605	1226	2010.3	254	939	19	
20	20	Śro	408	20.11200	-10.50	20.0756	-20.11	0.98395	4.5644	17.34	59.014	3.5	85	747	1156.6	1606	1309	2105.7	403	935	20	
21	21	Czw	409	20.15165	-11.07	20.1210	-19.58	0.98403	5.5405	18.21	59.421	4.5	92	746	1156.9	1608	1359	2201.0	507	931	21	
22	22	Pią	410	20.19131	-11.24	20.1623	-19.45	0.98411	6.5051	18.04	59.897	5.5	97	745	1157.1	1610	1457	2255.3	602	927	22	
23	23	Sob	411	20.23097	-11.40	20.2036	-19.31	0.98421	7.4615	16.49	60.433	6.5	100	744	1157.4	1612	1559	2347.7	648	924	23	
24	24	Nie	412	20.27062	-11.55	20.2447	-19.17	0.98431	8.3942	14.41	61.012	0.4	100	742	1157.7	1613	1705	****	727	920	24	
25	25	Pon	413	20.31028	-12.09	20.2858	-19.02	0.98441	9.3058	11.53	61.605	1.4	98	741	1157.9	1615	1812	037.8	759	916	25	
26	26	Wto	414	20.34593	-12.23	20.3308	-18.47	0.98452	10.2006	8.35	62.178	2.4	94	740	1158.1	1617	1919	125.5	827	912	26	
27	27	Śro	415	20.38559	-12.36	20.3718	-18.32	0.98464	11.0726	4.59	62.686	3.4	89	738	1158.3	1619	2024	211.0	852	908	27	
28	28	Czw	416	20.42524	-12.48	20.4126	-18.17	0.98476	11.5329	1.15	63.089	4.4	82	737	1158.5	1621	2129	254.8	914	904	28	
29	29	Pią	417	20.46490	-12.59	20.4534	-18.01	0.98489	12.3848	-2.30	63.346	5.4	74	735	1158.7	1623	2233	337.6	936	900	29	
30	30	Sob	418	20.50455	-13.09	20.4941	-17.45	0.98502	13.2403	-6.07	63.427	6.4	66	734	1158.9	1625	2336	420.1	958	856	30	
31	31	Nie	419	20.54421	-13.19	20.5347	-17.28	0.98516	14.0952	-9.29	63.312	7.4	56	732	1159.1	1627	****	503.0	1021	852	31	

Fazy Księżyca [Dm, h.mm]: 3kw 2, 6.30 Nów 10, 2.31 1kw 17, 0.26 Pełn 24, 2.46

STYCZEŃ 2016 (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	9.10	17.13	4.52	13.25	1.43	12.05	22.15	11.05	5.39	13.48	11.31	0.44	10.30	20.54	8.08	16.11		
	18.758	-23.02	20.127	-20.88	16.064	-18.74	13.822	-9.65	11.615	3.85	16.659	-20.50	1.035	5.93	22.638	-9.46	19.089	-20.96	6.67272	1
3	5.51	17.50	9.01	17.14	4.58	13.24	1.42	11.59	22.07	10.58	5.33	13.41	11.23	0.36	10.22	20.46	8.00	16.03		
	18.905	-22.85	20.192	-20.17	16.232	-19.25	13.892	-10.04	11.617	3.85	16.674	-20.53	1.036	5.94	22.641	-9.44	19.094	-20.96	6.80414	3
5	5.51	17.52	8.50	17.12	5.03	13.23	1.40	11.53	21.59	10.50	5.26	13.34	11.15	0.28	10.14	20.38	7.53	15.56		
	19.051	-22.64	20.211	-19.53	16.400	-19.73	13.962	-10.42	11.619	3.85	16.689	-20.56	1.037	5.94	22.644	-9.42	19.098	-20.95	6.93556	5
7	5.51	17.54	8.36	17.05	5.08	13.22	1.39	11.47	21.52	10.42	5.19	13.27	11.07	0.20	10.07	20.31	7.45	15.48		
	19.197	-22.41	20.177	-19.00	16.570	-20.17	14.032	-10.80	11.620	3.85	16.704	-20.58	1.038	5.95	22.647	-9.40	19.103	-20.95	7.06698	7
9	5.50	17.56	8.21	16.55	5.14	13.21	1.37	11.42	21.44	10.34	5.12	13.20	10.59	0.13	9.59	20.23	7.38	15.41		
	19.343	-22.14	20.089	-18.62	16.742	-20.58	14.101	-11.17	11.620	3.86	16.719	-20.61	1.039	5.96	22.651	-9.38	19.108	-20.94	7.19840	9
11	5.49	17.59	8.03	16.40	5.19	13.21	1.36	11.36	21.36	10.27	5.06	13.13	10.51	0.05	9.51	20.16	7.30	15.33		
	19.488	-21.85	19.953	-18.40	16.914	-20.95	14.170	-11.54	11.619	3.87	16.733	-20.63	1.041	5.97	22.654	-9.36	19.113	-20.94	7.32982	11
13	5.49	18.01	7.45	16.23	5.23	13.21	1.34	11.30	21.28	10.19	4.59	13.05	10.44	23.53	9.43	20.08	7.22	15.25		
	19.633	-21.53	19.781	-18.33	17.087	-21.28	14.239	-11.90	11.618	3.89	16.747	-20.66	1.043	5.99	22.658	-9.34	19.118	-20.93	7.46124	13
15	5.47	18.04	7.26	16.03	5.28	13.22	1.32	11.24	21.20	10.11	4.52	12.58	10.36	23.46	9.36	20.01	7.15	15.18		
	19.776	-21.18	19.595	-18.40	17.261	-21.57	14.308	-12.25	11.615	3.92	16.761	-20.68	1.045	6.00	22.661	-9.32	19.123	-20.93	7.59266	15
17	5.46	18.07	7.09	15.44	5.32	13.23	1.31	11.18	21.11	10.03	4.45	12.51	10.28	23.38	9.28	19.53	7.07	15.10		
	19.919	-20.80	19.417	-18.56	17.436	-21.83	14.377	-12.60	11.612	3.95	16.775	-20.71	1.047	6.01	22.665	-9.30	19.128	-20.92	7.72408	17
19	5.45	18.09	6.53	15.25	5.37	13.24	1.29	11.13	21.03	9.55	4.38	12.44	10.20	23.30	9.20	19.46	6.60	15.03		
	20.061	-20.40	19.265	-18.80	17.612	-22.04	14.445	-12.94	11.609	3.98	16.788	-20.73	1.050	6.03	22.669	-9.27	19.133	-20.92	7.85550	19
21	5.43	18.12	6.41	15.09	5.40	13.25	1.27	11.07	20.55	9.47	4.31	12.37	10.12	23.23	9.12	19.38	6.52	14.55		
	20.203	-19.97	19.152	-19.09	17.788	-22.21	14.512	-13.27	11.604	4.02	16.802	-20.75	1.052	6.05	22.673	-9.25	19.138	-20.91	7.98692	21
23	5.41	18.15	6.31	14.55	5.44	13.27	1.25	11.01	20.46	9.39	4.24	12.29	10.05	23.15	9.04	19.31	6.44	14.48		
	20.343	-19.52	19.083	-19.40	17.965	-22.33	14.580	-13.60	11.599	4.07	16.814	-20.77	1.055	6.07	22.677	-9.22	19.142	-20.91	8.11834	23
25	5.39	18.18	6.23	14.43	5.47	13.29	1.23	10.55	20.38	9.31	4.17	12.22	9.57	23.08	8.57	19.23	6.37	14.40		
	20.483	-19.04	19.057	-19.71	18.143	-22.41	14.647	-13.92	11.593	4.11	16.827	-20.79	1.058	6.09	22.681	-9.20	19.147	-20.90	8.24976	25
27	5.37	18.21	6.18	14.34	5.50	13.32	1.21	10.50	20.29	9.23	4.10	12.15	9.49	23.00	8.49	19.16	6.29	14.33		
	20.622	-18.54	19.069	-20.02	18.320	-22.45	14.714	-14.23	11.586	4.17	16.839	-20.81	1.061	6.11	22.685	-9.18	19.152	-20.90	8.38118	27
29	5.35	18.24	6.15	14.27	5.53	13.35	1.19	10.44	20.21	9.15	4.03	12.08	9.41	22.53	8.41	19.08	6.22	14.25		
	20.759	-18.01	19.116	-20.29	18.498	-22.44	14.780	-14.54	11.578	4.23	16.851	-20.82	1.065	6.13	22.689	-9.15	19.156	-20.89	8.51260	29
31	5.32	18.28	6.13	14.22	5.56	13.38	1.17	10.38	20.12	9.07	3.56	12.00	9.33	22.45	8.33	19.01	6.14	14.18		
	20.896	-17.47	19.191	-20.53	18.676	-22.39	14.846	-14.84	11.570	4.29	16.863	-20.84	1.068	6.16	22.694	-9.12	19.161	-20.89	8.64402	31

LUTY 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
32	1	Pon	420	20.58386	-13.27	20.5752	-17.11	0.98530	14.5649	-12.30	62.995	0.3	47	730	1159.2	1629	039	546.9	1047	848	1	
33	2	Wto	421	21.02352	-13.35	21.0157	-16.54	0.98545	15.4526	-15.01	62.486	1.3	37	729	1159.3	1630	142	632.6	1117	844	2	
34	3	Śro	422	21.06318	-13.43	21.0601	-16.37	0.98560	16.3604	-16.55	61.813	2.3	28	727	1159.5	1632	244	720.3	1153	840	3	
35	4	Czw	423	21.10283	-13.49	21.1004	-16.19	0.98576	17.2851	-18.03	61.020	3.3	20	725	1159.6	1634	343	810.5	1236	836	4	
36	5	Pią	424	21.14249	-13.55	21.1406	-16.01	0.98591	18.2336	-18.16	60.162	4.3	12	724	1159.7	1636	439	902.9	1327	832	5	
37	6	Sob	425	21.18214	-13.59	21.1807	-15.43	0.98607	19.1953	-17.29	59.308	5.3	6	722	1159.7	1638	530	957.1	1428	829	6	
38	7	Nie	426	21.22180	-14.03	21.2208	-15.24	0.98624	20.1703	-15.40	58.526	6.3	2	720	1159.8	1640	614	1052.3	1536	825	7	
39	8	Pon	427	21.26146	-14.07	21.2607	-15.05	0.98641	21.1423	-12.52	57.880	7.3	0	718	1159.9	1642	653	1147.8	1651	821	8	
40	9	Wto	428	21.30111	-14.09	21.3006	-14.46	0.98658	22.1122	-9.14	57.419	8.8	1	716	1159.9	1644	726	1242.8	1809	817	9	
41	10	Śro	429	21.34076	-14.11	21.3404	-14.27	0.98675	23.0747	-5.00	57.172	1.8	5	715	1159.9	1646	757	1337.2	1930	813	10	
42	11	Czw	430	21.38042	-14.11	21.3802	-14.08	0.98692	0.0339	-0.28	57.139	2.8	11	713	1159.9	1648	825	1431.0	2050	809	11	
43	12	Pią	431	21.42007	-14.11	21.4158	-13.48	0.98710	0.5913	4.05	57.301	3.8	19	711	1159.9	1650	853	1524.6	2210	805	12	
44	13	Sob	432	21.45573	-14.11	21.4554	-13.28	0.98728	1.5449	8.20	57.621	4.8	29	709	1159.9	1652	922	1618.2	2328	801	13	
45	14	Nie	433	21.49538	-14.09	21.4949	-13.08	0.98747	2.5044	12.04	58.056	5.8	40	707	1159.9	1654	953	1712.2	****	757	14	
46	15	Pon	434	21.53504	-14.07	21.5344	-12.47	0.98765	3.4705	15.01	58.563	0.1	52	705	1159.9	1656	1028	1806.7	044	753	15	
47	16	Wto	435	21.57469	-14.04	21.5737	-12.26	0.98784	4.4343	17.04	59.106	1.1	63	703	1159.8	1658	1109	1901.4	155	749	16	
48	17	Śro	436	22.01435	-14.00	22.0130	-12.06	0.98804	5.4017	18.07	59.661	2.1	73	701	1159.8	1700	1156	1955.9	259	745	17	
49	18	Czw	437	22.05401	-13.56	22.0522	-11.45	0.98824	6.3614	18.08	60.211	3.1	82	658	1159.7	1702	1250	2049.5	356	741	18	
50	19	Pią	438	22.09366	-13.51	22.0914	-11.23	0.98844	7.3060	17.11	60.750	4.1	89	656	1159.6	1704	1350	2141.5	445	737	19	
51	20	Sob	439	22.13332	-13.45	22.1304	-11.02	0.98865	8.2406	15.21	61.274	5.1	95	654	1159.5	1706	1453	2231.6	526	733	20	
52	21	Nie	440	22.17297	-13.38	22.1654	-10.40	0.98886	9.1520	12.48	61.778	6.1	98	652	1159.4	1707	1559	2319.5	600	730	21	
53	22	Pon	441	22.21263	-13.31	22.2044	-10.19	0.98908	10.0442	9.42	62.255	7.1	100	650	1159.3	1709	1705	*****	629	726	22	
54	23	Wto	442	22.25229	-13.23	22.2432	-9.57	0.98930	10.5226	6.13	62.690	0.7	100	648	1159.1	1711	1811	005.6	655	722	23	
55	24	Śro	443	22.29194	-13.15	22.2821	-9.35	0.98953	11.3852	2.32	63.063	1.7	97	646	1159.0	1713	1916	049.9	718	718	24	
56	25	Czw	444	22.33159	-13.06	22.3208	-9.13	0.98976	12.2431	-1.13	63.350	2.7	93	643	1158.8	1715	2020	133.2	740	714	25	
57	26	Pią	445	22.37125	-12.56	22.3555	-8.50	0.99000	13.0951	-4.53	63.522	3.7	88	641	1158.7	1717	2123	215.9	802	710	26	
58	27	Sob	446	22.41090	-12.46	22.3941	-8.28	0.99024	13.5526	-8.20	63.550	4.7	81	639	1158.5	1719	2226	258.6	825	706	27	
59	28	Nie	447	22.45056	-12.36	22.4327	-8.05	0.99048	14.4146	-11.28	63.412	5.7	73	637	1158.3	1721	2329	341.9	850	702	28	
60	29	Pon	448	22.49021	-12.24	22.4713	-7.43	0.99073	15.2918	-14.08	63.092	6.7	64	634	1158.2	1723	****	426.4	918	658	29	

Fazy Księżyca [Dm, h.mm]: 3kw 1, 4.28 Now 8, 15.39 1kw 15, 8.46 Pełn 22, 19.20

LUTY 2016 (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	18.29	6.13	14.20	5.57	13.40	1.16	10.35	20.08	9.03	3.53	11.57	9.30	22.41	8.30	18.57	6.10	14.14		
	20.965	-17.19	19.238	-20.64	18.765	-22.35	14.879	-14.99	11.565	4.32	16.869	-20.85	1.070	6.17	22.696	-9.11	19.163	-20.88	8.70972	1
3	5.28	18.32	6.13	14.18	5.59	13.43	1.14	10.30	19.59	8.55	3.45	11.49	9.22	22.34	8.22	18.50	6.02	14.06		
	21.100	-16.61	19.347	-20.80	18.942	-22.23	14.944	-15.28	11.556	4.39	16.880	-20.86	1.074	6.19	22.700	-9.08	19.168	-20.88	8.84115	3
5	5.25	18.36	6.13	14.17	6.00	13.47	1.11	10.24	19.50	8.47	3.38	11.42	9.14	22.26	8.14	18.42	5.55	13.59		
	21.235	-16.02	19.474	-20.90	19.120	-22.07	15.009	-15.56	11.546	4.46	16.891	-20.88	1.078	6.22	22.705	-9.06	19.172	-20.87	8.97257	5
7	5.22	18.39	6.14	14.17	6.01	13.51	1.09	10.18	19.41	8.39	3.31	11.35	9.06	22.19	8.06	18.35	5.47	13.51		
	21.369	-15.40	19.616	-20.93	19.296	-21.86	15.073	-15.84	11.535	4.54	16.902	-20.89	1.082	6.25	22.709	-9.03	19.177	-20.87	9.10399	7
9	5.19	18.43	6.15	14.19	6.02	13.56	1.06	10.13	19.32	8.31	3.24	11.27	8.59	22.11	7.59	18.27	5.40	13.44		
	21.502	-14.77	19.771	-20.89	19.473	-21.61	15.136	-16.10	11.524	4.62	16.912	-20.91	1.087	6.27	22.714	-9.00	19.181	-20.86	9.23541	9
11	5.16	18.46	6.16	14.21	6.03	14.00	1.04	10.07	19.23	8.23	3.17	11.20	8.51	22.04	7.51	18.20	5.32	13.36		
	21.634	-14.13	19.935	-20.77	19.649	-21.32	15.199	-16.36	11.512	4.70	16.921	-20.92	1.091	6.30	22.718	-8.98	19.185	-20.86	9.36682	11
13	5.12	18.49	6.17	14.25	6.03	14.05	1.01	10.01	19.14	8.15	3.10	11.13	8.43	21.57	7.43	18.12	5.24	13.28		
	21.765	-13.46	20.108	-20.58	19.824	-20.98	15.261	-16.62	11.500	4.79	16.931	-20.93	1.096	6.33	22.723	-8.95	19.189	-20.85	9.49824	13
15	5.09	18.53	6.18	14.30	6.03	14.11	0.59	9.55	19.05	8.06	3.02	11.05	8.35	21.49	7.35	18.05	5.17	13.21		
	21.895	-12.79	20.288	-20.30	19.998	-20.61	15.322	-16.86	11.487	4.88	16.940	-20.94	1.101	6.37	22.728	-8.92	19.193	-20.85	9.62966	15
17	5.05	18.57	6.19	14.36	6.03	14.16	0.56	9.50	18.56	7.58	2.55	10.58	8.28	21.42	7.28	17.58	5.09	13.13		
	22.025	-12.09	20.473	-19.94	20.172	-20.19	15.382	-17.10	11.474	4.97	16.948	-20.95	1.106	6.40	22.732	-8.89	19.197	-20.85	9.76108	17
19	5.01	19.00	6.20	14.42	6.02	14.22	0.53	9.44	18.46	7.50	2.48	10.50	8.20	21.34	7.20	17.50	5.01	13.06		
	22.154	-11.39	20.664	-19.50	20.344	-19.73	15.442	-17.33	11.460	5.07	16.957	-20.96	1.111	6.43	22.737	-8.86	19.201	-20.84	9.89250	19
21	4.57	19.04	6.20	14.50	6.01	14.27	0.50	9.38	18.37	7.42	2.40	10.43	8.12	21.27	7.12	17.43	4.54	12.58		
	22.282	-10.67	20.859	-18.97	20.515	-19.24	15.501	-17.56	11.445	5.16	16.964	-20.97	1.117	6.46	22.742	-8.84	19.205	-20.84	10.02392	21
23	4.53	19.07	6.20	14.58	6.00	14.33	0.47	9.32	18.28	7.34	2.33	10.36	8.04	21.20	7.04	17.35	4.46	12.50		
	22.409	-9.95	21.057	-18.36	20.686	-18.71	15.559	-17.78	11.431	5.26	16.972	-20.97	1.122	6.50	22.746	-8.81	19.209	-20.83	10.15534	23
25	4.49	19.11	6.20	15.06	5.59	14.39	0.44	9.27	18.19	7.25	2.26	10.28	7.57	21.12	6.57	17.28	4.38	12.43		
	22.536	-9.21	21.258	-17.66	20.855	-18.14	15.616	-17.99	11.416	5.36	16.979	-20.98	1.128	6.53	22.751	-8.78	19.212	-20.83	10.28675	25
27	4.44	19.15	6.19	15.15	5.57	14.45	0.41	9.21	18.09	7.17	2.18	10.21	7.49	21.05	6.49	17.20	4.31	12.35		
	22.662	-8.46	21.462	-16.88	21.023	-17.53	15.672	-18.19	11.401	5.46	16.985	-20.99	1.133	6.57	22.756	-8.75	19.216	-20.82	10.41817	27
29	4.40	19.19	6.18	15.25	5.55	14.51	0.38	9.15	17.60	7.09	2.11	10.13	7.41	20.58	6.41	17.13	4.23	12.27		
	22.787	-7.71	21.668	-16.01	21.190	-16.90	15.726	-18.39	11.385	5.57	16.991	-20.99	1.139	6.61	22.761	-8.72	19.219	-20.82	10.54958	29

MARZEC 2016

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
61	1	Wto	449	22.52587	-12.13	22.5058	-7.20	0.99098	16.1825	-16.14	62.587	7.7	55	632	1158.0	1725	030	512.5	950	654	1	
62	2	Śro	450	22.56553	-12.01	22.5442	-6.57	0.99123	17.0921	-17.37	61.907	0.5	45	630	1157.8	1727	129	600.6	1029	650	2	
63	3	Czw	451	23.00518	-11.48	22.5826	-6.34	0.99148	18.0208	-18.12	61.082	1.5	35	628	1157.5	1728	226	650.7	1115	646	3	
64	4	Pią	452	23.04484	-11.35	23.0210	-6.11	0.99174	18.5636	-17.51	60.156	2.5	26	625	1157.3	1730	317	742.7	1210	642	4	
65	5	Sob	453	23.08449	-11.21	23.0553	-5.47	0.99200	19.5224	-16.31	59.192	3.5	17	623	1157.1	1732	404	836.3	1313	638	5	
66	6	Nie	454	23.12415	-11.08	23.0935	-5.24	0.99225	20.4902	-14.10	58.265	4.5	9	621	1156.9	1734	445	930.9	1424	634	6	
67	7	Pon	455	23.16380	-10.53	23.1318	-5.01	0.99251	21.4606	-10.55	57.455	5.5	4	618	1156.6	1736	521	1026.0	1540	631	7	
68	8	Wto	456	23.20346	-10.39	23.1659	-4.37	0.99278	22.4318	-6.54	56.836	6.5	1	616	1156.4	1738	553	1121.3	1701	627	8	
69	9	Śro	457	23.24311	-10.24	23.2041	-4.14	0.99304	23.4030	-2.24	56.464	0.4	0	614	1156.1	1740	623	1216.6	1823	623	9	
70	10	Czw	458	23.28277	-10.08	23.2422	-3.50	0.99330	0.3747	2.18	56.370	1.4	3	611	1155.9	1741	652	1312.0	1946	619	10	
71	11	Pią	459	23.32242	-9.53	23.2803	-3.27	0.99356	1.3517	6.51	56.548	2.4	8	609	1155.6	1743	721	1407.7	2108	615	11	
72	12	Sob	460	23.36208	-9.37	23.3144	-3.03	0.99383	2.3306	10.54	56.967	3.4	16	607	1155.4	1745	753	1503.7	2228	611	12	
73	13	Nie	461	23.40173	-9.20	23.3524	-2.40	0.99409	3.3111	14.13	57.571	4.4	26	604	1155.1	1747	828	1560.0	2343	607	13	
74	14	Pon	462	23.44139	-9.04	23.3904	-2.16	0.99436	4.2917	16.35	58.294	5.4	36	602	1154.8	1749	908	1656.2	****	603	14	
75	15	Wto	463	23.48104	-8.47	23.4244	-1.52	0.99462	5.2655	17.55	59.074	6.4	47	559	1154.5	1751	954	1751.8	052	559	15	
76	16	Śro	464	23.52070	-8.30	23.4623	-1.28	0.99489	6.2331	18.10	59.855	0.7	58	557	1154.2	1752	1046	1846.0	152	555	16	
77	17	Czw	465	23.56035	-8.13	23.5002	-1.05	0.99516	7.1835	17.26	60.597	1.7	68	555	1154.0	1754	1144	1938.4	244	551	17	
78	18	Pią	466	24.00001	-7.55	23.5341	-0.41	0.99543	8.1145	15.49	61.274	2.7	77	552	1153.7	1756	1246	2028.7	326	547	18	
79	19	Sob	467	0.03566	-7.37	23.5720	-0.17	0.99570	9.0254	13.28	61.873	3.7	85	550	1153.4	1758	1350	2116.7	402	543	19	
80	20	Nie	468	0.07532	-7.20	0.0059	0.06	0.99598	9.5209	10.31	62.388	4.7	92	547	1153.1	1800	1455	2202.8	432	539	20	
81	21	Pon	469	0.11497	-7.02	0.0438	0.30	0.99626	10.3947	7.10	62.819	5.7	96	545	1152.8	1802	1601	2247.2	459	536	21	
82	22	Wto	470	0.15463	-6.44	0.0816	0.54	0.99654	11.2610	3.33	63.167	6.7	99	543	1152.5	1803	1705	2330.5	522	532	22	
83	23	Śro	471	0.19428	-6.26	0.1155	1.17	0.99682	12.1147	-0.11	63.430	7.7	100	540	1152.2	1805	1809	*****	545	528	23	
84	24	Czw	472	0.23394	-6.07	0.1533	1.41	0.99710	12.5706	-3.53	63.602	1.0	99	538	1151.9	1807	1913	013.2	607	524	24	
85	25	Pią	473	0.27359	-5.49	0.1911	2.05	0.99739	13.4236	-7.24	63.673	2.0	97	535	1151.6	1809	2016	055.8	629	520	25	
86	26	Sob	474	0.31325	-5.31	0.2250	2.28	0.99768	14.2842	-10.38	63.629	3.0	92	533	1151.3	1811	2119	138.9	653	516	26	
87	27	Nie	475	0.35290	-5.13	0.2628	2.52	0.99797	15.1548	-13.27	63.453	4.0	87	531	1151.0	1812	2221	222.9	720	512	27	
87	27	Nie	475	23.35192	-5.13	0.2619	2.51	0.99796	15.1349	-13.20	63.463	3.9	87	631	1251.0	1912	2321	322.9	820	612	27	
88	28	Pon	476	23.39157	-4.55	0.2957	3.14	0.99825	16.0207	-15.38	63.147	4.9	80	628	1250.7	1914	****	408.2	850	608	28	
89	29	Wto	477	23.43123	-4.37	0.3336	3.37	0.99854	16.5153	-17.16	62.676	5.9	71	626	1250.4	1916	020	455.0	926	604	29	
90	30	Śro	478	23.47088	-4.19	0.3714	4.01	0.99884	17.4307	-18.08	62.048	6.9	62	624	1250.1	1918	117	543.5	1008	600	30	
91	31	Czw	479	23.51054	-4.01	0.4053	4.24	0.99913	18.3545	-18.08	61.277	7.9	52	621	1249.8	1920	210	633.5	1058	556	31	

Fazy Księżycyca [Dm, h.mm]: 3kw 2, 0.11 Now 9, 2.55 1kw 15, 18.03 Pełn 23, 13.01 Pełn 23, 14.01 3kw 31, 17.17

MARZEC 2016 (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	6.18	15.31	5.54	14.54	0.36	9.12	17.55	7.05	2.07	10.09	7.37	20.54	6.37	17.09	4.19	12.24		
	22.849	-7.33	21.772	-15.54	21.273	-16.57	15.753	-18.48	11.377	5.62	16.994	-20.99	1.142	6.63	22.763	-8.71	19.221	-20.82	10.61529	1
3	4.33	19.24	6.16	15.41	5.52	15.01	0.32	9.06	17.46	6.57	1.60	10.02	7.30	20.47	6.30	17.02	4.11	12.16		
	22.974	-6.56	21.982	-14.55	21.438	-15.88	15.806	-18.67	11.362	5.72	17.000	-21.00	1.148	6.66	22.768	-8.68	19.224	-20.81	10.74672	3
5	4.28	19.28	6.15	15.52	5.49	15.07	0.29	9.00	17.36	6.48	1.52	9.54	7.22	20.39	6.22	16.54	4.04	12.08		
	23.098	-5.79	22.194	-13.46	21.602	-15.17	15.858	-18.85	11.346	5.83	17.005	-21.00	1.154	6.70	22.772	-8.65	19.227	-20.81	10.87814	5
7	4.24	19.32	6.13	16.04	5.47	15.13	0.25	8.54	17.27	6.40	1.44	9.46	7.14	20.32	6.14	16.47	3.56	12.01		
	23.222	-5.01	22.408	-12.30	21.765	-14.43	15.908	-19.02	11.330	5.93	17.009	-21.00	1.161	6.74	22.777	-8.62	19.230	-20.81	11.00955	7
9	4.19	19.36	6.11	16.16	5.44	15.20	0.21	8.48	17.18	6.32	1.37	9.39	7.07	20.25	6.06	16.40	3.48	11.53		
	23.345	-4.23	22.624	-11.04	21.927	-13.66	15.957	-19.19	11.314	6.03	17.013	-21.01	1.167	6.78	22.782	-8.60	19.233	-20.80	11.14097	9
11	4.14	19.40	6.08	16.29	5.41	15.26	0.17	8.42	17.08	6.24	1.29	9.31	6.59	20.18	5.59	16.32	3.40	11.45		
	23.467	-3.45	22.843	-9.71	22.087	-12.87	16.004	-19.35	11.297	6.14	17.017	-21.01	1.173	6.82	22.787	-8.57	19.235	-20.80	11.27238	11
13	4.09	19.44	6.06	16.42	5.38	15.32	0.13	8.36	16.59	6.15	1.21	9.23	6.51	20.10	5.51	16.25	3.33	11.38		
	23.590	-2.66	23.064	-8.29	22.247	-12.05	16.050	-19.50	11.281	6.24	17.020	-21.01	1.180	6.86	22.791	-8.54	19.238	-20.80	11.40380	13
15	4.03	19.48	6.03	16.56	5.35	15.39	0.09	8.30	16.50	6.07	1.14	9.16	6.43	20.03	5.43	16.17	3.25	11.30		
	23.712	-1.87	23.287	-6.80	22.405	-11.21	16.094	-19.65	11.266	6.34	17.022	-21.01	1.187	6.90	22.796	-8.51	19.240	-20.80	11.53522	15
17	3.58	19.52	6.00	17.10	5.32	15.45	0.05	8.23	16.40	5.59	1.06	9.08	6.36	19.56	5.35	16.10	3.17	11.22		
	23.834	-1.08	23.513	-5.23	22.563	-10.35	16.136	-19.79	11.250	6.44	17.024	-21.01	1.193	6.94	22.801	-8.49	19.243	-20.79	11.66664	17
19	3.53	19.57	5.57	17.25	5.28	15.52	23.56	8.17	16.31	5.51	0.58	9.00	6.28	19.49	5.28	16.02	3.10	11.15		
	23.956	-0.29	23.743	-3.58	22.719	-9.48	16.177	-19.93	11.234	6.54	17.026	-21.00	1.200	6.98	22.805	-8.46	19.245	-20.79	11.79806	19
21	3.47	20.01	5.54	17.40	5.25	15.58	23.51	8.10	16.22	5.42	0.50	8.53	6.20	19.41	5.20	15.55	3.02	11.07		
	0.077	0.50	23.975	-1.86	22.875	-8.58	16.215	-20.06	11.219	6.63	17.027	-21.00	1.207	7.03	22.810	-8.43	19.247	-20.79	11.92948	21
23	3.42	20.06	5.51	17.56	5.21	16.04	23.47	8.04	16.12	5.34	0.43	8.45	6.13	19.34	5.12	15.47	2.54	10.59		
	0.199	1.29	0.211	-0.09	23.030	-7.67	16.251	-20.18	11.204	6.73	17.028	-21.00	1.214	7.07	22.814	-8.41	19.249	-20.79	12.06089	23
25	3.36	20.10	5.48	18.12	5.17	16.11	23.42	7.57	16.03	5.26	0.35	8.37	6.05	19.27	5.05	15.40	2.46	10.51		
	0.320	2.08	0.450	1.74	23.184	-6.75	16.285	-20.30	11.189	6.82	17.028	-21.00	1.221	7.11	22.819	-8.38	19.251	-20.79	12.19231	25
27	3.30	20.15	5.44	18.28	5.14	16.17	23.36	7.50	15.54	5.18	0.27	8.29	5.57	19.20	4.57	15.33	2.38	10.44		
	0.441	2.86	0.691	3.61	23.337	-5.81	16.317	-20.42	11.175	6.91	17.028	-20.99	1.228	7.15	22.823	-8.35	19.252	-20.79	12.32372	27
27	4.30	21.15	6.44	19.28	6.14	17.17	0.40	8.50	16.54	6.18	1.27	9.29	6.57	20.20	5.57	16.33	3.38	11.44		
	0.439	2.84	0.686	3.57	23.334	-5.83	16.317	-20.42	11.175	6.90	17.028	-20.99	1.227	7.15	22.823	-8.35	19.252	-20.79	12.32372	27
29	4.24	21.19	6.41	19.45	6.10	17.23	0.35	8.44	16.45	6.09	1.19	9.21	6.50	20.13	5.49	16.25	3.31	11.36		
	0.560	3.62	0.929	5.46	23.487	-4.88	16.346	-20.53	11.161	6.99	17.027	-20.99	1.234	7.19	22.827	-8.33	19.254	-20.78	12.45514	29
31	4.18	21.24	6.37	20.02	6.06	17.30	0.29	8.37	16.36	6.01	1.11	9.13	6.42	20.05	5.41	16.18	3.23	11.28		
	0.681	4.40	1.173	7.35	23.639	-3.93	16.373	-20.63	11.148	7.07	17.026	-20.98	1.241	7.24	22.831	-8.30	19.255	-20.78	12.58656	31

KWIECIEŃ 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
92	1	Pią	480	23.55020	-3.43	0.4432	4.47	0.99942	19.2932	-17.13	60.388	0.8	42	619	1249.5	1921	257	724.9	1156	552	1
93	2	Sob	481	23.58585	-3.26	0.4811	5.10	0.99972	20.2414	-15.21	59.426	1.8	32	616	1249.2	1923	339	817.4	1301	548	2
94	3	Nie	482	0.02551	-3.08	0.5150	5.33	1.00001	21.1934	-12.34	58.456	2.8	22	614	1248.9	1925	416	910.6	1413	544	3
95	4	Pon	483	0.06516	-2.51	0.5529	5.56	1.00030	22.1526	-8.58	57.551	3.8	13	612	1248.6	1927	449	1004.4	1530	540	4
96	5	Wto	484	0.10481	-2.34	0.5908	6.19	1.00059	23.1150	-4.43	56.796	4.8	6	609	1248.3	1928	519	1058.8	1650	537	5
97	6	Śro	485	0.14447	-2.17	1.0248	6.41	1.00088	0.0854	-0.04	56.264	5.8	2	607	1248.0	1930	548	1154.0	1813	533	6
98	7	Czw	486	0.18412	-2.00	1.0628	7.04	1.00117	1.0648	4.39	56.014	6.8	0	605	1247.7	1932	617	1250.0	1937	529	7
99	8	Pią	487	0.22378	-1.44	1.1008	7.26	1.00145	2.0540	9.05	56.070	0.9	1	602	1247.5	1934	648	1347.2	2101	525	8
100	9	Sob	488	0.26343	-1.27	1.1348	7.49	1.00174	3.0524	12.54	56.423	1.9	6	600	1247.2	1936	722	1445.3	2221	521	9
101	10	Nie	489	0.30309	-1.11	1.1729	8.11	1.00202	4.0536	15.48	57.030	2.9	13	558	1246.9	1937	801	1543.9	2336	517	10
102	11	Pon	490	0.34275	-0.56	1.2109	8.33	1.00230	5.0536	17.37	57.823	3.9	21	555	1246.7	1939	846	1642.1	****	513	11
103	12	Wto	491	0.38240	-0.40	1.2450	8.55	1.00258	6.0433	18.17	58.725	4.9	31	553	1246.4	1941	938	1738.9	043	509	12
104	13	Śro	492	0.42206	-0.25	1.2832	9.16	1.00286	7.0140	17.51	59.659	5.9	42	551	1246.2	1943	1035	1833.5	139	505	13
105	14	Czw	493	0.46171	-0.10	1.3214	9.38	1.00313	7.5627	16.28	60.562	0.2	53	548	1245.9	1945	1138	1925.4	226	501	14
106	15	Pią	494	0.50137	0.04	1.3556	9.60	1.00341	8.4844	14.16	61.383	1.2	63	546	1245.7	1946	1242	2014.6	305	457	15
107	16	Sob	495	0.54102	0.19	1.3938	10.21	1.00368	9.3840	11.28	62.092	2.2	72	544	1245.4	1948	1347	2101.3	337	453	16
108	17	Nie	496	0.58068	0.32	1.4321	10.42	1.00395	10.2636	8.12	62.672	3.2	80	542	1245.2	1950	1452	2146.0	404	449	17
109	18	Pon	497	1.02033	0.46	1.4704	11.03	1.00423	11.1303	4.39	63.117	4.2	88	539	1245.0	1952	1557	2229.3	428	445	18
110	19	Wto	498	1.05599	0.59	1.5047	11.23	1.00450	11.5834	0.56	63.433	5.2	93	537	1244.8	1954	1701	2311.8	450	441	19
111	20	Śro	499	1.09564	1.12	1.5431	11.44	1.00477	12.4342	-2.47	63.626	6.2	97	535	1244.6	1955	1805	2354.2	512	438	20
112	21	Czw	500	1.13530	1.24	1.5816	12.04	1.00504	13.2859	-6.24	63.706	7.2	99	533	1244.4	1957	1908	*****	534	434	21
113	22	Pią	501	1.17495	1.36	2.0200	12.24	1.00531	14.1452	-9.45	63.681	0.2	100	531	1244.2	1959	2011	037.1	557	430	22
114	23	Sob	502	1.21461	1.47	2.0546	12.44	1.00559	15.0144	-12.44	63.553	1.2	99	528	1244.0	2001	2114	120.8	623	426	23
115	24	Nie	503	1.25426	1.58	2.0931	13.04	1.00586	15.4949	-15.12	63.322	2.2	96	526	1243.8	2002	2214	205.8	652	422	24
116	25	Pon	504	1.29392	2.08	2.1318	13.24	1.00613	16.3916	-17.02	62.983	3.2	91	524	1243.6	2004	2312	252.2	726	418	25
117	26	Wto	505	1.33358	2.18	2.1704	13.43	1.00640	17.3001	-18.07	62.531	4.2	85	522	1243.4	2006	****	340.1	805	414	26
118	27	Śro	506	1.37323	2.27	2.2052	14.02	1.00667	18.2154	-18.22	61.963	5.2	77	520	1243.3	2008	006	429.3	852	410	27
119	28	Czw	507	1.41289	2.36	2.2439	14.21	1.00693	19.1437	-17.43	61.283	6.2	68	518	1243.1	2010	055	519.5	946	406	28
120	29	Pią	508	1.45254	2.44	2.2828	14.39	1.00720	20.0754	-16.10	60.503	7.2	58	516	1243.0	2011	138	610.5	1048	402	29
121	30	Sob	509	1.49220	2.52	2.3216	14.58	1.00746	21.0132	-13.44	59.649	0.3	47	514	1242.9	2013	215	701.9	1155	358	30

Fazy Księżyca [Dm, h.mm]: 3kw 0, 17.17 Now 7, 13.24 1kw 14, 5.59 Pełn 22, 7.24 3kw 30, 5.29

MAJ 2016

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2457																					
122	1	Nie	510	1.53185	2.59	2.3606	15.16	1.00772	21.5527	-10.29	58.764	1.3	36	512	1242.8	2015	249	753.6	1307	354	1
123	2	Pon	511	1.57151	3.06	2.3956	15.34	1.00798	22.4949	-6.33	57.905	2.3	26	510	1242.7	2017	319	845.8	1424	350	2
124	3	Wto	512	2.01116	3.12	2.4346	15.51	1.00824	23.4453	-2.08	57.141	3.3	16	508	1242.5	2018	347	938.7	1543	346	3
125	4	Śro	513	2.05082	3.17	2.4737	16.09	1.00849	0.4104	2.31	56.547	4.3	9	506	1242.5	2020	415	1032.8	1705	343	4
126	5	Czw	514	2.09047	3.22	2.5129	16.26	1.00873	1.3841	7.06	56.188	5.3	3	504	1242.4	2022	444	1128.5	1828	339	5
127	6	Pią	515	2.13013	3.27	2.5521	16.43	1.00898	2.3757	11.17	56.111	6.3	0	502	1242.3	2024	515	1225.8	1951	335	6
128	7	Sob	516	2.16578	3.30	2.5914	16.59	1.00922	3.3837	14.42	56.332	0.6	1	500	1242.2	2025	551	1325.1	2111	331	7
129	8	Nie	517	2.20544	3.34	3.0307	17.15	1.00945	4.4006	17.06	56.832	1.6	4	459	1242.2	2027	634	1425.0	2224	327	8
130	9	Pon	518	2.24509	3.36	3.0701	17.31	1.00968	5.4119	18.18	57.562	2.6	10	457	1242.1	2029	723	1524.6	2328	323	9
131	10	Wto	519	2.28475	3.38	3.1056	17.47	1.00991	6.4109	18.18	58.450	3.6	18	455	1242.1	2030	820	1622.3	****	319	10
132	11	Śro	520	2.32441	3.40	3.1451	18.02	1.01013	7.3838	17.13	59.417	4.6	27	453	1242.1	2032	923	1717.4	021	315	11
133	12	Czw	521	2.36406	3.41	3.1846	18.17	1.01035	8.3316	15.12	60.384	5.6	37	452	1242.1	2034	1029	1809.1	104	311	12
134	13	Pią	522	2.40372	3.41	3.2242	18.32	1.01057	9.2500	12.30	61.285	6.6	47	450	1242.1	2035	1136	1857.8	139	307	13
135	14	Sob	523	2.44337	3.41	3.2639	18.47	1.01078	10.1412	9.17	62.070	0.7	57	448	1242.1	2037	1242	1943.8	209	303	14
136	15	Nie	524	2.48303	3.41	3.3036	19.01	1.01099	11.0122	5.45	62.706	1.7	67	447	1242.1	2039	1347	2027.8	234	259	15
137	16	Pon	525	2.52268	3.39	3.3434	19.15	1.01120	11.4712	2.02	63.178	2.7	75	445	1242.1	2040	1452	2110.6	257	255	16
138	17	Wto	526	2.56234	3.38	3.3832	19.28	1.01140	12.3220	-1.44	63.482	3.7	83	444	1242.1	2042	1556	2152.9	318	251	17
139	18	Śro	527	3.00199	3.35	3.4231	19.41	1.01160	13.1724	-5.24	63.627	4.7	89	442	1242.2	2043	1659	2235.4	340	247	18
140	19	Czw	528	3.04165	3.32	3.4630	19.54	1.01180	14.0260	-8.53	63.628	5.7	94	441	1242.2	2045	1803	2318.7	402	244	19
141	20	Pią	529	3.08130	3.29	3.5030	20.06	1.01200	14.4935	-12.00	63.505	6.7	98	439	1242.3	2046	1906	*****	427	240	20
142	21	Sob	530	3.12096	3.25	3.5431	20.19	1.01220	15.3729	-14.40	63.276	7.7	100	438	1242.3	2048	2008	003.3	454	236	21
143	22	Nie	531	3.16062	3.21	3.5832	20.30	1.01239	16.2651	-16.43	62.958	0.5	100	436	1242.4	2049	2107	049.5	526	232	22
144	23	Pon	532	3.20027	3.16	4.0233	20.42	1.01258	17.1740	-18.03	62.563	1.5	98	435	1242.5	2051	2203	137.2	604	228	23
145	24	Wto	533	3.23593	3.10	4.0635	20.53	1.01277	18.0938	-18.32	62.100	2.5	94	434	1242.6	2052	2254	226.4	649	224	24
146	25	Śro	534	3.27558	3.04	4.1038	21.03	1.01295	19.0224	-18.08	61.571	3.5	88	433	1242.7	2054	2339	316.7	740	220	25
147	26	Czw	535	3.31524	2.58	4.1441	21.14	1.01313	19.5531	-16.49	60.982	4.5	81	432	1242.8	2055	****	407.5	839	216	26
148	27	Pią	536	3.35490	2.51	4.1844	21.24	1.01331	20.4838	-14.37	60.339	5.5	72	430	1242.9	2056	018	458.5	945	212	27
149	28	Sob	537	3.39455	2.44	4.2248	21.33	1.01349	21.4137	-11.38	59.653	6.5	62	429	1243.0	2058	052	549.3	1054	208	28
150	29	Nie	538	3.43421	2.36	4.2653	21.43	1.01366	22.3432	-7.57	58.947	7.5	51	428	1243.2	2059	122	640.0	1207	204	29
151	30	Pon	539	3.47386	2.27	4.3058	21.52	1.01383	23.2742	-3.47	58.254	0.9	40	427	1243.3	2100	150	730.9	1323	200	30
152	31	Wto	540	3.51352	2.18	4.3503	21.60	1.01399	0.2137	0.43	57.621	1.9	29	426	1243.4	2101	217	822.4	1441	156	31

Fazy Księżyca [Dm, h.mm]: Now 6, 21.30 1kw 13, 19.02 Pełn 21, 23.14 3kw 29, 14.12

MAJ 2016 (c.d.)

Światy, 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	2.30	23.00	5.25	21.31	5.05	19.09	22.32	6.28	14.22	3.55	22.60	7.08	4.43	18.14	3.41	14.21	1.21	9.26		
	2.602	15.27	3.357	20.51	2.000	10.91	16.393	-21.69	11.013	7.83	16.952	-20.83	1.351	7.90	22.887	-7.98	19.258	-20.81	14.62355	1
3	2.21	23.09	5.19	21.17	5.01	19.16	22.23	6.19	14.13	3.47	22.51	6.60	4.35	18.06	3.33	14.13	1.13	9.18		
	2.730	15.86	3.322	19.95	2.156	11.79	16.366	-21.72	11.010	7.84	16.945	-20.82	1.358	7.94	22.890	-7.96	19.257	-20.81	14.75496	3
5	2.12	23.18	5.13	21.02	4.58	19.23	22.13	6.09	14.05	3.39	22.43	6.52	4.28	17.59	3.25	14.06	1.06	9.10		
	2.858	16.43	3.272	19.26	2.313	12.65	16.335	-21.74	11.008	7.84	16.936	-20.80	1.364	7.98	22.892	-7.95	19.256	-20.81	14.88638	5
7	2.01	23.29	5.07	20.45	4.54	19.29	22.04	5.59	13.57	3.32	22.34	6.43	4.20	17.52	3.18	13.58	0.58	9.02		
	2.987	16.99	3.209	18.45	2.472	13.50	16.300	-21.76	11.007	7.84	16.928	-20.79	1.371	8.02	22.895	-7.94	19.255	-20.82	15.01780	7
9	1.50	23.41	5.01	20.27	4.51	19.36	21.54	5.49	13.50	3.24	22.26	6.35	4.12	17.45	3.10	13.50	0.50	8.54		
	3.117	17.52	3.140	17.59	2.631	14.32	16.263	-21.77	11.006	7.84	16.919	-20.78	1.378	8.06	22.897	-7.92	19.254	-20.82	15.14922	9
11	1.37	23.55	4.55	20.09	4.48	19.43	21.43	5.38	13.42	3.16	22.17	6.27	4.05	17.37	3.02	13.43	0.42	8.46		
	3.247	18.04	3.069	16.69	2.792	15.12	16.223	-21.77	11.007	7.83	16.910	-20.76	1.384	8.09	22.900	-7.91	19.252	-20.83	15.28064	11
13	1.21	0.26	4.48	19.52	4.45	19.49	21.33	5.28	13.34	3.08	22.09	6.18	3.57	17.30	2.54	13.35	0.34	8.38		
	3.378	18.54	3.003	15.82	2.953	15.89	16.180	-21.76	11.008	7.82	16.901	-20.75	1.390	8.13	22.902	-7.90	19.251	-20.83	15.41206	13
15	*****	*****	4.42	19.35	4.42	19.56	21.22	5.18	13.26	2.60	22.00	6.10	3.49	17.23	2.46	13.27	0.26	8.30		
	3.510	19.01	2.945	15.01	3.116	16.64	16.135	-21.75	11.009	7.80	16.891	-20.73	1.397	8.17	22.904	-7.89	19.249	-20.84	15.54348	15
17	*****	*****	4.36	19.20	4.39	20.02	21.11	5.07	13.19	2.52	21.52	6.02	3.41	17.16	2.39	13.20	0.18	8.22		
	3.642	19.47	2.899	14.30	3.280	17.36	16.088	-21.73	11.012	7.78	16.882	-20.71	1.403	8.21	22.906	-7.88	19.247	-20.84	15.67490	17
19	*****	*****	4.30	19.07	4.37	20.09	21.00	4.56	13.11	2.44	21.43	5.53	3.34	17.08	2.31	13.12	0.10	8.14		
	3.775	19.90	2.869	13.71	3.445	18.05	16.039	-21.70	11.015	7.75	16.872	-20.70	1.409	8.24	22.908	-7.87	19.245	-20.85	15.80631	19
21	*****	*****	4.24	18.56	4.35	20.15	20.49	4.46	13.04	2.36	21.35	5.45	3.26	17.01	2.23	13.04	0.02	8.06		
	3.909	20.31	2.856	13.28	3.612	18.71	15.990	-21.67	11.019	7.72	16.862	-20.68	1.415	8.28	22.909	-7.86	19.243	-20.85	15.93773	21
23	*****	*****	4.18	18.47	4.32	20.22	20.38	4.35	12.56	2.29	21.26	5.37	3.18	16.54	2.15	12.57	23.50	7.58		
	4.043	20.70	2.860	12.99	3.780	19.33	15.939	-21.63	11.023	7.68	16.852	-20.67	1.421	8.31	22.911	-7.85	19.241	-20.86	16.06915	23
25	*****	*****	4.12	18.39	4.31	20.28	20.27	4.25	12.49	2.21	21.17	5.28	3.11	16.46	2.07	12.49	23.42	7.50		
	4.177	21.06	2.883	12.86	3.949	19.92	15.888	-21.59	11.029	7.64	16.842	-20.65	1.427	8.35	22.912	-7.84	19.239	-20.87	16.20058	25
27	*****	*****	4.06	18.34	4.29	20.34	20.16	4.14	12.42	2.13	21.09	5.20	3.03	16.39	1.59	12.41	23.34	7.42		
	4.312	21.40	2.924	12.88	4.119	20.48	15.838	-21.54	11.035	7.60	16.831	-20.63	1.433	8.38	22.913	-7.83	19.236	-20.87	16.33200	27
29	*****	*****	4.01	18.31	4.28	20.40	20.04	4.04	12.35	2.05	21.00	5.12	2.55	16.32	1.52	12.33	23.26	7.34		
	4.448	21.71	2.982	13.05	4.290	21.00	15.788	-21.48	11.041	7.55	16.821	-20.62	1.438	8.41	22.915	-7.83	19.234	-20.88	16.46342	29
31	*****	*****	3.56	18.29	4.27	20.46	19.53	3.53	12.28	1.58	20.52	5.03	2.48	16.24	1.44	12.25	23.18	7.26		
	4.584	22.00	3.058	13.35	4.463	21.48	15.738	-21.43	11.049	7.50	16.811	-20.60	1.444	8.44	22.916	-7.82	19.231	-20.89	16.59484	31

CZERWIEC 2016

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
153	1	Śro	541	3.55317	2.09	4.3909	22.08	1.01415	1.1648	5.15	57.101	2.9	19	426	1243.6	2102	244	915.4	1601	152	1	
154	2	Czw	542	3.59283	1.60	4.4315	22.16	1.01431	2.1344	9.34	56.752	3.9	11	425	1243.8	2103	312	1010.2	1722	148	2	
155	3	Pią	543	4.03248	1.50	4.4722	22.23	1.01446	3.1236	13.19	56.621	4.9	4	424	1243.9	2105	345	1107.2	1843	145	3	
156	4	Sob	544	4.07214	1.39	4.5129	22.30	1.01460	4.1311	16.13	56.739	5.9	1	423	1244.1	2106	423	1206.1	1959	141	4	
157	5	Nie	545	4.11180	1.29	4.5536	22.37	1.01474	5.1442	18.00	57.109	0.3	0	423	1244.3	2107	508	1306.1	2109	137	5	
158	6	Pon	546	4.15145	1.18	4.5943	22.43	1.01487	6.1558	18.35	57.707	1.3	2	422	1244.5	2108	602	1405.7	2209	133	6	
159	7	Wto	547	4.19111	1.06	5.0351	22.48	1.01500	7.1542	17.57	58.483	2.3	7	421	1244.6	2108	703	1503.5	2258	129	7	
160	8	Śro	548	4.23076	0.55	5.0759	22.54	1.01512	8.1255	16.16	59.370	3.3	14	421	1244.8	2109	809	1558.4	2338	125	8	
161	9	Czw	549	4.27042	0.43	5.1208	22.59	1.01523	9.0709	13.45	60.294	4.3	22	420	1245.0	2110	918	1649.9	****	121	9	
162	10	Pią	550	4.31008	0.31	5.1616	23.03	1.01534	9.5826	10.38	61.183	5.3	31	420	1245.2	2111	1026	1738.2	011	117	10	
163	11	Sob	551	4.34573	0.19	5.2025	23.07	1.01545	10.4711	7.07	61.977	6.3	41	420	1245.4	2112	1134	1823.9	038	113	11	
164	12	Nie	552	4.38539	0.06	5.2434	23.11	1.01555	11.3402	3.22	62.628	0.1	51	419	1245.6	2112	1240	1907.6	102	109	12	
165	13	Pon	553	4.42504	-0.06	5.2843	23.14	1.01564	12.1941	-0.26	63.106	1.1	60	419	1245.9	2113	1344	1950.3	124	105	13	
166	14	Wto	554	4.46470	-0.19	5.3252	23.17	1.01573	13.0451	-4.11	63.397	2.1	69	419	1246.1	2114	1448	2032.8	146	101	14	
167	15	Śro	555	4.50435	-0.32	5.3702	23.20	1.01582	13.5014	-7.45	63.501	3.1	78	419	1246.3	2114	1552	2115.7	208	057	15	
168	16	Czw	556	4.54401	-0.45	5.4111	23.22	1.01590	14.3624	-11.02	63.433	4.1	85	419	1246.5	2115	1655	2159.7	231	053	16	
169	17	Pią	557	4.58366	-0.57	5.4521	23.24	1.01598	15.2351	-13.53	63.214	5.1	91	419	1246.7	2115	1758	2245.3	257	050	17	
170	18	Sob	558	5.02332	-1.10	5.4930	23.25	1.01606	16.1253	-16.10	62.874	6.1	96	419	1246.9	2115	1859	2332.6	327	046	18	
171	19	Nie	559	5.06298	-1.23	5.5340	23.26	1.01613	17.0335	-17.46	62.443	7.1	99	419	1247.1	2116	1957	*****	403	042	19	
172	20	Pon	560	5.10263	-1.36	5.5749	23.26	1.01620	17.5545	-18.33	61.953	8.1	100	419	1247.4	2116	2051	021.8	445	038	20	
173	21	Wto	561	5.14229	-1.49	6.0159	23.26	1.01627	18.4859	-18.26	61.428	1.0	99	419	1247.6	2116	2139	112.4	534	034	21	
174	22	Śro	562	5.18194	-2.02	6.0608	23.26	1.01633	19.4246	-17.22	60.890	2.0	96	419	1247.8	2116	2221	203.8	632	030	22	
175	23	Czw	563	5.22160	-2.15	6.1017	23.25	1.01639	20.3632	-15.23	60.353	3.0	91	420	1248.0	2116	2257	255.5	736	026	23	
176	24	Pią	564	5.26126	-2.28	6.1427	23.24	1.01645	21.2957	-12.34	59.825	4.0	84	420	1248.2	2116	2328	346.9	845	022	24	
177	25	Sob	565	5.30091	-2.41	6.1836	23.22	1.01650	22.2254	-9.04	59.312	5.0	75	420	1248.4	2116	2356	437.8	957	018	25	
178	26	Nie	566	5.34057	-2.53	6.2245	23.20	1.01655	23.1534	-5.01	58.822	6.0	65	421	1248.6	2116	****	528.3	1111	014	26	
179	27	Pon	567	5.38022	-3.05	6.2654	23.17	1.01659	0.0822	-0.40	58.367	7.0	54	421	1248.8	2116	022	618.7	1227	010	27	
180	28	Wto	568	5.41588	-3.18	6.3103	23.15	1.01663	1.0150	3.48	57.967	0.7	43	422	1249.0	2116	048	709.8	1345	006	28	
181	29	Śro	569	5.45553	-3.30	6.3512	23.11	1.01667	1.5633	8.06	57.648	1.7	31	423	1249.2	2116	115	802.2	1503	002	29	
182	30	Czw	570	5.49519	-3.42	6.3920	23.08	1.01670	2.5258	11.59	57.442	2.7	21	423	1249.4	2115	145	856.3	1621	2354	30	

Fazy Księżyca [Dm, h.mm]: Now 5, 5.00 1kw 12, 10.10 Pełn 20, 13.02 3kw 27, 20.19

CZERWIEC 2016 (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	*****	*****	3.53	18.29	4.26	20.49	19.48	3.48	12.24	1.54	20.47	4.59	2.44	16.21	1.40	12.22	23.14	7.22		
	4.652	22.13	3.102	13.55	4.549	21.70	15.714	-21.40	11.053	7.47	16.805	-20.59	1.446	8.46	22.916	-7.82	19.230	-20.89	16.66054	1
3	*****	*****	3.49	18.30	4.26	20.55	19.37	3.38	12.17	1.46	20.39	4.51	2.36	16.13	1.32	12.14	23.06	7.14		
	4.789	22.39	3.202	14.03	4.723	22.12	15.667	-21.34	11.061	7.41	16.795	-20.58	1.452	8.49	22.917	-7.82	19.227	-20.90	16.79196	3
5	*****	*****	3.44	18.33	4.26	21.00	19.26	3.28	12.10	1.39	20.30	4.42	2.28	16.06	1.24	12.06	22.58	7.06		
	4.927	22.61	3.318	14.62	4.899	22.50	15.622	-21.29	11.070	7.35	16.784	-20.56	1.457	8.52	22.918	-7.82	19.224	-20.90	16.92339	5
7	*****	*****	3.40	18.37	4.26	21.06	19.15	3.18	12.03	1.31	20.22	4.34	2.21	15.58	1.16	11.58	22.51	6.58		
	5.064	22.81	3.450	15.28	5.075	22.84	15.579	-21.23	11.080	7.28	16.774	-20.55	1.462	8.55	22.918	-7.81	19.222	-20.91	17.05481	7
9	*****	*****	3.36	18.42	4.26	21.11	19.04	3.08	11.56	1.23	20.13	4.25	2.13	15.51	1.09	11.50	22.43	6.50		
	5.202	22.98	3.597	16.02	5.251	23.13	15.539	-21.18	11.090	7.21	16.763	-20.53	1.466	8.57	22.918	-7.81	19.219	-20.92	17.18623	9
11	*****	*****	3.33	18.49	4.27	21.15	18.54	2.58	11.49	1.16	20.04	4.17	2.05	15.44	1.01	11.42	22.35	6.42		
	5.340	23.12	3.759	16.82	5.429	23.37	15.502	-21.13	11.101	7.13	16.753	-20.51	1.471	8.60	22.919	-7.81	19.216	-20.93	17.31765	11
13	*****	*****	3.30	18.57	4.28	21.20	18.44	2.48	11.43	1.08	19.56	4.09	1.57	15.36	0.53	11.35	22.27	6.33		
	5.479	23.24	3.936	17.67	5.607	23.58	15.469	-21.09	11.113	7.05	16.743	-20.50	1.476	8.63	22.919	-7.81	19.213	-20.94	17.44907	13
15	*****	*****	3.28	19.07	4.30	21.24	18.34	2.39	11.36	1.00	19.47	4.00	1.50	15.29	0.45	11.27	22.19	6.25		
	5.617	23.33	4.128	18.54	5.786	23.73	15.438	-21.05	11.125	6.97	16.733	-20.48	1.480	8.65	22.919	-7.81	19.210	-20.94	17.58049	15
17	*****	*****	3.27	19.17	4.32	21.28	18.24	2.30	11.29	0.53	19.39	3.52	1.42	15.21	0.37	11.19	22.11	6.17		
	5.756	23.39	4.337	19.41	5.964	23.84	15.412	-21.02	11.138	6.88	16.723	-20.47	1.484	8.67	22.919	-7.82	19.206	-20.95	17.71191	17
19	*****	*****	3.26	19.29	4.34	21.31	18.15	2.21	11.23	0.45	19.30	3.44	1.34	15.14	0.29	11.11	22.03	6.09		
	5.894	23.43	4.561	20.28	6.144	23.90	15.389	-21.00	11.151	6.79	16.713	-20.45	1.488	8.70	22.918	-7.82	19.203	-20.96	17.84333	19
21	*****	*****	3.27	19.42	4.37	21.34	18.06	2.12	11.16	0.38	19.22	3.35	1.26	15.06	0.21	11.03	21.55	6.01		
	6.033	23.43	4.802	21.12	6.323	23.92	15.369	-20.99	11.165	6.70	16.703	-20.44	1.492	8.72	22.918	-7.82	19.200	-20.97	17.97475	21
23	*****	*****	3.29	19.55	4.40	21.36	17.57	2.03	11.10	0.30	19.13	3.27	1.19	14.59	0.14	10.55	21.47	5.53		
	6.172	23.41	5.058	21.91	6.502	23.88	15.354	-20.99	11.179	6.60	16.694	-20.43	1.496	8.74	22.917	-7.83	19.197	-20.98	18.10618	23
25	*****	*****	3.32	20.09	4.43	21.39	17.48	1.54	11.03	0.23	19.04	3.19	1.11	14.51	0.06	10.47	21.39	5.45		
	6.310	23.37	5.330	22.62	6.681	23.81	15.343	-21.00	11.194	6.50	16.684	-20.41	1.499	8.76	22.917	-7.83	19.193	-20.99	18.23759	25
27	*****	*****	3.36	20.22	4.47	21.41	17.40	1.46	10.57	0.15	18.56	3.10	1.03	14.44	23.54	10.39	21.31	5.37		
	6.448	23.29	5.617	23.22	6.860	23.68	15.335	-21.02	11.210	6.40	16.675	-20.40	1.502	8.78	22.916	-7.84	19.190	-21.00	18.36901	27
29	*****	*****	3.43	20.36	4.51	21.42	17.32	1.38	10.51	0.08	18.47	3.02	0.55	14.36	23.46	10.31	21.23	5.29		
	6.587	23.19	5.915	23.69	7.038	23.50	15.331	-21.05	11.226	6.29	16.666	-20.39	1.506	8.80	22.915	-7.85	19.186	-21.01	18.50043	29

LIPIEC 2016

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
183	1	Pią	571	5.53484	-3.53	6.4328	23.04	1.01672	3.5114	15.10	57.383	3.7	12	424	1249.6	2115	219	952.6	1738	2351	1	
184	2	Sob	572	5.57450	-4.05	6.4736	22.59	1.01674	4.5102	17.24	57.496	4.7	6	425	1249.8	2115	259	1050.6	1850	2347	2	
185	3	Nie	573	6.01416	-4.16	6.5144	22.54	1.01675	5.5133	18.30	57.797	5.7	1	425	1250.0	2114	348	1149.5	1954	2343	3	
186	4	Pon	574	6.05381	-4.27	6.5551	22.49	1.01675	6.5139	18.24	58.279	6.7	0	426	1250.2	2114	444	1247.9	2048	2339	4	
187	5	Wto	575	6.09347	-4.37	6.5958	22.43	1.01675	7.5010	17.10	58.917	1.0	1	427	1250.4	2113	548	1344.5	2133	2335	5	
188	6	Śro	576	6.13312	-4.47	7.0405	22.37	1.01674	8.4613	14.59	59.668	2.0	5	428	1250.5	2112	656	1438.3	2210	2331	6	
189	7	Czw	577	6.17278	-4.57	7.0811	22.31	1.01673	9.3929	12.04	60.473	3.0	10	429	1250.7	2112	806	1529.0	2240	2327	7	
190	8	Pią	578	6.21244	-5.06	7.1217	22.24	1.01671	10.3003	8.38	61.270	4.0	17	430	1250.8	2111	915	1616.7	2306	2323	8	
191	9	Sob	579	6.25209	-5.15	7.1622	22.16	1.01668	11.1821	4.54	62.000	5.0	26	431	1251.0	2110	1023	1702.1	2329	2319	9	
192	10	Nie	580	6.29175	-5.24	7.2027	22.09	1.01665	12.0460	1.03	62.610	6.0	35	432	1251.1	2109	1129	1745.8	2351	2315	10	
193	11	Pon	581	6.33140	-5.31	7.2432	22.01	1.01662	12.5042	-2.46	63.058	7.0	44	433	1251.3	2108	1234	1828.7	****	2311	11	
194	12	Wto	582	6.37106	-5.39	7.2836	21.52	1.01658	13.3609	-6.27	63.319	0.4	54	435	1251.4	2107	1338	1911.5	013	2307	12	
195	13	Śro	583	6.41071	-5.46	7.3240	21.44	1.01653	14.2200	-9.50	63.380	1.4	63	436	1251.5	2106	1442	1954.9	036	2303	13	
196	14	Czw	584	6.45037	-5.53	7.3643	21.35	1.01648	15.0852	-12.51	63.248	2.4	72	437	1251.6	2105	1545	2039.6	100	2259	14	
197	15	Pią	585	6.49002	-5.59	7.4045	21.25	1.01643	15.5710	-15.22	62.940	3.4	80	438	1251.7	2104	1646	2126.1	128	2255	15	
198	16	Sob	586	6.52568	-6.04	7.4447	21.15	1.01637	16.4711	-17.13	62.487	4.4	87	440	1251.8	2103	1746	2214.5	201	2252	16	
199	17	Nie	587	6.56534	-6.09	7.4849	21.05	1.01631	17.3856	-18.19	61.929	5.4	93	441	1251.9	2102	1842	2304.7	240	2248	17	
200	18	Pon	588	7.00499	-6.13	7.5250	20.54	1.01624	18.3211	-18.32	61.308	6.4	97	442	1252.0	2101	1933	2356.3	327	2244	18	
201	19	Wto	589	7.04465	-6.17	7.5650	20.43	1.01617	19.2626	-17.48	60.671	7.4	100	444	1252.0	2059	2018	*****	421	2240	19	
202	20	Śro	590	7.08430	-6.21	8.0050	20.32	1.01610	20.2107	-16.07	60.058	0.5	100	445	1252.1	2058	2057	048.8	524	2236	20	
203	21	Czw	591	7.12396	-6.23	8.0449	20.21	1.01603	21.1540	-13.31	59.502	1.5	98	447	1252.1	2057	2131	141.3	632	2232	21	
204	22	Pią	592	7.16361	-6.25	8.0848	20.09	1.01595	22.0947	-10.08	59.024	2.5	93	448	1252.2	2055	2201	233.5	745	2228	22	
205	23	Sob	593	7.20327	-6.27	8.1246	19.56	1.01587	23.0322	-6.10	58.636	3.5	86	449	1252.2	2054	2229	325.2	900	2224	23	
206	24	Nie	594	7.24292	-6.28	8.1644	19.44	1.01578	23.5640	-1.50	58.340	4.5	78	451	1252.2	2053	2255	416.3	1016	2220	24	
207	25	Pon	595	7.28258	-6.29	8.2041	19.31	1.01569	0.5006	2.37	58.131	5.5	67	452	1252.2	2051	2321	507.5	1133	2216	25	
208	26	Wto	596	7.32223	-6.28	8.2437	19.17	1.01560	1.4409	6.58	58.004	6.5	56	454	1252.2	2049	2349	559.2	1251	2212	26	
209	27	Śro	597	7.36189	-6.28	8.2833	19.04	1.01550	2.3918	10.55	57.958	0.5	45	455	1252.2	2048	****	652.0	1408	2208	27	
210	28	Czw	598	7.40155	-6.26	8.3228	18.50	1.01540	3.3550	14.15	57.995	1.5	33	457	1252.2	2046	021	746.2	1524	2204	28	
211	29	Pią	599	7.44120	-6.25	8.3623	18.36	1.01529	4.3343	16.44	58.121	2.5	23	459	1252.2	2045	058	842.1	1636	2200	29	
212	30	Sob	600	7.48086	-6.22	8.4017	18.21	1.01518	5.3232	18.11	58.348	3.5	14	500	1252.1	2043	141	939.0	1741	2157	30	
213	31	Nie	601	7.52051	-6.19	8.4411	18.06	1.01506	6.3129	18.30	58.682	4.5	7	502	1252.1	2041	233	1036.3	1839	2153	31	

Fazy Księżyca [Dm, h.mm]: Nów 4, 13.01 1kw 12, 2.52 Pełn 20, 0.57 3kw 27, 1.00

LIPIEC 2016 (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	*****	*****	3.51	20.49	4.56	21.43	17.25	1.29	10.44	23.56	18.39	2.54	0.47	14.28	23.38	10.23	21.15	5.20	
	6.724	23.06	6.224	24.00	7.216	23.28	15.331	-21.09	11.242	6.18	16.658	-20.38	1.509	8.81	22.914	-7.86	19.183	-21.01	18.63185 1
3	*****	*****	4.01	21.01	5.01	21.44	17.17	1.21	10.38	23.49	18.31	2.45	0.40	14.21	23.30	10.15	21.07	5.12	
	6.862	22.90	6.539	24.14	7.393	23.02	15.335	-21.14	11.259	6.07	16.649	-20.37	1.511	8.83	22.913	-7.86	19.180	-21.02	18.76327 3
5	*****	*****	4.12	21.12	5.06	21.44	17.10	1.14	10.32	23.41	18.22	2.37	0.32	14.13	23.22	10.07	20.59	5.04	
	6.999	22.72	6.857	24.10	7.570	22.71	15.343	-21.20	11.276	5.96	16.641	-20.36	1.514	8.84	22.911	-7.87	19.176	-21.03	18.89470 5
7	*****	*****	4.25	21.21	5.11	21.44	17.04	1.06	10.26	23.34	18.14	2.29	0.24	14.05	23.14	9.59	20.51	4.56	
	7.136	22.51	7.173	23.87	7.745	22.35	15.355	-21.27	11.294	5.84	16.633	-20.35	1.516	8.85	22.910	-7.88	19.173	-21.04	19.02612 7
9	*****	*****	4.39	21.29	5.17	21.43	16.57	0.58	10.20	23.26	18.05	2.21	0.16	13.58	23.07	9.51	20.43	4.48	
	7.273	22.27	7.485	23.46	7.920	21.95	15.370	-21.35	11.313	5.72	16.626	-20.34	1.518	8.87	22.909	-7.89	19.169	-21.05	19.15754 9
11	*****	*****	4.54	21.35	5.23	21.43	16.51	0.51	10.14	23.19	17.57	2.12	0.09	13.50	22.59	9.43	20.35	4.40	
	7.409	22.01	7.790	22.89	8.094	21.51	15.389	-21.44	11.331	5.59	16.619	-20.33	1.520	8.88	22.907	-7.91	19.166	-21.06	19.28896 11
13	*****	*****	5.09	21.39	5.28	21.42	16.45	0.44	10.08	23.12	17.49	2.04	23.57	13.42	22.51	9.35	20.27	4.32	
	7.544	21.73	8.085	22.16	8.266	21.03	15.411	-21.54	11.350	5.47	16.612	-20.32	1.522	8.89	22.905	-7.92	19.162	-21.07	19.42037 13
15	*****	*****	5.25	21.42	5.35	21.40	16.40	0.37	10.02	23.04	17.40	1.56	23.49	13.35	22.43	9.27	20.19	4.23	
	7.679	21.42	8.369	21.30	8.437	20.51	15.436	-21.65	11.370	5.34	16.606	-20.32	1.524	8.89	22.903	-7.93	19.159	-21.08	19.55179 15
17	*****	*****	5.40	21.43	5.41	21.39	16.35	0.30	9.56	22.57	17.32	1.48	23.41	13.27	22.35	9.19	20.10	4.15	
	7.814	21.08	8.641	20.33	8.607	19.95	15.465	-21.77	11.390	5.21	16.600	-20.31	1.525	8.90	22.901	-7.94	19.155	-21.09	19.68322 17
19	*****	*****	5.55	21.44	5.47	21.37	16.29	0.23	9.50	22.50	17.24	1.40	23.33	13.19	22.27	9.11	20.02	4.07	
	7.947	20.72	8.901	19.27	8.776	19.35	15.497	-21.90	11.410	5.07	16.594	-20.31	1.526	8.91	22.899	-7.96	19.152	-21.10	19.81464 19
21	*****	*****	6.10	21.43	5.54	21.35	16.25	0.16	9.44	22.42	17.16	1.31	23.25	13.11	22.19	9.03	19.54	3.59	
	8.080	20.34	9.149	18.13	8.943	18.71	15.533	-22.03	11.430	4.94	16.589	-20.30	1.527	8.91	22.897	-7.97	19.149	-21.11	19.94606 21
23	*****	*****	6.24	21.41	6.00	21.32	16.20	0.10	9.38	22.35	17.08	1.23	23.18	13.04	22.11	8.55	19.46	3.51	
	8.213	19.94	9.385	16.92	9.109	18.04	15.571	-22.17	11.451	4.80	16.584	-20.30	1.528	8.92	22.895	-7.99	19.145	-21.12	20.07748 23
25	*****	*****	6.38	21.39	6.07	21.30	16.16	0.03	9.32	22.27	16.59	1.15	23.10	12.56	22.03	8.47	19.39	3.43	
	8.345	19.51	9.610	15.67	9.274	17.34	15.612	-22.31	11.472	4.66	16.580	-20.30	1.529	8.92	22.892	-8.00	19.142	-21.13	20.20889 25
27	*****	*****	6.50	21.36	6.13	21.27	16.12	23.53	9.26	22.20	16.51	1.07	23.02	12.48	21.55	8.39	19.31	3.35	
	8.476	19.06	9.823	14.39	9.438	16.61	15.655	-22.46	11.494	4.52	16.576	-20.29	1.529	8.92	22.890	-8.02	19.139	-21.14	20.34031 27
29	1.18	0.03	7.03	21.32	6.20	21.24	16.08	23.47	9.21	22.13	16.43	0.59	22.54	12.40	21.47	8.31	19.23	3.27	
	8.606	18.59	10.027	13.08	9.600	15.84	15.702	-22.61	11.516	4.37	16.572	-20.29	1.529	8.92	22.887	-8.04	19.135	-21.14	20.47173 29
31	1.39	23.59	7.14	21.28	6.27	21.21	16.04	23.40	9.15	22.05	16.35	0.51	22.46	12.32	21.39	8.23	19.15	3.18	
	8.736	18.10	10.220	11.75	9.761	15.05	15.751	-22.77	11.538	4.23	16.569	-20.30	1.529	8.92	22.884	-8.05	19.132	-21.15	20.60316 31

SIERPIEŃ 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
214	1	Pon	602	7.56017	-6.16	8.4804	17.51	1.01494	7.2935	17.43	59.124	5.5	3	503	1252.0	2039	332	1132.6	1927	2149	1
215	2	Wto	603	7.59583	-6.11	8.5156	17.36	1.01481	8.2559	15.55	59.667	6.5	0	505	1251.9	2038	438	1227.0	2007	2145	2
216	3	Śro	604	8.03548	-6.06	8.5548	17.20	1.01468	9.2006	13.17	60.287	0.6	0	507	1251.9	2036	547	1318.9	2040	2141	3
217	4	Czw	605	8.07514	-6.01	8.5939	17.04	1.01454	10.1147	10.02	60.951	1.6	3	508	1251.8	2034	656	1408.1	2108	2137	4
218	5	Pią	606	8.11479	-5.55	9.0329	16.48	1.01439	11.0115	6.23	61.616	2.6	7	510	1251.7	2032	805	1454.9	2132	2133	5
219	6	Sob	607	8.15445	-5.48	9.0719	16.31	1.01424	11.4854	2.33	62.233	3.6	13	512	1251.6	2030	913	1539.7	2155	2129	6
220	7	Nie	608	8.19410	-5.41	9.1108	16.14	1.01409	12.3518	-1.20	62.754	4.6	20	513	1251.4	2028	1019	1623.3	2217	2125	7
221	8	Pon	609	8.23376	-5.33	9.1457	15.57	1.01393	13.2106	-5.05	63.137	5.6	28	515	1251.3	2026	1124	1706.4	2240	2121	8
222	9	Wto	610	8.27341	-5.25	9.1845	15.40	1.01376	14.0654	-8.36	63.348	6.6	37	517	1251.2	2024	1228	1749.6	2303	2117	9
223	10	Śro	611	8.31307	-5.16	9.2233	15.22	1.01359	14.5318	-11.45	63.366	7.6	47	518	1251.0	2022	1331	1833.6	2330	2113	10
224	11	Czw	612	8.35272	-5.06	9.2620	15.04	1.01342	15.4048	-14.26	63.182	0.7	56	520	1250.8	2020	1432	1918.9	****	2109	11
225	12	Pią	613	8.39238	-4.56	9.3006	14.46	1.01324	16.2946	-16.32	62.805	1.7	66	522	1250.7	2018	1533	2006.0	000	2105	12
226	13	Sob	614	8.43203	-4.45	9.3352	14.28	1.01306	17.2026	-17.55	62.259	2.7	75	523	1250.5	2016	1630	2054.9	036	2101	13
227	14	Nie	615	8.47169	-4.34	9.3737	14.10	1.01287	18.1246	-18.28	61.582	3.7	83	525	1250.3	2014	1723	2145.6	118	2058	14
228	15	Pon	616	8.51134	-4.22	9.4122	13.51	1.01269	19.0631	-18.07	60.824	4.7	90	527	1250.1	2012	1811	2237.7	209	2054	15
229	16	Wto	617	8.55100	-4.09	9.4506	13.32	1.01250	20.0114	-16.48	60.042	5.7	95	529	1249.9	2010	1853	2330.6	308	2050	16
230	17	Śro	618	8.59066	-3.56	9.4849	13.13	1.01231	20.5624	-14.31	59.296	6.7	99	530	1249.7	2008	1930	****	414	2046	17
231	18	Czw	619	9.03031	-3.43	9.5232	12.53	1.01211	21.5135	-11.23	58.641	0.0	100	532	1249.5	2006	2002	023.8	526	2042	18
232	19	Pią	620	9.06597	-3.29	9.5615	12.34	1.01192	22.4632	-7.32	58.121	1.0	99	534	1249.2	2004	2031	116.8	642	2038	19
233	20	Sob	621	9.10562	-3.14	9.5957	12.14	1.01172	23.4115	-3.12	57.765	2.0	95	535	1249.0	2001	2058	209.6	800	2034	20
234	21	Nie	622	9.14528	-2.60	10.0339	11.54	1.01152	0.3557	1.21	57.580	3.0	88	537	1248.7	1959	2125	302.1	919	2030	21
235	22	Pon	623	9.18493	-2.44	10.0720	11.34	1.01131	1.3057	5.49	57.558	4.0	80	539	1248.5	1957	2154	354.9	1038	2026	22
236	23	Wto	624	9.22459	-2.28	10.1101	11.13	1.01111	2.2637	9.57	57.676	5.0	70	541	1248.2	1955	2224	448.3	1157	2022	23
237	24	Śro	625	9.26424	-2.12	10.1441	10.53	1.01090	3.2309	13.28	57.909	6.0	58	542	1248.0	1952	2300	542.6	1313	2018	24
238	25	Czw	626	9.30390	-1.56	10.1821	10.32	1.01069	4.2035	16.09	58.226	0.3	47	544	1247.7	1950	2341	637.9	1426	2014	25
239	26	Pią	627	9.34355	-1.39	10.2201	10.11	1.01048	5.1835	17.51	58.607	1.3	36	546	1247.4	1948	****	734.0	1534	2010	26
240	27	Sob	628	9.38321	-1.21	10.2540	9.50	1.01026	6.1635	18.27	59.035	2.3	25	547	1247.1	1946	029	830.2	1633	2006	27
241	28	Nie	629	9.42286	-1.04	10.2919	9.29	1.01004	7.1350	17.59	59.501	3.3	17	549	1246.8	1943	124	925.7	1723	2002	28
242	29	Pon	630	9.46252	-0.46	10.3257	9.08	1.00981	8.0939	16.30	59.999	4.3	9	551	1246.5	1941	226	1019.7	1805	1959	29
243	30	Wto	631	9.50218	-0.27	10.3636	8.46	1.00959	9.0333	14.09	60.525	5.3	4	553	1246.2	1939	333	1111.6	1840	1955	30
244	31	Śro	632	9.54183	-0.09	10.4014	8.25	1.00935	9.5521	11.08	61.071	6.3	1	554	1245.9	1936	441	1201.1	1909	1951	31

Fazy Księżyca [Dm, h.mm]: Nów 2, 22.45 1kw 10, 20.21 Pełn 18, 11.27 3kw 25, 5.41

WRZESIEŃ 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
245	1	Czw	633	9.58149	0.10	10.4351	8.03	1.00912	10.4508	7.38	61.621	0.0	0	556	1245.6	1934	550	1248.4	1935	1947	1
246	2	Pią	634	10.02114	0.29	10.4728	7.41	1.00888	11.3314	3.51	62.155	1.0	1	558	1245.3	1932	658	1333.9	1958	1943	2
247	3	Sob	635	10.06079	0.49	10.5106	7.19	1.00863	12.2004	-0.01	62.643	2.0	4	559	1244.9	1929	804	1418.0	2021	1939	3
248	4	Nie	636	10.10045	1.09	10.5442	6.57	1.00838	13.0610	-3.50	63.052	3.0	9	601	1244.6	1927	910	1501.4	2043	1935	4
249	5	Pon	637	10.14010	1.29	10.5819	6.35	1.00813	13.5204	-7.27	63.347	4.0	15	603	1244.3	1925	1014	1544.6	2106	1931	5
250	6	Wto	638	10.17576	1.49	11.0155	6.12	1.00788	14.3816	-10.44	63.495	5.0	22	604	1243.9	1922	1118	1628.3	2131	1927	6
251	7	Śro	639	10.21541	2.09	11.0531	5.50	1.00762	15.2513	-13.34	63.470	6.0	31	606	1243.6	1920	1220	1712.8	2200	1923	7
252	8	Czw	640	10.25507	2.30	11.0907	5.27	1.00735	16.1317	-15.51	63.254	7.0	40	608	1243.2	1917	1320	1758.7	2233	1919	8
253	9	Pią	641	10.29473	2.51	11.1243	5.04	1.00709	17.0245	-17.29	62.844	8.0	49	610	1242.9	1915	1418	1846.1	2312	1915	9
254	10	Sob	642	10.33438	3.12	11.1619	4.42	1.00682	17.5341	-18.20	62.251	0.9	59	611	1242.6	1913	1512	1935.1	2358	1911	10
255	11	Nie	643	10.37404	3.33	11.1954	4.19	1.00656	18.4602	-18.20	61.502	1.9	69	613	1242.2	1910	1602	2025.7	0**	1907	11
256	12	Pon	644	10.41369	3.54	11.2329	3.56	1.00629	19.3935	-17.25	60.641	2.9	78	615	1241.8	1908	1646	2117.4	052	1904	12
257	13	Wto	645	10.45335	4.15	11.2704	3.33	1.00602	20.3359	-15.32	59.729	3.9	86	616	1241.5	1905	1724	2210.0	154	1900	13
258	14	Śro	646	10.49300	4.37	11.3040	3.10	1.00575	21.2856	-12.45	58.833	4.9	93	618	1241.1	1903	1759	2303.1	302	1856	14
259	15	Czw	647	10.53266	4.58	11.3415	2.47	1.00547	22.2413	-9.10	58.028	5.9	97	620	1240.8	1901	1829	2356.4	417	1852	15
260	16	Pią	648	10.57231	5.20	11.3750	2.24	1.00520	23.1944	-4.56	57.381	6.9	100	622	1240.4	1858	1858	*****	535	1848	16
261	17	Sob	649	11.01197	5.41	11.4125	2.01	1.00493	0.1535	-0.21	56.945	0.6	99	623	1240.1	1856	1926	050.1	655	1844	17
262	18	Nie	650	11.05162	6.03	11.4460	1.37	1.00466	1.1160	4.19	56.750	1.6	96	625	1239.7	1853	1954	144.3	817	1840	18
263	19	Pon	651	11.09128	6.24	11.4835	1.14	1.00439	2.0909	8.43	56.798	2.6	90	627	1239.3	1851	2025	239.2	938	1836	19
264	20	Wto	652	11.13093	6.46	11.5210	0.51	1.00411	3.0709	12.34	57.065	3.6	82	628	1239.0	1848	2059	335.0	1059	1832	20
265	21	Śro	653	11.17059	7.07	11.5545	0.28	1.00384	4.0551	15.34	57.508	4.6	72	630	1238.6	1846	2139	431.7	1215	1828	21
266	22	Czw	654	11.21024	7.28	11.5921	0.04	1.00357	5.0450	17.33	58.074	5.6	61	632	1238.3	1844	2226	528.9	1326	1824	22
267	23	Pią	655	11.24590	7.49	12.0256	-0.19	1.00329	6.0328	18.26	58.712	0.0	50	634	1237.9	1841	2320	625.9	1429	1820	23
268	24	Sob	656	11.28555	8.10	12.0632	-0.42	1.00302	7.0101	18.12	59.377	1.0	39	635	1237.6	1839	****	721.9	1522	1816	24
269	25	Nie	657	11.32521	8.31	12.1008	-1.06	1.00274	7.5652	16.56	60.036	2.0	29	637	1237.2	1836	020	816.1	1605	1812	25
270	26	Pon	658	11.36486	8.51	12.1344	-1.29	1.00247	8.5038	14.48	60.666	3.0	20	639	1236.9	1834	124	908.0	1642	1808	26
271	27	Wto	659	11.40452	9.12	12.1720	-1.53	1.00219	9.4213	11.58	61.256	4.0	12	641	1236.6	1832	231	957.5	1712	1805	27
272	28	Śro	660	11.44417	9.32	12.2057	-2.16	1.00191	10.3150	8.37	61.800	5.0	6	642	1236.2	1829	339	1044.8	1739	1801	28
273	29	Czw	661	11.48383	9.52	12.2433	-2.39	1.00162	11.1947	4.56	62.294	6.0	2	644	1235.9	1827	446	1130.2	1803	1757	29
274	30	Pią	662	11.52348	10.11	12.2810	-3.03	1.00134	12.0633	1.06	62.733	7.0	0	646	1235.6	1824	553	1214.5	1825	1753	30

Fazy Księżyca [Dm, h.mm]: Nów 1, 11.03 1kw 9, 13.49 Pełn 16, 21.05 3kw 23, 11.56

WRZESIEŃ 2016 (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	8.07	19.36	8.12	20.16	15.22	22.21	7.46	20.09	14.31	22.41	20.40	10.24	19.32	6.12	17.07	1.09		
	10.731	8.05	11.820	-3.44	12.202	-0.18	16.832	-25.21	11.925	1.68	16.579	-20.43	1.502	8.75	22.834	-8.37	19.093	-21.28	22.70585	1
3	3.50	21.39	7.56	19.26	8.19	20.11	15.20	22.17	7.40	20.02	14.23	22.33	20.32	10.16	19.24	6.04	16.59	1.01		
	10.852	7.32	11.781	-3.31	12.351	-1.22	16.915	-25.32	11.951	1.51	16.583	-20.45	1.498	8.73	22.830	-8.39	19.091	-21.29	22.83727	3
5	3.55	21.32	7.42	19.17	8.25	20.07	15.18	22.13	7.35	19.55	14.16	22.25	20.24	10.07	19.16	5.56	16.51	0.53		
	10.972	6.58	11.720	-2.94	12.499	-2.25	16.999	-25.43	11.977	1.34	16.588	-20.47	1.495	8.71	22.827	-8.42	19.090	-21.30	22.96869	5
7	4.00	21.26	7.26	19.07	8.32	20.02	15.16	22.09	7.29	19.48	14.09	22.18	20.16	9.59	19.09	5.47	16.44	0.45		
	11.092	5.83	11.637	-2.31	12.647	-3.27	17.085	-25.52	12.003	1.18	16.593	-20.48	1.491	8.68	22.824	-8.44	19.088	-21.31	23.10010	7
9	4.05	21.20	7.08	18.58	8.38	19.58	15.14	22.06	7.24	19.40	14.01	22.10	20.08	9.51	19.01	5.39	16.36	0.37		
	11.212	5.07	11.536	-1.43	12.796	-4.30	17.172	-25.61	12.029	1.01	16.599	-20.50	1.488	8.66	22.820	-8.46	19.087	-21.31	23.23152	9
11	4.10	21.14	6.47	18.49	8.45	19.54	15.12	22.03	7.19	19.33	13.54	22.03	19.60	9.43	18.53	5.31	16.28	0.29		
	11.332	4.32	11.425	-0.35	12.945	-5.32	17.260	-25.69	12.055	0.84	16.605	-20.52	1.484	8.64	22.817	-8.48	19.086	-21.32	23.36295	11
13	4.14	21.08	6.26	18.41	8.51	19.49	15.10	21.60	7.13	19.26	13.46	21.55	19.52	9.35	18.45	5.23	16.20	0.21		
	11.451	3.55	11.312	0.87	13.094	-6.33	17.350	-25.75	12.081	0.66	16.612	-20.54	1.480	8.61	22.813	-8.50	19.085	-21.32	23.49436	13
15	4.19	21.02	6.05	18.34	8.58	19.45	15.08	21.57	7.08	19.19	13.39	21.47	19.44	9.26	18.37	5.15	16.12	0.13		
	11.571	2.78	11.209	2.14	13.244	-7.34	17.440	-25.81	12.107	0.49	16.619	-20.56	1.476	8.59	22.810	-8.52	19.084	-21.33	23.62578	15
17	4.23	20.56	5.46	18.27	9.04	19.40	15.06	21.54	7.02	19.11	13.32	21.40	19.36	9.18	18.29	5.06	16.04	0.05		
	11.690	2.01	11.125	3.35	13.394	-8.33	17.532	-25.85	12.133	0.32	16.626	-20.59	1.472	8.57	22.807	-8.54	19.084	-21.34	23.75719	17
19	4.27	20.51	5.29	18.22	9.11	19.36	15.04	21.52	6.57	19.04	13.25	21.32	19.28	9.10	18.21	4.58	15.56	23.54		
	11.810	1.24	11.070	4.41	13.545	-9.32	17.625	-25.89	12.160	0.15	16.634	-20.61	1.467	8.54	22.803	-8.56	19.083	-21.34	23.88861	19
21	4.32	20.45	5.16	18.17	9.18	19.32	15.02	21.49	6.52	18.57	13.17	21.25	19.20	9.02	18.13	4.50	15.48	23.46		
	11.929	0.46	11.051	5.24	13.697	-10.29	17.718	-25.91	12.186	-0.02	16.642	-20.63	1.463	8.51	22.800	-8.58	19.083	-21.35	0.02003	21
23	4.36	20.39	5.06	18.14	9.24	19.28	14.60	21.47	6.46	18.50	13.10	21.17	19.12	8.53	18.05	4.42	15.41	23.38		
	12.049	-0.32	11.071	5.79	13.849	-11.24	17.813	-25.91	12.213	-0.19	16.651	-20.65	1.458	8.49	22.797	-8.60	19.083	-21.35	0.15145	23
25	4.40	20.34	5.00	18.10	9.31	19.24	14.57	21.45	6.41	18.43	13.03	21.10	19.04	8.45	17.57	4.34	15.33	23.30		
	12.169	-1.10	11.129	6.02	14.003	-12.18	17.908	-25.91	12.239	-0.36	16.660	-20.68	1.454	8.46	22.794	-8.62	19.082	-21.36	0.28287	25
27	4.44	20.29	4.59	18.08	9.38	19.20	14.55	21.43	6.36	18.36	12.56	21.02	18.56	8.37	17.49	4.26	15.25	23.22		
	12.289	-1.88	11.224	5.93	14.157	-13.10	18.005	-25.89	12.266	-0.53	16.669	-20.70	1.449	8.43	22.791	-8.64	19.082	-21.36	0.41429	27
29	4.48	20.23	5.01	18.05	9.44	19.16	14.53	21.41	6.30	18.28	12.49	20.55	18.48	8.28	17.41	4.18	15.17	23.14		
	12.409	-2.65	11.350	5.54	14.312	-14.00	18.102	-25.85	12.292	-0.71	16.679	-20.73	1.444	8.40	22.788	-8.65	19.083	-21.36	0.54571	29

PAŹDZIERNIK 2016

Piwnice, CA UMK			← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									 Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
275	1	Sob	663	11.56314	10.30	12.3148	-3.26	1.00105	12.5237	-2.45	63.106	0.4	0	648	1235.2	1822	658	1257.8	1847	1749	1
276	2	Nie	664	12.00279	10.49	12.3525	-3.49	1.00077	13.3828	-6.27	63.400	1.4	2	649	1234.9	1820	803	1341.0	1910	1745	2
277	3	Pon	665	12.04245	11.08	12.3903	-4.12	1.00048	14.2433	-9.51	63.595	2.4	5	651	1234.6	1817	907	1424.4	1934	1741	3
278	4	Wto	666	12.08210	11.26	12.4241	-4.35	1.00019	15.1114	-12.51	63.670	3.4	10	653	1234.3	1815	1010	1508.6	2001	1737	4
279	5	Śro	667	12.12176	11.44	12.4620	-4.58	0.99990	15.5850	-15.19	63.601	4.4	17	655	1234.0	1812	1111	1553.8	2032	1733	5
280	6	Czw	668	12.16142	12.02	12.4959	-5.21	0.99960	16.4733	-17.09	63.370	5.4	24	656	1233.7	1810	1209	1640.2	2108	1729	6
281	7	Pią	669	12.20107	12.19	12.5338	-5.44	0.99931	17.3726	-18.15	62.963	6.4	33	658	1233.4	1808	1304	1727.9	2150	1725	7
282	8	Sob	670	12.24073	12.36	12.5718	-6.07	0.99902	18.2826	-18.32	62.380	7.4	42	700	1233.1	1805	1355	1816.8	2240	1721	8
283	9	Nie	671	12.28038	12.52	13.0058	-6.30	0.99872	19.2026	-17.57	61.633	0.2	52	702	1232.9	1803	1440	1906.8	2337	1717	9
284	10	Pon	672	12.32004	13.08	13.0439	-6.53	0.99843	20.1313	-16.27	60.752	1.2	62	704	1232.6	1801	1520	1957.6	****	1713	10
285	11	Wto	673	12.35569	13.24	13.0820	-7.15	0.99814	21.0638	-14.04	59.785	2.2	72	705	1232.4	1758	1555	2049.0	041	1709	11
286	12	Śro	674	12.39535	13.39	13.1201	-7.38	0.99785	22.0036	-10.51	58.795	3.2	81	707	1232.1	1756	1626	2141.1	151	1706	12
287	13	Czw	675	12.43500	13.53	13.1543	-8.00	0.99756	22.5509	-6.55	57.859	4.2	89	709	1231.9	1754	1655	2233.9	306	1702	13
288	14	Pią	676	12.47466	14.07	13.1926	-8.23	0.99727	23.5030	-2.27	57.060	5.2	95	711	1231.6	1752	1723	2327.7	424	1658	14
289	15	Sob	677	12.51431	14.21	13.2309	-8.45	0.99698	0.4655	2.16	56.473	6.2	99	713	1231.4	1749	1751	*****	546	1654	15
290	16	Nie	678	12.55397	14.34	13.2653	-9.07	0.99670	1.4439	6.56	56.156	0.2	100	714	1231.2	1747	1821	022.8	709	1650	16
291	17	Pon	679	12.59362	14.46	13.3037	-9.29	0.99642	2.4348	11.11	56.135	1.2	98	716	1231.0	1745	1854	119.5	833	1646	17
292	18	Wto	680	13.03328	14.58	13.3422	-9.50	0.99614	3.4413	14.40	56.404	2.2	93	718	1230.8	1743	1933	217.8	955	1642	18
293	19	Śro	681	13.07293	15.09	13.3807	-10.12	0.99586	4.4520	17.08	56.924	3.2	85	720	1230.6	1740	2018	317.1	1111	1638	19
294	20	Czw	682	13.11259	15.19	13.4153	-10.34	0.99559	5.4613	18.25	57.632	4.2	76	722	1230.4	1738	2111	416.6	1220	1634	20
295	21	Pią	683	13.15224	15.29	13.4540	-10.55	0.99532	6.4551	18.31	58.455	5.2	65	724	1230.3	1736	2211	515.0	1318	1630	21
296	22	Sob	684	13.19190	15.38	13.4928	-11.16	0.99505	7.4325	17.29	59.324	6.2	54	725	1230.1	1734	2315	611.4	1406	1626	22
297	23	Nie	685	13.23156	15.46	13.5316	-11.37	0.99478	8.3823	15.31	60.179	0.6	43	727	1230.0	1732	****	704.9	1445	1622	23
298	24	Pon	686	13.27121	15.54	13.5705	-11.58	0.99451	9.3042	12.48	60.974	1.6	33	729	1229.9	1730	023	755.5	1517	1618	24
299	25	Wto	687	13.31087	16.01	14.0055	-12.19	0.99424	10.2036	9.32	61.682	2.6	24	731	1229.7	1728	130	843.3	1544	1614	25
300	26	Śro	688	13.35052	16.07	14.0445	-12.39	0.99398	11.0834	5.55	62.287	3.6	16	733	1229.6	1726	238	929.0	1608	1611	26
301	27	Czw	689	13.39018	16.12	14.0836	-12.59	0.99372	11.5510	2.06	62.784	4.6	10	735	1229.5	1724	344	1013.0	1631	1607	27
302	28	Pią	690	13.42583	16.17	14.1228	-13.19	0.99345	12.4057	-1.45	63.176	5.6	5	737	1229.5	1721	449	1056.2	1652	1603	28
303	29	Sob	691	13.46549	16.21	14.1621	-13.39	0.99319	13.2631	-5.30	63.466	6.6	2	739	1229.4	1719	554	1138.9	1714	1559	29
304	30	Nie	692	13.50514	16.24	14.2014	-13.59	0.99293	14.1219	-9.02	63.657	7.6	0	740	1229.4	1718	658	1222.2	1738	1555	30
304	30	Nie	692	14.51013	16.24	14.2024	-13.60	0.99292	14.1414	-9.10	63.663	7.7	0	640	1129.3	1618	558	1122.1	1638	1455	30
305	31	Pon	693	14.54578	16.26	14.2418	-14.19	0.99266	15.0044	-12.18	63.752	0.7	0	642	1129.3	1616	701	1206.0	1703	1451	31

Fazy Księżyca [Dm, h.mm]: Nów 1, 2.11 1kw 9, 6.33 Pełn 16, 6.23 3kw 22, 21.14 3kw 22, 20.14 Nów 30, 18.38

PAŹDZIERNIK 2016 (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	5.05	18.03	9.51	19.12	14.50	21.39	6.25	18.21	12.42	20.47	18.40	8.20	17.33	4.09	15.09	23.06		
	12.530	-3.43	11.503	4.89	14.469	-14.88	18.200	-25.81	12.319	-0.88	16.689	-20.75	1.439	8.37	22.785	-8.67	19.083	-21.37	0.67712	1
3	4.56	20.13	5.13	18.01	9.58	19.09	14.48	21.38	6.20	18.14	12.35	20.40	18.32	8.12	17.25	4.01	15.02	22.58		
	12.651	-4.20	11.675	4.00	14.627	-15.74	18.298	-25.74	12.345	-1.05	16.699	-20.78	1.434	8.34	22.782	-8.69	19.083	-21.37	0.80854	3
5	4.59	20.08	5.22	17.58	10.05	19.05	14.45	21.37	6.14	18.07	12.28	20.32	18.24	8.03	17.17	3.53	14.54	22.51		
	12.772	-4.97	11.863	2.93	14.786	-16.57	18.398	-25.67	12.371	-1.22	16.710	-20.80	1.429	8.31	22.779	-8.70	19.084	-21.38	0.93995	5
7	5.03	20.03	5.32	17.56	10.12	19.02	14.43	21.36	6.09	17.60	12.21	20.25	18.16	7.55	17.09	3.45	14.46	22.43		
	12.894	-5.74	12.060	1.71	14.946	-17.38	18.497	-25.58	12.398	-1.39	16.721	-20.83	1.424	8.28	22.777	-8.72	19.085	-21.38	1.07137	7
9	5.07	19.59	5.43	17.53	10.18	18.59	14.40	21.35	6.03	17.52	12.14	20.18	18.08	7.47	17.01	3.37	14.38	22.35		
	13.016	-6.50	12.264	0.39	15.107	-18.15	18.598	-25.47	12.424	-1.55	16.733	-20.86	1.419	8.26	22.774	-8.74	19.086	-21.38	1.20280	9
11	5.11	19.54	5.55	17.50	10.25	18.56	14.37	21.34	5.58	17.45	12.07	20.10	18.00	7.38	16.53	3.29	14.30	22.27		
	13.139	-7.26	12.472	-1.00	15.270	-18.90	18.698	-25.35	12.450	-1.72	16.745	-20.88	1.414	8.23	22.771	-8.75	19.087	-21.39	1.33421	11
13	5.14	19.49	6.08	17.47	10.32	18.53	14.34	21.33	5.53	17.38	11.60	20.03	17.52	7.30	16.46	3.21	14.23	22.19		
	13.262	-8.00	12.682	-2.44	15.434	-19.62	18.800	-25.21	12.477	-1.89	16.757	-20.91	1.409	8.20	22.769	-8.77	19.088	-21.39	1.46563	13
15	5.18	19.45	6.20	17.44	10.38	18.50	14.31	21.32	5.47	17.31	11.53	19.56	17.44	7.22	16.38	3.13	14.15	22.11		
	13.386	-8.75	12.893	-3.91	15.599	-20.30	18.901	-25.06	12.503	-2.06	16.769	-20.94	1.404	8.17	22.767	-8.78	19.089	-21.39	1.59704	15
17	5.21	19.41	6.33	17.41	10.45	18.48	14.28	21.32	5.42	17.24	11.46	19.48	17.36	7.13	16.30	3.05	14.07	22.04		
	13.510	-9.48	13.103	-5.38	15.765	-20.95	19.003	-24.90	12.529	-2.22	16.782	-20.97	1.399	8.14	22.764	-8.79	19.091	-21.39	1.72846	17
19	5.25	19.36	6.46	17.38	10.51	18.46	14.25	21.32	5.36	17.16	11.39	19.41	17.28	7.05	16.22	2.57	13.59	21.56		
	13.635	-10.20	13.313	-6.84	15.933	-21.56	19.105	-24.71	12.555	-2.39	16.795	-21.00	1.394	8.11	22.762	-8.80	19.092	-21.39	1.85988	19
21	5.28	19.32	6.58	17.35	10.58	18.44	14.22	21.32	5.31	17.09	11.32	19.34	17.20	6.57	16.14	2.48	13.52	21.48		
	13.761	-10.92	13.522	-8.29	16.102	-22.13	19.207	-24.52	12.581	-2.55	16.808	-21.02	1.389	8.08	22.760	-8.82	19.094	-21.40	1.99130	21
23	5.32	19.28	7.11	17.31	11.04	18.42	14.18	21.32	5.25	17.02	11.25	19.27	17.12	6.48	16.06	2.40	13.44	21.40		
	13.888	-11.62	13.730	-9.70	16.272	-22.66	19.310	-24.30	12.607	-2.71	16.821	-21.05	1.384	8.05	22.758	-8.83	19.096	-21.40	2.12272	23
25	5.35	19.24	7.23	17.28	11.10	18.41	14.15	21.32	5.20	16.55	11.18	19.19	17.04	6.40	15.58	2.32	13.36	21.33		
	14.015	-12.31	13.938	-11.08	16.443	-23.15	19.412	-24.07	12.632	-2.87	16.835	-21.08	1.379	8.02	22.757	-8.84	19.098	-21.40	2.25414	25
27	5.39	19.21	7.35	17.25	11.16	18.40	14.11	21.32	5.14	16.48	11.12	19.12	16.56	6.32	15.50	2.24	13.28	21.25		
	14.143	-12.99	14.145	-12.42	16.616	-23.60	19.515	-23.83	12.658	-3.03	16.849	-21.11	1.374	7.99	22.755	-8.85	19.100	-21.40	2.38556	27
29	5.42	19.17	7.47	17.22	11.21	18.39	14.07	21.32	5.09	16.41	11.05	19.05	16.48	6.23	15.42	2.16	13.21	21.17		
	14.272	-13.65	14.353	-13.72	16.789	-24.01	19.618	-23.57	12.683	-3.19	16.863	-21.14	1.369	7.96	22.753	-8.86	19.102	-21.40	2.51697	29
31	4.45	18.13	6.60	16.19	10.27	17.39	13.04	20.33	4.03	15.33	9.58	17.58	15.40	5.15	14.34	1.08	12.13	20.09		
	14.405	-14.32	14.564	-14.99	16.967	-24.38	19.723	-23.29	12.709	-3.35	16.878	-21.16	1.364	7.93	22.752	-8.86	19.105	-21.40	2.64839	31

LISTOPAD 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
306	1	Wto	694	14.58544	16.28	14.2813	-14.38	0.99240	15.4810	-14.56	63.736	1.7	3	644	1129.3	1614	804	1250.8	1732	1447	1	
307	2	Śro	695	15.02509	16.28	14.3209	-14.57	0.99214	16.3640	-16.57	63.606	2.7	7	646	1129.3	1612	903	1336.9	1806	1443	2	
308	3	Czw	696	15.06475	16.28	14.3606	-15.16	0.99188	17.2613	-18.14	63.349	3.7	12	648	1129.3	1610	1000	1424.1	1846	1439	3	
309	4	Pią	697	15.10441	16.27	14.4003	-15.34	0.99162	18.1642	-18.44	62.956	4.7	19	650	1129.3	1608	1052	1512.3	1933	1435	4	
310	5	Sob	698	15.14406	16.25	14.4402	-15.53	0.99137	19.0751	-18.23	62.418	5.7	27	652	1129.3	1606	1138	1601.2	2026	1431	5	
311	6	Nie	699	15.18372	16.23	14.4801	-16.11	0.99112	19.5928	-17.09	61.736	6.7	36	654	1129.4	1604	1219	1650.5	2126	1427	6	
312	7	Pon	700	15.22337	16.20	14.5201	-16.28	0.99087	20.5123	-15.04	60.925	7.7	46	656	1129.4	1603	1255	1740.2	2232	1423	7	
313	8	Wto	701	15.26303	16.15	14.5602	-16.46	0.99062	21.4332	-12.10	60.013	0.6	57	657	1129.5	1601	1326	1830.2	2343	1419	8	
314	9	Śro	702	15.30268	16.10	15.0003	-17.03	0.99037	22.3606	-8.33	59.046	1.6	67	659	1129.6	1559	1355	1920.7	****	1415	9	
315	10	Czw	703	15.34234	16.04	15.0406	-17.19	0.99013	23.2924	-4.22	58.090	2.6	77	701	1129.7	1558	1422	2012.1	057	1412	10	
316	11	Pią	704	15.38199	15.58	15.0809	-17.36	0.98989	0.2352	0.13	57.219	3.6	86	703	1129.8	1556	1449	2105.1	215	1408	11	
317	12	Sob	705	15.42165	15.50	15.1213	-17.52	0.98966	1.2000	4.55	56.518	4.6	93	705	1129.9	1554	1516	2200.1	336	1404	12	
318	13	Nie	706	15.46130	15.42	15.1618	-18.08	0.98943	2.1811	9.25	56.059	5.6	98	707	1130.0	1553	1547	2257.5	459	1400	13	
319	14	Pon	707	15.50096	15.33	15.2024	-18.24	0.98921	3.1831	13.21	55.896	6.6	100	709	1130.2	1551	1623	2357.2	623	1356	14	
320	15	Wto	708	15.54061	15.23	15.2430	-18.39	0.98899	4.2036	16.23	56.049	0.9	99	710	1130.4	1550	1705	*****	744	1352	15	
321	16	Śro	709	15.58027	15.12	15.2838	-18.54	0.98877	5.2331	18.15	56.502	1.9	95	712	1130.6	1548	1756	058.4	900	1348	16	
322	17	Czw	710	16.01593	14.60	15.3246	-19.08	0.98856	6.2555	18.48	57.203	2.9	88	714	1130.7	1547	1854	159.8	1006	1344	17	
323	18	Pią	711	16.05558	14.47	15.3655	-19.23	0.98836	7.2627	18.07	58.080	3.9	79	716	1131.0	1546	2000	259.6	1101	1340	18	
324	19	Sob	712	16.09524	14.34	15.4105	-19.36	0.98815	8.2410	16.21	59.050	4.9	70	718	1131.2	1544	2109	356.6	1145	1336	19	
325	20	Nie	713	16.13490	14.20	15.4516	-19.50	0.98796	9.1842	13.45	60.032	5.9	59	719	1131.4	1543	2218	450.1	1220	1332	20	
326	21	Pon	714	16.17455	14.05	15.4928	-20.03	0.98776	10.1010	10.31	60.960	0.1	49	721	1131.7	1542	2327	540.2	1250	1328	21	
327	22	Wto	715	16.21421	13.49	15.5340	-20.16	0.98757	10.5905	6.54	61.784	1.1	39	723	1131.9	1541	****	627.2	1315	1324	22	
328	23	Śro	716	16.25386	13.32	15.5753	-20.28	0.98739	11.4607	3.04	62.472	2.1	30	724	1132.2	1540	035	712.0	1338	1320	23	
329	24	Czw	717	16.29352	13.14	16.0207	-20.41	0.98720	12.3158	-0.49	63.008	3.1	21	726	1132.5	1538	141	755.3	1359	1316	24	
330	25	Pią	718	16.33317	12.56	16.0622	-20.52	0.98703	13.1720	-4.38	63.391	4.1	14	728	1132.8	1537	245	838.0	1421	1313	25	
331	26	Sob	719	16.37283	12.37	16.1038	-21.03	0.98685	14.0249	-8.14	63.628	5.1	8	729	1133.1	1536	350	920.8	1443	1309	26	
332	27	Nie	720	16.41248	12.17	16.1454	-21.14	0.98668	14.4856	-11.31	63.733	6.1	4	731	1133.5	1535	453	1004.1	1507	1305	27	
333	28	Pon	721	16.45214	11.57	16.1911	-21.25	0.98651	15.3603	-14.20	63.720	7.1	1	733	1133.8	1535	556	1048.6	1535	1301	28	
334	29	Wto	722	16.49179	11.36	16.2329	-21.35	0.98634	16.2423	-16.34	63.603	8.1	0	734	1134.2	1534	657	1134.2	1607	1257	29	
335	30	Śro	723	16.53145	11.14	16.2747	-21.45	0.98617	17.1356	-18.06	63.391	0.9	1	736	1134.5	1533	755	1221.5	1644	1253	30	

Fazy Księżyca [Dm, h.mm]: 1kw 7, 20.51 Pełn 14, 14.52 3kw 21, 9.33 Nów 29, 13.18

LISTOPAD 2016 (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	7.06	16.18	10.30	17.39	13.02	20.33	4.01	15.30	9.55	17.54	15.36	5.11	14.30	1.04	12.09	20.06		
	14.470	-14.64	14.668	-15.60	17.054	-24.54	19.774	-23.15	12.721	-3.43	16.886	-21.18	1.361	7.92	22.751	-8.87	19.106	-21.40	2.71410	1
3	4.50	18.09	7.17	16.15	10.35	17.40	12.58	20.33	3.55	15.23	9.48	17.47	15.28	5.03	14.22	0.56	12.01	19.58		
	14.602	-15.27	14.876	-16.77	17.229	-24.83	19.877	-22.85	12.746	-3.59	16.900	-21.21	1.357	7.89	22.750	-8.87	19.109	-21.40	2.84552	3
5	4.53	18.05	7.29	16.13	10.39	17.40	12.54	20.34	3.50	15.15	9.41	17.40	15.20	4.54	14.15	0.48	11.54	19.50		
	14.734	-15.88	15.084	-17.88	17.405	-25.08	19.980	-22.54	12.771	-3.74	16.915	-21.23	1.352	7.86	22.749	-8.88	19.111	-21.40	2.97694	5
7	4.57	18.02	7.40	16.11	10.44	17.41	12.50	20.35	3.44	15.08	9.34	17.33	15.12	4.46	14.07	0.41	11.46	19.42		
	14.867	-16.47	15.293	-18.93	17.582	-25.28	20.082	-22.21	12.795	-3.89	16.931	-21.26	1.347	7.83	22.748	-8.89	19.114	-21.40	3.10836	7
9	4.60	17.60	7.52	16.09	10.48	17.43	12.45	20.35	3.38	15.01	9.28	17.26	15.04	4.38	13.59	0.33	11.38	19.35		
	15.001	-17.04	15.503	-19.92	17.758	-25.43	20.185	-21.87	12.820	-4.04	16.946	-21.29	1.343	7.81	22.747	-8.89	19.117	-21.40	3.23978	9
11	5.03	17.57	8.03	16.07	10.51	17.45	12.41	20.36	3.33	14.54	9.21	17.18	14.56	4.30	13.51	0.25	11.31	19.27		
	15.136	-17.60	15.714	-20.84	17.935	-25.53	20.287	-21.51	12.844	-4.19	16.962	-21.32	1.339	7.78	22.746	-8.89	19.120	-21.40	3.37120	11
13	5.06	17.54	8.14	16.06	10.54	17.47	12.37	20.37	3.27	14.47	9.14	17.11	14.48	4.21	13.43	0.17	11.23	19.19		
	15.272	-18.13	15.927	-21.69	18.111	-25.58	20.389	-21.14	12.868	-4.33	16.977	-21.34	1.334	7.76	22.746	-8.90	19.123	-21.40	3.50261	13
15	5.09	17.52	8.24	16.05	10.57	17.50	12.32	20.38	3.21	14.39	9.07	17.04	14.40	4.13	13.35	0.09	11.15	19.12		
	15.408	-18.65	16.140	-22.47	18.287	-25.59	20.490	-20.76	12.891	-4.48	16.993	-21.37	1.330	7.73	22.745	-8.90	19.127	-21.40	3.63404	15
17	5.12	17.50	8.34	16.05	10.59	17.53	12.28	20.39	3.16	14.32	9.01	16.57	14.32	4.05	13.27	23.57	11.08	19.04		
	15.546	-19.14	16.354	-23.18	18.463	-25.54	20.592	-20.36	12.914	-4.62	17.009	-21.40	1.326	7.71	22.745	-8.90	19.130	-21.40	3.76546	17
19	5.15	17.48	8.44	16.05	11.01	17.56	12.23	20.40	3.10	14.25	8.54	16.50	14.24	3.57	13.19	23.49	10.60	18.56		
	15.685	-19.61	16.570	-23.82	18.639	-25.45	20.693	-19.95	12.938	-4.76	17.025	-21.42	1.322	7.69	22.745	-8.90	19.134	-21.39	3.89688	19
21	5.18	17.46	8.54	16.06	11.02	17.60	12.19	20.41	3.04	14.18	8.47	16.43	14.16	3.48	13.11	23.41	10.52	18.49		
	15.824	-20.05	16.785	-24.37	18.813	-25.30	20.794	-19.53	12.960	-4.90	17.042	-21.45	1.319	7.67	22.745	-8.90	19.137	-21.39	4.02830	21
23	5.20	17.44	9.02	16.07	11.03	18.04	12.14	20.42	2.58	14.10	8.41	16.36	14.08	3.40	13.04	23.33	10.45	18.41		
	15.965	-20.47	17.001	-24.84	18.987	-25.11	20.894	-19.10	12.983	-5.03	17.058	-21.48	1.315	7.65	22.745	-8.90	19.141	-21.39	4.15972	23
25	5.23	17.43	9.10	16.09	11.04	18.08	12.09	20.43	2.53	14.03	8.34	16.29	14.00	3.32	12.56	23.26	10.37	18.34		
	16.106	-20.87	17.217	-25.22	19.160	-24.88	20.995	-18.65	13.005	-5.16	17.075	-21.50	1.312	7.63	22.745	-8.89	19.145	-21.39	4.29114	25
27	5.26	17.42	9.18	16.12	11.04	18.13	12.04	20.44	2.47	13.56	8.27	16.22	13.52	3.24	12.48	23.18	10.29	18.26		
	16.248	-21.24	17.432	-25.51	19.332	-24.59	21.095	-18.19	13.027	-5.29	17.091	-21.53	1.308	7.61	22.746	-8.89	19.149	-21.38	4.42255	27
29	5.28	17.41	9.24	16.15	11.04	18.18	11.59	20.45	2.41	13.49	8.20	16.15	13.44	3.16	12.40	23.10	10.22	18.18		
	16.391	-21.58	17.644	-25.71	19.502	-24.26	21.194	-17.72	13.048	-5.42	17.108	-21.55	1.305	7.59	22.747	-8.89	19.153	-21.38	4.55398	29

GRUDZIEŃ 2016

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
336	1	Czw	724	16.57111	10.51	16.3206	-21.54	0.98601	18.0429	-18.51	63.087	1.9	3	737	1134.9	1532	850	1309.6	1729	1249	1
337	2	Pią	725	17.01076	10.28	16.3626	-22.03	0.98585	18.5542	-18.44	62.693	2.9	8	739	1135.3	1532	938	1358.5	1820	1245	2
338	3	Sob	726	17.05042	10.04	16.4046	-22.11	0.98569	19.4714	-17.45	62.204	3.9	14	740	1135.7	1531	1021	1447.7	1918	1241	3
339	4	Nie	727	17.09007	9.40	16.4507	-22.19	0.98554	20.3844	-15.54	61.620	4.9	21	741	1136.1	1530	1058	1536.9	2021	1237	4
340	5	Pon	728	17.12573	9.15	16.4929	-22.27	0.98539	21.3003	-13.16	60.944	5.9	30	743	1136.5	1530	1130	1625.9	2129	1233	5
341	6	Wto	729	17.16539	8.50	16.5351	-22.34	0.98525	22.2115	-9.55	60.186	6.9	40	744	1136.9	1530	1159	1714.7	2240	1229	6
342	7	Śro	730	17.20504	8.24	16.5813	-22.41	0.98511	23.1239	-6.00	59.370	0.1	51	745	1137.3	1529	1225	1803.9	2354	1225	7
343	8	Czw	731	17.24470	7.58	17.0236	-22.47	0.98497	0.0443	-1.40	58.537	1.1	62	746	1137.8	1529	1251	1854.0	****	1221	8
344	9	Pią	732	17.28435	7.31	17.0659	-22.53	0.98484	0.5804	2.53	57.740	2.1	72	748	1138.2	1529	1316	1945.7	110	1218	9
345	10	Sob	733	17.32401	7.04	17.1123	-22.58	0.98471	1.5321	7.24	57.047	3.1	82	749	1138.7	1528	1344	2039.8	229	1214	10
346	11	Nie	734	17.36366	6.36	17.1547	-23.03	0.98459	2.5102	11.34	56.526	4.1	90	750	1139.1	1528	1416	2136.7	350	1210	11
347	12	Pon	735	17.40332	6.08	17.2011	-23.07	0.98448	3.5116	15.04	56.241	5.1	96	751	1139.6	1528	1453	2236.3	512	1206	12
348	13	Wto	736	17.44297	5.40	17.2436	-23.11	0.98437	4.5336	17.33	56.236	6.1	100	752	1140.1	1528	1538	2337.9	631	1202	13
349	14	Śro	737	17.48263	5.12	17.2901	-23.15	0.98427	5.5656	18.48	56.522	0.5	100	753	1140.6	1528	1633	****	744	1158	14
350	15	Czw	738	17.52229	4.43	17.3327	-23.18	0.98417	6.5943	18.44	57.080	1.5	97	754	1141.0	1528	1736	039.8	846	1154	15
351	16	Pią	739	17.56194	4.14	17.3752	-23.20	0.98408	8.0030	17.25	57.856	2.5	92	754	1141.5	1529	1846	140.1	937	1150	16
352	17	Sob	740	18.00160	3.45	17.4218	-23.22	0.98400	8.5814	15.05	58.779	3.5	84	755	1142.0	1529	1958	237.4	1019	1146	17
353	18	Nie	741	18.04125	3.15	17.4644	-23.24	0.98392	9.5236	11.58	59.765	4.5	76	756	1142.5	1529	2110	331.0	1052	1142	18
354	19	Pon	742	18.08091	2.46	17.5110	-23.25	0.98385	10.4351	8.22	60.736	5.5	66	757	1143.0	1529	2220	421.0	1119	1138	19
355	20	Wto	743	18.12057	2.16	17.5536	-23.26	0.98378	11.3232	4.29	61.624	6.5	56	757	1143.5	1530	2328	507.9	1143	1134	20
356	21	Śro	744	18.16022	1.46	18.0003	-23.26	0.98372	12.1924	0.32	62.378	0.4	46	758	1144.0	1530	****	552.6	1206	1130	21
357	22	Czw	745	18.19588	1.16	18.0429	-23.26	0.98367	13.0513	-3.22	62.964	1.4	37	758	1144.5	1531	034	635.9	1227	1126	22
358	23	Pią	746	18.23553	0.46	18.0856	-23.25	0.98362	13.5043	-7.05	63.366	2.4	28	759	1145.0	1531	139	718.7	1249	1122	23
359	24	Sob	747	18.27518	0.16	18.1322	-23.24	0.98357	14.3633	-10.30	63.584	3.4	20	759	1145.5	1532	243	801.7	1312	1119	24
360	25	Nie	748	18.31484	-0.13	18.1748	-23.22	0.98353	15.2314	-13.29	63.631	4.4	13	759	1146.0	1533	346	845.6	1338	1115	25
361	26	Pon	749	18.35450	-0.43	18.2215	-23.20	0.98349	16.1109	-15.56	63.527	5.4	7	759	1146.5	1534	448	930.8	1408	1111	26
362	27	Wto	750	18.39415	-1.13	18.2641	-23.18	0.98345	17.0026	-17.44	63.299	6.4	3	800	1147.0	1534	548	1017.5	1443	1107	27
363	28	Śro	751	18.43381	-1.42	18.3107	-23.15	0.98342	17.5060	-18.45	62.973	7.4	1	800	1147.4	1535	644	1105.6	1525	1103	28
364	29	Czw	752	18.47347	-2.11	18.3533	-23.11	0.98339	18.4233	-18.55	62.575	0.2	0	800	1147.9	1536	736	1154.8	1614	1059	29
365	30	Pią	753	18.51312	-2.40	18.3958	-23.07	0.98337	19.3438	-18.11	62.123	1.2	1	800	1148.4	1537	822	1244.6	1711	1055	30
366	31	Sob	754	18.55278	-3.09	18.4423	-23.03	0.98335	20.2646	-16.34	61.631	2.2	5	800	1148.9	1538	901	1334.5	1813	1051	31

Fazy Księżyca [Dm, h.mm]: 1kw 7, 10.03 Pełn 14, 1.06 3kw 21, 2.56 Now 29, 7.53

GRUDZIEŃ 2016 (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	9.30	16.19	11.03	18.23	11.54	20.46	2.35	13.41	8.14	16.08	13.37	3.08	12.32	23.02	10.14	18.11		
	16.535	-21.90	17.854	-25.82	19.671	-23.89	21.293	-17.24	13.069	-5.55	17.124	-21.57	1.302	7.57	22.747	-8.88	19.157	-21.38	4.68540	1
3	5.33	17.39	9.34	16.23	11.02	18.28	11.49	20.47	2.29	13.34	8.07	16.01	13.29	2.59	12.24	22.54	10.06	18.03		
	16.680	-22.19	18.058	-25.83	19.839	-23.47	21.392	-16.75	13.090	-5.67	17.141	-21.60	1.300	7.56	22.748	-8.88	19.161	-21.38	4.81682	3
5	5.35	17.38	9.38	16.28	11.01	18.34	11.44	20.48	2.23	13.27	8.00	15.54	13.21	2.51	12.17	22.47	9.59	17.56		
	16.825	-22.45	18.255	-25.75	20.005	-23.01	21.491	-16.24	13.110	-5.79	17.158	-21.62	1.297	7.54	22.749	-8.87	19.165	-21.37	4.94824	5
7	5.37	17.38	9.40	16.33	10.59	18.40	11.39	20.50	2.17	13.19	7.54	15.47	13.13	2.43	12.09	22.39	9.51	17.48		
	16.970	-22.68	18.443	-25.57	20.169	-22.51	21.589	-15.73	13.130	-5.90	17.175	-21.64	1.295	7.53	22.750	-8.86	19.170	-21.37	5.07966	7
9	5.39	17.38	9.40	16.37	10.57	18.45	11.34	20.51	2.11	13.12	7.47	15.40	13.05	2.35	12.01	22.31	9.43	17.40		
	17.116	-22.88	18.617	-25.31	20.331	-21.97	21.687	-15.21	13.149	-6.02	17.192	-21.66	1.292	7.52	22.752	-8.85	19.174	-21.37	5.21108	9
11	5.41	17.38	9.39	16.42	10.55	18.51	11.29	20.52	2.05	13.05	7.40	15.33	12.57	2.27	11.53	22.23	9.36	17.33		
	17.263	-23.05	18.774	-24.96	20.491	-21.40	21.784	-14.68	13.168	-6.13	17.209	-21.69	1.290	7.51	22.753	-8.84	19.179	-21.36	5.34250	11
13	5.43	17.38	9.35	16.45	10.52	18.57	11.23	20.53	1.58	12.57	7.34	15.26	12.49	2.19	11.45	22.16	9.28	17.25		
	17.410	-23.19	18.907	-24.54	20.649	-20.78	21.881	-14.14	13.187	-6.23	17.226	-21.71	1.289	7.50	22.755	-8.83	19.183	-21.36	5.47392	13
15	5.44	17.38	9.30	16.47	10.49	19.03	11.18	20.54	1.52	12.50	7.27	15.19	12.41	2.11	11.37	22.08	9.21	17.18		
	17.557	-23.29	19.011	-24.06	20.806	-20.14	21.978	-13.59	13.205	-6.34	17.243	-21.73	1.287	7.49	22.756	-8.82	19.188	-21.35	5.60534	15
17	5.46	17.39	9.22	16.47	10.46	19.09	11.13	20.55	1.46	12.43	7.20	15.12	12.33	2.03	11.30	22.00	9.13	17.10		
	17.705	-23.37	19.077	-23.54	20.960	-19.46	22.074	-13.04	13.223	-6.44	17.259	-21.75	1.286	7.48	22.758	-8.81	19.192	-21.35	5.73677	17
19	5.47	17.40	9.11	16.45	10.42	19.15	11.07	20.57	1.40	12.35	7.13	15.05	12.25	1.55	11.22	21.53	9.05	17.03		
	17.853	-23.42	19.098	-23.00	21.111	-18.75	22.169	-12.48	13.240	-6.53	17.276	-21.77	1.284	7.48	22.760	-8.80	19.197	-21.34	5.86819	19
21	5.48	17.41	8.58	16.39	10.39	19.21	11.02	20.58	1.33	12.28	7.07	14.58	12.17	1.47	11.14	21.45	8.58	16.55		
	18.001	-23.43	19.066	-22.46	21.261	-18.01	22.265	-11.91	13.257	-6.63	17.293	-21.79	1.283	7.47	22.762	-8.78	19.202	-21.34	5.99960	21
23	5.49	17.42	8.41	16.30	10.35	19.27	10.56	20.59	1.27	12.21	6.60	14.51	12.09	1.39	11.06	21.37	8.50	16.48		
	18.149	-23.42	18.979	-21.94	21.409	-17.24	22.360	-11.33	13.273	-6.72	17.310	-21.80	1.283	7.47	22.765	-8.77	19.207	-21.33	6.13102	23
25	5.50	17.43	8.21	16.17	10.30	19.32	10.51	20.60	1.20	12.13	6.53	14.44	12.02	1.31	10.58	21.30	8.43	16.40		
	18.297	-23.37	18.839	-21.47	21.554	-16.45	22.455	-10.75	13.288	-6.80	17.326	-21.82	1.282	7.47	22.767	-8.75	19.211	-21.33	6.26244	25
27	5.51	17.45	7.60	16.01	10.26	19.38	10.45	21.01	1.14	12.06	6.46	14.37	11.54	1.24	10.51	21.22	8.35	16.32		
	18.445	-23.29	18.661	-21.04	21.697	-15.63	22.549	-10.16	13.303	-6.89	17.343	-21.84	1.282	7.47	22.770	-8.74	19.216	-21.32	6.39386	27
29	5.51	17.46	7.38	15.44	10.22	19.44	10.40	21.02	1.07	11.58	6.40	14.30	11.46	1.16	10.43	21.14	8.27	16.25		
	18.592	-23.18	18.466	-20.68	21.837	-14.79	22.643	-9.57	13.318	-6.97	17.359	-21.85	1.282	7.47	22.772	-8.72	19.221	-21.32	6.52529	29
31	5.51	17.48	7.17	15.27	10.17	19.49	10.34	21.03	1.01	11.51	6.33	14.23	11.38	1.08	10.35	21.07	8.20	16.17		
	18.740	-23.04	18.278	-20.41	21.976	-13.93	22.737	-8.97	13.331	-7.04	17.376	-21.87	1.282	7.47	22.775	-8.70	19.226	-21.31	6.65671	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2016

Nowy Rok	Pią	1 styczeń	Trójcy Najświętszej	Nie	22 maj
Najświętszej Maryi Panny Rodzicielki	Pią	1 styczeń	Boże Ciało	Czw	26 maj
Objawienia Pańskiego (Trzech Króli)	Śro	6 styczeń	Dzień Matki	Czw	26 maj
Juliański Nowy Rok	Czw	14 styczeń	Dzień Dziecka	Śro	1 czerwiec
Dzień Babci	Czw	21 styczeń	Najświętszego Serca Pana Jezusa	Pią	3 czerwiec
Dzień Dziadka	Pią	22 styczeń	Dzień Dzięczynienia	Nie	5 czerwiec
Ofiarowania Pańskiego	Wto	2 luty	Dzień Ojca	Czw	23 czerwiec
Matki Boskiej Gromnicznej	Wto	2 luty	Noc Świętojańska	Czw	23 czerwiec
Tłusty czwartek	Czw	4 luty	Św. Piotra i Pawła	Śro	29 czerwiec
Środa Popielcowa	Śro	10 luty	Wniebowzięcia N.M.P.	Pon	15 sierpień
Walentynki	Nie	14 luty	Święto Wojska Polskiego	Pon	15 sierpień
Święto UMK	Pią	19 luty	Dzień Solidarności i Wolności	Śro	31 sierpień
Dzień Kobiet	Wto	8 marzec	Dzień Programisty	Wto	13 wrzesień
Niedziela Palmowa	Nie	20 marzec	Dożynki – Święto Plonów	Pią	23 wrzesień
Narodowy Dzień Życia	Czw	24 marzec	Dzień Edukacji Narodowej	Pią	14 październik
Niedziela Wielkanocna	Nie	27 marzec	Dzień Papieski	Nie	16 październik
Niedziela Miłosierdzia Bożego	Nie	3 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
Wniebowstąpienia Pańskiego	Czw	5 maj	Niepokalane Poczęcie N.M.P.	Czw	8 grudzień
Zesłania Ducha Świętego	Nie	15 maj	Boże Narodzenie	Nie	25 grudzień
Dzień Polskiej Niezapominajki	Nie	15 maj	Sylwester	Sob	31 grudzień

Kalendarz astronomiczny 2017

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 7.10.2010 r.)

Data Wielkanocy: **2017 KWIECIEŃ 16**

Dla całego roku przyjęto: TDT – UT = 71 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 11.29**, Lato **VI 21, 5.24**, Jesień **IX 22, 21.02**, Zima **XII 21, 17.28**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 26 marca do 29 października 2017 r.**

Oznaczenia:

Dr — dzień 2017 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
1	1	Nie	755	18.59243	-3.38	18.4848	-22.58	0.98333	21.1836	-14.07	61.107	3.2	10	800	1149.4	1539	935	1424.0	1920	1047	1	
2	2	Pon	756	19.03209	-4.06	18.5313	-22.52	0.98332	22.0958	-10.57	60.554	4.2	17	759	1149.8	1540	1005	1513.0	2030	1043	2	
3	3	Wto	757	19.07174	-4.33	18.5737	-22.46	0.98332	23.0101	-7.11	59.977	5.2	25	759	1150.3	1542	1032	1601.7	2142	1039	3	
4	4	Śro	758	19.11140	-5.01	19.0201	-22.40	0.98331	23.5206	-3.00	59.382	6.2	35	759	1150.8	1543	1057	1650.5	2256	1035	4	
5	5	Czw	759	19.15105	-5.27	19.0624	-22.33	0.98331	0.4345	1.24	58.783	7.2	46	759	1151.2	1544	1121	1740.0	****	1031	5	
6	6	Pią	760	19.19071	-5.54	19.1047	-22.26	0.98332	1.3639	5.50	58.208	0.6	57	758	1151.6	1545	1147	1831.2	012	1027	6	
7	7	Sob	761	19.23036	-6.20	19.1510	-22.19	0.98333	2.3124	10.01	57.691	1.6	68	758	1152.1	1547	1215	1924.5	129	1024	7	
8	8	Nie	762	19.27002	-6.45	19.1932	-22.11	0.98335	3.2829	13.41	57.278	2.6	79	757	1152.5	1548	1248	2020.6	248	1020	8	
9	9	Pon	763	19.30568	-7.10	19.2353	-22.02	0.98338	4.2758	16.34	57.019	3.6	87	756	1152.9	1550	1328	2119.2	405	1016	9	
10	10	Wto	764	19.34533	-7.34	19.2814	-21.53	0.98341	5.2921	18.22	56.956	4.6	94	756	1153.3	1551	1416	2219.5	520	1012	10	
11	11	Śro	765	19.38499	-7.58	19.3234	-21.44	0.98344	6.3134	18.56	57.117	5.6	99	755	1153.7	1553	1513	2320.2	627	1008	11	
12	12	Czw	766	19.42464	-8.21	19.3654	-21.34	0.98348	7.3310	18.13	57.509	6.6	100	754	1154.1	1554	1620	*****	724	1004	12	
13	13	Pią	767	19.46430	-8.43	19.4113	-21.24	0.98353	8.3250	16.21	58.110	1.0	99	754	1154.5	1556	1731	019.4	811	1000	13	
14	14	Sob	768	19.50396	-9.05	19.4531	-21.13	0.98359	9.2941	13.32	58.874	2.0	95	753	1154.8	1557	1845	115.8	848	956	14	
15	15	Nie	769	19.54361	-9.26	19.4949	-21.02	0.98365	10.2328	10.04	59.739	3.0	89	752	1155.2	1559	1958	208.8	920	952	15	
16	16	Pon	770	19.58327	-9.47	19.5406	-20.51	0.98372	11.1425	6.11	60.634	4.0	82	751	1155.5	1601	2109	258.5	946	948	16	
17	17	Wto	771	20.02292	-10.07	19.5822	-20.39	0.98379	12.0305	2.09	61.486	5.0	73	750	1155.9	1602	2218	345.5	1010	944	17	
18	18	Śro	772	20.06258	-10.26	20.0238	-20.27	0.98387	12.5009	-1.52	62.235	6.0	64	749	1156.2	1604	2325	430.4	1032	940	18	
19	19	Czw	773	20.10223	-10.44	20.0653	-20.14	0.98396	13.3621	-5.43	62.832	7.0	54	748	1156.5	1606	****	514.2	1054	936	19	
20	20	Pią	774	20.14189	-11.02	20.1107	-20.01	0.98405	14.2223	-9.17	63.244	0.5	45	746	1156.8	1608	030	557.5	1116	932	20	
21	21	Sob	775	20.18154	-11.19	20.1521	-19.48	0.98414	15.0852	-12.26	63.455	1.5	36	745	1157.1	1609	133	641.2	1141	928	21	
22	22	Nie	776	20.22120	-11.35	20.1933	-19.34	0.98424	15.5617	-15.05	63.465	2.5	27	744	1157.3	1611	236	725.8	1209	925	22	
23	23	Pon	777	20.26085	-11.50	20.2345	-19.20	0.98435	16.4458	-17.07	63.292	3.5	19	743	1157.6	1613	337	811.7	1242	921	23	
24	24	Wto	778	20.30051	-12.05	20.2757	-19.06	0.98445	17.3502	-18.25	62.961	4.5	12	741	1157.8	1615	435	859.1	1321	917	24	
25	25	Śro	779	20.34017	-12.19	20.3207	-18.51	0.98457	18.2622	-18.54	62.509	5.5	6	740	1158.1	1617	528	948.0	1407	913	25	
26	26	Czw	780	20.37582	-12.32	20.3617	-18.36	0.98468	19.1838	-18.29	61.976	6.5	2	739	1158.3	1619	617	1037.9	1501	909	26	
27	27	Pią	781	20.41548	-12.44	20.4026	-18.21	0.98480	20.1123	-17.09	61.404	7.5	0	737	1158.5	1620	659	1128.4	1602	905	27	
28	28	Sob	782	20.45514	-12.56	20.4434	-18.05	0.98492	21.0409	-14.56	60.827	0.5	0	736	1158.7	1622	736	1219.0	1708	901	28	
29	29	Nie	783	20.49479	-13.07	20.4841	-17.49	0.98504	21.5637	-11.55	60.275	1.5	2	734	1158.9	1624	808	1309.2	1819	857	29	
30	30	Pon	784	20.53444	-13.16	20.5247	-17.32	0.98517	22.4840	-8.15	59.767	2.5	7	732	1159.0	1626	837	1358.9	1931	853	30	
31	31	Wto	785	20.57410	-13.25	20.5653	-17.15	0.98530	23.4027	-4.07	59.312	3.5	13	731	1159.2	1628	903	1448.4	2046	849	31	

Fazy Księżyca [Dm, h.mm]: 1kw 5, 20.47 Pełn 12, 12.34 3kw 19, 23.13 Nów 28, 1.07

STYCZEŃ 2017 (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	Zach		
1	5.51	17.49	7.07	15.19	10.15	19.52	10.31	21.04	0.57	11.47	6.30	14.19	11.34	1.04	10.31	21.03	8.16	16.14		
	18.813	-22.96	18.195	-20.32	22.044	-13.50	22.784	-8.67	13.338	-7.08	17.384	-21.88	1.282	7.47	22.776	-8.70	19.228	-21.31	6.72242	1
3	5.51	17.51	6.50	15.03	10.10	19.57	10.26	21.05	0.51	11.40	6.23	14.12	11.26	0.56	10.23	20.55	8.08	16.06		
	18.960	-22.77	18.057	-20.22	22.179	-12.61	22.877	-8.07	13.351	-7.15	17.400	-21.89	1.282	7.47	22.779	-8.68	19.233	-21.31	6.85384	3
5	5.51	17.53	6.37	14.50	10.04	20.03	10.20	21.06	0.44	11.32	6.16	14.05	11.18	0.48	10.15	20.48	8.01	15.59		
	19.107	-22.56	17.966	-20.23	22.311	-11.71	22.970	-7.46	13.363	-7.21	17.416	-21.91	1.283	7.48	22.782	-8.66	19.238	-21.30	6.98526	5
7	5.50	17.55	6.28	14.39	9.59	20.08	10.14	21.07	0.37	11.25	6.09	13.58	11.10	0.41	10.08	20.40	7.53	15.51		
	19.253	-22.31	17.923	-20.36	22.441	-10.80	23.063	-6.85	13.375	-7.27	17.432	-21.92	1.284	7.49	22.785	-8.64	19.243	-21.30	7.11667	7
9	5.50	17.57	6.21	14.29	9.54	20.13	10.09	21.08	0.30	11.17	6.02	13.51	11.03	0.33	9.60	20.33	7.45	15.43		
	19.398	-22.04	17.923	-20.56	22.569	-9.88	23.155	-6.23	13.386	-7.33	17.448	-21.93	1.285	7.49	22.789	-8.62	19.248	-21.29	7.24810	9
11	5.49	17.60	6.17	14.22	9.48	20.17	10.03	21.09	0.23	11.10	5.55	13.44	10.55	0.25	9.52	20.25	7.38	15.36		
	19.543	-21.73	17.963	-20.83	22.694	-8.94	23.247	-5.62	13.396	-7.38	17.464	-21.95	1.286	7.50	22.792	-8.60	19.253	-21.28	7.37952	11
13	5.48	18.02	6.16	14.16	9.42	20.22	9.57	21.10	0.16	11.02	5.49	13.37	10.47	0.17	9.44	20.18	7.30	15.28		
	19.687	-21.40	18.035	-21.12	22.816	-8.00	23.339	-5.00	13.406	-7.43	17.479	-21.96	1.288	7.51	22.796	-8.58	19.258	-21.28	7.51094	13
15	5.47	18.05	6.16	14.12	9.37	20.27	9.52	21.11	0.09	10.55	5.42	13.30	10.39	0.10	9.37	20.10	7.23	15.21		
	19.830	-21.04	18.133	-21.43	22.936	-7.05	23.431	-4.38	13.414	-7.47	17.494	-21.97	1.289	7.52	22.799	-8.55	19.263	-21.27	7.64236	15
17	5.46	18.08	6.18	14.10	9.31	20.31	9.46	21.12	0.02	10.47	5.35	13.23	10.31	0.02	9.29	20.03	7.15	15.13		
	19.973	-20.65	18.254	-21.72	23.054	-6.10	23.522	-3.76	13.423	-7.51	17.510	-21.98	1.291	7.54	22.803	-8.53	19.267	-21.27	7.77378	17
19	5.44	18.10	6.20	14.08	9.24	20.35	9.40	21.12	23.51	10.39	5.28	13.16	10.23	23.50	9.21	19.55	7.07	15.06		
	20.115	-20.24	18.393	-21.98	23.169	-5.14	23.613	-3.13	13.430	-7.55	17.524	-21.99	1.293	7.55	22.807	-8.51	19.272	-21.26	7.90520	19
21	5.42	18.13	6.23	14.08	9.18	20.39	9.35	21.13	23.43	10.32	5.21	13.09	10.16	23.43	9.13	19.48	6.60	14.58		
	20.256	-19.80	18.546	-22.20	23.281	-4.19	23.704	-2.51	13.437	-7.58	17.539	-22.00	1.296	7.57	22.810	-8.48	19.277	-21.25	8.03662	21
23	5.40	18.16	6.26	14.09	9.12	20.43	9.29	21.14	23.36	10.24	5.14	13.02	10.08	23.35	9.06	19.40	6.52	14.51		
	20.396	-19.34	18.711	-22.36	23.390	-3.24	23.795	-1.88	13.443	-7.61	17.554	-22.01	1.298	7.58	22.814	-8.46	19.282	-21.25	8.16804	23
25	5.38	18.19	6.29	14.10	9.05	20.46	9.23	21.15	23.29	10.16	5.07	12.55	10.00	23.27	8.58	19.33	6.45	14.43		
	20.535	-18.85	18.886	-22.47	23.496	-2.29	23.886	-1.26	13.448	-7.63	17.568	-22.02	1.301	7.60	22.818	-8.44	19.287	-21.24	8.29946	25
27	5.36	18.22	6.33	14.13	8.58	20.50	9.17	21.16	23.21	10.09	5.00	12.48	9.52	23.20	8.50	19.25	6.37	14.36		
	20.674	-18.34	19.069	-22.51	23.599	-1.35	23.977	-0.64	13.452	-7.65	17.582	-22.02	1.304	7.62	22.822	-8.41	19.291	-21.24	8.43088	27
29	5.34	18.26	6.36	14.17	8.52	20.53	9.12	21.17	23.14	10.01	4.53	12.41	9.44	23.12	8.42	19.18	6.29	14.28		
	20.811	-17.81	19.259	-22.47	23.699	-0.41	0.067	-0.01	13.456	-7.66	17.595	-22.03	1.307	7.64	22.827	-8.39	19.296	-21.23	8.56230	29
31	5.31	18.29	6.39	14.22	8.45	20.56	9.06	21.18	23.06	9.53	4.46	12.34	9.37	23.05	8.34	19.10	6.22	14.21		
	20.948	-17.26	19.454	-22.36	23.796	0.52	0.158	0.61	13.459	-7.67	17.609	-22.04	1.310	7.66	22.831	-8.36	19.301	-21.23	8.69372	31

LUTY 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
32	1	Śro	786	21.01376	-13.34	21.0058	-16.58	0.98544	0.3220	0.17	58.914	4.5	21	729	1159.3	1630	928	1538.0	2201	845	1	
33	2	Czw	787	21.05341	-13.41	21.0502	-16.41	0.98557	1.2450	4.42	58.570	5.5	31	728	1159.4	1632	953	1628.5	2318	841	2	
34	3	Pią	788	21.09307	-13.48	21.0905	-16.23	0.98572	2.1829	8.55	58.280	6.5	42	726	1159.5	1634	1020	1720.3	****	837	3	
35	4	Sob	789	21.13272	-13.53	21.1307	-16.05	0.98586	3.1346	12.41	58.051	0.3	53	724	1159.6	1636	1050	1814.0	034	833	4	
36	5	Nie	790	21.17238	-13.58	21.1708	-15.47	0.98601	4.1056	15.43	57.893	1.3	65	722	1159.7	1638	1126	1909.8	151	830	5	
37	6	Pon	791	21.21203	-14.02	21.2109	-15.29	0.98617	5.0951	17.49	57.826	2.3	75	721	1159.8	1640	1209	2007.4	304	826	6	
38	7	Wto	792	21.25169	-14.05	21.2509	-15.10	0.98633	6.0953	18.48	57.872	3.3	84	719	1159.8	1642	1300	2106.0	412	822	7	
39	8	Śro	793	21.29134	-14.08	21.2908	-14.51	0.98649	7.1005	18.35	58.052	4.3	92	717	1159.9	1644	1401	2204.3	511	818	8	
40	9	Czw	794	21.33100	-14.10	21.3306	-14.32	0.98667	8.0918	17.12	58.377	5.3	97	715	1159.9	1646	1509	2301.0	602	814	9	
41	10	Pią	795	21.37066	-14.10	21.3704	-14.12	0.98684	9.0637	14.48	58.849	6.3	100	713	1159.9	1648	1621	2355.2	643	810	10	
42	11	Sob	796	21.41031	-14.10	21.4100	-13.53	0.98702	10.0130	11.36	59.448	0.4	100	711	1159.9	1650	1734	*****	717	806	11	
43	12	Nie	797	21.44597	-14.10	21.4456	-13.33	0.98721	10.5352	7.52	60.140	1.4	98	709	1159.9	1651	1847	046.6	746	802	12	
44	13	Pon	798	21.48562	-14.08	21.4851	-13.13	0.98740	11.4359	3.51	60.878	2.4	93	707	1159.9	1653	1958	135.3	811	758	13	
45	14	Wto	799	21.52527	-14.06	21.5246	-12.52	0.98760	12.3222	-0.15	61.606	3.4	87	705	1159.9	1655	2106	221.8	834	754	14	
46	15	Śro	800	21.56493	-14.03	21.5639	-12.32	0.98780	13.1935	-4.15	62.267	4.4	80	703	1159.8	1657	2213	306.9	857	750	15	
47	16	Czw	801	22.00459	-13.60	22.0032	-12.11	0.98801	14.0615	-7.58	62.810	5.4	72	701	1159.7	1659	2318	351.0	919	746	16	
48	17	Pią	802	22.04424	-13.55	22.0424	-11.50	0.98822	14.5257	-11.19	63.191	6.4	63	659	1159.7	1701	****	435.0	943	742	17	
49	18	Sob	803	22.08389	-13.51	22.0816	-11.29	0.98843	15.4011	-14.10	63.381	7.4	53	657	1159.6	1703	022	519.5	1010	738	18	
50	19	Nie	804	22.12355	-13.45	22.1207	-11.07	0.98865	16.2821	-16.26	63.366	0.6	44	655	1159.5	1705	124	604.8	1041	734	19	
51	20	Pon	805	22.16321	-13.39	22.1557	-10.46	0.98887	17.1739	-17.60	63.147	1.6	35	653	1159.4	1707	223	651.3	1117	731	20	
52	21	Wto	806	22.20286	-13.32	22.1947	-10.24	0.98909	18.0811	-18.46	62.743	2.6	26	650	1159.3	1709	318	739.2	1159	727	21	
53	22	Śro	807	22.24252	-13.24	22.2336	-10.02	0.98932	18.5949	-18.42	62.185	3.6	18	648	1159.2	1711	408	828.4	1249	723	22	
54	23	Czw	808	22.28218	-13.16	22.2724	-9.40	0.98955	19.5216	-17.42	61.518	4.6	11	646	1159.0	1713	454	918.5	1347	719	23	
55	24	Pią	809	22.32183	-13.07	22.3112	-9.18	0.98978	20.4510	-15.49	60.794	5.6	5	644	1158.9	1715	533	1009.1	1451	715	24	
56	25	Sob	810	22.36149	-12.58	22.3460	-8.56	0.99001	21.3814	-13.03	60.071	6.6	2	642	1158.7	1717	607	1060.0	1601	711	25	
57	26	Nie	811	22.40114	-12.48	22.3846	-8.33	0.99024	22.3115	-9.33	59.400	7.6	0	640	1158.6	1718	638	1150.8	1714	707	26	
58	27	Pon	812	22.44080	-12.38	22.4232	-8.11	0.99048	23.2414	-5.28	58.826	0.8	1	637	1158.4	1720	705	1241.5	1830	703	27	
59	28	Wto	813	22.48045	-12.27	22.4618	-7.48	0.99071	0.1721	-1.01	58.379	1.8	4	635	1158.2	1722	731	1332.5	1947	659	28	

Fazy Księżyca [Dm, h.mm]: 1kw 4, 5.19 Pełn 11, 1.33 3kw 18, 20.33 Now 26, 15.58

LUTY 2017 (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	18.30	6.40	14.24	8.41	20.57	9.03	21.18	23.02	9.49	4.43	12.30	9.33	23.01	8.31	19.07	6.18	14.17		
	21.016	-16.97	19.554	-22.28	23.842	0.97	0.203	0.92	13.460	-7.67	17.615	-22.04	1.312	7.67	22.833	-8.35	19.303	-21.22	8.75943	1
3	5.27	18.34	6.43	14.30	8.34	20.59	8.57	21.19	22.54	9.42	4.36	12.23	9.25	22.53	8.23	18.59	6.10	14.09		
	21.151	-16.39	19.756	-22.04	23.933	1.88	0.293	1.54	13.462	-7.67	17.628	-22.05	1.316	7.70	22.837	-8.32	19.307	-21.22	8.89084	3
5	5.24	18.37	6.45	14.37	8.26	21.01	8.51	21.20	22.47	9.34	4.29	12.16	9.17	22.46	8.15	18.52	6.03	14.02		
	21.286	-15.79	19.962	-21.73	0.020	2.77	0.384	2.15	13.463	-7.67	17.641	-22.05	1.320	7.72	22.842	-8.29	19.312	-21.21	9.02226	5
7	5.21	18.40	6.47	14.44	8.19	21.03	8.46	21.21	22.39	9.26	4.22	12.09	9.09	22.39	8.07	18.44	5.55	13.54		
	21.419	-15.17	20.171	-21.33	0.103	3.64	0.474	2.77	13.463	-7.66	17.653	-22.06	1.324	7.75	22.846	-8.27	19.316	-21.21	9.15369	7
9	5.18	18.44	6.48	14.53	8.11	21.05	8.40	21.21	22.31	9.18	4.14	12.01	9.02	22.31	7.60	18.37	5.47	13.47		
	21.552	-14.53	20.382	-20.84	0.181	4.49	0.564	3.38	13.462	-7.65	17.666	-22.06	1.328	7.77	22.851	-8.24	19.320	-21.20	9.28511	9
11	5.14	18.47	6.49	15.01	8.03	21.06	8.34	21.22	22.23	9.10	4.07	11.54	8.54	22.24	7.52	18.29	5.40	13.39		
	21.683	-13.88	20.595	-20.27	0.254	5.32	0.654	3.99	13.461	-7.63	17.677	-22.07	1.332	7.80	22.855	-8.21	19.325	-21.20	9.41653	11
13	5.11	18.51	6.50	15.11	7.55	21.06	8.28	21.23	22.15	9.02	4.00	11.47	8.46	22.16	7.44	18.22	5.32	13.31		
	21.814	-13.21	20.811	-19.61	0.322	6.12	0.744	4.59	13.459	-7.61	17.689	-22.07	1.337	7.83	22.860	-8.18	19.329	-21.19	9.54794	13
15	5.07	18.54	6.50	15.21	7.47	21.06	8.23	21.24	22.06	8.55	3.53	11.40	8.38	22.09	7.36	18.14	5.24	13.24		
	21.944	-12.53	21.028	-18.86	0.385	6.89	0.835	5.19	13.455	-7.58	17.700	-22.08	1.341	7.86	22.864	-8.16	19.333	-21.18	9.67936	15
17	5.04	18.58	6.50	15.32	7.38	21.06	8.17	21.25	21.58	8.47	3.46	11.33	8.31	22.01	7.29	18.07	5.17	13.16		
	22.073	-11.83	21.246	-18.02	0.441	7.62	0.925	5.79	13.452	-7.55	17.710	-22.08	1.346	7.89	22.869	-8.13	19.337	-21.18	9.81077	17
19	4.60	19.01	6.49	15.43	7.29	21.05	8.11	21.25	21.50	8.39	3.39	11.25	8.23	21.54	7.21	17.60	5.09	13.09		
	22.202	-11.12	21.466	-17.10	0.490	8.32	1.015	6.38	13.447	-7.51	17.721	-22.08	1.351	7.92	22.874	-8.10	19.341	-21.17	9.94219	19
21	4.56	19.05	6.48	15.55	7.20	21.03	8.06	21.26	21.41	8.31	3.31	11.18	8.15	21.47	7.13	17.52	5.01	13.01		
	22.330	-10.40	21.688	-16.08	0.533	8.97	1.105	6.97	13.442	-7.47	17.731	-22.08	1.356	7.95	22.878	-8.07	19.345	-21.17	10.07362	21
23	4.51	19.09	6.47	16.07	7.11	21.01	8.00	21.27	21.33	8.23	3.24	11.11	8.08	21.39	7.05	17.45	4.54	12.53		
	22.457	-9.67	21.910	-14.97	0.568	9.58	1.196	7.55	13.436	-7.43	17.740	-22.08	1.362	7.98	22.883	-8.04	19.348	-21.17	10.20504	23
25	4.47	19.12	6.45	16.20	7.02	20.58	7.54	21.28	21.24	8.15	3.17	11.03	7.60	21.32	6.58	17.37	4.46	12.46		
	22.583	-8.93	22.134	-13.77	0.596	10.13	1.286	8.12	13.429	-7.38	17.749	-22.09	1.367	8.01	22.888	-8.01	19.352	-21.16	10.33646	25
27	4.43	19.16	6.43	16.33	6.52	20.54	7.49	21.28	21.16	8.07	3.09	10.56	7.52	21.24	6.50	17.30	4.38	12.38		
	22.709	-8.18	22.359	-12.48	0.615	10.63	1.377	8.70	13.421	-7.33	17.758	-22.09	1.373	8.05	22.892	-7.98	19.355	-21.16	10.46787	27

MARZEC 2017

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
60	1	Śro	814	22.52011	-12.15	22.5003	-7.25	0.99095	1.1056	3.32	58.073	2.8	10	633	1158.0	1724	757	1424.0	2105	655	1	
61	2	Czw	815	22.55576	-12.03	22.5348	-7.02	0.99119	2.0523	7.55	57.906	3.8	18	630	1157.8	1726	824	1516.4	2223	651	2	
62	3	Pią	816	22.59542	-11.51	22.5732	-6.39	0.99143	3.0101	11.51	57.865	4.8	27	628	1157.6	1728	853	1610.3	2341	647	3	
63	4	Sob	817	23.03507	-11.38	23.0115	-6.16	0.99168	3.5802	15.06	57.929	5.8	38	626	1157.4	1730	927	1705.7	****	643	4	
64	5	Nie	818	23.07473	-11.25	23.0458	-5.53	0.99192	4.5616	17.25	58.079	6.8	50	624	1157.2	1732	1008	1802.3	055	639	5	
65	6	Pon	819	23.11438	-11.11	23.0841	-5.30	0.99217	5.5516	18.40	58.300	1.0	61	621	1156.9	1734	1056	1859.7	204	635	6	
66	7	Wto	820	23.15404	-10.56	23.1223	-5.07	0.99242	6.5415	18.45	58.583	2.0	72	619	1156.7	1735	1152	1956.7	305	632	7	
67	8	Śro	821	23.19369	-10.42	23.1605	-4.43	0.99267	7.5222	17.43	58.925	3.0	81	617	1156.4	1737	1256	2052.5	357	628	8	
68	9	Czw	822	23.23335	-10.27	23.1947	-4.20	0.99293	8.4853	15.39	59.327	4.0	89	614	1156.2	1739	1405	2146.2	441	624	9	
69	10	Pią	823	23.27300	-10.11	23.2328	-3.56	0.99319	9.4322	12.45	59.790	5.0	95	612	1155.9	1741	1516	2237.6	516	620	10	
70	11	Sob	824	23.31266	-9.55	23.2709	-3.33	0.99345	10.3541	9.14	60.310	6.0	99	610	1155.7	1743	1628	2326.6	546	616	11	
71	12	Nie	825	23.35231	-9.39	23.3049	-3.09	0.99372	11.2603	5.19	60.873	7.0	100	607	1155.4	1745	1739	*****	612	612	12	
72	13	Pon	826	23.39197	-9.23	23.3429	-2.45	0.99399	12.1451	1.13	61.457	0.8	99	605	1155.1	1746	1849	013.7	636	608	13	
73	14	Wto	827	23.43162	-9.06	23.3809	-2.22	0.99426	13.0232	-2.51	62.030	1.8	97	602	1154.9	1748	1957	059.3	659	604	14	
74	15	Śro	828	23.47128	-8.49	23.4149	-1.58	0.99453	13.4938	-6.43	62.554	2.8	92	600	1154.6	1750	2103	144.0	721	600	15	
75	16	Czw	829	23.51093	-8.32	23.4528	-1.34	0.99481	14.3638	-10.15	62.989	3.8	86	558	1154.3	1752	2208	228.4	745	556	16	
76	17	Pią	830	23.55059	-8.15	23.4908	-1.11	0.99509	15.2357	-13.19	63.294	4.8	79	555	1154.0	1754	2311	313.0	810	552	17	
77	18	Sob	831	23.59024	-7.58	23.5247	-0.47	0.99538	16.1154	-15.48	63.436	5.8	70	553	1153.7	1756	****	358.1	839	548	18	
78	19	Nie	832	0.02590	-7.40	23.5626	-0.23	0.99566	17.0043	-17.36	63.391	6.8	61	550	1153.4	1757	011	444.1	913	544	19	
79	20	Pon	833	0.06555	-7.22	0.0005	0.00	0.99594	17.5030	-18.40	63.146	7.8	52	548	1153.1	1759	108	531.1	952	540	20	
80	21	Wto	834	0.10521	-7.05	0.0343	0.24	0.99623	18.4111	-18.53	62.705	0.8	42	546	1152.8	1801	200	619.2	1038	537	21	
81	22	Śro	835	0.14487	-6.47	0.0722	0.48	0.99652	19.3239	-18.15	62.088	1.8	33	543	1152.5	1803	247	708.2	1132	533	22	
82	23	Czw	836	0.18452	-6.29	0.1101	1.12	0.99681	20.2441	-16.42	61.331	2.8	24	541	1152.2	1805	328	757.8	1232	529	23	
83	24	Pią	837	0.22418	-6.11	0.1439	1.35	0.99709	21.1708	-14.17	60.485	3.8	16	538	1151.9	1806	404	848.0	1339	525	24	
84	25	Sob	838	0.26383	-5.53	0.1818	1.59	0.99738	22.0952	-11.04	59.613	4.8	9	536	1151.6	1808	436	938.5	1450	521	25	
85	26	Nie	839	0.30349	-5.35	0.2156	2.22	0.99767	23.0257	-7.10	58.783	5.8	4	534	1151.3	1810	504	1029.3	1605	517	26	
85	26	Nie	839	23.30250	-5.35	0.2147	2.21	0.99766	23.0044	-7.21	58.816	5.8	4	634	1251.3	1910	604	1129.3	1705	617	26	
86	27	Pon	840	23.34216	-5.17	0.2526	2.45	0.99794	23.5418	-2.58	58.092	6.8	1	631	1251.0	1912	631	1220.6	1823	613	27	
87	28	Wto	841	23.38181	-4.59	0.2904	3.08	0.99823	0.4840	1.41	57.534	0.3	0	629	1250.7	1914	657	1313.0	1943	609	28	
88	29	Śro	842	23.42146	-4.41	0.3243	3.32	0.99851	1.4410	6.19	57.181	1.3	2	626	1250.4	1915	724	1406.5	2104	605	29	
89	30	Czw	843	23.46112	-4.23	0.3621	3.55	0.99880	2.4101	10.36	57.048	2.3	7	624	1250.1	1917	753	1501.7	2224	601	30	
90	31	Pią	844	23.50077	-4.05	0.3960	4.18	0.99908	3.3919	14.14	57.128	3.3	15	622	1249.8	1919	826	1558.4	2343	557	31	

Fazy Księżycyca [Dm, h.mm]: 1kw 5, 12.32 Pełn 12, 15.54 3kw 20, 16.58 3kw 20, 17.58 Now 28, 4.57

MARZEC 2017 (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	6.41	16.46	6.42	20.49	7.43	21.29	21.07	7.59	3.02	10.49	7.44	21.17	6.42	17.22	4.31	12.31		
	22.834	-7.42	22.586	-11.10	0.625	11.07	1.468	9.26	13.413	-7.27	17.767	-22.09	1.378	8.08	22.897	-7.96	19.359	-21.15	10.59929	1
3	4.34	19.24	6.39	17.00	6.32	20.43	7.38	21.30	20.58	7.51	2.55	10.41	7.37	21.10	6.34	17.15	4.23	12.23		
	22.959	-6.66	22.814	-9.64	0.625	11.44	1.559	9.82	13.404	-7.21	17.775	-22.09	1.384	8.12	22.902	-7.93	19.362	-21.15	10.73070	3
5	4.29	19.28	6.36	17.15	6.22	20.36	7.32	21.31	20.50	7.42	2.47	10.34	7.29	21.03	6.27	17.08	4.15	12.15		
	23.083	-5.89	23.044	-8.09	0.616	11.73	1.650	10.37	13.394	-7.15	17.782	-22.09	1.390	8.15	22.907	-7.90	19.365	-21.14	10.86212	5
7	4.24	19.32	6.33	17.30	6.12	20.29	7.27	21.31	20.41	7.34	2.40	10.26	7.21	20.55	6.19	17.00	4.07	12.08		
	23.206	-5.11	23.275	-6.47	0.597	11.93	1.741	10.91	13.384	-7.08	17.789	-22.09	1.396	8.19	22.911	-7.87	19.368	-21.14	10.99354	7
9	4.19	19.36	6.30	17.45	6.02	20.20	7.21	21.32	20.32	7.26	2.32	10.19	7.14	20.48	6.11	16.53	3.60	11.60		
	23.330	-4.33	23.507	-4.77	0.569	12.05	1.832	11.45	13.373	-7.01	17.796	-22.09	1.402	8.23	22.916	-7.84	19.371	-21.14	11.12496	9
11	4.14	19.40	6.27	18.00	5.52	20.10	7.16	21.33	20.23	7.18	2.25	10.11	7.06	20.41	6.04	16.45	3.52	11.52		
	23.452	-3.54	23.741	-3.00	0.531	12.08	1.924	11.98	13.361	-6.93	17.802	-22.09	1.409	8.27	22.921	-7.81	19.374	-21.13	11.25638	11
13	4.09	19.44	6.23	18.16	5.41	19.59	7.10	21.33	20.14	7.10	2.17	10.04	6.58	20.33	5.56	16.38	3.44	11.45		
	23.575	-2.76	23.974	-1.18	0.484	12.00	2.015	12.50	13.349	-6.86	17.808	-22.09	1.415	8.31	22.925	-7.78	19.377	-21.13	11.38780	13
15	4.04	19.48	6.19	18.32	5.31	19.47	7.05	21.34	20.05	7.02	2.10	9.56	6.50	20.26	5.48	16.30	3.37	11.37		
	23.697	-1.97	0.207	0.67	0.428	11.83	2.107	13.01	13.337	-6.78	17.813	-22.09	1.421	8.34	22.930	-7.76	19.379	-21.13	11.51921	15
17	3.59	19.52	6.15	18.48	5.21	19.33	6.59	21.35	19.56	6.54	2.02	9.49	6.43	20.19	5.40	16.23	3.29	11.29		
	23.819	-1.18	0.438	2.55	0.366	11.55	2.199	13.52	13.324	-6.69	17.818	-22.09	1.428	8.38	22.935	-7.73	19.382	-21.13	11.65063	17
19	3.53	19.56	6.11	19.04	5.11	19.19	6.54	21.35	19.46	6.45	1.55	9.41	6.35	20.12	5.33	16.16	3.21	11.22		
	23.940	-0.39	0.666	4.41	0.298	11.18	2.291	14.01	13.310	-6.61	17.823	-22.09	1.435	8.42	22.939	-7.70	19.384	-21.12	11.78205	19
21	3.48	20.01	6.06	19.19	5.02	19.04	6.49	21.36	19.37	6.37	1.47	9.34	6.27	20.04	5.25	16.08	3.13	11.14		
	0.062	0.40	0.886	6.24	0.227	10.72	2.384	14.50	13.296	-6.52	17.827	-22.09	1.441	8.46	22.944	-7.67	19.386	-21.12	11.91347	21
23	3.42	20.05	6.02	19.33	4.53	18.49	6.44	21.36	19.28	6.29	1.39	9.26	6.20	19.57	5.17	16.01	3.06	11.06		
	0.183	1.19	1.098	7.99	0.153	10.17	2.477	14.98	13.282	-6.43	17.830	-22.08	1.448	8.50	22.948	-7.65	19.388	-21.12	12.04489	23
25	3.37	20.09	5.56	19.47	4.44	18.33	6.38	21.37	19.19	6.21	1.32	9.18	6.12	19.50	5.09	15.53	2.58	10.58		
	0.305	1.98	1.296	9.64	0.080	9.56	2.570	15.45	13.267	-6.34	17.833	-22.08	1.455	8.55	22.953	-7.62	19.390	-21.12	12.17630	25
27	4.31	21.14	6.51	20.58	5.36	19.18	7.33	22.37	20.10	7.12	2.24	10.11	7.04	20.43	6.02	16.46	3.50	11.51		
	0.424	2.75	1.475	11.12	0.010	8.90	2.661	15.90	13.252	-6.24	17.836	-22.08	1.462	8.59	22.957	-7.59	19.392	-21.12	12.30772	27
29	4.25	21.19	6.45	21.08	5.28	19.02	7.28	22.38	20.00	7.04	2.16	10.03	6.57	20.36	5.54	16.38	3.42	11.43		
	0.545	3.53	1.639	12.46	23.942	8.20	2.754	16.34	13.237	-6.15	17.838	-22.08	1.469	8.63	22.962	-7.57	19.394	-21.12	12.43913	29
31	4.19	21.24	6.39	21.15	5.20	18.46	7.23	22.39	19.51	6.56	2.08	9.55	6.49	20.28	5.46	16.31	3.35	11.35		
	0.667	4.30	1.781	13.62	23.880	7.47	2.848	16.78	13.222	-6.05	17.839	-22.08	1.476	8.67	22.966	-7.54	19.395	-21.12	12.57055	31

KWIECIEŃ 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
91	1	Sob	845	23.54043	-3.48	0.4339	4.41	0.99936	4.3848	16.57	57.390	4.3	24	619	1249.5	1921	905	1656.3	****	553	1	
92	2	Nie	846	23.58009	-3.30	0.4717	5.05	0.99964	5.3850	18.33	57.793	5.3	35	617	1249.2	1923	951	1754.7	056	549	2	
93	3	Pon	847	0.01574	-3.12	0.5056	5.27	0.99992	6.3835	18.58	58.292	6.3	46	615	1249.0	1924	1046	1852.4	201	545	3	
94	4	Wto	848	0.05540	-2.55	0.5436	5.50	1.00020	7.3706	18.13	58.845	0.6	57	612	1248.7	1926	1148	1948.6	256	541	4	
95	5	Śro	849	0.09505	-2.38	0.5815	6.13	1.00048	8.3342	16.25	59.422	1.6	68	610	1248.4	1928	1255	2042.4	342	538	5	
96	6	Czw	850	0.13471	-2.20	1.0154	6.36	1.00076	9.2802	13.45	60.000	2.6	77	607	1248.1	1930	1405	2133.7	419	534	6	
97	7	Pią	851	0.17436	-2.04	1.0534	6.58	1.00105	10.2005	10.25	60.566	3.6	86	605	1247.8	1932	1516	2222.5	450	530	7	
98	8	Sob	852	0.21402	-1.47	1.0914	7.21	1.00133	11.1007	6.38	61.113	4.6	92	603	1247.5	1933	1626	2309.3	516	526	8	
99	9	Nie	853	0.25367	-1.30	1.1254	7.43	1.00161	11.5836	2.37	61.637	5.6	97	600	1247.3	1935	1735	2354.7	540	522	9	
100	10	Pon	854	0.29333	-1.14	1.1634	8.05	1.00189	12.4603	-1.28	62.130	6.6	99	558	1247.0	1937	1843	*****	603	518	10	
101	11	Wto	855	0.33298	-0.58	1.2015	8.27	1.00218	13.3258	-5.26	62.582	0.2	100	556	1246.7	1939	1950	039.2	625	514	11	
102	12	Śro	856	0.37264	-0.42	1.2356	8.49	1.00246	14.1949	-9.07	62.976	1.2	99	554	1246.5	1941	2056	123.4	647	510	12	
103	13	Czw	857	0.41229	-0.27	1.2737	9.11	1.00275	15.0700	-12.23	63.289	2.2	96	551	1246.2	1942	2200	207.8	712	506	13	
104	14	Pią	858	0.45195	-0.12	1.3118	9.33	1.00303	15.5448	-15.07	63.497	3.2	91	549	1245.9	1944	2301	252.8	739	502	14	
105	15	Sob	859	0.49160	0.03	1.3500	9.54	1.00332	16.4323	-17.12	63.573	4.2	85	547	1245.7	1946	****	338.5	811	458	15	
106	16	Nie	860	0.53126	0.17	1.3843	10.15	1.00360	17.3245	-18.33	63.491	5.2	77	544	1245.5	1948	000	425.2	847	454	16	
107	17	Pon	861	0.57091	0.31	1.4225	10.37	1.00389	18.2250	-19.05	63.236	6.2	69	542	1245.2	1950	054	512.6	930	450	17	
108	18	Wto	862	1.01057	0.44	1.4608	10.58	1.00417	19.1328	-18.46	62.797	7.2	60	540	1245.0	1951	142	600.7	1020	446	18	
109	19	Śro	863	1.05023	0.57	1.4952	11.18	1.00445	20.0428	-17.36	62.181	0.0	50	538	1244.8	1953	225	649.3	1117	442	19	
110	20	Czw	864	1.08588	1.10	1.5336	11.39	1.00473	20.5543	-15.33	61.409	1.0	40	535	1244.6	1955	302	738.2	1220	439	20	
111	21	Pią	865	1.12554	1.22	1.5720	11.59	1.00501	21.4712	-12.43	60.518	2.0	30	533	1244.4	1957	335	827.3	1328	435	21	
112	22	Sob	866	1.16519	1.34	2.0105	12.20	1.00529	22.3903	-9.08	59.563	3.0	21	531	1244.2	1958	404	916.8	1440	431	22	
113	23	Nie	867	1.20485	1.45	2.0450	12.40	1.00556	23.3132	-4.58	58.614	4.0	13	529	1244.0	2000	430	1006.9	1555	427	23	
114	24	Pon	868	1.24450	1.56	2.0836	12.59	1.00584	0.2505	-0.24	57.747	5.0	6	527	1243.8	2002	456	1058.2	1714	423	24	
115	25	Wto	869	1.28416	2.06	2.1222	13.19	1.00610	1.2008	4.20	57.041	6.0	2	525	1243.6	2004	522	1151.2	1835	419	25	
116	26	Śro	870	1.32381	2.16	2.1609	13.38	1.00637	2.1705	8.55	56.561	7.0	0	523	1243.5	2006	550	1246.2	1958	415	26	
117	27	Czw	871	1.36347	2.25	2.1956	13.57	1.00663	3.1607	12.59	56.347	0.9	1	520	1243.3	2007	621	1343.6	2120	411	27	
118	28	Pią	872	1.40312	2.34	2.2344	14.16	1.00689	4.1701	16.13	56.412	1.9	5	518	1243.2	2009	658	1443.1	2239	407	28	
119	29	Sob	873	1.44278	2.42	2.2732	14.35	1.00715	5.1902	18.20	56.735	2.9	12	516	1243.0	2011	743	1543.7	2351	403	29	
120	30	Nie	874	1.48243	2.50	2.3121	14.53	1.00740	6.2104	19.10	57.270	3.9	21	514	1242.9	2013	836	1644.0	****	359	30	

Fazy Księżyca [Dm, h.mm]: 1kw 3, 20.39 Pełn 11, 8.08 3kw 19, 11.57 Now 26, 14.16

MAJ 2017

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
121	1	Pon	875	1.52209	2.57	2.3510	15.12	1.00765	7.2149	18.44	57.956	4.9	31	512	1242.8	2014	937	1742.7	052	355	1	
122	2	Wto	876	1.56175	3.04	2.3900	15.30	1.00789	8.2016	17.09	58.727	5.9	42	510	1242.7	2016	1045	1838.6	142	351	2	
123	3	Śro	877	2.00140	3.10	2.4250	15.47	1.00814	9.1555	14.38	59.524	0.3	53	508	1242.6	2018	1155	1931.3	222	347	3	
124	4	Czw	878	2.04106	3.16	2.4641	16.05	1.00838	10.0844	11.24	60.299	1.3	64	506	1242.5	2020	1306	2021.0	255	344	4	
125	5	Pią	879	2.08071	3.21	2.5033	16.22	1.00862	10.5903	7.41	61.019	2.3	73	505	1242.4	2021	1417	2108.1	323	340	5	
126	6	Sob	880	2.12037	3.26	2.5425	16.39	1.00885	11.4727	3.42	61.664	3.3	82	503	1242.3	2023	1526	2153.3	347	336	6	
127	7	Nie	881	2.16002	3.30	2.5817	16.55	1.00909	12.3434	-0.23	62.224	4.3	89	501	1242.2	2025	1634	2237.5	409	332	7	
128	8	Pon	882	2.19568	3.33	3.0210	17.11	1.00932	13.2102	-4.23	62.696	5.3	94	459	1242.2	2027	1740	2321.2	430	328	8	
129	9	Wto	883	2.23533	3.36	3.0604	17.28	1.00955	14.0725	-8.10	63.080	6.3	98	457	1242.1	2028	1846	*****	452	324	9	
130	10	Śro	884	2.27499	3.39	3.0958	17.43	1.00978	14.5410	-11.35	63.375	7.3	100	455	1242.1	2030	1951	005.1	515	320	10	
131	11	Czw	885	2.31464	3.41	3.1353	17.59	1.01001	15.4138	-14.31	63.577	0.5	100	454	1242.1	2032	2053	049.5	541	316	11	
132	12	Pią	886	2.35430	3.42	3.1748	18.14	1.01024	16.2958	-16.50	63.678	1.5	98	452	1242.0	2033	2153	134.9	611	312	12	
133	13	Sob	887	2.39395	3.43	3.2144	18.29	1.01046	17.1911	-18.25	63.667	2.5	94	450	1242.0	2035	2249	221.3	645	308	13	
134	14	Nie	888	2.43361	3.43	3.2540	18.43	1.01069	18.0906	-19.13	63.529	3.5	89	449	1242.0	2037	2340	308.5	726	304	14	
135	15	Pon	889	2.47327	3.42	3.2937	18.57	1.01091	18.5929	-19.10	63.251	4.5	83	447	1242.0	2038	****	356.3	813	300	15	
136	16	Wto	890	2.51292	3.41	3.3335	19.11	1.01113	19.5002	-18.15	62.821	5.5	75	445	1242.1	2040	025	444.5	907	256	16	
137	17	Śro	891	2.55258	3.39	3.3733	19.25	1.01134	20.4033	-16.30	62.237	6.5	66	444	1242.1	2041	103	532.6	1007	252	17	
138	18	Czw	892	2.59223	3.37	3.4132	19.38	1.01156	21.3057	-13.57	61.507	7.5	56	442	1242.1	2043	137	620.7	1111	248	18	
139	19	Pią	893	3.03189	3.34	3.4531	19.51	1.01177	22.2123	-10.41	60.653	0.4	46	441	1242.2	2044	206	708.7	1220	245	19	
140	20	Sob	894	3.07154	3.31	3.4931	20.03	1.01197	23.1209	-6.48	59.714	1.4	36	440	1242.2	2046	233	757.0	1332	241	20	
141	21	Nie	895	3.11120	3.27	3.5332	20.16	1.01217	0.0345	-2.26	58.746	2.4	25	438	1242.3	2047	257	846.1	1447	237	21	
142	22	Pon	896	3.15085	3.23	3.5733	20.27	1.01237	0.5646	2.12	57.820	3.4	16	437	1242.4	2049	322	936.7	1605	233	22	
143	23	Wto	897	3.19051	3.18	4.0134	20.39	1.01256	1.5151	6.51	57.016	4.4	9	435	1242.5	2050	348	1029.5	1726	229	23	
144	24	Śro	898	3.23016	3.12	4.0536	20.50	1.01275	2.4930	11.13	56.411	5.4	3	434	1242.5	2052	416	1125.2	1849	225	24	
145	25	Czw	899	3.26582	3.06	4.0939	21.01	1.01293	3.4949	14.57	56.069	6.4	0	433	1242.6	2053	450	1223.7	2011	221	25	
146	26	Pią	900	3.30548	2.60	4.1342	21.11	1.01311	4.5225	17.40	56.025	0.6	1	432	1242.8	2055	530	1325.1	2129	217	26	
147	27	Sob	901	3.34513	2.53	4.1746	21.21	1.01328	5.5612	19.08	56.283	1.6	4	431	1242.9	2056	620	1427.5	2238	213	27	
148	28	Nie	902	3.38479	2.45	4.2150	21.31	1.01345	6.5936	19.14	56.811	2.6	10	430	1243.0	2057	719	1529.4	2336	209	28	
149	29	Pon	903	3.42444	2.37	4.2554	21.40	1.01361	8.0105	18.02	57.548	3.6	18	429	1243.1	2058	827	1628.8	****	205	29	
150	30	Wto	904	3.46410	2.29	4.2959	21.49	1.01377	8.5936	15.43	58.421	4.6	28	428	1243.3	2100	939	1724.8	021	201	30	
151	31	Śro	905	3.50376	2.20	4.3404	21.58	1.01392	9.5445	12.36	59.353	5.6	38	427	1243.4	2101	1053	1817.0	058	157	31	

Fazy Księżyca [Dm, h.mm]: 1kw 3, 4.47 Pełn 10, 23.42 3kw 19, 2.33 Now 25, 21.44

MAJ 2017 (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	22.59	4.54	18.28	3.60	16.23	6.13	22.42	17.27	4.48	0.04	7.51	4.50	18.37	3.46	14.34	1.33	9.33		
	2.586	15.19	1.544	8.20	0.051	1.65	4.329	22.11	12.986	-4.64	17.805	-22.04	1.586	9.32	23.023	-7.20	19.401	-21.14	14.60754	1
3	2.22	23.08	4.49	18.17	3.56	16.20	6.09	22.42	17.18	4.39	23.52	7.43	4.42	18.29	3.38	14.27	1.25	9.25		
	2.714	15.79	1.543	7.70	0.126	1.77	4.426	22.35	12.973	-4.56	17.799	-22.04	1.593	9.36	23.026	-7.19	19.400	-21.15	14.73896	3
5	2.13	23.17	4.44	18.09	3.52	16.18	6.05	22.41	17.09	4.31	23.44	7.35	4.35	18.22	3.30	14.19	1.17	9.17		
	2.842	16.36	1.560	7.38	0.205	1.94	4.523	22.57	12.961	-4.49	17.793	-22.04	1.600	9.40	23.029	-7.17	19.399	-21.15	14.87038	5
7	2.03	23.28	4.39	18.02	3.48	16.16	6.02	22.41	17.00	4.23	23.35	7.27	4.27	18.15	3.22	14.11	1.10	9.09		
	2.971	16.92	1.595	7.23	0.289	2.17	4.620	22.79	12.949	-4.42	17.786	-22.03	1.607	9.44	23.031	-7.16	19.398	-21.15	15.00179	7
9	1.52	23.39	4.34	17.57	3.44	16.15	5.58	22.41	16.52	4.15	23.27	7.19	4.19	18.08	3.15	14.04	1.02	9.01		
	3.101	17.46	1.647	7.24	0.378	2.43	4.718	22.99	12.938	-4.36	17.779	-22.03	1.614	9.48	23.034	-7.14	19.397	-21.16	15.13321	9
11	1.39	23.53	4.29	17.54	3.40	16.15	5.55	22.40	16.43	4.06	23.19	7.10	4.12	18.00	3.07	13.56	0.54	8.54		
	3.231	17.98	1.716	7.40	0.470	2.74	4.815	23.17	12.927	-4.30	17.772	-22.03	1.621	9.51	23.036	-7.13	19.395	-21.16	15.26463	11
13	1.23	0.22	4.25	17.53	3.36	16.14	5.51	22.39	16.34	3.58	23.10	7.02	4.04	17.53	2.59	13.48	0.46	8.46		
	3.362	18.48	1.800	7.71	0.566	3.09	4.913	23.34	12.917	-4.24	17.764	-22.02	1.627	9.55	23.039	-7.11	19.394	-21.17	15.39605	13
15	****	****	4.20	17.54	3.32	16.14	5.48	22.38	16.25	3.50	23.02	6.54	3.56	17.46	2.51	13.41	0.38	8.38		
	3.494	18.96	1.898	8.16	0.665	3.47	5.011	23.50	12.907	-4.19	17.756	-22.02	1.634	9.59	23.041	-7.10	19.392	-21.18	15.52747	15
17	****	****	4.16	17.56	3.28	16.15	5.45	22.38	16.17	3.42	22.54	6.45	3.49	17.39	2.43	13.33	0.30	8.30		
	3.626	19.41	2.010	8.72	0.767	3.88	5.109	23.65	12.899	-4.15	17.748	-22.02	1.640	9.63	23.043	-7.09	19.391	-21.18	15.65889	17
19	****	****	4.12	17.59	3.24	16.16	5.42	22.37	16.08	3.34	22.45	6.37	3.41	17.31	2.36	13.25	0.22	8.22		
	3.759	19.85	2.136	9.39	0.873	4.33	5.206	23.78	12.890	-4.10	17.739	-22.01	1.647	9.66	23.045	-7.08	19.389	-21.19	15.79031	19
21	****	****	4.08	18.04	3.20	16.17	5.39	22.36	15.60	3.26	22.37	6.29	3.33	17.24	2.28	13.18	0.14	8.13		
	3.892	20.26	2.273	10.17	0.980	4.80	5.304	23.90	12.883	-4.06	17.731	-22.01	1.653	9.70	23.047	-7.07	19.387	-21.19	15.92173	21
23	****	****	4.04	18.10	3.16	16.18	5.36	22.34	15.51	3.18	22.28	6.20	3.26	17.17	2.20	13.10	0.06	8.05		
	4.026	20.65	2.423	11.02	1.091	5.30	5.402	24.00	12.876	-4.03	17.721	-22.01	1.659	9.73	23.048	-7.06	19.385	-21.20	16.05315	23
25	****	****	4.00	18.17	3.12	16.20	5.33	22.33	15.43	3.10	22.20	6.12	3.18	17.10	2.12	13.02	23.54	7.57		
	4.161	21.02	2.584	11.95	1.204	5.82	5.500	24.09	12.870	-4.00	17.712	-22.00	1.665	9.77	23.050	-7.05	19.383	-21.21	16.18457	25
27	****	****	3.57	18.25	3.08	16.22	5.31	22.32	15.34	3.02	22.12	6.03	3.10	17.02	2.04	12.55	23.46	7.49		
	4.296	21.36	2.758	12.95	1.319	6.36	5.598	24.16	12.864	-3.97	17.703	-22.00	1.671	9.80	23.051	-7.04	19.381	-21.21	16.31599	27
29	****	****	3.54	18.35	3.04	16.24	5.28	22.30	15.26	2.54	22.03	5.55	3.03	16.55	1.57	12.47	23.38	7.41		
	4.432	21.67	2.943	14.00	1.436	6.91	5.695	24.22	12.860	-3.95	17.693	-22.00	1.677	9.84	23.053	-7.04	19.378	-21.22	16.44741	29
31	****	****	3.51	18.46	3.00	16.27	5.26	22.29	15.18	2.45	21.55	5.47	2.55	16.48	1.49	12.39	23.30	7.33		
	4.568	21.97	3.141	15.08	1.555	7.48	5.793	24.27	12.856	-3.94	17.683	-21.99	1.683	9.87	23.054	-7.03	19.376	-21.23	16.57883	31

CZERWIEC 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2457																		
152	1	Czw	906	3.54341	2.11	4.3810	22.06	1.01407	10.4646	8.54	60.274	6.6	49	426	1243.6	2102	1205	1905.9	128	153	1
153	2	Pią	907	3.58307	2.02	4.4216	22.14	1.01422	11.3613	4.54	61.130	0.9	59	425	1243.7	2103	1316	1952.2	153	149	2
154	3	Sob	908	4.02272	1.52	4.4622	22.21	1.01436	12.2349	0.47	61.882	1.9	69	424	1243.9	2104	1425	2036.8	216	146	3
155	4	Nie	909	4.06238	1.42	4.5029	22.28	1.01449	13.1020	-3.17	62.509	2.9	78	423	1244.1	2105	1532	2120.4	238	142	4
156	5	Pon	910	4.10203	1.31	4.5436	22.35	1.01462	13.5628	-7.09	63.002	3.9	85	423	1244.2	2106	1637	2203.9	259	138	5
157	6	Wto	911	4.14169	1.20	4.5843	22.41	1.01475	14.4249	-10.42	63.360	4.9	91	422	1244.4	2107	1742	2247.8	321	134	6
158	7	Śro	912	4.18134	1.09	5.0251	22.47	1.01488	15.2949	-13.48	63.591	5.9	96	421	1244.6	2108	1846	2332.6	346	130	7
159	8	Czw	913	4.22100	0.58	5.0659	22.53	1.01500	16.1746	-16.19	63.704	6.9	99	421	1244.8	2109	1947	*****	414	126	8
160	9	Pią	914	4.26066	0.46	5.1107	22.58	1.01512	17.0644	-18.09	63.705	7.9	100	420	1245.0	2110	2045	018.6	446	122	9
161	10	Sob	915	4.30031	0.34	5.1515	23.02	1.01524	17.5636	-19.12	63.601	0.9	99	420	1245.2	2111	2138	105.6	524	118	10
162	11	Nie	916	4.33597	0.22	5.1924	23.06	1.01535	18.4703	-19.24	63.393	1.9	97	420	1245.4	2111	2225	153.5	609	114	11
163	12	Pon	917	4.37562	0.10	5.2333	23.10	1.01547	19.3743	-18.44	63.078	2.9	93	419	1245.6	2112	2306	241.7	701	110	12
164	13	Wto	918	4.41528	-0.02	5.2742	23.14	1.01557	20.2815	-17.13	62.652	3.9	87	419	1245.8	2113	2341	329.9	758	106	13
165	14	Śro	919	4.45494	-0.15	5.3151	23.17	1.01568	21.1825	-14.53	62.112	4.9	79	419	1246.0	2113	****	417.8	901	102	14
166	15	Czw	920	4.49459	-0.28	5.3600	23.19	1.01578	22.0814	-11.51	61.461	5.9	71	419	1246.2	2114	011	505.3	1008	058	15
167	16	Pią	921	4.53425	-0.41	5.4010	23.21	1.01587	22.5754	-8.12	60.707	6.9	61	419	1246.4	2114	038	552.5	1117	054	16
168	17	Sob	922	4.57390	-0.54	5.4419	23.23	1.01596	23.4752	-4.04	59.875	7.9	51	419	1246.6	2115	102	640.0	1229	051	17
169	18	Nie	923	5.01356	-1.07	5.4829	23.24	1.01605	0.3845	0.23	58.999	0.9	40	419	1246.9	2115	126	728.2	1343	047	18
170	19	Pon	924	5.05321	-1.20	5.5239	23.25	1.01613	1.3116	4.57	58.134	1.9	29	419	1247.1	2116	150	818.1	1501	043	19
171	20	Wto	925	5.09287	-1.33	5.5648	23.26	1.01621	2.2607	9.22	57.344	2.9	19	419	1247.3	2116	216	910.5	1620	039	20
172	21	Śro	926	5.13252	-1.46	6.0058	23.26	1.01628	3.2350	13.21	56.702	3.9	11	419	1247.5	2116	245	1006.1	1741	035	21
173	22	Czw	927	5.17218	-1.59	6.0508	23.26	1.01635	4.2430	16.34	56.276	4.9	4	419	1247.7	2116	321	1105.0	1901	031	22
174	23	Pią	928	5.21184	-2.12	6.0917	23.25	1.01640	5.2735	18.40	56.120	5.9	1	420	1248.0	2116	405	1206.6	2015	027	23
175	24	Sob	929	5.25149	-2.25	6.1327	23.24	1.01646	6.3147	19.26	56.258	0.3	0	420	1248.2	2116	459	1309.5	2120	023	24
176	25	Nie	930	5.29115	-2.38	6.1736	23.22	1.01650	7.3523	18.49	56.681	1.3	3	420	1248.4	2116	603	1411.6	2213	019	25
177	26	Pon	931	5.33080	-2.51	6.2146	23.20	1.01655	8.3647	16.55	57.349	2.3	8	421	1248.6	2116	715	1511.1	2256	015	26
178	27	Wto	932	5.37046	-3.03	6.2555	23.18	1.01658	9.3500	14.01	58.198	3.3	15	421	1248.8	2116	831	1606.9	2330	011	27
179	28	Śro	933	5.41012	-3.16	6.3004	23.15	1.01661	10.2947	10.24	59.147	4.3	24	422	1249.0	2116	947	1658.9	2358	007	28
180	29	Czw	934	5.44577	-3.28	6.3412	23.12	1.01663	11.2126	6.23	60.119	5.3	34	422	1249.2	2116	1100	1747.6	****	003	29
181	30	Pią	935	5.48543	-3.40	6.3821	23.09	1.01665	12.1037	2.11	61.043	6.3	44	423	1249.4	2115	1211	1833.8	022	2355	30

Fazy Księżyca [Dm, h.mm]: 1kw 1, 14.42 Pełn 9, 15.10 3kw 17, 13.33 Nów 24, 4.31

CZERWIEC 2017 (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	*****	*****	3.50	18.51	2.59	16.28	5.25	22.28	15.14	2.41	21.50	5.42	2.51	16.44	1.45	12.35	23.26	7.29		
	4.636	22.10	3.245	15.64	1.615	7.77	5.842	24.29	12.854	-3.93	17.678	-21.99	1.686	9.88	23.054	-7.03	19.375	-21.23	16.64454	1
3	*****	*****	3.48	19.04	2.55	16.31	5.22	22.26	15.06	2.34	21.42	5.34	2.43	16.37	1.37	12.27	23.18	7.21		
	4.773	22.36	3.462	16.76	1.737	8.36	5.939	24.32	12.851	-3.92	17.668	-21.99	1.692	9.92	23.055	-7.02	19.372	-21.24	16.77596	3
5	*****	*****	3.47	19.17	2.51	16.33	5.20	22.24	14.58	2.26	21.33	5.25	2.36	16.29	1.29	12.20	23.11	7.13		
	4.910	22.58	3.693	17.89	1.861	8.96	6.036	24.33	12.849	-3.92	17.657	-21.99	1.697	9.95	23.056	-7.02	19.369	-21.25	16.90738	5
7	*****	*****	3.46	19.31	2.47	16.37	5.18	22.22	14.50	2.18	21.25	5.17	2.28	16.22	1.21	12.12	23.03	7.05		
	5.048	22.78	3.938	19.01	1.987	9.56	6.134	24.33	12.848	-3.92	17.647	-21.98	1.702	9.98	23.057	-7.02	19.367	-21.26	17.03880	7
9	*****	*****	3.46	19.46	2.44	16.40	5.16	22.20	14.42	2.10	21.16	5.08	2.20	16.14	1.13	12.04	22.55	6.57		
	5.185	22.96	4.197	20.09	2.114	10.18	6.231	24.31	12.847	-3.92	17.637	-21.98	1.707	10.00	23.058	-7.02	19.364	-21.27	17.17022	9
11	*****	*****	3.48	20.02	2.40	16.43	5.14	22.17	14.34	2.02	21.08	4.60	2.12	16.07	1.06	11.56	22.47	6.49		
	5.323	23.11	4.470	21.11	2.244	10.79	6.327	24.28	12.847	-3.93	17.626	-21.98	1.713	10.03	23.058	-7.01	19.361	-21.27	17.30165	11
13	*****	*****	3.50	20.18	2.36	16.47	5.13	22.15	14.26	1.54	20.59	4.52	2.05	15.60	0.58	11.48	22.39	6.41		
	5.462	23.23	4.756	22.06	2.375	11.41	6.424	24.24	12.848	-3.95	17.615	-21.97	1.717	10.06	23.058	-7.01	19.358	-21.28	17.43307	13
15	*****	*****	3.54	20.34	2.33	16.50	5.11	22.12	14.19	1.46	20.51	4.43	1.57	15.52	0.50	11.40	22.31	6.33		
	5.600	23.32	5.055	22.89	2.507	12.02	6.520	24.19	12.849	-3.97	17.605	-21.97	1.722	10.09	23.058	-7.01	19.355	-21.29	17.56449	15
17	*****	*****	3.59	20.51	2.29	16.54	5.09	22.10	14.11	1.38	20.42	4.35	1.49	15.45	0.42	11.33	22.23	6.24		
	5.739	23.39	5.364	23.59	2.642	12.63	6.617	24.12	12.852	-3.99	17.594	-21.96	1.727	10.11	23.058	-7.02	19.352	-21.30	17.69590	17
19	*****	*****	4.05	21.06	2.26	16.58	5.08	22.07	14.04	1.30	20.34	4.26	1.41	15.37	0.34	11.25	22.15	6.16		
	5.877	23.42	5.680	24.14	2.778	13.24	6.713	24.04	12.855	-4.02	17.584	-21.96	1.731	10.14	23.058	-7.02	19.349	-21.31	17.82732	19
21	*****	*****	4.14	21.20	2.23	17.02	5.07	22.04	13.56	1.22	20.25	4.18	1.34	15.30	0.26	11.17	22.07	6.08		
	6.016	23.43	6.001	24.50	2.915	13.84	6.808	23.94	12.858	-4.05	17.573	-21.96	1.735	10.16	23.058	-7.02	19.345	-21.32	17.95874	21
23	*****	*****	4.24	21.33	2.20	17.06	5.05	22.01	13.49	1.15	20.17	4.09	1.26	15.22	0.19	11.09	21.59	6.00		
	6.155	23.42	6.322	24.68	3.055	14.43	6.904	23.84	12.863	-4.09	17.563	-21.95	1.739	10.18	23.058	-7.02	19.342	-21.33	18.09017	23
25	*****	*****	4.35	21.44	2.17	17.10	5.04	21.58	13.41	1.07	20.08	4.01	1.18	15.15	0.11	11.01	21.51	5.52		
	6.293	23.37	6.640	24.68	3.195	15.01	6.999	23.72	12.868	-4.13	17.552	-21.95	1.743	10.20	23.057	-7.03	19.339	-21.34	18.22159	25
27	*****	*****	4.47	21.54	2.14	17.14	5.03	21.55	13.34	0.59	19.60	3.52	1.10	15.07	0.03	10.53	21.43	5.44		
	6.432	23.30	6.952	24.49	3.338	15.58	7.094	23.59	12.874	-4.18	17.542	-21.95	1.747	10.22	23.057	-7.03	19.336	-21.35	18.35301	27
29	*****	*****	5.00	22.01	2.11	17.19	5.02	21.51	13.27	0.51	19.51	3.44	1.03	14.60	23.51	10.45	21.35	5.36		
	6.570	23.20	7.255	24.13	3.482	16.14	7.188	23.44	12.880	-4.23	17.532	-21.94	1.751	10.24	23.056	-7.04	19.332	-21.36	18.48443	29

LIPIEC 2017

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
182	1	Sob	936	5.52508	-3.52	6.4229	23.05	1.01666	12.5807	-1.60	61.865	0.4	54	424	1249.6	2115	1320	1918.3	044	2352	1	
183	2	Nie	937	5.56474	-4.03	6.4637	23.00	1.01667	13.4443	-5.59	62.546	1.4	64	425	1249.8	2115	1427	2002.1	105	2348	2	
184	3	Pon	938	6.00439	-4.14	6.5045	22.55	1.01668	14.3106	-9.40	63.065	2.4	73	425	1250.0	2114	1533	2046.0	127	2344	3	
185	4	Wto	939	6.04405	-4.25	6.5452	22.50	1.01667	15.1753	-12.55	63.415	3.4	81	426	1250.2	2114	1637	2130.4	151	2340	4	
186	5	Śro	940	6.08370	-4.35	6.5859	22.45	1.01667	16.0528	-15.38	63.603	4.4	88	427	1250.3	2113	1739	2215.8	217	2336	5	
187	6	Czw	941	6.12336	-4.45	7.0305	22.39	1.01666	16.5406	-17.41	63.641	5.4	93	428	1250.5	2112	1838	2302.5	248	2332	6	
188	7	Pią	942	6.16302	-4.55	7.0712	22.32	1.01665	17.4345	-18.58	63.548	6.4	97	429	1250.7	2112	1933	2350.1	324	2328	7	
189	8	Sob	943	6.20267	-5.04	7.1117	22.25	1.01663	18.3414	-19.26	63.343	7.4	99	430	1250.8	2111	2023	*****	406	2324	8	
190	9	Nie	944	6.24233	-5.13	7.1523	22.18	1.01661	19.2510	-19.02	63.045	0.2	100	431	1251.0	2110	2106	038.6	455	2320	9	
191	10	Pon	945	6.28198	-5.21	7.1928	22.11	1.01659	20.1608	-17.44	62.666	1.2	99	432	1251.1	2109	2144	127.2	552	2316	10	
192	11	Wto	946	6.32164	-5.29	7.2332	22.03	1.01657	21.0646	-15.37	62.217	2.2	95	433	1251.2	2109	2216	215.6	653	2312	11	
193	12	Śro	947	6.36130	-5.37	7.2737	21.55	1.01654	21.5653	-12.45	61.704	3.2	90	434	1251.4	2108	2243	303.6	759	2308	12	
194	13	Czw	948	6.40095	-5.44	7.3140	21.46	1.01650	22.4633	-9.14	61.130	4.2	83	436	1251.5	2107	2308	350.9	908	2304	13	
195	14	Pią	949	6.44061	-5.51	7.3543	21.37	1.01647	23.3604	-5.15	60.502	5.2	75	437	1251.6	2106	2332	438.0	1018	2300	14	
196	15	Sob	950	6.48026	-5.57	7.3946	21.27	1.01643	0.2555	-0.56	59.829	6.2	65	438	1251.7	2105	2355	525.2	1131	2256	15	
197	16	Nie	951	6.51592	-6.02	7.4348	21.18	1.01638	1.1645	3.31	59.129	7.2	54	439	1251.8	2103	****	613.4	1245	2253	16	
198	17	Pon	952	6.55557	-6.08	7.4750	21.07	1.01633	2.0918	7.54	58.434	0.6	43	441	1251.9	2102	019	703.2	1401	2249	17	
199	18	Wto	953	6.59523	-6.12	7.5151	20.57	1.01628	3.0411	11.57	57.785	1.6	32	442	1252.0	2101	046	755.5	1519	2245	18	
200	19	Śro	954	7.03488	-6.16	7.5552	20.46	1.01622	4.0152	15.23	57.235	2.6	22	443	1252.0	2100	118	850.9	1637	2241	19	
201	20	Czw	955	7.07454	-6.20	7.5952	20.35	1.01615	5.0218	17.54	56.839	3.6	13	445	1252.1	2058	156	949.4	1752	2237	20	
202	21	Pią	956	7.11420	-6.23	8.0352	20.23	1.01608	6.0448	19.14	56.648	4.6	6	446	1252.1	2057	243	1050.3	1901	2233	21	
203	22	Sob	957	7.15385	-6.26	8.0751	20.11	1.01600	7.0802	19.15	56.699	5.6	1	448	1252.2	2056	341	1152.1	2000	2229	22	
204	23	Nie	958	7.19351	-6.28	8.1149	19.59	1.01592	8.1027	17.55	57.003	0.0	0	449	1252.2	2054	449	1253.0	2047	2225	23	
205	24	Pon	959	7.23316	-6.29	8.1547	19.47	1.01583	9.1038	15.26	57.543	1.0	1	451	1252.2	2053	604	1351.4	2126	2221	24	
206	25	Wto	960	7.27282	-6.30	8.1945	19.34	1.01573	10.0749	12.03	58.276	2.0	5	452	1252.2	2051	721	1446.3	2157	2217	25	
207	26	Śro	961	7.31247	-6.30	8.2341	19.21	1.01563	11.0153	8.05	59.139	3.0	12	454	1252.2	2050	838	1537.8	2224	2213	26	
208	27	Czw	962	7.35213	-6.29	8.2737	19.07	1.01552	11.5311	3.50	60.059	4.0	19	455	1252.2	2048	952	1626.4	2248	2209	27	
209	28	Pią	963	7.39178	-6.28	8.3133	18.53	1.01541	12.4222	-0.28	60.964	5.0	28	457	1252.2	2047	1104	1712.7	2310	2205	28	
210	29	Sob	964	7.43144	-6.27	8.3528	18.39	1.01529	13.3008	-4.37	61.787	6.0	38	458	1252.2	2045	1213	1757.7	2332	2201	29	
211	30	Nie	965	7.47109	-6.24	8.3922	18.25	1.01517	14.1714	-8.28	62.479	7.0	48	500	1252.2	2043	1320	1842.1	2355	2158	30	
212	31	Pon	966	7.51075	-6.21	8.4315	18.10	1.01505	15.0416	-11.54	63.003	0.8	58	501	1252.1	2042	1425	1926.6	****	2154	31	

Fazy Księżyca [Dm, h.mm]: 1kw 1, 2.51 Pełn 9, 6.07 3kw 16, 21.26 Nów 23, 11.46 1kw 30, 17.23

LIPIEC 2017 (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	*****	*****	5.14	22.06	2.09	17.23	5.01	21.48	13.20	0.44	19.43	3.35	0.55	14.52	23.43	10.37	21.27	5.28		
	6.708	23.08	7.548	23.62	3.628	16.68	7.282	23.28	12.888	-4.28	17.522	-21.94	1.754	10.26	23.055	-7.05	19.329	-21.37	18.61585	1
3	*****	*****	5.28	22.10	2.06	17.27	4.60	21.44	13.13	0.36	19.34	3.27	0.47	14.45	23.35	10.29	21.19	5.19		
	6.846	22.92	7.829	22.96	3.775	17.20	7.376	23.11	12.895	-4.34	17.512	-21.94	1.757	10.28	23.054	-7.06	19.325	-21.38	18.74726	3
5	*****	*****	5.42	22.13	2.04	17.31	4.59	21.41	13.06	0.28	19.26	3.19	0.39	14.37	23.27	10.21	21.11	5.11		
	6.983	22.74	8.096	22.19	3.924	17.71	7.469	22.93	12.904	-4.41	17.502	-21.94	1.760	10.29	23.053	-7.06	19.322	-21.39	18.87869	5
7	*****	*****	5.56	22.13	2.02	17.36	4.58	21.37	12.59	0.21	19.17	3.10	0.32	14.29	23.19	10.13	21.03	5.03		
	7.120	22.54	8.351	21.32	4.074	18.19	7.563	22.74	12.913	-4.47	17.493	-21.93	1.763	10.31	23.052	-7.07	19.319	-21.40	19.01011	7
9	*****	*****	6.10	22.13	1.60	17.40	4.57	21.33	12.52	0.13	19.09	3.02	0.24	14.22	23.12	10.05	20.55	4.55		
	7.256	22.30	8.593	20.37	4.226	18.65	7.655	22.54	12.923	-4.54	17.484	-21.93	1.766	10.32	23.050	-7.08	19.315	-21.41	19.14153	9
11	*****	*****	6.22	22.12	1.58	17.44	4.57	21.29	12.45	0.05	19.00	2.53	0.16	14.14	23.04	9.57	20.47	4.47		
	7.392	22.05	8.823	19.34	4.379	19.09	7.747	22.32	12.934	-4.62	17.475	-21.93	1.768	10.34	23.049	-7.09	19.312	-21.42	19.27295	11
13	*****	*****	6.35	22.10	1.57	17.49	4.56	21.25	12.38	23.54	18.52	2.45	0.08	14.06	22.56	9.49	20.39	4.39		
	7.528	21.76	9.039	18.26	4.534	19.50	7.839	22.09	12.945	-4.70	17.466	-21.93	1.770	10.35	23.047	-7.11	19.308	-21.43	19.40437	13
15	*****	*****	6.47	22.07	1.56	17.53	4.55	21.21	12.31	23.46	18.44	2.37	23.57	13.59	22.48	9.41	20.31	4.31		
	7.663	21.46	9.243	17.14	4.690	19.89	7.931	21.86	12.956	-4.78	17.458	-21.92	1.772	10.36	23.045	-7.12	19.305	-21.44	19.53579	15
17	*****	*****	6.58	22.03	1.55	17.57	4.55	21.17	12.25	23.39	18.35	2.28	23.49	13.51	22.40	9.33	20.23	4.22		
	7.797	21.12	9.436	15.99	4.848	20.24	8.022	21.61	12.969	-4.86	17.449	-21.92	1.774	10.37	23.043	-7.13	19.301	-21.45	19.66721	17
19	*****	*****	7.08	21.59	1.54	18.01	4.54	21.12	12.18	23.31	18.27	2.20	23.41	13.43	22.32	9.25	20.15	4.14		
	7.931	20.77	9.616	14.83	5.007	20.57	8.113	21.35	12.981	-4.95	17.441	-21.92	1.776	10.38	23.041	-7.14	19.298	-21.46	19.79863	19
21	*****	*****	7.17	21.54	1.54	18.05	4.54	21.08	12.12	23.23	18.19	2.12	23.33	13.36	22.24	9.17	20.07	4.06		
	8.064	20.39	9.786	13.66	5.167	20.86	8.203	21.08	12.995	-5.04	17.434	-21.92	1.777	10.38	23.039	-7.16	19.295	-21.47	19.93005	21
23	*****	*****	7.26	21.49	1.54	18.08	4.53	21.03	12.05	23.16	18.10	2.03	23.25	13.28	22.16	9.09	19.59	3.58		
	8.197	19.99	9.943	12.49	5.328	21.13	8.293	20.80	13.009	-5.14	17.427	-21.92	1.779	10.39	23.037	-7.17	19.291	-21.48	20.06148	23
25	*****	*****	7.33	21.43	1.54	18.12	4.53	20.59	11.59	23.08	18.02	1.55	23.17	13.20	22.08	9.01	19.51	3.50		
	8.329	19.56	10.088	11.34	5.490	21.36	8.382	20.51	13.023	-5.24	17.420	-21.92	1.780	10.39	23.035	-7.19	19.288	-21.49	20.19290	25
27	*****	*****	7.40	21.36	1.54	18.15	4.53	20.54	11.52	23.01	17.54	1.47	23.10	13.12	22.00	8.53	19.43	3.42		
	8.460	19.12	10.222	10.21	5.654	21.55	8.472	20.21	13.038	-5.34	17.413	-21.92	1.780	10.40	23.033	-7.20	19.285	-21.50	20.32431	27
29	1.15	0.04	7.45	21.30	1.55	18.18	4.52	20.49	11.46	22.53	17.46	1.39	23.02	13.05	21.52	8.45	19.35	3.34		
	8.591	18.65	10.343	9.12	5.818	21.71	8.560	19.90	13.054	-5.44	17.407	-21.92	1.781	10.40	23.030	-7.22	19.281	-21.50	20.45573	29
31	1.37	-0.07	7.50	21.22	1.56	18.21	4.52	20.45	11.40	22.46	17.37	1.30	22.54	12.57	21.45	8.37	19.27	3.26		
	8.721	18.16	10.451	8.08	5.983	21.83	8.648	19.59	13.070	-5.55	17.402	-21.92	1.781	10.40	23.028	-7.24	19.278	-21.51	20.58715	31

SIERPIEŃ 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2457																					
213	1	Wto	967	7.55041	-6.18	8.4708	17.55	1.01491	15.5148	-14.48	63.342	1.8	67	503	1252.0	2040	1529	2011.8	020	2150	1
214	2	Śro	968	7.59006	-6.13	8.5101	17.39	1.01478	16.4008	-17.04	63.492	2.8	75	505	1252.0	2038	1629	2058.0	049	2146	2
215	3	Czw	969	8.02572	-6.09	8.5453	17.24	1.01464	17.2928	-18.37	63.464	3.8	83	506	1251.9	2036	1726	2145.2	123	2142	3
216	4	Pią	970	8.06537	-6.03	8.5844	17.08	1.01450	18.1943	-19.20	63.279	4.8	90	508	1251.8	2034	1818	2233.5	203	2138	4
217	5	Sob	971	8.10503	-5.57	9.0234	16.52	1.01435	19.1040	-19.12	62.964	5.8	95	510	1251.7	2033	1904	2322.2	250	2134	5
218	6	Nie	972	8.14468	-5.50	9.0624	16.35	1.01421	20.0155	-18.10	62.552	6.8	98	511	1251.6	2031	1944	*****	343	2130	6
219	7	Pon	973	8.18434	-5.43	9.1013	16.18	1.01405	20.5307	-16.16	62.072	7.8	100	513	1251.5	2029	2018	011.2	444	2126	7
220	8	Wto	974	8.22400	-5.35	9.1402	16.01	1.01390	21.4358	-13.35	61.554	0.7	100	515	1251.3	2027	2047	059.9	549	2122	8
221	9	Śro	975	8.26365	-5.27	9.1750	15.44	1.01375	22.3423	-10.12	61.019	1.7	97	516	1251.2	2025	2114	148.1	658	2118	9
222	10	Czw	976	8.30331	-5.18	9.2138	15.27	1.01359	23.2429	-6.17	60.483	2.7	93	518	1251.0	2023	2138	235.9	808	2114	10
223	11	Pią	977	8.34296	-5.08	9.2525	15.09	1.01342	0.1436	-1.60	59.956	3.7	86	520	1250.9	2021	2201	323.5	921	2110	11
224	12	Sob	978	8.38262	-4.58	9.2911	14.51	1.01326	1.0514	2.27	59.445	4.7	78	521	1250.7	2019	2225	411.5	1035	2106	12
225	13	Nie	979	8.42227	-4.48	9.3257	14.33	1.01309	1.5659	6.50	58.955	5.7	68	523	1250.5	2017	2251	500.6	1150	2102	13
226	14	Pon	980	8.46193	-4.36	9.3642	14.14	1.01292	2.5027	10.55	58.496	6.7	57	525	1250.4	2015	2320	551.3	1306	2059	14
227	15	Wto	981	8.50158	-4.25	9.4027	13.55	1.01275	3.4606	14.28	58.084	0.4	46	526	1250.2	2013	2354	644.3	1422	2055	15
228	16	Śro	982	8.54124	-4.12	9.4412	13.37	1.01257	4.4406	17.12	57.744	1.4	34	528	1250.0	2011	****	740.0	1537	2051	16
229	17	Czw	983	8.58089	-3.60	9.4755	13.17	1.01238	5.4409	18.54	57.506	2.4	24	530	1249.7	2008	036	838.1	1646	2047	17
230	18	Pią	984	9.02055	-3.47	9.5139	12.58	1.01220	6.4526	19.22	57.405	3.4	15	532	1249.5	2006	128	937.7	1747	2043	18
231	19	Sob	985	9.06021	-3.33	9.5522	12.38	1.01201	7.4645	18.34	57.468	4.4	7	533	1249.3	2004	230	1037.5	1839	2039	19
232	20	Nie	986	9.09586	-3.19	9.5904	12.19	1.01181	8.4650	16.33	57.716	5.4	2	535	1249.1	2002	340	1136.0	1921	2035	20
233	21	Pon	987	9.13552	-3.04	10.0246	11.59	1.01161	9.4445	13.32	58.148	6.4	0	537	1248.8	2000	456	1232.0	1955	2031	21
234	22	Wto	988	9.17517	-2.49	10.0627	11.39	1.01140	10.4004	9.46	58.745	0.6	1	538	1248.6	1958	613	1325.2	2024	2027	22
235	23	Śro	989	9.21483	-2.34	10.1008	11.18	1.01119	11.3251	5.35	59.468	1.6	3	540	1248.3	1955	729	1415.6	2049	2023	23
236	24	Czw	990	9.25448	-2.18	10.1349	10.58	1.01098	12.2330	1.13	60.264	2.6	8	542	1248.0	1953	843	1503.6	2112	2019	24
237	25	Pią	991	9.29414	-2.01	10.1729	10.37	1.01076	13.1234	-3.05	61.070	3.6	15	544	1247.8	1951	954	1550.0	2134	2015	25
238	26	Sob	992	9.33379	-1.44	10.2109	10.16	1.01053	14.0039	-7.08	61.824	4.6	23	545	1247.5	1949	1104	1635.4	2157	2011	26
239	27	Nie	993	9.37345	-1.27	10.2448	9.55	1.01031	14.4822	-10.47	62.471	5.6	32	547	1247.2	1946	1211	1720.6	2222	2007	27
240	28	Pon	994	9.41310	-1.10	10.2827	9.34	1.01008	15.3612	-13.55	62.965	6.6	41	549	1246.9	1944	1316	1805.9	2250	2003	28
241	29	Wto	995	9.45276	-0.52	10.3206	9.13	1.00984	16.2432	-16.25	63.277	0.1	51	550	1246.6	1942	1418	1851.9	2321	2000	29
242	30	Śro	996	9.49241	-0.33	10.3544	8.51	1.00960	17.1337	-18.12	63.389	1.1	60	552	1246.3	1939	1516	1938.8	2358	1956	30
243	31	Czw	997	9.53207	-0.15	10.3922	8.30	1.00936	18.0330	-19.12	63.303	2.1	69	554	1246.0	1937	1610	2026.5	000	1952	31

Fazy Księżyca [Dm, h.mm]: Pełn 7, 20.11 3kw 15, 3.15 Now 21, 20.30 1kw 29, 10.13

SIERPIEŃ 2017 (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	1.45	23.54	7.51	21.19	1.57	18.23	4.52	20.42	11.36	22.42	17.33	1.26	22.50	12.53	21.41	8.32	19.23	3.21		
	8.786	17.91	10.500	7.58	6.066	21.88	8.692	19.43	13.078	-5.60	17.399	-21.92	1.782	10.40	23.026	-7.24	19.277	-21.52	20.65286	1
3	1.58	23.42	7.54	21.11	1.58	18.25	4.51	20.37	11.30	22.35	17.25	1.18	22.42	12.45	21.33	8.24	19.15	3.13		
	8.915	17.39	10.587	6.64	6.232	21.94	8.780	19.09	13.095	-5.72	17.394	-21.92	1.782	10.40	23.024	-7.26	19.273	-21.53	20.78428	3
5	2.09	23.31	7.55	21.02	2.00	18.27	4.51	20.32	11.24	22.27	17.17	1.10	22.34	12.37	21.25	8.16	19.07	3.05		
	9.043	16.86	10.659	5.77	6.399	21.97	8.867	18.76	13.113	-5.83	17.389	-21.93	1.782	10.40	23.021	-7.28	19.270	-21.54	20.91570	5
7	2.19	23.21	7.55	20.54	2.03	18.29	4.50	20.27	11.18	22.20	17.09	1.02	22.26	12.29	21.17	8.08	18.59	2.57		
	9.170	16.31	10.714	5.01	6.567	21.96	8.954	18.41	13.131	-5.95	17.385	-21.93	1.781	10.40	23.018	-7.30	19.267	-21.55	21.04712	7
9	2.28	23.12	7.53	20.45	2.05	18.31	4.50	20.22	11.12	22.12	17.01	0.54	22.19	12.21	21.09	7.60	18.51	2.49		
	9.297	15.74	10.752	4.36	6.734	21.91	9.040	18.05	13.149	-6.06	17.381	-21.93	1.781	10.39	23.015	-7.32	19.264	-21.56	21.17854	9
11	2.36	23.03	7.49	20.35	2.08	18.33	4.50	20.17	11.06	22.05	16.53	0.46	22.11	12.13	21.01	7.52	18.43	2.41		
	9.424	15.15	10.770	3.85	6.902	21.82	9.126	17.69	13.168	-6.19	17.377	-21.93	1.780	10.39	23.012	-7.34	19.262	-21.56	21.30996	11
13	2.44	22.54	7.42	20.25	2.11	18.34	4.50	20.12	10.60	21.58	16.45	0.38	22.03	12.05	20.53	7.44	18.35	2.33		
	9.549	14.54	10.769	3.50	7.070	21.69	9.212	17.32	13.187	-6.31	17.374	-21.94	1.779	10.38	23.009	-7.36	19.259	-21.57	21.44137	13
15	2.52	22.46	7.34	20.15	2.15	18.35	4.49	20.07	10.54	21.50	16.37	0.29	21.55	11.57	20.45	7.35	18.27	2.25		
	9.674	13.92	10.746	3.33	7.239	21.52	9.297	16.94	13.206	-6.44	17.372	-21.94	1.778	10.38	23.006	-7.38	19.256	-21.58	21.57279	15
17	2.59	22.39	7.23	20.05	2.18	18.36	4.49	20.01	10.48	21.43	16.29	0.21	21.47	11.49	20.37	7.27	18.19	2.17		
	9.799	13.29	10.702	3.36	7.407	21.31	9.382	16.55	13.226	-6.56	17.370	-21.94	1.777	10.37	23.003	-7.40	19.254	-21.59	21.70421	17
19	3.06	22.31	7.10	19.54	2.22	18.36	4.49	19.56	10.42	21.36	16.21	0.13	21.39	11.41	20.29	7.19	18.11	2.09		
	9.923	12.64	10.637	3.59	7.575	21.06	9.466	16.16	13.247	-6.69	17.368	-21.95	1.775	10.36	23.000	-7.42	19.251	-21.60	21.83563	19
21	3.12	22.24	6.55	19.44	2.27	18.36	4.48	19.51	10.36	21.28	16.13	0.05	21.31	11.33	20.21	7.11	18.03	2.01		
	10.046	11.98	10.554	4.04	7.743	20.77	9.550	15.76	13.267	-6.83	17.367	-21.95	1.773	10.35	22.996	-7.44	19.249	-21.61	21.96705	21
23	3.18	22.16	6.38	19.34	2.31	18.36	4.48	19.45	10.30	21.21	16.05	23.54	21.23	11.25	20.13	7.03	17.55	1.52		
	10.169	11.31	10.458	4.69	7.911	20.45	9.634	15.35	13.289	-6.96	17.366	-21.96	1.771	10.34	22.993	-7.46	19.246	-21.62	22.09847	23
25	3.25	22.09	6.20	19.24	2.36	18.36	4.48	19.40	10.24	21.14	15.57	23.46	21.15	11.17	20.05	6.55	17.47	1.44		
	10.291	10.62	10.353	5.51	8.078	20.08	9.717	14.94	13.310	-7.09	17.366	-21.97	1.769	10.32	22.990	-7.48	19.244	-21.62	22.22989	25
27	3.30	22.03	6.00	19.15	2.41	18.35	4.47	19.35	10.18	21.06	15.49	23.38	21.07	11.09	19.57	6.46	17.39	1.36		
	10.413	9.92	10.248	6.46	8.245	19.67	9.800	14.52	13.332	-7.23	17.366	-21.97	1.767	10.31	22.986	-7.50	19.242	-21.63	22.36130	27
29	3.36	21.56	5.41	19.07	2.46	18.34	4.47	19.29	10.12	20.59	15.42	23.30	20.59	11.01	19.49	6.38	17.31	1.28		
	10.535	9.21	10.152	7.47	8.411	19.23	9.882	14.09	13.354	-7.37	17.367	-21.98	1.764	10.30	22.983	-7.52	19.240	-21.64	22.49272	29
31	3.41	21.49	5.23	19.00	2.51	18.33	4.47	19.23	10.07	20.52	15.34	23.22	20.52	10.53	19.41	6.30	17.23	1.20		
	10.656	8.50	10.073	8.48	8.576	18.76	9.965	13.66	13.377	-7.51	17.368	-21.99	1.762	10.28	22.980	-7.54	19.238	-21.65	22.62414	31

WRZESIEŃ 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2457																			
244	1	Pią	998	9.57172	0.04	10.4260	8.08	1.00912	18.5406	-19.21	63.034	3.1	78	556	1245.7	1935	1658	2115.0	042	1948	1	
245	2	Sob	999	10.01138	0.24	10.4637	7.46	1.00888	19.4510	-18.36	62.610	4.1	85	557	1245.4	1932	1740	2203.8	133	1944	2	
246	3	Nie	000	10.05103	0.43	10.5014	7.24	1.00863	20.3626	-16.59	62.069	5.1	91	559	1245.0	1930	1817	2252.7	231	1940	3	
247	4	Pon	001	10.09069	1.03	10.5350	7.02	1.00838	21.2739	-14.31	61.456	6.1	96	601	1244.7	1928	1848	2341.5	334	1936	4	
248	5	Wto	002	10.13035	1.23	10.5727	6.40	1.00813	22.1841	-11.19	60.815	7.1	99	602	1244.4	1925	1916	*****	443	1932	5	
249	6	Śro	003	10.16600	1.44	11.0103	6.18	1.00788	23.0935	-7.29	60.191	0.1	100	604	1244.0	1923	1942	030.1	554	1928	6	
250	7	Czw	004	10.20565	2.04	11.0439	5.55	1.00763	0.0033	-3.12	59.618	1.1	99	606	1243.7	1920	2005	118.7	707	1924	7	
251	8	Pią	005	10.24531	2.25	11.0815	5.33	1.00738	0.5157	1.19	59.123	2.1	95	607	1243.3	1918	2029	207.5	822	1920	8	
252	9	Sob	006	10.28496	2.46	11.1151	5.10	1.00713	1.4415	5.49	58.719	3.1	89	609	1243.0	1916	2055	257.1	939	1916	9	
253	10	Nie	007	10.32462	3.07	11.1526	4.47	1.00687	2.3756	10.04	58.408	4.1	81	611	1242.6	1913	2123	348.0	1056	1912	10	
254	11	Pon	008	10.36427	3.28	11.1902	4.24	1.00662	3.3322	13.47	58.187	5.1	71	613	1242.3	1911	2155	440.8	1213	1908	11	
255	12	Wto	009	10.40393	3.49	11.2237	4.02	1.00636	4.3039	16.44	58.050	6.1	60	614	1241.9	1908	2235	535.6	1327	1905	12	
256	13	Śro	010	10.44359	4.10	11.2612	3.39	1.00610	5.2933	18.39	57.991	0.1	48	616	1241.6	1906	2322	632.4	1438	1901	13	
257	14	Czw	011	10.48324	4.32	11.2948	3.16	1.00584	6.2927	19.26	58.011	1.1	37	618	1241.2	1904	****	730.4	1540	1857	14	
258	15	Pią	012	10.52290	4.53	11.3323	2.53	1.00558	7.2923	18.58	58.115	2.1	26	619	1240.9	1901	019	828.8	1634	1853	15	
259	16	Sob	013	10.56255	5.14	11.3658	2.29	1.00532	8.2822	17.20	58.312	3.1	17	621	1240.5	1859	125	926.2	1718	1849	16	
260	17	Nie	014	11.00221	5.36	11.4033	2.06	1.00505	9.2536	14.40	58.612	4.1	9	623	1240.2	1856	237	1021.7	1754	1845	17	
261	18	Pon	015	11.04186	5.57	11.4408	1.43	1.00478	10.2041	11.11	59.019	5.1	4	625	1239.8	1854	352	1114.8	1824	1841	18	
262	19	Wto	016	11.08152	6.18	11.4744	1.20	1.00451	11.1336	7.09	59.529	6.1	1	626	1239.4	1851	507	1205.6	1850	1837	19	
263	20	Śro	017	11.12117	6.40	11.5119	0.56	1.00423	12.0438	2.50	60.124	0.2	0	628	1239.1	1849	622	1254.2	1914	1833	20	
264	21	Czw	018	11.16083	7.01	11.5454	0.33	1.00396	12.5413	-1.32	60.776	1.2	2	630	1238.7	1847	735	1341.3	1936	1829	21	
265	22	Pią	019	11.20048	7.22	11.5830	0.10	1.00368	13.4253	-5.45	61.442	2.2	5	631	1238.4	1844	845	1427.4	1959	1825	22	
266	23	Sob	020	11.24014	7.43	12.0205	-0.14	1.00339	14.3107	-9.37	62.076	3.2	11	633	1238.0	1842	954	1513.0	2023	1821	23	
267	24	Nie	021	11.27579	8.04	12.0541	-0.37	1.00311	15.1921	-12.59	62.629	4.2	17	635	1237.7	1839	1101	1558.8	2049	1817	24	
268	25	Pon	022	11.31545	8.24	12.0917	-1.00	1.00282	16.0754	-15.45	63.056	5.2	25	637	1237.3	1837	1205	1644.9	2119	1813	25	
269	26	Wto	023	11.35510	8.45	12.1253	-1.24	1.00253	16.5658	-17.48	63.320	6.2	34	638	1237.0	1835	1306	1731.6	2154	1809	26	
270	27	Śro	024	11.39476	9.05	12.1629	-1.47	1.00224	17.4637	-19.05	63.394	7.2	43	640	1236.7	1832	1402	1819.0	2235	1806	27	
271	28	Czw	025	11.43441	9.26	12.2005	-2.10	1.00195	18.3648	-19.31	63.265	0.3	53	642	1236.3	1830	1452	1906.9	2322	1802	28	
272	29	Pią	026	11.47407	9.46	12.2342	-2.34	1.00166	19.2722	-19.05	62.938	1.3	62	644	1236.0	1827	1536	1955.1	****	1758	29	
273	30	Sob	027	11.51373	10.05	12.2719	-2.57	1.00137	20.1808	-17.46	62.430	2.3	71	645	1235.7	1825	1615	2043.6	017	1754	30	

Fazy Księżyca [Dm, h.mm]: Pełn 6, 9.03 3kw 13, 8.25 Nów 20, 7.30 1kw 28, 4.54

WRZESIEŃ 2017 (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	5.15	18.57	2.54	18.32	4.46	19.21	10.04	20.48	15.30	23.18	20.48	10.49	19.37	6.26	17.19	1.16		
	10.717	8.13	10.043	8.95	8.659	18.50	10.006	13.44	13.388	-7.58	17.369	-21.99	1.760	10.27	22.978	-7.55	19.237	-21.65	22.68985	1
3	3.49	21.39	4.60	18.52	2.59	18.30	4.46	19.15	9.58	20.41	15.22	23.10	20.40	10.41	19.30	6.18	17.12	1.08		
	10.837	7.40	10.005	9.82	8.823	17.97	10.087	13.00	13.411	-7.72	17.370	-22.00	1.757	10.25	22.975	-7.58	19.236	-21.66	22.82127	3
5	3.54	21.33	4.47	18.48	3.05	18.29	4.46	19.09	9.52	20.34	15.15	23.03	20.32	10.33	19.22	6.10	17.04	1.00		
	10.957	6.66	10.001	10.52	8.987	17.41	10.169	12.56	13.435	-7.87	17.373	-22.01	1.754	10.24	22.971	-7.60	19.234	-21.66	22.95269	5
7	3.59	21.27	4.39	18.44	3.11	18.27	4.45	19.04	9.47	20.26	15.07	22.55	20.24	10.24	19.14	6.01	16.56	0.52		
	11.078	5.92	10.033	11.01	9.150	16.81	10.250	12.11	13.458	-8.01	17.375	-22.01	1.751	10.22	22.968	-7.62	19.232	-21.67	23.08410	7
9	4.04	21.21	4.34	18.42	3.17	18.25	4.45	18.58	9.41	20.19	14.59	22.47	20.16	10.16	19.06	5.53	16.48	0.44		
	11.197	5.17	10.102	11.26	9.312	16.18	10.330	11.65	13.482	-8.16	17.379	-22.02	1.748	10.20	22.964	-7.64	19.231	-21.68	23.21552	9
11	4.09	21.15	4.32	18.41	3.23	18.22	4.45	18.52	9.36	20.12	14.52	22.39	20.08	10.08	18.58	5.45	16.40	0.36		
	11.317	4.41	10.206	11.26	9.474	15.52	10.411	11.20	13.507	-8.30	17.382	-22.03	1.744	10.18	22.961	-7.66	19.230	-21.68	23.34694	11
13	4.14	21.09	4.34	18.39	3.29	18.20	4.44	18.47	9.30	20.05	14.44	22.32	19.60	9.60	18.50	5.37	16.32	0.28		
	11.437	3.64	10.341	11.00	9.635	14.83	10.491	10.73	13.531	-8.45	17.386	-22.04	1.740	10.16	22.958	-7.68	19.229	-21.69	23.47836	13
15	4.18	21.03	4.38	18.38	3.35	18.17	4.44	18.41	9.24	19.57	14.37	22.24	19.52	9.52	18.42	5.29	16.24	0.20		
	11.556	2.88	10.503	10.49	9.794	14.11	10.571	10.27	13.556	-8.60	17.391	-22.05	1.737	10.13	22.954	-7.70	19.228	-21.69	23.60978	15
17	4.23	20.57	4.46	18.37	3.41	18.14	4.43	18.35	9.19	19.50	14.29	22.16	19.44	9.43	18.34	5.21	16.16	0.12		
	11.676	2.10	10.686	9.74	9.953	13.36	10.651	9.80	13.581	-8.75	17.396	-22.06	1.733	10.11	22.951	-7.72	19.227	-21.70	23.74120	17
19	4.27	20.51	4.55	18.36	3.47	18.11	4.43	18.29	9.13	19.43	14.22	22.09	19.36	9.35	18.26	5.12	16.08	0.05		
	11.795	1.33	10.886	8.79	10.112	12.59	10.730	9.32	13.606	-8.90	17.402	-22.07	1.728	10.09	22.948	-7.74	19.226	-21.70	23.87261	19
21	4.31	20.46	5.06	18.34	3.53	18.08	4.42	18.24	9.08	19.36	14.14	22.01	19.28	9.27	18.18	5.04	16.01	23.53		
	11.915	0.55	11.097	7.67	10.269	11.79	10.810	8.84	13.632	-9.05	17.407	-22.09	1.724	10.06	22.944	-7.76	19.226	-21.71	0.00403	21
23	4.35	20.40	5.18	18.33	3.60	18.05	4.42	18.18	9.02	19.29	14.07	21.54	19.20	9.19	18.10	4.56	15.53	23.45		
	12.035	-0.23	11.315	6.40	10.426	10.97	10.889	8.36	13.658	-9.20	17.414	-22.10	1.720	10.04	22.941	-7.78	19.225	-21.71	0.13545	23
25	4.39	20.35	5.31	18.30	4.06	18.02	4.41	18.12	8.57	19.22	13.60	21.46	19.12	9.10	18.02	4.48	15.45	23.37		
	12.155	-1.01	11.536	5.03	10.582	10.13	10.967	7.88	13.683	-9.35	17.421	-22.11	1.715	10.01	22.938	-7.80	19.225	-21.72	0.26686	25
27	4.43	20.29	5.44	18.28	4.12	17.58	4.41	18.06	8.51	19.14	13.52	21.39	19.04	9.02	17.54	4.40	15.37	23.29		
	12.275	-1.78	11.758	3.58	10.737	9.27	11.046	7.39	13.710	-9.51	17.428	-22.12	1.711	9.99	22.935	-7.82	19.225	-21.72	0.39828	27
29	4.47	20.24	5.58	18.25	4.18	17.55	4.41	18.00	8.46	19.07	13.45	21.31	18.56	8.54	17.46	4.32	15.29	23.21		
	12.395	-2.56	11.980	2.08	10.892	8.40	11.125	6.90	13.736	-9.66	17.435	-22.13	1.706	9.96	22.932	-7.84	19.225	-21.73	0.52970	29

PAŹDZIERNIK 2017

Piwnice, CA UMK			← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									 Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
274	1	Nie	028	11.55338	10.25	12.30566	-3.20	1.00108	21.0857	-15.36	61.777	3.3	80	647	1235.3	1823	1648	2132.0	118	1750	1
275	2	Pon	029	11.59303	10.44	12.3433	-3.44	1.00079	21.5946	-12.39	61.025	4.3	87	649	1235.0	1820	1717	2220.5	223	1746	2
276	3	Wto	030	12.03269	11.03	12.3811	-4.07	1.00050	22.5040	-9.00	60.233	5.3	93	651	1234.7	1818	1743	2309.2	333	1742	3
277	4	Śro	031	12.07234	11.21	12.4149	-4.30	1.00021	23.4154	-4.48	59.460	6.3	98	652	1234.4	1815	1807	2358.3	446	1738	4
278	5	Czw	032	12.11200	11.40	12.4527	-4.53	0.99992	0.3348	-0.15	58.767	7.3	100	654	1234.1	1813	1831	*****	602	1734	5
279	6	Pią	033	12.15165	11.57	12.4906	-5.16	0.99963	1.2648	4.25	58.202	0.6	99	656	1233.8	1811	1856	048.5	720	1730	6
280	7	Sob	034	12.19131	12.15	12.5245	-5.39	0.99935	2.2120	8.55	57.800	1.6	96	658	1233.5	1808	1924	140.2	839	1726	7
281	8	Nie	035	12.23096	12.32	12.5625	-6.02	0.99906	3.1742	12.57	57.574	2.6	91	700	1233.2	1806	1955	233.7	958	1722	8
282	9	Pon	036	12.27062	12.48	13.0005	-6.25	0.99878	4.1554	16.13	57.520	3.6	83	701	1232.9	1804	2033	329.4	1117	1718	9
283	10	Wto	037	12.31028	13.05	13.0345	-6.47	0.99850	5.1534	18.28	57.618	4.6	73	703	1232.7	1801	2118	426.9	1230	1714	10
284	11	Śro	038	12.34593	13.20	13.0726	-7.10	0.99822	6.1559	19.32	57.838	5.6	63	705	1232.4	1759	2213	525.5	1337	1710	11
285	12	Czw	039	12.38559	13.35	13.1107	-7.32	0.99794	7.1606	19.21	58.151	6.6	51	707	1232.2	1757	2316	624.2	1433	1707	12
286	13	Pią	040	12.42524	13.50	13.1449	-7.55	0.99766	8.1456	17.58	58.529	0.9	40	708	1231.9	1754	****	721.6	1519	1703	13
287	14	Sob	041	12.46490	14.04	13.1832	-8.17	0.99738	9.1147	15.33	58.953	1.9	29	710	1231.7	1752	026	816.9	1556	1659	14
288	15	Nie	042	12.50455	14.17	13.2215	-8.39	0.99711	10.0620	12.17	59.413	2.9	20	712	1231.5	1750	139	909.7	1627	1655	15
289	16	Pon	043	12.54421	14.30	13.2559	-9.01	0.99683	10.5842	8.26	59.901	3.9	12	714	1231.2	1748	253	1000.1	1654	1651	16
290	17	Wto	044	12.58386	14.42	13.2943	-9.23	0.99655	11.4914	4.13	60.414	4.9	6	716	1231.0	1745	406	1048.3	1717	1647	17
291	18	Śro	045	13.02352	14.54	13.3328	-9.45	0.99627	12.3825	-0.09	60.947	5.9	2	718	1230.8	1743	518	1135.0	1739	1643	18
292	19	Czw	046	13.06317	15.05	13.3713	-10.07	0.99599	13.2648	-4.25	61.489	6.9	0	719	1230.7	1741	629	1221.0	1801	1639	19
293	20	Pią	047	13.10283	15.16	13.4060	-10.29	0.99572	14.1453	-8.26	62.022	0.6	0	721	1230.5	1739	739	1306.5	1824	1635	20
294	21	Sob	048	13.14248	15.25	13.4446	-10.50	0.99544	15.0304	-12.02	62.520	1.6	3	723	1230.3	1737	847	1352.1	1849	1631	21
295	22	Nie	049	13.18214	15.35	13.4834	-11.11	0.99516	15.5139	-15.03	62.952	2.6	7	725	1230.2	1734	953	1438.3	1917	1627	22
296	23	Pon	050	13.22179	15.43	13.5222	-11.32	0.99488	16.4046	-17.24	63.284	3.6	12	727	1230.0	1732	1055	1525.0	1950	1623	23
297	24	Wto	051	13.26145	15.51	13.5611	-11.53	0.99460	17.3024	-18.58	63.481	4.6	19	729	1229.9	1730	1154	1612.2	2028	1619	24
298	25	Śro	052	13.30111	15.58	14.0000	-12.14	0.99432	18.2025	-19.41	63.513	5.6	27	731	1229.8	1728	1246	1659.9	2113	1615	25
299	26	Czw	053	13.34076	16.04	14.0350	-12.34	0.99405	19.1038	-19.33	63.360	6.6	36	732	1229.7	1726	1333	1747.7	2204	1612	26
300	27	Pią	054	13.38042	16.10	14.0741	-12.55	0.99377	20.0050	-18.33	63.011	7.6	45	734	1229.6	1724	1413	1835.5	2302	1608	27
301	28	Sob	055	13.42007	16.15	14.1133	-13.15	0.99350	20.5053	-16.42	62.471	0.5	55	736	1229.5	1722	1448	1923.1	****	1604	28
302	29	Nie	056	13.45573	16.19	14.1525	-13.35	0.99323	21.4049	-14.03	61.763	1.5	64	738	1229.4	1720	1517	2010.5	005	1600	29
302	29	Nie	056	14.46071	16.19	14.1535	-13.35	0.99322	21.4253	-13.56	61.730	1.5	65	638	1129.4	1620	1417	1910.5	****	1500	29
303	30	Pon	057	14.50037	16.22	14.1928	-13.55	0.99295	22.3250	-10.32	60.886	2.5	74	640	1129.4	1618	1444	1958.1	012	1456	30
304	31	Wto	058	14.54002	16.25	14.2322	-14.15	0.99268	23.2308	-6.33	59.969	3.5	83	642	1129.3	1616	1508	2046.3	122	1452	31

Fazy Księżyca [Dm, h.mm]: Pełn 5, 20.40 3kw 12, 14.25 Now 19, 21.12 1kw 28, 0.22 1kw 27, 23.22

PAŹDZIERNIK 2017 (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	6.11	18.23	4.25	17.51	4.40	17.54	8.41	19.00	13.38	21.24	18.48	8.45	17.38	4.23	15.21	23.13		
	12.516	-3.34	12.199	0.55	11.046	7.50	11.203	6.41	13.762	-9.81	17.443	-22.14	1.701	9.93	22.929	-7.86	19.225	-21.73	0.66112	1
3	4.55	20.14	6.25	18.19	4.31	17.47	4.40	17.48	8.35	18.53	13.30	21.16	18.40	8.37	17.30	4.15	15.14	23.05		
	12.636	-4.11	12.417	-1.00	11.200	6.59	11.281	5.91	13.789	-9.96	17.452	-22.16	1.697	9.90	22.926	-7.88	19.225	-21.73	0.79254	3
5	4.59	20.09	6.38	18.16	4.37	17.44	4.39	17.43	8.30	18.46	13.23	21.09	18.32	8.29	17.22	4.07	15.06	22.57		
	12.758	-4.88	12.632	-2.54	11.353	5.67	11.359	5.42	13.816	-10.12	17.461	-22.17	1.692	9.88	22.923	-7.90	19.226	-21.74	0.92395	5
7	5.03	20.04	6.51	18.13	4.44	17.40	4.39	17.37	8.24	18.39	13.16	21.01	18.24	8.20	17.14	3.59	14.58	22.50		
	12.879	-5.65	12.844	-4.08	11.506	4.73	11.437	4.92	13.843	-10.27	17.470	-22.18	1.687	9.85	22.920	-7.91	19.226	-21.74	1.05537	7
9	5.06	19.59	7.04	18.09	4.50	17.36	4.38	17.31	8.19	18.32	13.09	20.54	18.16	8.12	17.06	3.51	14.50	22.42		
	13.001	-6.41	13.054	-5.60	11.659	3.78	11.514	4.42	13.870	-10.42	17.479	-22.19	1.682	9.82	22.917	-7.93	19.227	-21.74	1.18679	9
11	5.10	19.54	7.16	18.06	4.56	17.32	4.38	17.25	8.14	18.25	13.02	20.47	18.08	8.04	16.59	3.43	14.42	22.34		
	13.124	-7.16	13.262	-7.08	11.811	2.83	11.592	3.92	13.897	-10.57	17.489	-22.21	1.677	9.79	22.915	-7.94	19.228	-21.74	1.31821	11
13	5.14	19.50	7.29	18.02	5.03	17.28	4.37	17.19	8.08	18.18	12.54	20.39	18.00	7.56	16.51	3.35	14.35	22.26		
	13.247	-7.91	13.467	-8.54	11.964	1.86	11.670	3.42	13.925	-10.73	17.500	-22.22	1.671	9.76	22.912	-7.96	19.229	-21.75	1.44963	13
15	5.17	19.45	7.41	17.59	5.09	17.24	4.36	17.13	8.03	18.11	12.47	20.32	17.52	7.47	16.43	3.27	14.27	22.18		
	13.371	-8.66	13.672	-9.96	12.116	0.90	11.747	2.91	13.952	-10.88	17.510	-22.23	1.666	9.73	22.910	-7.97	19.230	-21.75	1.58105	15
17	5.21	19.41	7.53	17.55	5.16	17.20	4.36	17.07	7.58	18.03	12.40	20.25	17.44	7.39	16.35	3.19	14.19	22.10		
	13.495	-9.39	13.875	-11.34	12.268	-0.08	11.824	2.41	13.980	-11.03	17.522	-22.24	1.661	9.70	22.907	-7.99	19.231	-21.75	1.71246	17
19	5.24	19.37	8.05	17.52	5.22	17.16	4.35	17.01	7.52	17.56	12.33	20.17	17.36	7.30	16.27	3.10	14.11	22.03		
	13.620	-10.12	14.077	-12.67	12.420	-1.05	11.902	1.90	14.007	-11.18	17.533	-22.26	1.656	9.67	22.905	-8.00	19.233	-21.75	1.84388	19
21	5.28	19.33	8.17	17.49	5.29	17.13	4.35	16.55	7.47	17.49	12.26	20.10	17.28	7.22	16.19	3.02	14.03	21.55		
	13.746	-10.83	14.278	-13.96	12.573	-2.03	11.979	1.40	14.035	-11.33	17.545	-22.27	1.651	9.64	22.903	-8.01	19.234	-21.75	1.97530	21
23	5.31	19.29	8.28	17.45	5.35	17.09	4.34	16.49	7.41	17.42	12.19	20.03	17.20	7.14	16.11	2.54	13.56	21.47		
	13.873	-11.54	14.479	-15.20	12.726	-3.01	12.056	0.89	14.063	-11.48	17.557	-22.28	1.646	9.62	22.901	-8.03	19.236	-21.75	2.10672	23
25	5.35	19.25	8.40	17.42	5.42	17.05	4.34	16.43	7.36	17.35	12.12	19.56	17.12	7.05	16.03	2.46	13.48	21.39		
	14.000	-12.23	14.680	-16.38	12.879	-3.98	12.133	0.39	14.091	-11.63	17.569	-22.30	1.641	9.59	22.899	-8.04	19.238	-21.75	2.23814	25
27	5.38	19.21	8.51	17.39	5.48	17.01	4.33	16.37	7.31	17.28	12.05	19.48	17.04	6.57	15.55	2.38	13.40	21.32		
	14.128	-12.91	14.881	-17.50	13.033	-4.95	12.210	-0.12	14.119	-11.78	17.582	-22.31	1.635	9.56	22.897	-8.05	19.240	-21.75	2.36956	27
29	5.42	19.17	9.02	17.37	5.55	16.57	4.33	16.32	7.25	17.21	11.58	19.41	16.56	6.49	15.47	2.30	13.32	21.24		
	14.257	-13.58	15.082	-18.57	13.187	-5.91	12.288	-0.62	14.147	-11.93	17.595	-22.32	1.630	9.53	22.896	-8.06	19.242	-21.75	2.50098	29
29	4.42	18.17	8.02	16.37	4.55	15.57	3.33	15.32	6.26	16.21	10.58	18.41	15.56	5.49	14.47	1.30	12.32	20.24		
	14.260	-13.59	15.086	-18.59	13.190	-5.93	12.289	-0.63	14.147	-11.93	17.595	-22.32	1.630	9.53	22.895	-8.06	19.242	-21.75	2.50098	29
31	4.45	18.14	8.13	16.34	5.02	15.53	3.32	15.26	6.20	16.14	10.51	18.34	15.48	5.40	14.39	1.22	12.25	20.16		
	14.390	-14.24	15.288	-19.60	13.345	-6.89	12.366	-1.14	14.175	-12.08	17.608	-22.33	1.625	9.50	22.894	-8.07	19.244	-21.75	2.63239	31

LISTOPAD 2017

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2458																					
305	1	Śro	059	14.57568	16.27	14.2717	-14.34	0.99242	0.1414	-2.06	59.046	4.5	90	644	1129.3	1614	1532	2135.5	236	1448	1
306	2	Czw	060	15.01533	16.28	14.3113	-14.53	0.99216	1.0642	2.37	58.192	5.5	96	646	1129.3	1612	1556	2226.5	353	1444	2
307	3	Pią	061	15.05499	16.28	14.3509	-15.11	0.99190	2.0105	7.18	57.481	6.5	99	648	1129.3	1610	1622	2319.9	512	1440	3
308	4	Sob	062	15.09464	16.27	14.3906	-15.30	0.99165	2.5748	11.41	56.973	0.2	100	649	1129.3	1608	1652	*****	633	1436	4
309	5	Nie	063	15.13430	16.26	14.4304	-15.48	0.99140	3.5659	15.24	56.706	1.2	98	651	1129.3	1607	1727	016.0	755	1432	5
310	6	Pon	064	15.17395	16.24	14.4703	-16.06	0.99116	4.5814	18.07	56.693	2.2	93	653	1129.4	1605	1810	114.7	914	1428	6
311	7	Wto	065	15.21361	16.21	14.5102	-16.24	0.99092	6.0038	19.36	56.916	3.2	85	655	1129.4	1603	1903	215.3	1027	1424	7
312	8	Śro	066	15.25327	16.17	14.5503	-16.41	0.99068	7.0249	19.44	57.334	4.2	76	657	1129.5	1601	2005	316.2	1129	1420	8
313	9	Czw	067	15.29292	16.12	14.5904	-16.59	0.99045	8.0328	18.35	57.894	5.2	66	659	1129.5	1600	2115	416.0	1220	1416	9
314	10	Pią	068	15.33258	16.06	15.0306	-17.15	0.99022	9.0138	16.19	58.540	6.2	54	701	1129.6	1558	2228	513.2	1300	1413	10
315	11	Sob	069	15.37223	15.60	15.0710	-17.32	0.98999	9.5654	13.09	59.222	0.6	43	703	1129.8	1556	2342	607.3	1333	1409	11
316	12	Nie	070	15.41189	15.52	15.1114	-17.48	0.98977	10.4927	9.23	59.901	1.6	33	704	1129.9	1555	****	658.2	1400	1405	12
317	13	Pon	071	15.45154	15.44	15.1518	-18.04	0.98954	11.3945	5.13	60.551	2.6	23	706	1130.0	1553	056	746.5	1424	1401	13
318	14	Wto	072	15.49120	15.35	15.1924	-18.20	0.98933	12.2826	0.54	61.156	3.6	15	708	1130.2	1552	207	832.9	1446	1357	14
319	15	Śro	073	15.53086	15.25	15.2331	-18.35	0.98911	13.1611	-3.24	61.711	4.6	9	710	1130.3	1550	318	918.2	1507	1353	15
320	16	Czw	074	15.57051	15.14	15.2738	-18.50	0.98890	14.0336	-7.29	62.211	5.6	4	712	1130.5	1549	427	1003.0	1529	1349	16
321	17	Pią	075	16.01016	15.02	15.3146	-19.05	0.98868	14.5113	-11.13	62.655	6.6	1	714	1130.7	1547	535	1048.0	1552	1345	17
322	18	Sob	076	16.04582	14.50	15.3555	-19.19	0.98847	15.3922	-14.25	63.035	7.6	0	715	1130.9	1546	641	1133.5	1619	1341	18
323	19	Nie	077	16.08548	14.36	15.4005	-19.33	0.98827	16.2814	-16.59	63.342	1.0	1	717	1131.1	1545	746	1220.1	1649	1337	19
324	20	Pon	078	16.12513	14.22	15.4416	-19.47	0.98806	17.1748	-18.48	63.560	2.0	4	719	1131.4	1543	846	1307.1	1725	1333	20
325	21	Wto	079	16.16479	14.07	15.4828	-20.00	0.98786	18.0750	-19.47	63.668	3.0	8	721	1131.6	1542	941	1354.7	1807	1329	21
326	22	Śro	080	16.20444	13.51	15.5240	-20.13	0.98766	18.5803	-19.54	63.643	4.0	14	722	1131.9	1541	1031	1442.6	1856	1325	22
327	23	Czw	081	16.24410	13.35	15.5653	-20.26	0.98746	19.4807	-19.08	63.464	5.0	21	724	1132.2	1540	1113	1530.2	1951	1321	23
328	24	Pią	082	16.28376	13.18	16.0107	-20.38	0.98726	20.3747	-17.32	63.117	6.0	29	726	1132.5	1539	1149	1617.3	2051	1317	24
329	25	Sob	083	16.32341	12.60	16.0522	-20.49	0.98707	21.2658	-15.09	62.593	7.0	38	727	1132.8	1538	1220	1703.9	2155	1314	25
330	26	Nie	084	16.36307	12.41	16.0937	-21.01	0.98688	22.1548	-12.03	61.900	8.0	47	729	1133.1	1537	1247	1750.2	2303	1310	26
331	27	Pon	085	16.40272	12.21	16.1353	-21.12	0.98670	23.0437	-8.20	61.060	0.7	58	731	1133.4	1536	1311	1836.6	****	1306	27
332	28	Wto	086	16.44238	12.01	16.1810	-21.22	0.98652	23.5356	-4.08	60.112	1.7	68	732	1133.7	1535	1334	1923.7	013	1302	28
333	29	Śro	087	16.48203	11.40	16.2227	-21.33	0.98634	0.4423	0.24	59.115	2.7	77	734	1134.1	1534	1357	2012.4	126	1258	29
334	30	Czw	088	16.52169	11.19	16.2645	-21.42	0.98617	1.3642	5.06	58.142	3.7	86	735	1134.4	1533	1421	2103.3	242	1254	30

Fazy Księżyca [Dm, h.mm]: Pełn 4, 6.23 3kw 10, 21.36 Now 18, 12.42 1kw 26, 18.03

LISTOPAD 2017 (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	4.46	18.12	8.18	16.33	5.05	15.51	3.32	15.23	6.17	16.11	10.48	18.31	15.44	5.36	14.35	1.18	12.21	20.12		
	14.455	-14.56	15.388	-20.08	13.422	-7.37	12.405	-1.39	14.189	-12.15	17.615	-22.34	1.623	9.49	22.893	-8.07	19.246	-21.75	2.69810	1
3	4.50	18.09	8.29	16.31	5.11	15.48	3.31	15.17	6.12	16.04	10.41	18.23	15.36	5.28	14.27	1.10	12.13	20.05		
	14.586	-15.19	15.590	-20.99	13.578	-8.31	12.482	-1.89	14.217	-12.30	17.629	-22.35	1.618	9.46	22.892	-8.08	19.248	-21.75	2.82952	3
5	4.53	18.06	8.39	16.29	5.18	15.44	3.31	15.11	6.07	15.57	10.34	18.16	15.28	5.20	14.20	1.02	12.05	19.57		
	14.718	-15.80	15.792	-21.83	13.735	-9.24	12.559	-2.39	14.245	-12.44	17.643	-22.36	1.613	9.43	22.891	-8.09	19.251	-21.75	2.96094	5
7	4.56	18.03	8.49	16.28	5.25	15.41	3.30	15.05	6.01	15.50	10.27	18.09	15.20	5.11	14.12	0.54	11.58	19.49		
	14.851	-16.40	15.993	-22.60	13.892	-10.15	12.637	-2.89	14.273	-12.59	17.657	-22.37	1.608	9.40	22.889	-8.09	19.253	-21.75	3.09236	7
9	4.59	17.60	8.58	16.27	5.31	15.37	3.30	14.59	5.56	15.42	10.20	18.02	15.12	5.03	14.04	0.46	11.50	19.42		
	14.985	-16.98	16.194	-23.29	14.051	-11.06	12.714	-3.39	14.301	-12.73	17.671	-22.38	1.603	9.38	22.888	-8.10	19.256	-21.75	3.22378	9
11	5.03	17.57	9.07	16.26	5.38	15.34	3.29	14.53	5.51	15.35	10.13	17.55	15.04	4.55	13.56	0.38	11.42	19.34		
	15.119	-17.53	16.394	-23.90	14.210	-11.94	12.792	-3.89	14.329	-12.87	17.686	-22.40	1.599	9.35	22.888	-8.10	19.259	-21.75	3.35520	11
13	5.06	17.55	9.15	16.26	5.45	15.30	3.28	14.47	5.45	15.28	10.06	17.48	14.56	4.47	13.48	0.30	11.35	19.26		
	15.255	-18.07	16.591	-24.43	14.371	-12.81	12.869	-4.38	14.357	-13.01	17.701	-22.41	1.594	9.32	22.887	-8.11	19.262	-21.74	3.48662	13
15	5.09	17.52	9.22	16.26	5.52	15.27	3.28	14.41	5.40	15.21	9.59	17.41	14.48	4.38	13.40	0.23	11.27	19.19		
	15.392	-18.59	16.786	-24.88	14.533	-13.65	12.947	-4.87	14.385	-13.15	17.716	-22.42	1.590	9.30	22.886	-8.11	19.265	-21.74	3.61804	15
17	5.12	17.50	9.29	16.27	5.58	15.24	3.27	14.36	5.35	15.14	9.52	17.34	14.40	4.30	13.32	0.15	11.19	19.11		
	15.530	-19.08	16.976	-25.24	14.696	-14.48	13.024	-5.36	14.413	-13.29	17.731	-22.43	1.585	9.28	22.886	-8.11	19.269	-21.74	3.74945	17
19	5.15	17.48	9.34	16.28	6.05	15.22	3.27	14.30	5.29	15.07	9.45	17.27	14.32	4.22	13.24	0.07	11.12	19.03		
	15.668	-19.55	17.159	-25.51	14.860	-15.27	13.102	-5.85	14.441	-13.43	17.746	-22.43	1.581	9.25	22.885	-8.11	19.272	-21.74	3.88088	19
21	5.17	17.46	9.38	16.29	6.12	15.19	3.26	14.24	5.24	15.00	9.38	17.20	14.24	4.14	13.16	23.55	11.04	18.56		
	15.808	-20.00	17.334	-25.68	15.025	-16.05	13.180	-6.33	14.468	-13.56	17.762	-22.44	1.577	9.23	22.885	-8.11	19.275	-21.73	4.01230	21
23	5.20	17.45	9.40	16.30	6.19	15.16	3.26	14.18	5.18	14.53	9.32	17.13	14.16	4.05	13.09	23.47	10.56	18.48		
	15.948	-20.43	17.496	-25.76	15.192	-16.79	13.258	-6.82	14.496	-13.69	17.778	-22.45	1.573	9.21	22.885	-8.11	19.279	-21.73	4.14372	23
25	5.23	17.43	9.41	16.31	6.25	15.14	3.25	14.12	5.13	14.46	9.25	17.06	14.08	3.57	13.01	23.39	10.49	18.40		
	16.089	-20.82	17.643	-25.74	15.360	-17.51	13.337	-7.29	14.523	-13.83	17.794	-22.46	1.569	9.19	22.885	-8.11	19.283	-21.73	4.27514	25
27	5.25	17.42	9.40	16.32	6.32	15.12	3.24	14.07	5.07	14.39	9.18	16.59	14.00	3.49	12.53	23.31	10.41	18.33		
	16.231	-21.20	17.768	-25.62	15.530	-18.19	13.415	-7.77	14.550	-13.95	17.810	-22.47	1.566	9.17	22.886	-8.11	19.287	-21.72	4.40656	27
29	5.28	17.41	9.36	16.32	6.39	15.10	3.24	14.01	5.02	14.32	9.11	16.52	13.52	3.41	12.45	23.24	10.33	18.25		
	16.374	-21.54	17.865	-25.40	15.700	-18.85	13.494	-8.24	14.577	-14.08	17.826	-22.48	1.562	9.15	22.886	-8.10	19.290	-21.72	4.53798	29

GRUDZIEŃ 2017

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°/′	j astr	h.mmss	°/′	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
335	1	Pią	089	16.56134	10.57	16.3104	-21.52	0.98601	2.3137	9.40	57.276	4.7	93	737	1134.8	1532	1447	2157.4	401	1250	1
336	2	Sob	090	17.00100	10.34	16.3523	-22.01	0.98585	3.2935	13.47	56.599	5.7	98	738	1135.2	1532	1519	2255.1	523	1246	2
337	3	Nie	091	17.04066	10.10	16.3943	-22.09	0.98570	4.3038	17.05	56.177	6.7	100	740	1135.6	1531	1558	2355.9	645	1242	3
338	4	Pon	092	17.08031	9.46	16.4404	-22.17	0.98555	5.3408	19.14	56.051	0.8	99	741	1136.0	1531	1647	*****	804	1238	4
339	5	Wto	093	17.11597	9.22	16.4825	-22.25	0.98540	6.3839	20.01	56.228	1.8	95	742	1136.4	1530	1747	058.9	914	1234	5
340	6	Śro	094	17.15562	8.57	16.5247	-22.32	0.98527	7.4223	19.21	56.679	2.8	89	744	1136.8	1530	1856	201.9	1013	1230	6
341	7	Czw	095	17.19528	8.31	16.5709	-22.39	0.98514	8.4347	17.23	57.348	3.8	80	745	1137.2	1529	2011	302.9	1100	1226	7
342	8	Pią	096	17.23494	8.05	17.0132	-22.45	0.98501	9.4154	14.23	58.161	4.8	70	746	1137.7	1529	2128	400.5	1136	1222	8
343	9	Sob	097	17.27459	7.38	17.0555	-22.51	0.98489	10.3636	10.39	59.044	5.8	59	747	1138.1	1529	2244	454.2	1206	1219	9
344	10	Nie	098	17.31425	7.11	17.1018	-22.57	0.98478	11.2817	6.29	59.929	0.1	49	748	1138.6	1528	2357	544.4	1231	1215	10
345	11	Pon	099	17.35390	6.43	17.1442	-23.02	0.98467	12.1740	2.07	60.765	1.1	38	750	1139.0	1528	****	631.8	1253	1211	11
346	12	Wto	100	17.39356	6.16	17.1907	-23.06	0.98456	13.0533	-2.14	61.514	2.1	29	751	1139.5	1528	108	717.4	1314	1207	12
347	13	Śro	101	17.43321	5.47	17.2332	-23.10	0.98446	13.5241	-6.24	62.157	3.1	20	752	1140.0	1528	218	802.1	1336	1203	13
348	14	Czw	102	17.47287	5.19	17.2757	-23.14	0.98436	14.3946	-10.14	62.687	4.1	13	753	1140.4	1528	326	846.5	1358	1159	14
349	15	Pią	103	17.51252	4.50	17.3222	-23.17	0.98427	15.2717	-13.36	63.104	5.1	7	753	1140.9	1528	432	931.4	1423	1155	15
350	16	Sob	104	17.55218	4.21	17.3648	-23.20	0.98418	16.1534	-16.22	63.413	6.1	3	754	1141.4	1528	537	1017.0	1451	1151	16
351	17	Nie	105	17.59184	3.51	17.4114	-23.22	0.98409	17.0444	-18.25	63.621	7.1	1	755	1141.9	1529	639	1103.7	1524	1147	17
352	18	Pon	106	18.03149	3.22	17.4540	-23.24	0.98401	17.5437	-19.40	63.730	0.2	0	756	1142.4	1529	736	1151.1	1604	1143	18
353	19	Wto	107	18.07115	2.52	17.5006	-23.25	0.98393	18.4455	-20.04	63.741	1.2	1	756	1142.9	1529	828	1239.0	1650	1139	19
354	20	Śro	108	18.11081	2.22	17.5433	-23.26	0.98385	19.3511	-19.34	63.645	2.2	4	757	1143.4	1530	913	1326.9	1743	1135	20
355	21	Czw	109	18.15046	1.52	17.5859	-23.26	0.98378	20.2503	-18.12	63.435	3.2	9	758	1143.9	1530	952	1414.2	1841	1131	21
356	22	Pią	110	18.19012	1.22	18.0326	-23.26	0.98371	21.1415	-16.03	63.097	4.2	15	758	1144.4	1531	1024	1500.9	1944	1127	22
357	23	Sob	111	18.22577	0.53	18.0752	-23.25	0.98365	22.0245	-13.11	62.622	5.2	22	758	1144.9	1531	1052	1546.8	2050	1123	23
358	24	Nie	112	18.26543	0.23	18.1218	-23.24	0.98359	22.5045	-9.42	62.007	6.2	31	759	1145.4	1532	1116	1632.2	2158	1120	24
359	25	Pon	113	18.30508	-0.07	18.1645	-23.23	0.98353	23.3842	-5.43	61.259	7.2	40	759	1145.9	1533	1139	1717.6	2308	1116	25
360	26	Wto	114	18.34474	-0.37	18.2111	-23.21	0.98348	0.2711	-1.24	60.396	0.1	51	759	1146.4	1533	1201	1803.8	****	1112	26
361	27	Śro	115	18.38439	-1.06	18.2537	-23.18	0.98344	1.1657	3.08	59.457	1.1	61	800	1146.9	1534	1223	1851.7	020	1108	27
362	28	Czw	116	18.42405	-1.36	18.3003	-23.15	0.98340	2.0851	7.38	58.497	2.1	72	800	1147.3	1535	1247	1942.2	135	1104	28
363	29	Pią	117	18.46370	-2.05	18.3429	-23.12	0.98336	3.0338	11.54	57.586	3.1	81	800	1147.8	1536	1315	2036.1	253	1100	29
364	30	Sob	118	18.50336	-2.34	18.3854	-23.08	0.98334	4.0150	15.35	56.805	4.1	90	800	1148.3	1537	1348	2133.9	413	1056	30
365	31	Nie	119	18.54302	-3.02	18.4319	-23.04	0.98331	5.0325	18.20	56.234	5.1	96	800	1148.8	1538	1430	2235.3	533	1052	31

Fazy Księżyca [Dm, h.mm]: Pełn 3, 16.47 3kw 10, 8.51 Now 18, 7.30 1kw 26, 10.20

GRUDZIEŃ 2017 (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	5.30	17.40	9.29	16.30	6.45	15.08	3.23	13.55	4.56	14.25	9.04	16.45	13.44	3.33	12.37	23.16	10.26	18.18		
	16.518	-21.86	17.928	-25.08	15.872	-19.46	13.572	-8.71	14.604	-14.21	17.843	-22.48	1.559	9.13	22.887	-8.10	19.294	-21.72	4.66940	1
3	5.33	17.39	9.19	16.27	6.52	15.07	3.23	13.49	4.51	14.18	8.57	16.38	13.36	3.24	12.29	23.08	10.18	18.10		
	16.662	-22.15	17.948	-24.66	16.046	-20.04	13.651	-9.17	14.631	-14.33	17.859	-22.49	1.556	9.11	22.887	-8.09	19.299	-21.71	4.80082	3
5	5.35	17.38	9.06	16.21	6.58	15.06	3.22	13.44	4.45	14.11	8.51	16.31	13.28	3.16	12.21	23.00	10.10	18.02		
	16.807	-22.42	17.919	-24.15	16.220	-20.59	13.730	-9.63	14.658	-14.46	17.876	-22.50	1.553	9.10	22.888	-8.09	19.303	-21.71	4.93224	5
7	5.37	17.38	8.48	16.13	7.04	15.05	3.21	13.38	4.40	14.04	8.44	16.24	13.20	3.08	12.14	22.52	10.03	17.55		
	16.952	-22.65	17.836	-23.53	16.396	-21.09	13.809	-10.09	14.684	-14.58	17.893	-22.50	1.550	9.08	22.889	-8.08	19.307	-21.70	5.06366	7
9	5.39	17.38	8.27	16.03	7.10	15.04	3.21	13.32	4.34	13.57	8.37	16.17	13.12	3.00	12.06	22.45	9.55	17.47		
	17.099	-22.85	17.702	-22.83	16.573	-21.55	13.889	-10.54	14.710	-14.70	17.909	-22.51	1.548	9.07	22.890	-8.07	19.311	-21.70	5.19509	9
11	5.41	17.38	8.03	15.50	7.16	15.04	3.20	13.27	4.29	13.50	8.30	16.11	13.04	2.52	11.58	22.37	9.47	17.40		
	17.245	-23.03	17.527	-22.06	16.752	-21.97	13.969	-10.98	14.736	-14.81	17.926	-22.51	1.545	9.05	22.892	-8.07	19.316	-21.69	5.32650	11
13	5.43	17.38	7.38	15.36	7.22	15.04	3.20	13.21	4.23	13.43	8.23	16.04	12.57	2.44	11.50	22.29	9.40	17.32		
	17.392	-23.17	17.334	-21.28	16.931	-22.35	14.049	-11.42	14.762	-14.93	17.943	-22.52	1.543	9.04	22.893	-8.06	19.320	-21.69	5.45792	13
15	5.44	17.38	7.14	15.22	7.27	15.05	3.19	13.16	4.17	13.36	8.16	15.57	12.49	2.36	11.42	22.22	9.32	17.25		
	17.540	-23.28	17.147	-20.56	17.111	-22.69	14.129	-11.86	14.787	-15.04	17.960	-22.52	1.541	9.03	22.895	-8.05	19.324	-21.68	5.58934	15
17	5.46	17.39	6.53	15.09	7.32	15.06	3.19	13.10	4.12	13.29	8.10	15.50	12.41	2.28	11.34	22.14	9.24	17.17		
	17.687	-23.36	16.989	-19.98	17.292	-22.97	14.209	-12.29	14.812	-15.15	17.977	-22.52	1.539	9.02	22.896	-8.03	19.329	-21.68	5.72076	17
19	5.47	17.40	6.35	14.57	7.37	15.07	3.18	13.05	4.06	13.22	8.03	15.43	12.33	2.20	11.27	22.06	9.17	17.09		
	17.835	-23.42	16.876	-19.60	17.474	-23.21	14.289	-12.71	14.837	-15.26	17.994	-22.53	1.537	9.01	22.898	-8.02	19.334	-21.67	5.85219	19
21	5.48	17.41	6.23	14.46	7.41	15.08	3.17	12.59	4.00	13.15	7.56	15.36	12.25	2.12	11.19	21.58	9.09	17.02		
	17.983	-23.43	16.813	-19.43	17.656	-23.41	14.370	-13.13	14.862	-15.37	18.011	-22.53	1.536	9.01	22.900	-8.01	19.338	-21.67	5.98361	21
23	5.49	17.42	6.14	14.37	7.45	15.10	3.17	12.54	3.54	13.08	7.49	15.29	12.17	2.04	11.11	21.51	9.02	16.54		
	18.131	-23.42	16.798	-19.46	17.839	-23.56	14.451	-13.54	14.886	-15.47	18.028	-22.53	1.535	9.00	22.902	-8.00	19.343	-21.66	6.11503	23
25	5.50	17.43	6.09	14.30	7.49	15.13	3.16	12.48	3.49	13.01	7.42	15.23	12.09	1.56	11.03	21.43	8.54	16.47		
	18.279	-23.38	16.826	-19.65	18.022	-23.65	14.532	-13.95	14.910	-15.57	18.045	-22.53	1.534	9.00	22.904	-7.98	19.348	-21.66	6.24645	25
27	5.50	17.44	6.07	14.24	7.53	15.15	3.16	12.43	3.43	12.54	7.35	15.16	12.01	1.48	10.55	21.35	8.46	16.39		
	18.427	-23.30	16.891	-19.95	18.205	-23.70	14.614	-14.35	14.934	-15.67	18.062	-22.53	1.533	8.99	22.907	-7.97	19.352	-21.65	6.37787	27
29	5.51	17.46	6.08	14.19	7.56	15.19	3.15	12.38	3.37	12.47	7.29	15.09	11.53	1.40	10.48	21.28	8.39	16.32		
	18.575	-23.20	16.985	-20.34	18.388	-23.70	14.695	-14.74	14.957	-15.77	18.079	-22.53	1.532	8.99	22.909	-7.95	19.357	-21.64	6.50929	29
31	5.51	17.48	6.10	14.15	7.59	15.22	3.14	12.32	3.31	12.40	7.22	15.02	11.45	1.32	10.40	21.20	8.31	16.24		
	18.722	-23.06	17.104	-20.77	18.572	-23.65	14.777	-15.13	14.979	-15.86	18.096	-22.53	1.532	8.99	22.912	-7.93	19.362	-21.64	6.64071	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2017

Nowy Rok	Nie	1 styczeń	Dzień Dziecka	Czw	1 czerwiec
Najświętszej Maryi Panny Rodzicielki	Nie	1 styczeń	Zesłania Ducha Świętego	Nie	4 czerwiec
Objawienia Pańskiego (Trzech Króli)	Pią	6 styczeń	Dzień Dziękczynienia	Nie	4 czerwiec
Juliański Nowy Rok	Sob	14 styczeń	Trójcy Najświętszej	Nie	11 czerwiec
Dzień Babci	Sob	21 styczeń	Boże Ciało	Czw	15 czerwiec
Dzień Dziadka	Nie	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	23 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
Święto UMK	Nie	19 luty	Wniebowzięcia N.M.P.	Wto	15 sierpień
Tłusty czwartek	Czw	23 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 Adventu	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 2018

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 7.10.2010 r.)

Data Wielkanocy: **2018 KWIECIEŃ 1**

Dla całego roku przyjęto: TDT – UT = 72 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 17.15**, Lato **VI 21, 11.07**, Jesień **IX 23, 2.54**, Zima **XII 21, 23.22**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 25 marca do 28 października 2018 r.**

Oznaczenia:

Dr — dzień 2018 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2018

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
1	1	Pon	120	18.58267	-3.30	18.4744	-22.59	0.98330	6.0736	19.50	55.937	6.1	99	800	1149.3	1539	1524	2338.9	648	1048	1
2	2	Wto	121	19.02233	-3.58	18.5209	-22.54	0.98329	7.1247	19.54	55.953	0.4	100	759	1149.7	1540	1629	*****	754	1044	2
3	3	Śro	122	19.06199	-4.26	18.5633	-22.48	0.98329	8.1701	18.31	56.281	1.4	97	759	1150.2	1541	1744	042.6	849	1040	3
4	4	Czw	123	19.10164	-4.53	19.0057	-22.42	0.98329	9.1839	15.52	56.885	2.4	92	759	1150.6	1543	1903	144.1	932	1036	4
5	5	Pią	124	19.14130	-5.20	19.0520	-22.35	0.98330	10.1650	12.16	57.702	3.4	84	759	1151.1	1544	2023	242.1	1006	1032	5
6	6	Sob	125	19.18095	-5.47	19.0943	-22.28	0.98332	11.1132	8.05	58.649	4.4	75	758	1151.5	1545	2140	336.0	1035	1028	6
7	7	Nie	126	19.22061	-6.13	19.1405	-22.21	0.98334	12.0314	3.38	59.643	5.4	65	758	1152.0	1546	2255	426.4	1059	1025	7
8	8	Pon	127	19.26026	-6.38	19.1828	-22.13	0.98337	12.5242	-0.52	60.609	6.4	55	757	1152.4	1548	****	514.0	1121	1021	8
9	9	Wto	128	19.29592	-7.03	19.2249	-22.04	0.98340	13.4046	-5.10	61.487	0.5	45	757	1152.8	1549	006	559.9	1142	1017	9
10	10	Śro	129	19.33557	-7.27	19.2710	-21.55	0.98344	14.2811	-9.09	62.238	1.5	35	756	1153.2	1551	116	644.8	1204	1013	10
11	11	Czw	130	19.37523	-7.51	19.3131	-21.46	0.98349	15.1538	-12.41	62.837	2.5	26	755	1153.6	1552	223	729.6	1228	1009	11
12	12	Pią	131	19.41488	-8.15	19.3550	-21.37	0.98354	16.0335	-15.38	63.276	3.5	18	755	1154.0	1554	328	814.9	1255	1005	12
13	13	Sob	132	19.45454	-8.37	19.4010	-21.26	0.98359	16.5218	-17.53	63.561	4.5	11	754	1154.4	1555	431	901.0	1326	1001	13
14	14	Nie	133	19.49420	-8.60	19.4428	-21.16	0.98364	17.4150	-19.23	63.704	5.5	6	753	1154.7	1557	530	947.9	1403	957	14
15	15	Pon	134	19.53385	-9.21	19.4846	-21.05	0.98370	18.3159	-20.02	63.720	6.5	2	752	1155.1	1559	624	1035.6	1447	953	15
16	16	Wto	135	19.57351	-9.42	19.5304	-20.54	0.98377	19.2223	-19.47	63.626	7.5	0	751	1155.4	1600	712	1123.7	1537	949	16
17	17	Śro	136	20.01317	-10.02	19.5721	-20.42	0.98384	20.1237	-18.40	63.435	0.4	0	750	1155.8	1602	753	1211.5	1634	945	17
18	18	Czw	137	20.05282	-10.21	20.0136	-20.30	0.98391	21.0219	-16.43	63.156	1.4	2	749	1156.1	1604	827	1258.7	1736	941	18
19	19	Pią	138	20.09248	-10.40	20.0552	-20.17	0.98398	21.5115	-14.00	62.793	2.4	5	748	1156.4	1605	857	1345.1	1841	937	19
20	20	Sob	139	20.13213	-10.58	20.1006	-20.05	0.98406	22.3929	-10.40	62.344	3.4	10	747	1156.7	1607	922	1430.8	1948	933	20
21	21	Nie	140	20.17179	-11.15	20.1420	-19.51	0.98414	23.2715	-6.50	61.807	4.4	17	746	1157.0	1609	945	1515.9	2057	929	21
22	22	Pon	141	20.21144	-11.32	20.1833	-19.38	0.98423	0.1501	-2.38	61.183	5.4	25	744	1157.3	1611	1007	1601.2	2207	926	22
23	23	Wto	142	20.25110	-11.47	20.2245	-19.24	0.98432	1.0325	1.46	60.478	6.4	34	743	1157.5	1613	1028	1647.3	2320	922	23
24	24	Śro	143	20.29075	-12.02	20.2656	-19.09	0.98441	1.5312	6.12	59.708	7.4	45	742	1157.8	1614	1051	1735.1	****	918	24
25	25	Czw	144	20.33041	-12.16	20.3107	-18.55	0.98451	2.4509	10.25	58.903	0.5	56	740	1158.0	1616	1116	1825.4	034	914	25
26	26	Pią	145	20.37006	-12.29	20.3517	-18.40	0.98462	3.3956	14.13	58.109	1.5	67	739	1158.2	1618	1145	1919.1	150	910	26
27	27	Sob	146	20.40572	-12.42	20.3926	-18.24	0.98473	4.3759	17.16	57.384	2.5	77	737	1158.4	1620	1221	2016.5	307	906	27
28	28	Nie	147	20.44537	-12.53	20.4334	-18.09	0.98484	5.3907	19.18	56.797	3.5	86	736	1158.6	1622	1307	2117.1	422	902	28
29	29	Pon	148	20.48503	-13.04	20.4741	-17.53	0.98497	6.4229	20.02	56.413	4.5	94	734	1158.8	1624	1404	2219.6	532	858	29
30	30	Wto	149	20.52469	-13.14	20.5147	-17.36	0.98509	7.4633	19.21	56.285	5.5	98	733	1159.0	1626	1513	2322.0	632	854	30
31	31	Śro	150	20.56434	-13.23	20.5553	-17.20	0.98523	8.4936	17.17	56.442	6.5	100	731	1159.1	1628	1631	*****	721	850	31

Fazy Księżyca [Dm, h.mm]: Pełn 2, 3.24 3kw 8, 23.25 Now 17, 3.17 1kw 24, 23.20 Pełn 31, 14.27

STYCZEŃ 2018 (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	5.51	17.49	6.12	14.14	7.60	15.24	3.14	12.30	3.28	12.36	7.18	14.59	11.41	1.28	10.36	21.16	8.27	16.20		
	18.796	-22.98	17.171	-21.00	18.663	-23.61	14.818	-15.32	14.991	-15.91	18.105	-22.53	1.532	8.99	22.913	-7.93	19.364	-21.64	6.70642	1
3	5.51	17.50	6.16	14.11	8.02	15.28	3.13	12.24	3.22	12.29	7.12	14.52	11.34	1.20	10.28	21.09	8.20	16.13		
	18.942	-22.80	17.318	-21.44	18.846	-23.49	14.901	-15.69	15.013	-16.00	18.122	-22.53	1.532	8.99	22.916	-7.91	19.369	-21.63	6.83784	3
5	5.51	17.53	6.20	14.10	8.04	15.32	3.13	12.19	3.16	12.22	7.05	14.45	11.26	1.13	10.20	21.01	8.12	16.05		
	19.089	-22.59	17.479	-21.88	19.028	-23.32	14.983	-16.06	15.035	-16.08	18.138	-22.53	1.532	8.99	22.919	-7.89	19.374	-21.62	6.96926	5
7	5.51	17.55	6.26	14.10	8.05	15.37	3.12	12.14	3.10	12.15	6.58	14.38	11.18	1.05	10.13	20.54	8.04	15.58		
	19.235	-22.34	17.652	-22.28	19.210	-23.10	15.066	-16.42	15.056	-16.17	18.155	-22.53	1.532	9.00	22.922	-7.87	19.379	-21.62	7.10068	7
9	5.50	17.57	6.31	14.10	8.06	15.42	3.11	12.09	3.04	12.08	6.51	14.31	11.10	0.57	10.05	20.46	7.57	15.50		
	19.380	-22.07	17.834	-22.64	19.392	-22.83	15.149	-16.78	15.077	-16.25	18.172	-22.52	1.533	9.00	22.925	-7.85	19.384	-21.61	7.23210	9
11	5.49	17.59	6.37	14.11	8.07	15.47	3.11	12.04	2.58	12.01	6.44	14.24	11.02	0.49	9.57	20.39	7.49	15.43		
	19.525	-21.77	18.024	-22.94	19.572	-22.52	15.232	-17.12	15.097	-16.33	18.188	-22.52	1.534	9.01	22.928	-7.83	19.389	-21.60	7.36352	11
13	5.48	18.02	6.43	14.13	8.07	15.53	3.10	11.59	2.51	11.54	6.37	14.17	10.54	0.41	9.49	20.31	7.42	15.35		
	19.669	-21.44	18.220	-23.18	19.751	-22.16	15.315	-17.46	15.117	-16.41	18.205	-22.52	1.535	9.01	22.931	-7.81	19.394	-21.60	7.49494	13
15	5.47	18.05	6.48	14.16	8.07	15.58	3.09	11.54	2.45	11.47	6.30	14.11	10.46	0.34	9.41	20.23	7.34	15.28		
	19.813	-21.08	18.422	-23.35	19.930	-21.76	15.399	-17.79	15.137	-16.49	18.221	-22.51	1.536	9.02	22.935	-7.79	19.398	-21.59	7.62636	15
17	5.46	18.07	6.54	14.20	8.07	16.04	3.08	11.49	2.39	11.39	6.23	14.04	10.39	0.26	9.34	20.16	7.26	15.20		
	19.956	-20.70	18.629	-23.45	20.107	-21.31	15.483	-18.11	15.156	-16.56	18.237	-22.51	1.538	9.03	22.938	-7.77	19.403	-21.58	7.75779	17
19	5.44	18.10	6.59	14.25	8.06	16.10	3.07	11.44	2.33	11.32	6.16	13.57	10.31	0.18	9.26	20.08	7.19	15.13		
	20.098	-20.29	18.840	-23.47	20.284	-20.82	15.567	-18.43	15.174	-16.63	18.253	-22.50	1.539	9.04	22.942	-7.74	19.408	-21.58	7.88921	19
21	5.43	18.13	7.03	14.30	8.05	16.17	3.07	11.39	2.26	11.25	6.09	13.50	10.23	0.11	9.18	20.01	7.11	15.05		
	20.239	-19.86	19.054	-23.41	20.459	-20.29	15.651	-18.73	15.192	-16.69	18.269	-22.50	1.541	9.06	22.946	-7.72	19.413	-21.57	8.02062	21
23	5.41	18.16	7.07	14.36	8.03	16.23	3.06	11.35	2.20	11.18	6.02	13.43	10.15	0.03	9.10	19.53	7.03	14.58		
	20.379	-19.40	19.271	-23.27	20.632	-19.72	15.735	-19.03	15.209	-16.76	18.284	-22.49	1.543	9.07	22.950	-7.70	19.418	-21.56	8.15204	23
25	5.39	18.19	7.11	14.43	8.02	16.30	3.05	11.30	2.13	11.10	5.55	13.36	10.07	23.51	9.03	19.46	6.56	14.50		
	20.519	-18.91	19.490	-23.04	20.805	-19.11	15.820	-19.31	15.225	-16.82	18.300	-22.49	1.546	9.09	22.953	-7.67	19.422	-21.56	8.28346	25
27	5.37	18.22	7.14	14.51	7.60	16.36	3.04	11.25	2.07	11.03	5.48	13.29	9.60	23.44	8.55	19.38	6.48	14.43		
	20.657	-18.40	19.712	-22.72	20.976	-18.46	15.905	-19.59	15.241	-16.88	18.315	-22.48	1.548	9.10	22.957	-7.65	19.427	-21.55	8.41488	27
29	5.34	18.25	7.16	14.60	7.58	16.43	3.03	11.21	2.00	10.56	5.41	13.22	9.52	23.36	8.47	19.31	6.41	14.35		
	20.795	-17.88	19.935	-22.32	21.145	-17.78	15.989	-19.86	15.257	-16.93	18.330	-22.48	1.551	9.12	22.962	-7.62	19.432	-21.54	8.54630	29
31	5.32	18.28	7.18	15.09	7.55	16.50	3.02	11.16	1.53	10.49	5.34	13.15	9.44	23.29	8.39	19.23	6.33	14.27		
	20.931	-17.33	20.159	-21.82	21.313	-17.07	16.074	-20.12	15.271	-16.98	18.345	-22.47	1.554	9.14	22.966	-7.60	19.436	-21.54	8.67773	31

LUTY 2018

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
32	1	Czw	151	21.00400	-13.31	20.5958	-17.03	0.98536	9.5014	14.04	56.878	0.9	99	730	1159.3	1630	1752	022.5	801	846	1	
33	2	Pią	152	21.04366	-13.39	21.0402	-16.45	0.98551	10.4749	10.02	57.556	1.9	95	728	1159.4	1631	1913	119.8	833	842	2	
34	3	Sob	153	21.08331	-13.45	21.0805	-16.28	0.98566	11.4220	5.32	58.413	2.9	89	726	1159.5	1633	2031	213.6	859	838	3	
35	4	Nie	154	21.12296	-13.51	21.1207	-16.10	0.98582	12.3415	0.53	59.371	3.9	81	725	1159.6	1635	2147	304.2	923	834	4	
36	5	Pon	155	21.16262	-13.56	21.1609	-15.52	0.98598	13.2417	-3.39	60.348	4.9	72	723	1159.7	1637	2300	352.4	946	831	5	
37	6	Wto	156	21.20227	-14.00	21.2010	-15.33	0.98614	14.1308	-7.52	61.272	5.9	62	721	1159.8	1639	****	439.1	1008	827	6	
38	7	Śro	157	21.24193	-14.04	21.2410	-15.15	0.98631	15.0129	-11.38	62.082	6.9	52	719	1159.8	1641	009	525.0	1031	823	7	
39	8	Czw	158	21.28158	-14.06	21.2809	-14.56	0.98649	15.4952	-14.48	62.737	0.8	42	717	1159.9	1643	117	610.8	1057	819	8	
40	9	Pią	159	21.32124	-14.08	21.3208	-14.37	0.98667	16.3840	-17.18	63.212	1.8	33	715	1159.9	1645	221	657.0	1127	815	9	
41	10	Sob	160	21.36090	-14.10	21.3605	-14.17	0.98685	17.2804	-19.01	63.499	2.8	24	714	1159.9	1647	322	743.8	1202	811	10	
42	11	Nie	161	21.40055	-14.10	21.4002	-13.58	0.98704	18.1801	-19.54	63.606	3.8	17	712	1159.9	1649	418	831.3	1243	807	11	
43	12	Pon	162	21.44021	-14.10	21.4359	-13.38	0.98722	19.0820	-19.55	63.551	4.8	10	710	1159.9	1651	508	919.1	1331	803	12	
44	13	Wto	163	21.47586	-14.08	21.4754	-13.18	0.98742	19.5841	-19.03	63.357	5.8	5	708	1159.9	1653	551	1007.1	1426	759	13	
45	14	Śro	164	21.51552	-14.07	21.5149	-12.57	0.98761	20.4844	-17.19	63.054	6.8	2	706	1159.9	1655	628	1054.8	1527	755	14	
46	15	Czw	165	21.55517	-14.04	21.5543	-12.37	0.98781	21.3815	-14.47	62.668	7.8	0	704	1159.8	1657	700	1141.8	1631	751	15	
47	16	Pią	166	21.59483	-14.01	21.5936	-12.16	0.98800	22.2709	-11.34	62.224	0.6	0	702	1159.8	1659	727	1228.3	1739	747	16	
48	17	Sob	167	22.03448	-13.57	22.0329	-11.55	0.98821	23.1533	-7.48	61.739	1.6	2	659	1159.7	1701	751	1314.1	1848	743	17	
49	18	Nie	168	22.07414	-13.52	22.0720	-11.34	0.98841	0.0345	-3.37	61.226	2.6	7	657	1159.6	1703	813	1359.8	1958	739	18	
50	19	Pon	169	22.11379	-13.47	22.1112	-11.12	0.98861	0.5215	0.47	60.690	3.6	13	655	1159.5	1705	834	1445.8	2110	735	19	
51	20	Wto	170	22.15345	-13.41	22.1502	-10.51	0.98882	1.4137	5.13	60.135	4.6	20	653	1159.4	1707	856	1532.9	2223	732	20	
52	21	Śro	171	22.19310	-13.34	22.1852	-10.29	0.98903	2.3232	9.28	59.567	5.6	30	651	1159.3	1708	920	1621.8	2338	728	21	
53	22	Czw	172	22.23276	-13.27	22.2241	-10.08	0.98925	3.2536	13.20	58.996	6.6	40	649	1159.2	1710	947	1713.2	****	724	22	
54	23	Pią	173	22.27242	-13.18	22.2629	-9.46	0.98946	4.2115	16.32	58.439	0.1	51	647	1159.1	1712	1019	1807.5	053	720	23	
55	24	Sob	174	22.31207	-13.10	22.3017	-9.23	0.98968	5.1933	18.49	57.926	1.1	63	644	1158.9	1714	1100	1904.7	207	716	24	
56	25	Nie	175	22.35173	-13.01	22.3405	-9.01	0.98991	6.2004	19.57	57.495	2.1	73	642	1158.8	1716	1150	2004.2	317	712	25	
57	26	Pon	176	22.39138	-12.51	22.3751	-8.39	0.99013	7.2151	19.48	57.193	3.1	83	640	1158.6	1718	1252	2104.6	419	708	26	
58	27	Wto	177	22.43104	-12.40	22.4137	-8.16	0.99037	8.2336	18.19	57.062	4.1	91	638	1158.4	1720	1403	2204.4	511	704	27	
59	28	Śro	178	22.47069	-12.29	22.4523	-7.54	0.99060	9.2402	15.36	57.137	5.1	97	636	1158.2	1722	1521	2302.2	554	700	28	

Fazy Księżyca [Dm, h.mm]: Pełn 0, 14.27 3kw 7, 16.54 Now 15, 22.05 1kw 23, 9.09

LUTY 2018 (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	7.19	15.14	7.54	16.53	3.01	11.14	1.50	10.45	5.31	13.12	9.40	23.25	8.35	19.20	6.29	14.24		
	20.999	-17.04	20.272	-21.54	21.397	-16.70	16.117	-20.25	15.279	-17.01	18.352	-22.47	1.556	9.15	22.968	-7.58	19.439	-21.53	8.74344	1
3	5.27	18.33	7.20	15.24	7.52	16.60	3.00	11.09	1.43	10.38	5.24	13.05	9.32	23.17	8.28	19.12	6.21	14.16		
	21.135	-16.46	20.498	-20.90	21.563	-15.93	16.202	-20.49	15.292	-17.06	18.367	-22.46	1.559	9.17	22.972	-7.56	19.443	-21.53	8.87485	3
5	5.25	18.37	7.21	15.34	7.49	17.07	2.59	11.05	1.37	10.30	5.17	12.58	9.25	23.10	8.20	19.05	6.14	14.09		
	21.269	-15.86	20.725	-20.17	21.727	-15.14	16.288	-20.73	15.305	-17.10	18.381	-22.45	1.562	9.19	22.976	-7.53	19.448	-21.52	9.00627	5
7	5.21	18.40	7.21	15.46	7.46	17.13	2.58	11.01	1.30	10.23	5.10	12.51	9.17	23.02	8.12	18.57	6.06	14.01		
	21.403	-15.25	20.953	-19.34	21.891	-14.32	16.373	-20.96	15.318	-17.14	18.395	-22.44	1.566	9.21	22.981	-7.50	19.452	-21.52	9.13769	7
9	5.18	18.43	7.21	15.58	7.43	17.20	2.57	10.56	1.23	10.15	5.03	12.44	9.09	22.55	8.04	18.50	5.59	13.53		
	21.535	-14.61	21.182	-18.42	22.053	-13.48	16.459	-21.18	15.329	-17.18	18.409	-22.44	1.570	9.23	22.985	-7.48	19.456	-21.51	9.26911	9
11	5.15	18.47	7.20	16.10	7.39	17.27	2.56	10.52	1.16	10.08	4.55	12.37	9.01	22.47	7.57	18.42	5.51	13.46		
	21.667	-13.96	21.411	-17.40	22.214	-12.61	16.544	-21.38	15.340	-17.22	18.423	-22.43	1.574	9.26	22.989	-7.45	19.461	-21.50	9.40053	11
13	5.11	18.50	7.19	16.23	7.36	17.34	2.54	10.48	1.09	10.00	4.48	12.30	8.53	22.40	7.49	18.35	5.43	13.38		
	21.798	-13.29	21.641	-16.29	22.373	-11.72	16.630	-21.58	15.350	-17.25	18.436	-22.42	1.578	9.28	22.994	-7.42	19.465	-21.50	9.53195	13
15	5.08	18.54	7.18	16.36	7.32	17.41	2.53	10.44	1.02	9.53	4.41	12.23	8.46	22.32	7.41	18.28	5.36	13.31		
	21.929	-12.61	21.872	-15.08	22.532	-10.81	16.716	-21.77	15.360	-17.28	18.449	-22.41	1.582	9.31	22.998	-7.39	19.469	-21.49	9.66337	15
17	5.04	18.57	7.16	16.50	7.29	17.47	2.51	10.40	0.54	9.45	4.34	12.16	8.38	22.25	7.33	18.20	5.28	13.23		
	22.058	-11.92	22.102	-13.78	22.689	-9.88	16.801	-21.95	15.368	-17.31	18.461	-22.41	1.587	9.34	23.003	-7.36	19.473	-21.49	9.79479	17
19	5.00	19.01	7.14	17.04	7.25	17.54	2.50	10.36	0.47	9.38	4.27	12.09	8.30	22.17	7.26	18.13	5.20	13.16		
	22.187	-11.21	22.334	-12.39	22.845	-8.93	16.887	-22.12	15.376	-17.33	18.474	-22.40	1.592	9.36	23.008	-7.34	19.477	-21.48	9.92620	19
21	4.56	19.05	7.11	17.18	7.21	18.01	2.48	10.32	0.40	9.30	4.20	12.02	8.23	22.10	7.18	18.05	5.13	13.08		
	22.314	-10.49	22.565	-10.91	23.001	-7.96	16.973	-22.28	15.383	-17.35	18.486	-22.39	1.596	9.39	23.012	-7.31	19.481	-21.48	10.05762	21
23	4.52	19.08	7.08	17.33	7.17	18.08	2.47	10.28	0.32	9.23	4.12	11.55	8.15	22.03	7.10	17.58	5.05	13.00		
	22.442	-9.76	22.795	-9.34	23.155	-6.98	17.058	-22.43	15.389	-17.37	18.497	-22.38	1.601	9.42	23.017	-7.28	19.485	-21.47	10.18904	23
25	4.48	19.12	7.05	17.48	7.13	18.14	2.45	10.25	0.25	9.15	4.05	11.48	8.07	21.55	7.02	17.50	4.57	12.53		
	22.568	-9.02	23.025	-7.70	23.309	-5.99	17.144	-22.57	15.395	-17.39	18.509	-22.37	1.607	9.45	23.022	-7.25	19.488	-21.47	10.32046	25
27	4.43	19.16	7.02	18.03	7.09	18.21	2.43	10.21	0.18	9.07	3.58	11.41	7.59	21.48	6.55	17.43	4.50	12.45		
	22.694	-8.27	23.252	-5.99	23.462	-4.99	17.229	-22.70	15.399	-17.40	18.520	-22.36	1.612	9.49	23.026	-7.22	19.492	-21.46	10.45188	27

MARZEC 2018

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]								
..... Dzień				ST	Δα	α _☉	δ _☉	R _☉	α _☾	δ _☾	R _☾	Faza ☾	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ _☉	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
60	1	Czw	179	22.51035	-12.18	22.4908	-7.31	0.99084	10.2220	11.55	57.433	6.1	100	633	1158.0	1724	1642	2357.5	628	656	1	
61	2	Pią	180	22.55000	-12.06	22.5253	-7.08	0.99108	11.1810	7.34	57.941	0.4	100	631	1157.8	1726	1803	*****	657	652	2	
62	3	Sob	181	22.58566	-11.53	22.5637	-6.45	0.99133	12.1143	2.53	58.628	1.4	97	629	1157.6	1727	1921	050.0	723	648	3	
63	4	Nie	182	23.02531	-11.40	23.0020	-6.22	0.99158	13.0324	-1.49	59.440	2.4	93	626	1157.4	1729	2037	140.2	746	644	4	
64	5	Pon	183	23.06497	-11.27	23.0403	-5.59	0.99184	13.5348	-6.19	60.309	3.4	86	624	1157.2	1731	2150	228.7	809	640	5	
65	6	Wto	184	23.10462	-11.13	23.0746	-5.36	0.99209	14.4328	-10.22	61.167	4.4	78	622	1157.0	1733	2300	316.1	832	636	6	
66	7	Śro	185	23.14428	-10.59	23.1129	-5.12	0.99236	15.3253	-13.51	61.948	5.4	69	619	1156.7	1735	****	403.1	857	633	7	
67	8	Czw	186	23.18393	-10.44	23.1510	-4.49	0.99262	16.2224	-16.39	62.598	6.4	60	617	1156.5	1737	008	450.1	926	629	8	
68	9	Pią	187	23.22359	-10.29	23.1852	-4.25	0.99289	17.1212	-18.39	63.078	7.4	50	615	1156.2	1739	111	537.4	959	625	9	
69	10	Sob	188	23.26324	-10.14	23.2233	-4.02	0.99316	18.0220	-19.49	63.363	1.0	41	612	1156.0	1741	210	625.1	1038	621	10	
70	11	Nie	189	23.30290	-9.58	23.2614	-3.38	0.99343	18.5239	-20.06	63.447	2.0	32	610	1155.7	1742	302	713.0	1124	617	11	
71	12	Pon	190	23.34256	-9.43	23.2955	-3.15	0.99370	19.4258	-19.29	63.340	3.0	23	608	1155.5	1744	348	800.9	1216	613	12	
72	13	Wto	191	23.38221	-9.26	23.3335	-2.51	0.99397	20.3303	-18.01	63.062	4.0	16	605	1155.2	1746	427	848.6	1314	609	13	
73	14	Śro	192	23.42187	-9.10	23.3716	-2.28	0.99424	21.2244	-15.42	62.647	5.0	9	603	1154.9	1748	501	935.9	1418	605	14	
74	15	Czw	193	23.46152	-8.53	23.4055	-2.04	0.99452	22.1157	-12.40	62.133	6.0	4	601	1154.6	1750	529	1022.7	1525	601	15	
75	16	Pią	194	23.50118	-8.36	23.4435	-1.40	0.99479	23.0050	-8.59	61.562	7.0	1	558	1154.4	1752	554	1109.1	1634	557	16	
76	17	Sob	195	23.54083	-8.19	23.4815	-1.16	0.99507	23.4938	-4.50	60.973	8.0	0	556	1154.1	1753	617	1155.4	1745	553	17	
77	18	Nie	196	23.58049	-8.02	23.5154	-0.53	0.99534	0.3845	-0.23	60.400	0.9	1	553	1153.8	1755	639	1242.0	1858	549	18	
78	19	Pon	197	0.02014	-7.45	23.5533	-0.29	0.99562	1.2842	4.10	59.867	1.9	4	551	1153.5	1757	701	1329.6	2012	545	19	
79	20	Wto	198	0.05580	-7.27	23.5912	-0.05	0.99589	2.1959	8.35	59.391	2.9	9	549	1153.2	1759	724	1418.7	2128	541	20	
80	21	Śro	199	0.09545	-7.09	0.0251	0.19	0.99617	3.1308	12.38	58.976	3.9	17	546	1152.9	1801	750	1509.9	2244	538	21	
81	22	Czw	200	0.13511	-6.51	0.0629	0.42	0.99644	4.0827	16.02	58.625	4.9	26	544	1152.6	1802	821	1603.5	2359	534	22	
82	23	Pią	201	0.17476	-6.33	0.1008	1.06	0.99672	5.0557	18.33	58.334	5.9	37	541	1152.3	1804	858	1659.6	000	530	23	
83	24	Sob	202	0.21442	-6.15	0.1347	1.29	0.99699	6.0515	19.57	58.107	6.9	48	539	1152.0	1806	944	1757.5	110	526	24	
84	25	Nie	203	0.25407	-5.57	0.1725	1.53	0.99727	7.0531	20.07	57.949	0.8	59	537	1151.7	1808	1041	1856.2	213	522	25	
84	25	Nie	203	23.25309	-5.58	0.1716	1.52	0.99726	7.0300	20.08	57.954	1.8	59	637	1251.7	1908	1141	1956.2	313	622	25	
85	26	Pon	204	23.29274	-5.40	0.2054	2.16	0.99754	8.0314	19.05	57.876	2.8	70	634	1251.4	1910	1248	2054.5	407	618	26	
86	27	Wto	205	23.33240	-5.22	0.2433	2.39	0.99781	9.0225	16.49	57.898	3.8	80	632	1251.1	1911	1401	2151.2	451	614	27	
87	28	Śro	206	23.37205	-5.04	0.2811	3.03	0.99810	9.5950	13.32	58.040	4.8	88	629	1250.8	1913	1519	2245.8	528	610	28	
88	29	Czw	207	23.41171	-4.45	0.3149	3.26	0.99838	10.5513	9.29	58.316	5.8	94	627	1250.5	1915	1638	2338.2	557	606	29	
89	30	Pią	208	23.45136	-4.27	0.3528	3.49	0.99866	11.4841	4.56	58.731	6.8	98	625	1250.2	1917	1756	*****	623	602	30	
90	31	Sob	209	23.49102	-4.09	0.3906	4.13	0.99895	12.4036	0.13	59.274	7.8	100	622	1249.9	1919	1913	028.6	647	558	31	

Fazy Księżyca [Dm, h.mm]: Pełn 2, 1.51 3kw 9, 12.20 Nów 17, 14.12 1kw 24, 16.35 Pełn 31, 14.37

MARZEC 2018 (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	
	Świt	Zm'ch	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	Wsch	Zach	(0 ^h UT) Dm
1	4.39	19.20	6.58	18.18	7.05	18.28	2.41	10.17	0.10	8.60	3.51	11.33	7.52	21.40	6.47	17.36	4.42	12.38			
	22.819	-7.51	23.477	-4.24	23.615	-3.98	17.315	-22.82	15.403	-17.41	18.530	-22.36	1.617	9.52	23.031	-7.19	19.495	-21.46	10.58330	1	
3	4.34	19.23	6.53	18.33	7.00	18.34	2.39	10.14	0.02	8.52	3.43	11.26	7.44	21.33	6.39	17.28	4.34	12.30			
	22.944	-6.75	23.697	-2.45	23.767	-2.97	17.400	-22.93	15.406	-17.41	18.540	-22.35	1.623	9.55	23.036	-7.16	19.499	-21.45	10.71471	3	
5	4.30	19.27	6.49	18.47	6.56	18.41	2.37	10.10	23.51	8.44	3.36	11.19	7.36	21.26	6.32	17.21	4.26	12.22			
	23.068	-5.98	23.909	-0.66	23.918	-1.94	17.485	-23.03	15.408	-17.41	18.550	-22.34	1.629	9.59	23.040	-7.13	19.502	-21.45	10.84613	5	
7	4.25	19.31	6.44	19.01	6.52	18.48	2.35	10.07	23.43	8.36	3.29	11.12	7.28	21.18	6.24	17.13	4.19	12.15			
	23.191	-5.20	0.112	1.10	0.069	-0.92	17.570	-23.12	15.409	-17.41	18.560	-22.33	1.635	9.62	23.045	-7.10	19.505	-21.44	10.97754	7	
9	4.20	19.35	6.38	19.13	6.48	18.54	2.33	10.03	23.35	8.29	3.21	11.04	7.21	21.11	6.16	17.06	4.11	12.07			
	23.314	-4.42	0.301	2.80	0.220	0.11	17.654	-23.21	15.410	-17.41	18.569	-22.32	1.641	9.66	23.050	-7.08	19.508	-21.44	11.10896	9	
11	4.15	19.39	6.32	19.24	6.43	19.01	2.31	9.60	23.27	8.21	3.14	10.57	7.13	21.04	6.08	16.58	4.03	11.59			
	23.437	-3.64	0.472	4.39	0.371	1.14	17.739	-23.28	15.409	-17.40	18.578	-22.32	1.647	9.69	23.055	-7.05	19.511	-21.44	11.24039	11	
13	4.10	19.43	6.25	19.33	6.39	19.08	2.28	9.57	23.19	8.13	3.06	10.50	7.05	20.57	6.01	16.51	3.56	11.52			
	23.560	-2.85	0.623	5.83	0.522	2.17	17.823	-23.34	15.408	-17.39	18.586	-22.31	1.653	9.73	23.059	-7.02	19.514	-21.43	11.37181	13	
15	4.05	19.47	6.18	19.40	6.35	19.14	2.26	9.53	23.11	8.05	2.59	10.42	6.58	20.49	5.53	16.44	3.48	11.44			
	23.682	-2.06	0.748	7.10	0.673	3.20	17.907	-23.40	15.406	-17.38	18.594	-22.30	1.659	9.76	23.064	-6.99	19.517	-21.43	11.50322	15	
17	3.59	19.51	6.10	19.44	6.30	19.21	2.23	9.50	23.03	7.57	2.51	10.35	6.50	20.42	5.45	16.36	3.40	11.36			
	23.804	-1.27	0.845	8.14	0.824	4.22	17.991	-23.45	15.403	-17.36	18.601	-22.30	1.666	9.80	23.069	-6.96	19.519	-21.43	11.63464	17	
19	3.54	19.56	6.02	19.44	6.26	19.28	2.21	9.47	22.55	7.49	2.44	10.28	6.42	20.35	5.37	16.29	3.32	11.29			
	23.926	-0.48	0.912	8.94	0.975	5.23	18.074	-23.48	15.399	-17.34	18.608	-22.29	1.672	9.84	23.073	-6.93	19.522	-21.43	11.76605	19	
21	3.48	20.00	5.53	19.41	6.22	19.34	2.18	9.44	22.46	7.41	2.36	10.20	6.35	20.28	5.30	16.21	3.25	11.21			
	0.047	0.31	0.947	9.46	1.127	6.24	18.157	-23.51	15.394	-17.32	18.615	-22.28	1.679	9.88	23.078	-6.90	19.524	-21.42	11.89747	21	
23	3.43	20.04	5.44	19.35	6.18	19.41	2.15	9.41	22.38	7.33	2.29	10.13	6.27	20.20	5.22	16.14	3.17	11.13			
	0.169	1.10	0.952	9.70	1.279	7.24	18.239	-23.53	15.389	-17.30	18.621	-22.28	1.685	9.92	23.082	-6.88	19.526	-21.42	12.02889	23	
25	3.37	20.09	5.35	19.25	6.13	19.48	2.13	9.38	22.30	7.25	2.21	10.05	6.19	20.13	5.14	16.06	3.09	11.05			
	0.290	1.88	0.926	9.66	1.432	8.23	18.321	-23.55	15.382	-17.27	18.627	-22.27	1.692	9.96	23.087	-6.85	19.528	-21.42	12.16031	25	
25	4.37	21.09	6.35	20.26	7.13	20.47	3.12	10.38	23.30	8.25	3.21	11.05	7.19	21.13	6.14	17.06	4.09	12.05			
	0.288	1.87	0.927	9.66	1.428	8.21	18.319	-23.54	15.383	-17.27	18.627	-22.27	1.692	9.96	23.087	-6.85	19.528	-21.42	12.16031	25	
27	4.31	21.14	6.26	20.13	7.09	20.54	3.09	10.34	23.21	8.17	3.14	10.58	7.12	21.06	6.06	16.59	4.01	11.58			
	0.409	2.65	0.876	9.34	1.582	9.19	18.401	-23.55	15.375	-17.24	18.632	-22.27	1.699	10.00	23.091	-6.82	19.530	-21.42	12.29173	27	
29	4.26	21.18	6.17	19.57	7.05	21.01	3.06	10.31	23.13	8.09	3.06	10.50	7.04	20.59	5.59	16.51	3.54	11.50			
	0.530	3.43	0.804	8.75	1.735	10.15	18.482	-23.55	15.368	-17.21	18.637	-22.26	1.706	10.03	23.096	-6.80	19.532	-21.42	12.42315	29	
31	4.20	21.23	6.09	19.40	7.01	21.08	3.03	10.29	23.04	8.01	2.59	10.43	6.56	20.51	5.51	16.44	3.46	11.42			
	0.652	4.21	0.718	7.95	1.890	11.09	18.562	-23.54	15.359	-17.17	18.641	-22.26	1.713	10.08	23.100	-6.77	19.534	-21.42	12.55456	31	

KWIECIEŃ 2018

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]									
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
91	1	Nie	210	23.53067	-3.51	0.4245	4.36	0.99923	13.3126	-4.26	59.920	0.9	99	620	1249.6	1920	2028	117.5	709	554	1	
92	2	Pon	211	23.57033	-3.33	0.4624	4.59	0.99952	14.2141	-8.47	60.627	1.9	96	618	1249.3	1922	2141	205.6	732	550	2	
93	3	Wto	212	24.00598	-3.16	0.5002	5.22	0.99981	15.1146	-12.36	61.345	2.9	91	615	1249.0	1924	2251	253.3	756	546	3	
94	4	Śro	213	0.04564	-2.58	0.5341	5.45	1.00010	16.0158	-15.46	62.020	3.9	84	613	1248.7	1926	2357	341.0	824	542	4	
95	5	Czw	214	0.08529	-2.41	0.5721	6.08	1.00039	16.5223	-18.09	62.598	4.9	76	610	1248.4	1928	****	429.0	855	539	5	
96	6	Pią	215	0.12495	-2.24	1.0100	6.30	1.00069	17.4301	-19.41	63.036	5.9	68	608	1248.1	1929	059	517.2	932	535	6	
97	7	Sob	216	0.16460	-2.07	1.0440	6.53	1.00098	18.3341	-20.18	63.297	6.9	58	606	1247.9	1931	155	605.5	1015	531	7	
98	8	Nie	217	0.20426	-1.50	1.0820	7.15	1.00127	19.2411	-20.02	63.361	0.1	49	603	1247.6	1933	244	653.6	1105	527	8	
99	9	Pon	218	0.24392	-1.34	1.1160	7.38	1.00156	20.1416	-18.52	63.222	1.1	40	601	1247.3	1935	326	741.4	1201	523	9	
100	10	Wto	219	0.28357	-1.17	1.1540	7.60	1.00185	21.0350	-16.51	62.890	2.1	30	559	1247.0	1937	401	828.6	1302	519	10	
101	11	Śro	220	0.32323	-1.01	1.1921	8.22	1.00214	21.5254	-14.05	62.391	3.1	22	556	1246.8	1938	431	915.2	1407	515	11	
102	12	Czw	221	0.36288	-0.46	1.2302	8.44	1.00243	22.4137	-10.37	61.764	4.1	14	554	1246.5	1940	457	1001.5	1516	511	12	
103	13	Pią	222	0.40254	-0.31	1.2643	9.06	1.00272	23.3019	-6.36	61.056	5.1	8	552	1246.3	1942	520	1047.7	1626	507	13	
104	14	Sob	223	0.44219	-0.16	1.3025	9.28	1.00300	0.1926	-2.11	60.324	6.1	3	549	1246.0	1944	542	1134.3	1739	503	14	
105	15	Nie	224	0.48185	-0.01	1.3407	9.49	1.00328	1.0930	2.27	59.620	7.1	1	547	1245.8	1946	604	1221.9	1854	459	15	
106	16	Pon	225	0.52150	0.13	1.3749	10.10	1.00356	2.0104	7.05	58.996	0.3	0	545	1245.5	1947	626	1311.3	2011	455	16	
107	17	Wto	226	0.56116	0.27	1.4132	10.32	1.00384	2.5440	11.25	58.489	1.3	2	543	1245.3	1949	651	1402.8	2129	451	17	
108	18	Śro	227	1.00081	0.41	1.4515	10.53	1.00411	3.5034	15.12	58.121	2.3	7	540	1245.1	1951	721	1457.0	2247	447	18	
109	19	Czw	228	1.04047	0.54	1.4858	11.13	1.00439	4.4846	18.06	57.897	3.3	14	538	1244.9	1953	756	1553.7	****	443	19	
110	20	Pią	229	1.08012	1.06	1.5242	11.34	1.00466	5.4844	19.54	57.811	4.3	23	536	1244.6	1954	840	1652.3	002	440	20	
111	21	Sob	230	1.11578	1.19	1.5626	11.54	1.00492	6.4932	20.26	57.844	5.3	33	534	1244.4	1956	934	1751.5	109	436	21	
112	22	Nie	231	1.15543	1.30	2.0011	12.15	1.00519	7.5001	19.40	57.977	6.3	44	532	1244.2	1958	1038	1850.0	207	432	22	
113	23	Pon	232	1.19509	1.42	2.0356	12.35	1.00545	8.4904	17.40	58.189	0.5	56	529	1244.0	2000	1150	1946.7	253	428	23	
114	24	Wto	233	1.23475	1.53	2.0742	12.55	1.00572	9.4604	14.37	58.468	1.5	67	527	1243.9	2002	1305	2040.9	331	424	24	
115	25	Śro	234	1.27440	2.03	2.1128	13.14	1.00598	10.4047	10.47	58.806	2.5	77	525	1243.7	2003	1423	2132.7	402	420	25	
116	26	Czw	235	1.31406	2.13	2.1514	13.34	1.00624	11.3327	6.25	59.202	3.5	86	523	1243.5	2005	1539	2222.4	428	416	26	
117	27	Pią	236	1.35371	2.23	2.1901	13.53	1.00650	12.2434	1.46	59.653	4.5	92	521	1243.4	2007	1655	2310.6	451	412	27	
118	28	Sob	237	1.39337	2.32	2.2249	14.12	1.00675	13.1441	-2.54	60.158	5.5	97	519	1243.2	2009	1810	2358.0	513	408	28	
119	29	Nie	238	1.43302	2.41	2.2637	14.30	1.00701	14.0423	-7.22	60.706	6.5	100	517	1243.1	2010	1923	*****	535	404	29	
120	30	Pon	239	1.47268	2.49	2.3025	14.49	1.00727	14.5407	-11.25	61.278	0.4	100	515	1242.9	2012	2034	045.2	558	400	30	

Fazy Księżyca [Dm, h.mm]: Pełn 0, 14.37 3kw 8, 9.18 Now 16, 3.57 1kw 22, 23.46 Pełn 30, 2.58

KWIECIEŃ 2018 (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	4.17	21.25	6.04	19.31	6.59	21.11	3.02	10.27	22.60	7.57	2.55	10.39	6.52	20.48	5.47	16.40	3.42	11.38			
	0.712	4.60	0.672	7.49	1.967	11.56	18.602	-23.53	15.354	-17.15	18.643	-22.25	1.716	10.10	23.102	-6.76	19.534	-21.42	12.62027	1	
3	4.11	21.30	5.57	19.12	6.55	21.18	2.58	10.24	22.51	7.48	2.47	10.31	6.45	20.41	5.39	16.33	3.34	11.31			
	0.834	5.36	0.581	6.48	2.123	12.48	18.682	-23.51	15.345	-17.11	18.647	-22.25	1.723	10.14	23.106	-6.73	19.536	-21.42	12.75168	3	
5	4.05	21.35	5.49	18.53	6.51	21.25	2.55	10.21	22.42	7.40	2.39	10.24	6.37	20.33	5.32	16.25	3.26	11.23			
	0.956	6.13	0.495	5.42	2.280	13.38	18.761	-23.48	15.334	-17.07	18.650	-22.25	1.731	10.18	23.111	-6.70	19.537	-21.42	12.88310	5	
7	3.58	21.41	5.43	18.35	6.48	21.32	2.52	10.18	22.33	7.32	2.32	10.16	6.29	20.26	5.24	16.18	3.19	11.15			
	1.078	6.88	0.420	4.38	2.437	14.26	18.840	-23.45	15.323	-17.02	18.653	-22.24	1.738	10.22	23.115	-6.68	19.538	-21.42	13.01453	7	
9	3.52	21.46	5.37	18.19	6.44	21.39	2.48	10.15	22.24	7.24	2.24	10.08	6.22	20.19	5.16	16.10	3.11	11.07			
	1.200	7.63	0.362	3.42	2.596	15.11	18.917	-23.41	15.311	-16.98	18.655	-22.24	1.745	10.26	23.119	-6.65	19.539	-21.42	13.14595	9	
11	3.45	21.51	5.31	18.04	6.40	21.45	2.45	10.12	22.16	7.15	2.16	10.01	6.14	20.12	5.08	16.03	3.03	10.59			
	1.322	8.37	0.323	2.57	2.756	15.94	18.995	-23.36	15.299	-16.93	18.657	-22.24	1.752	10.30	23.123	-6.63	19.540	-21.42	13.27736	11	
13	3.39	21.57	5.26	17.51	6.37	21.52	2.41	10.10	22.07	7.07	2.08	9.53	6.06	20.05	5.00	15.55	2.55	10.51			
	1.445	9.10	0.305	1.88	2.917	16.75	19.071	-23.31	15.286	-16.87	18.658	-22.24	1.759	10.34	23.127	-6.61	19.541	-21.42	13.40878	13	
15	3.32	22.03	5.21	17.41	6.34	21.59	2.37	10.07	21.58	6.59	2.00	9.45	5.59	19.57	4.53	15.48	2.47	10.44			
	1.568	9.82	0.307	1.36	3.079	17.52	19.146	-23.25	15.272	-16.82	18.659	-22.24	1.767	10.38	23.131	-6.58	19.542	-21.42	13.54019	15	
17	3.25	22.09	5.16	17.32	6.31	22.06	2.33	10.04	21.48	6.50	1.53	9.37	5.51	19.50	4.45	15.40	2.40	10.36			
	1.692	10.53	0.330	1.01	3.242	18.27	19.221	-23.19	15.258	-16.76	18.659	-22.24	1.774	10.42	23.135	-6.56	19.542	-21.42	13.67161	17	
19	3.18	22.15	5.12	17.26	6.28	22.13	2.29	10.01	21.39	6.42	1.45	9.29	5.43	19.43	4.37	15.33	2.32	10.28			
	1.816	11.22	0.372	0.84	3.407	18.98	19.295	-23.13	15.244	-16.70	18.659	-22.24	1.781	10.46	23.138	-6.54	19.542	-21.42	13.80303	19	
21	3.11	22.22	5.07	17.22	6.26	22.19	2.25	9.58	21.30	6.34	1.37	9.21	5.36	19.36	4.29	15.25	2.24	10.20			
	1.941	11.91	0.432	0.83	3.572	19.67	19.368	-23.06	15.229	-16.64	18.659	-22.24	1.788	10.50	23.142	-6.52	19.543	-21.43	13.93445	21	
23	3.04	22.28	5.03	17.19	6.23	22.26	2.21	9.55	21.21	6.25	1.29	9.13	5.28	19.29	4.22	15.18	2.16	10.12			
	2.066	12.58	0.507	0.98	3.739	20.31	19.439	-22.99	15.213	-16.58	18.658	-22.24	1.796	10.54	23.145	-6.50	19.543	-21.43	14.06587	23	
25	2.56	22.35	4.59	17.18	6.21	22.33	2.17	9.52	21.12	6.17	1.21	9.05	5.20	19.21	4.14	15.10	2.08	10.04			
	2.191	13.24	0.598	1.27	3.907	20.92	19.510	-22.91	15.197	-16.52	18.656	-22.24	1.803	10.59	23.149	-6.48	19.543	-21.43	14.19729	25	
27	2.48	22.42	4.55	17.19	6.19	22.39	2.13	9.49	21.03	6.08	1.13	8.57	5.13	19.14	4.06	15.03	2.00	9.56			
	2.317	13.88	0.701	1.70	4.076	21.50	19.580	-22.83	15.181	-16.46	18.654	-22.24	1.810	10.63	23.152	-6.46	19.542	-21.44	14.32871	27	
29	2.40	22.50	4.51	17.21	6.17	22.45	2.08	9.45	20.53	5.60	1.05	8.49	5.05	19.07	3.58	14.55	1.53	9.48			
	2.443	14.51	0.817	2.25	4.246	22.03	19.649	-22.75	15.165	-16.39	18.652	-22.24	1.817	10.67	23.155	-6.44	19.542	-21.44	14.46012	29	

MAJ 2018

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
121	1	Wto	240	1.51233	2.56	2.3414	15.07	1.00752	15.4412	-14.52	61.848	1.4	98	513	1242.8	2014	2143	132.7	623	356	1
122	2	Śro	241	1.55199	3.03	2.3804	15.25	1.00778	16.3445	-17.35	62.381	2.4	94	511	1242.7	2016	2247	220.7	652	352	2
123	3	Czw	242	1.59164	3.10	2.4154	15.43	1.00803	17.2542	-19.28	62.839	3.4	89	509	1242.6	2018	2347	309.1	726	348	3
124	4	Pią	243	2.03130	3.16	2.4544	16.00	1.00829	18.1646	-20.26	63.183	4.4	82	507	1242.5	2019	****	357.8	807	345	4
125	5	Sob	244	2.07095	3.21	2.4936	16.18	1.00854	19.0737	-20.28	63.379	5.4	74	505	1242.4	2021	039	446.4	854	341	5
126	6	Nie	245	2.11061	3.26	2.5327	16.34	1.00879	19.5756	-19.36	63.399	6.4	66	503	1242.3	2023	124	534.5	948	337	6
127	7	Pon	246	2.15027	3.30	2.5720	16.51	1.00903	20.4730	-17.52	63.226	7.4	56	501	1242.2	2024	201	621.8	1047	333	7
128	8	Wto	247	2.18592	3.33	3.0113	17.08	1.00928	21.3619	-15.21	62.858	0.3	47	459	1242.2	2026	233	708.3	1150	329	8
129	9	Śro	248	2.22558	3.36	3.0506	17.24	1.00952	22.2431	-12.09	62.308	1.3	37	458	1242.1	2028	300	754.1	1257	325	9
130	10	Czw	249	2.26523	3.39	3.0901	17.39	1.00976	23.1230	-8.21	61.605	2.3	28	456	1242.1	2030	324	839.5	1406	321	10
131	11	Pią	250	2.30489	3.41	3.1255	17.55	1.00999	0.0045	-4.04	60.793	3.3	19	454	1242.1	2031	345	925.2	1517	317	11
132	12	Sob	251	2.34454	3.42	3.1651	18.10	1.01022	0.4955	0.31	59.929	4.3	12	452	1242.1	2033	406	1011.7	1630	313	12
133	13	Nie	252	2.38420	3.42	3.2047	18.25	1.01045	1.4040	5.13	59.081	5.3	6	451	1242.0	2035	428	1000.0	1747	309	13
134	14	Pon	253	2.42385	3.42	3.2443	18.40	1.01067	2.3342	9.47	58.315	6.3	2	449	1242.0	2036	452	1150.8	1905	305	14
135	15	Wto	254	2.46351	3.42	3.2840	18.54	1.01089	3.2929	13.56	57.696	7.3	0	447	1242.0	2038	519	1244.6	2026	301	15
136	16	Śro	255	2.50316	3.41	3.3238	19.08	1.01110	4.2810	17.19	57.268	0.9	1	446	1242.1	2039	551	1341.6	2145	257	16
137	17	Czw	256	2.54282	3.39	3.3636	19.22	1.01131	5.2919	19.37	57.057	1.9	5	444	1242.1	2041	632	1441.4	2258	253	17
138	18	Pią	257	2.58248	3.37	3.4035	19.35	1.01151	6.3152	20.37	57.064	2.9	12	443	1242.1	2043	724	1542.6	****	249	18
139	19	Sob	258	3.02213	3.34	3.4434	19.48	1.01171	7.3418	20.13	57.267	3.9	20	441	1242.2	2044	826	1643.3	002	246	19
140	20	Nie	259	3.06179	3.31	3.4834	20.00	1.01191	8.3512	18.29	57.628	4.9	31	440	1242.2	2046	937	1742.1	054	242	20
141	21	Pon	260	3.10144	3.27	3.5234	20.13	1.01210	9.3335	15.38	58.102	5.9	42	438	1242.3	2047	1054	1837.9	135	238	21
142	22	Wto	261	3.14110	3.23	3.5635	20.25	1.01228	10.2906	11.55	58.647	0.3	53	437	1242.4	2049	1211	1930.5	208	234	22
143	23	Śro	262	3.18075	3.18	4.0036	20.36	1.01247	11.2201	7.38	59.226	1.3	64	436	1242.4	2050	1328	2020.4	235	230	23
144	24	Czw	263	3.22041	3.13	4.0438	20.48	1.01265	12.1252	3.03	59.813	2.3	74	435	1242.5	2051	1444	2108.3	258	226	24
145	25	Pią	264	3.26006	3.07	4.0841	20.58	1.01283	13.0223	-1.36	60.392	3.3	83	433	1242.6	2053	1557	2155.0	320	222	25
146	26	Sob	265	3.29572	3.01	4.1243	21.09	1.01300	13.5116	-6.06	60.951	4.3	90	432	1242.7	2054	1710	2241.3	340	218	26
147	27	Nie	266	3.33538	2.54	4.1647	21.19	1.01317	14.4008	-10.16	61.486	5.3	95	431	1242.8	2056	1821	2327.9	402	214	27
148	28	Pon	267	3.37503	2.47	4.2050	21.29	1.01334	15.2927	-13.55	61.990	6.3	99	430	1243.0	2057	1930	*****	426	210	28
149	29	Wto	268	3.41469	2.39	4.2455	21.38	1.01351	16.1926	-16.54	62.453	7.3	100	429	1243.1	2058	2036	015.1	453	206	29
150	30	Śro	269	3.45434	2.31	4.2859	21.47	1.01367	17.1005	-19.04	62.862	0.8	99	428	1243.2	2059	2138	103.0	524	202	30
151	31	Czw	270	3.49400	2.23	4.3304	21.56	1.01383	18.0109	-20.22	63.195	1.8	97	427	1243.4	2101	2233	151.6	602	158	31

Fazy Księżycyca [Dm, h.mm]: 3kw 8, 4.09 Now 15, 13.48 1kw 22, 5.49 Pełn 29, 16.19

MAJ 2018 (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	22.58	4.48	17.24	6.16	22.51	2.04	9.42	20.44	5.51	0.57	8.41	4.57	18.60	3.51	14.48	1.45	9.41		
	2.571	15.12	0.944	2.92	4.417	22.53	19.717	-22.67	15.148	-16.33	18.649	-22.24	1.824	10.71	23.159	-6.42	19.542	-21.44	14.59154	1
3	2.23	23.07	4.44	17.29	6.15	22.57	1.60	9.39	20.35	5.43	0.49	8.33	4.50	18.53	3.43	14.40	1.37	9.33		
	2.698	15.71	1.082	3.69	4.589	22.98	19.783	-22.59	15.132	-16.26	18.646	-22.25	1.832	10.75	23.162	-6.40	19.541	-21.45	14.72296	3
5	2.14	23.16	4.40	17.34	6.14	23.03	1.55	9.36	20.26	5.35	0.41	8.25	4.42	18.45	3.35	14.32	1.29	9.25		
	2.827	16.29	1.230	4.57	4.762	23.39	19.848	-22.51	15.115	-16.19	18.642	-22.25	1.839	10.78	23.165	-6.38	19.540	-21.45	14.85439	5
7	2.04	23.26	4.36	17.41	6.14	23.08	1.50	9.32	20.16	5.26	0.33	8.17	4.34	18.38	3.27	14.25	1.21	9.17		
	2.956	16.85	1.387	5.53	4.936	23.76	19.912	-22.43	15.098	-16.12	18.638	-22.25	1.846	10.82	23.167	-6.37	19.539	-21.46	14.98581	7
9	1.53	23.38	4.33	17.49	6.14	23.14	1.46	9.29	20.07	5.18	0.25	8.09	4.27	18.31	3.19	14.17	1.13	9.09		
	3.085	17.39	1.554	6.57	5.110	24.08	19.975	-22.35	15.081	-16.06	18.633	-22.26	1.853	10.86	23.170	-6.35	19.538	-21.46	15.11722	9
11	1.41	23.51	4.29	17.58	6.14	23.19	1.41	9.25	19.58	5.09	0.17	8.01	4.19	18.24	3.12	14.10	1.05	9.01		
	3.215	17.92	1.730	7.68	5.285	24.36	20.036	-22.27	15.064	-15.99	18.628	-22.26	1.860	10.90	23.173	-6.34	19.537	-21.47	15.24864	11
13	1.26	0.19	4.26	18.07	6.15	23.23	1.36	9.21	19.48	5.01	0.08	7.52	4.11	18.16	3.04	14.02	0.57	8.53		
	3.346	18.42	1.915	8.85	5.461	24.59	20.096	-22.20	15.047	-15.92	18.623	-22.27	1.867	10.94	23.175	-6.32	19.536	-21.48	15.38006	13
15	1.28	2.55	4.23	18.18	6.16	23.27	1.31	9.17	19.39	4.52	23.56	7.44	4.04	18.09	2.56	13.54	0.49	8.45		
	3.478	18.90	2.110	10.08	5.637	24.78	20.154	-22.12	15.030	-15.85	18.617	-22.27	1.873	10.98	23.177	-6.31	19.534	-21.48	15.51148	15
17	*****	*****	4.20	18.30	6.18	23.31	1.26	9.13	19.30	4.44	23.48	7.36	3.56	18.02	2.48	13.47	0.42	8.37		
	3.610	19.36	2.315	11.36	5.813	24.92	20.210	-22.05	15.013	-15.79	18.610	-22.28	1.880	11.01	23.180	-6.30	19.533	-21.49	15.64290	17
19	*****	*****	4.17	18.43	6.19	23.35	1.21	9.09	19.21	4.35	23.40	7.28	3.48	17.55	2.40	13.39	0.34	8.29		
	3.743	19.80	2.530	12.67	5.989	25.01	20.265	-21.99	14.996	-15.72	18.604	-22.29	1.887	11.05	23.182	-6.28	19.531	-21.49	15.77432	19
21	*****	*****	4.15	18.56	6.22	23.38	1.16	9.05	19.11	4.27	23.32	7.19	3.41	17.47	2.33	13.31	0.26	8.21		
	3.876	20.21	2.756	14.01	6.165	25.05	20.318	-21.93	14.980	-15.66	18.597	-22.29	1.893	11.09	23.184	-6.27	19.529	-21.50	15.90574	21
23	*****	*****	4.13	19.11	6.24	23.40	1.11	9.01	19.02	4.18	23.23	7.11	3.33	17.40	2.25	13.23	0.18	8.13		
	4.010	20.60	2.994	15.36	6.340	25.05	20.369	-21.88	14.964	-15.59	18.590	-22.30	1.900	11.12	23.186	-6.26	19.527	-21.51	16.03716	23
25	*****	*****	4.12	19.26	6.27	23.42	1.06	8.56	18.53	4.10	23.15	7.03	3.25	17.33	2.17	13.16	0.10	8.05		
	4.145	20.97	3.244	16.70	6.516	24.99	20.418	-21.83	14.948	-15.53	18.582	-22.31	1.906	11.16	23.187	-6.25	19.525	-21.52	16.16858	25
27	*****	*****	4.11	19.43	6.31	23.44	1.00	8.51	18.44	4.02	23.07	6.54	3.18	17.26	2.09	13.08	0.02	7.57		
	4.280	21.32	3.507	18.03	6.690	24.90	20.465	-21.79	14.933	-15.47	18.574	-22.32	1.913	11.19	23.189	-6.25	19.523	-21.52	16.30000	27
29	*****	*****	4.11	20.00	6.35	23.45	0.55	8.46	18.35	3.53	22.59	6.46	3.10	17.18	2.01	13.00	23.50	7.49		
	4.415	21.64	3.781	19.31	6.864	24.75	20.510	-21.75	14.918	-15.41	18.566	-22.32	1.919	11.22	23.190	-6.24	19.521	-21.53	16.43142	29
31	*****	*****	4.12	20.18	6.39	23.46	0.49	8.41	18.26	3.45	22.50	6.37	3.02	17.11	1.54	12.53	23.42	7.41		
	4.551	21.93	4.068	20.52	7.037	24.56	20.553	-21.73	14.904	-15.36	18.557	-22.33	1.925	11.26	23.192	-6.23	19.519	-21.54	16.56284	31

CZERWIEC 2018

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
152	1	Pią	271	3.53366	2.14	4.3710	22.04	1.01399	18.5214	-20.43	63.430	2.8	93	426	1243.5	2102	2321	240.4	647	154	1	
153	2	Sob	272	3.57331	2.05	4.4116	22.12	1.01415	19.4252	-20.09	63.542	3.8	87	425	1243.7	2103	****	328.8	738	150	2	
154	3	Nie	273	4.01297	1.55	4.4522	22.20	1.01430	20.3241	-18.42	63.506	4.8	80	424	1243.8	2104	002	416.6	835	147	3	
155	4	Pon	274	4.05262	1.45	4.4929	22.27	1.01445	21.2132	-16.26	63.302	5.8	72	424	1244.0	2105	036	503.2	937	143	4	
156	5	Wto	275	4.09228	1.34	4.5336	22.33	1.01459	22.0927	-13.28	62.921	6.8	63	423	1244.2	2106	104	548.8	1042	139	5	
157	6	Śro	276	4.13193	1.23	4.5743	22.40	1.01474	22.5644	-9.54	62.362	7.8	54	422	1244.4	2107	128	633.6	1148	135	6	
158	7	Czw	277	4.17159	1.12	5.0151	22.46	1.01487	23.4354	-5.50	61.641	0.6	44	422	1244.5	2108	150	718.2	1257	131	7	
159	8	Pią	278	4.21124	1.01	5.0558	22.51	1.01501	0.3136	-1.25	60.790	1.6	34	421	1244.7	2109	211	803.2	1408	127	8	
160	9	Sob	279	4.25090	0.49	5.1007	22.56	1.01513	1.2036	3.12	59.858	2.6	24	421	1244.9	2110	231	849.4	1522	123	9	
161	10	Nie	280	4.29055	0.37	5.1415	23.01	1.01526	2.1142	7.49	58.909	3.6	15	420	1245.1	2111	253	937.9	1638	119	10	
162	11	Pon	281	4.33021	0.25	5.1824	23.05	1.01537	3.0541	12.11	58.018	4.6	8	420	1245.3	2111	317	1029.4	1757	115	11	
163	12	Wto	282	4.36587	0.13	5.2233	23.09	1.01548	4.0302	15.58	57.261	5.6	3	419	1245.5	2112	346	1124.7	1918	111	12	
164	13	Śro	283	4.40552	0.00	5.2642	23.13	1.01559	5.0346	18.50	56.709	6.6	0	419	1245.7	2113	423	1223.7	2036	107	13	
165	14	Czw	284	4.44518	-0.13	5.3051	23.16	1.01569	6.0705	20.28	56.411	0.6	1	419	1246.0	2113	510	1325.8	2146	103	14	
166	15	Pią	285	4.48484	-0.25	5.3501	23.19	1.01578	7.1129	20.39	56.389	1.6	4	419	1246.2	2114	608	1428.9	2246	059	15	
167	16	Sob	286	4.52449	-0.38	5.3910	23.21	1.01587	8.1506	19.22	56.632	2.6	10	419	1246.4	2114	718	1530.9	2333	055	16	
168	17	Nie	287	4.56415	-0.52	5.4320	23.23	1.01595	9.1621	16.47	57.102	3.6	18	419	1246.6	2115	836	1630.1	****	052	17	
169	18	Pon	288	5.00380	-1.05	5.4730	23.24	1.01603	10.1426	13.12	57.743	4.6	28	419	1246.8	2115	956	1725.6	010	048	18	
170	19	Wto	289	5.04346	-1.18	5.5139	23.25	1.01610	11.0916	8.56	58.489	5.6	39	419	1247.0	2115	1115	1817.6	040	044	19	
171	20	Śro	290	5.08311	-1.31	5.5549	23.26	1.01617	12.0121	4.20	59.279	6.6	50	419	1247.3	2116	1232	1906.7	105	040	20	
172	21	Czw	291	5.12277	-1.44	5.5959	23.26	1.01623	12.5126	-0.23	60.062	1.0	60	419	1247.5	2116	1347	1953.9	127	036	21	
173	22	Pią	292	5.16242	-1.57	6.0408	23.26	1.01629	13.4021	-4.57	60.799	2.0	70	419	1247.7	2116	1500	2040.1	148	032	22	
174	23	Sob	293	5.20208	-2.10	6.0818	23.25	1.01634	14.2851	-9.13	61.466	3.0	79	419	1247.9	2116	1611	2126.1	209	028	23	
175	24	Nie	294	5.24173	-2.23	6.1227	23.24	1.01639	15.1732	-12.60	62.051	4.0	87	420	1248.1	2116	1720	2212.5	232	024	24	
176	25	Pon	295	5.28139	-2.35	6.1636	23.23	1.01643	16.0649	-16.09	62.548	5.0	93	420	1248.3	2116	1827	2259.6	257	020	25	
177	26	Wto	296	5.32105	-2.48	6.2045	23.21	1.01648	16.5650	-18.34	62.957	6.0	97	421	1248.5	2116	1930	2347.6	326	016	26	
178	27	Śro	297	5.36070	-3.00	6.2454	23.19	1.01651	17.4730	-20.07	63.277	7.0	99	421	1248.8	2116	2028	*****	401	012	27	
179	28	Czw	298	5.40036	-3.13	6.2903	23.16	1.01655	18.3828	-20.45	63.506	0.2	100	422	1249.0	2116	2119	036.1	443	008	28	
180	29	Pią	299	5.44002	-3.25	6.3312	23.13	1.01658	19.2915	-20.28	63.636	1.2	99	422	1249.2	2116	2202	124.7	532	004	29	
181	30	Sob	300	5.47567	-3.37	6.3720	23.09	1.01661	20.1922	-19.16	63.659	2.2	96	423	1249.4	2115	2238	212.7	627	000	30	

Fazy Księżyca [Dm, h.mm]: 3kw 6, 20.32 Now 13, 21.43 1kw 20, 12.51 Pełn 28, 6.53

CZERWIEC 2018 (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	*****	*****	4.13	20.27	6.41	23.47	0.47	8.39	18.21	3.41	22.46	6.33	2.58	17.07	1.50	12.49	23.38	7.37		
	4.619	22.07	4.216	21.10	7.124	24.45	20.574	-21.72	14.897	-15.33	18.553	-22.34	1.928	11.27	23.192	-6.23	19.518	-21.54	16.62855	1
3	*****	*****	4.15	20.45	6.45	23.47	0.41	8.33	18.12	3.32	22.38	6.25	2.51	16.60	1.42	12.41	23.30	7.28		
	4.756	22.33	4.518	22.16	7.296	24.19	20.614	-21.71	14.883	-15.28	18.544	-22.34	1.934	11.31	23.194	-6.22	19.515	-21.55	16.75998	3
5	*****	*****	4.19	21.03	6.50	23.47	0.35	8.27	18.03	3.24	22.29	6.16	2.43	16.53	1.34	12.33	23.22	7.20		
	4.893	22.56	4.829	23.09	7.466	23.88	20.651	-21.70	14.870	-15.22	18.535	-22.35	1.940	11.34	23.195	-6.22	19.513	-21.56	16.89140	5
7	*****	*****	4.24	21.20	6.55	23.46	0.30	8.22	17.54	3.16	22.21	6.08	2.35	16.45	1.26	12.25	23.14	7.12		
	5.031	22.76	5.145	23.86	7.636	23.53	20.685	-21.71	14.857	-15.18	18.525	-22.36	1.945	11.37	23.195	-6.21	19.510	-21.57	17.02281	7
9	*****	*****	4.30	21.36	7.01	23.45	0.24	8.16	17.45	3.07	22.13	5.59	2.28	16.38	1.18	12.18	23.06	7.04		
	5.169	22.94	5.463	24.46	7.804	23.14	20.717	-21.74	14.845	-15.13	18.516	-22.37	1.951	11.40	23.196	-6.21	19.507	-21.58	17.15423	9
11	*****	*****	4.38	21.50	7.06	23.44	0.18	8.09	17.37	2.59	22.04	5.51	2.20	16.31	1.11	12.10	22.58	6.56		
	5.307	23.09	5.779	24.87	7.970	22.71	20.746	-21.77	14.833	-15.09	18.506	-22.38	1.956	11.43	23.197	-6.21	19.505	-21.59	17.28565	11
13	*****	*****	4.46	22.03	7.12	23.43	0.12	8.03	17.28	2.51	21.56	5.42	2.12	16.23	1.03	12.02	22.50	6.48		
	5.445	23.21	6.091	25.10	8.136	22.24	20.773	-21.81	14.823	-15.05	18.496	-22.39	1.962	11.45	23.197	-6.21	19.502	-21.60	17.41707	13
15	*****	*****	4.56	22.14	7.17	23.41	0.06	7.56	17.19	2.42	21.48	5.34	2.05	16.16	0.55	11.54	22.42	6.40		
	5.584	23.31	6.395	25.15	8.299	21.73	20.796	-21.87	14.812	-15.01	18.486	-22.40	1.967	11.48	23.198	-6.21	19.499	-21.61	17.54850	15
17	*****	*****	5.07	22.23	7.23	23.39	23.56	7.48	17.10	2.34	21.39	5.25	1.57	16.08	0.47	11.46	22.34	6.32		
	5.722	23.38	6.690	25.02	8.461	21.18	20.816	-21.95	14.803	-14.97	18.475	-22.41	1.972	11.51	23.198	-6.21	19.496	-21.62	17.67992	17
19	*****	*****	5.19	22.29	7.29	23.36	23.50	7.41	17.02	2.26	21.31	5.17	1.49	16.01	0.39	11.38	22.26	6.24		
	5.861	23.42	6.973	24.74	8.621	20.60	20.833	-22.03	14.794	-14.94	18.465	-22.42	1.976	11.53	23.198	-6.21	19.493	-21.63	17.81134	19
21	*****	*****	5.30	22.34	7.35	23.33	23.43	7.33	16.53	2.18	21.22	5.08	1.41	15.53	0.31	11.30	22.19	6.16		
	6.000	23.44	7.244	24.32	8.780	19.98	20.847	-22.13	14.786	-14.92	18.455	-22.43	1.981	11.56	23.198	-6.21	19.490	-21.64	17.94276	21
23	*****	*****	5.42	22.37	7.41	23.30	23.37	7.25	16.45	2.10	21.14	4.59	1.34	15.46	0.23	11.23	22.11	6.07		
	6.138	23.42	7.501	23.78	8.937	19.33	20.857	-22.25	14.779	-14.89	18.444	-22.43	1.986	11.58	23.198	-6.21	19.486	-21.65	18.07418	23
25	*****	*****	5.54	22.39	7.47	23.27	23.30	7.17	16.37	2.02	21.05	4.51	1.26	15.39	0.16	11.15	22.03	5.59		
	6.277	23.38	7.744	23.13	9.092	18.65	20.865	-22.38	14.772	-14.87	18.434	-22.44	1.990	11.60	23.197	-6.22	19.483	-21.66	18.20560	25
27	*****	*****	6.06	22.39	7.53	23.24	23.24	7.08	16.28	1.53	20.57	4.42	1.18	15.31	0.08	11.07	21.55	5.51		
	6.415	23.31	7.974	22.39	9.245	17.94	20.868	-22.52	14.767	-14.85	18.423	-22.45	1.994	11.63	23.197	-6.22	19.480	-21.67	18.33702	27
29	*****	*****	6.17	22.38	7.59	23.20	23.17	6.59	16.20	1.45	20.49	4.34	1.10	15.24	23.56	10.59	21.47	5.43		
	6.553	23.22	8.190	21.58	9.396	17.20	20.869	-22.67	14.762	-14.84	18.412	-22.46	1.998	11.65	23.196	-6.22	19.477	-21.68	18.46844	29

LIPIEC 2018

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
182	1	Nie	301	5.51533	-3.48	6.4128	23.06	1.01663	21.0831	-17.14	63.559	3.2	91	424	1249.6	2115	2308	259.8	727	2353	1	
183	2	Pon	302	5.55498	-3.60	6.4536	23.01	1.01665	21.5634	-14.29	63.324	4.2	85	424	1249.7	2115	2333	345.7	831	2349	2	
184	3	Wto	303	5.59464	-4.11	6.4944	22.57	1.01667	22.4341	-11.06	62.942	5.2	77	425	1249.9	2114	2356	430.6	936	2345	3	
185	4	Śro	304	6.03429	-4.22	6.5351	22.51	1.01668	23.3015	-7.13	62.408	6.2	69	426	1250.1	2114	****	514.6	1044	2341	4	
186	5	Czw	305	6.07395	-4.32	6.5759	22.46	1.01669	0.1650	-2.58	61.724	7.2	59	427	1250.3	2113	016	558.5	1152	2337	5	
187	6	Pią	306	6.11360	-4.42	7.0205	22.40	1.01670	1.0409	1.30	60.910	0.1	49	428	1250.5	2113	036	642.9	1303	2333	6	
188	7	Sob	307	6.15326	-4.52	7.0612	22.34	1.01670	1.5304	6.02	59.999	1.1	39	429	1250.6	2112	056	728.9	1416	2329	7	
189	8	Nie	308	6.19292	-5.02	7.1018	22.27	1.01669	2.4424	10.25	59.040	2.1	28	430	1250.8	2111	118	817.4	1531	2325	8	
190	9	Pon	309	6.23257	-5.11	7.1423	22.20	1.01668	3.3856	14.24	58.102	3.1	19	431	1250.9	2110	144	909.4	1649	2321	9	
191	10	Wto	310	6.27223	-5.19	7.1829	22.13	1.01666	4.3708	17.40	57.260	4.1	11	432	1251.1	2110	216	1005.3	1808	2317	10	
192	11	Śro	311	6.31188	-5.28	7.2234	22.05	1.01664	5.3849	19.53	56.595	5.1	4	433	1251.2	2109	256	1105.3	1923	2313	11	
193	12	Czw	312	6.35154	-5.36	7.2638	21.57	1.01661	6.4301	20.45	56.173	6.1	1	434	1251.3	2108	348	1208.1	2029	2309	12	
194	13	Pią	313	6.39120	-5.43	7.3042	21.48	1.01657	7.4759	20.07	56.041	0.3	0	435	1251.5	2107	453	1311.9	2123	2305	13	
195	14	Sob	314	6.43085	-5.50	7.3445	21.39	1.01653	8.5148	18.02	56.211	1.3	3	436	1251.6	2106	609	1414.1	2206	2301	14	
196	15	Nie	315	6.47051	-5.56	7.3848	21.30	1.01648	9.5258	14.44	56.661	2.3	8	438	1251.7	2105	731	1513.3	2240	2257	15	
197	16	Pon	316	6.51016	-6.02	7.4251	21.20	1.01643	10.5049	10.33	57.339	3.3	15	439	1251.8	2104	853	1608.8	2308	2254	16	
198	17	Wto	317	6.54582	-6.07	7.4653	21.10	1.01637	11.4529	5.53	58.174	4.3	25	440	1251.9	2103	1014	1700.8	2332	2250	17	
199	18	Śro	318	6.58547	-6.12	7.5054	20.60	1.01630	12.3732	1.03	59.089	5.3	35	442	1252.0	2101	1133	1750.0	2354	2246	18	
200	19	Czw	319	7.02513	-6.17	7.5455	20.49	1.01623	13.2746	-3.41	60.012	6.3	46	443	1252.0	2100	1248	1837.5	****	2242	19	
201	20	Pią	320	7.06478	-6.20	7.5855	20.38	1.01615	14.1659	-8.06	60.884	0.6	56	444	1252.1	2059	1401	1924.1	015	2238	20	
202	21	Sob	321	7.10444	-6.23	8.0255	20.26	1.01607	15.0555	-12.03	61.663	1.6	66	446	1252.1	2057	1511	2010.5	037	2234	21	
203	22	Nie	322	7.14409	-6.26	8.0654	20.14	1.01599	15.5504	-15.24	62.322	2.6	75	447	1252.2	2056	1619	2057.4	102	2230	22	
204	23	Pon	323	7.18375	-6.28	8.1052	20.02	1.01590	16.4445	-17.60	62.849	3.6	83	449	1252.2	2055	1723	2144.9	130	2226	23	
205	24	Wto	324	7.22341	-6.29	8.1450	19.50	1.01581	17.3503	-19.47	63.242	4.6	90	450	1252.2	2053	1822	2233.0	202	2222	24	
206	25	Śro	325	7.26306	-6.30	8.1847	19.37	1.01571	18.2545	-20.40	63.507	5.6	95	452	1252.2	2052	1915	2321.4	242	2218	25	
207	26	Czw	326	7.30272	-6.30	8.2244	19.24	1.01561	19.1628	-20.37	63.653	6.6	98	453	1252.2	2050	2001	*****	328	2214	26	
208	27	Pią	327	7.34238	-6.29	8.2640	19.10	1.01551	20.0647	-19.39	63.688	7.6	100	455	1252.2	2049	2039	009.6	421	2210	27	
209	28	Sob	328	7.38203	-6.28	8.3036	18.57	1.01541	20.5616	-17.50	63.617	0.6	100	456	1252.2	2047	2111	057.1	519	2206	28	
210	29	Nie	329	7.42169	-6.27	8.3430	18.42	1.01530	21.4444	-15.15	63.444	1.6	98	458	1252.2	2045	2138	143.6	622	2202	29	
211	30	Pon	330	7.46134	-6.24	8.3825	18.28	1.01519	22.3209	-12.00	63.166	2.6	94	459	1252.2	2044	2202	228.8	727	2159	30	
212	31	Wto	331	7.50100	-6.21	8.4218	18.13	1.01507	23.1847	-8.15	62.779	3.6	89	501	1252.1	2042	2223	313.1	834	2155	31	

Fazy Księżyca [Dm, h.mm]: 3kw 6, 9.51 Now 13, 4.48 1kw 19, 21.52 Pełn 27, 22.20

LIPIEC 2018 (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	*****	*****	6.27	22.36	8.05	23.16	23.10	6.50	16.12	1.37	20.40	4.25	1.03	15.16	23.48	10.51	21.39	5.35		
	6.691	23.09	8.391	20.71	9.545	16.43	20.865	-22.84	14.757	-14.83	18.402	-22.47	2.002	11.67	23.195	-6.23	19.473	-21.69	18.59987	1
3	*****	*****	6.37	22.33	8.11	23.12	23.03	6.40	16.04	1.29	20.32	4.17	0.55	15.09	23.40	10.43	21.31	5.27		
	6.829	22.94	8.579	19.79	9.693	15.64	20.859	-23.01	14.754	-14.82	18.391	-22.48	2.006	11.69	23.195	-6.24	19.470	-21.70	18.73129	3
5	*****	*****	6.46	22.29	8.17	23.08	22.56	6.30	15.56	1.21	20.23	4.08	0.47	15.01	23.32	10.35	21.23	5.19		
	6.966	22.77	8.753	18.85	9.839	14.83	20.849	-23.20	14.751	-14.82	18.381	-22.49	2.009	11.70	23.194	-6.25	19.467	-21.71	18.86270	5
7	*****	*****	6.54	22.24	8.23	23.04	22.49	6.20	15.48	1.13	20.15	3.59	0.39	14.53	23.24	10.27	21.15	5.10		
	7.103	22.56	8.913	17.88	9.983	13.99	20.835	-23.40	14.749	-14.82	18.370	-22.50	2.012	11.72	23.192	-6.25	19.463	-21.72	18.99412	7
9	*****	*****	7.02	22.19	8.29	22.59	22.42	6.10	15.40	1.05	20.06	3.51	0.32	14.46	23.16	10.19	21.07	5.02		
	7.240	22.33	9.059	16.91	10.126	13.13	20.818	-23.61	14.748	-14.82	18.360	-22.51	2.015	11.74	23.191	-6.26	19.460	-21.73	19.12554	9
11	*****	*****	7.08	22.13	8.34	22.55	22.34	5.59	15.32	0.57	19.58	3.42	0.24	14.38	23.09	10.11	20.59	4.54		
	7.376	22.08	9.190	15.95	10.266	12.26	20.797	-23.82	14.748	-14.83	18.350	-22.52	2.018	11.75	23.190	-6.27	19.456	-21.74	19.25697	11
13	*****	*****	7.13	22.06	8.40	22.50	22.27	5.48	15.24	0.50	19.50	3.34	0.16	14.31	23.01	10.03	20.51	4.46		
	7.512	21.80	9.306	15.00	10.405	11.36	20.773	-24.04	14.748	-14.84	18.340	-22.52	2.021	11.77	23.188	-6.28	19.453	-21.75	19.38839	13
15	*****	*****	7.16	21.58	8.46	22.45	22.19	5.37	15.16	0.42	19.41	3.25	0.08	14.23	22.53	9.55	20.43	4.38		
	7.647	21.49	9.406	14.10	10.543	10.45	20.747	-24.26	14.750	-14.86	18.330	-22.53	2.024	11.78	23.187	-6.29	19.449	-21.76	19.51981	15
17	*****	*****	7.19	21.50	8.51	22.40	22.11	5.25	15.09	0.34	19.33	3.17	23.57	14.15	22.45	9.47	20.35	4.30		
	7.781	21.17	9.490	13.23	10.679	9.53	20.717	-24.49	14.752	-14.88	18.320	-22.54	2.026	11.79	23.185	-6.31	19.446	-21.77	19.65123	17
19	*****	*****	7.19	21.42	8.57	22.35	22.03	5.14	15.01	0.26	19.24	3.08	23.49	14.08	22.37	9.39	20.27	4.22		
	7.915	20.81	9.556	12.44	10.813	8.60	20.686	-24.71	14.755	-14.90	18.311	-22.55	2.028	11.80	23.183	-6.32	19.443	-21.78	19.78265	19
21	*****	*****	7.19	21.33	9.02	22.30	21.55	5.02	14.54	0.18	19.16	2.60	23.41	13.60	22.29	9.31	20.19	4.13		
	8.049	20.44	9.604	11.71	10.945	7.65	20.652	-24.92	14.758	-14.93	18.302	-22.56	2.030	11.81	23.181	-6.33	19.439	-21.79	19.91406	21
23	*****	*****	7.16	21.23	9.07	22.25	21.47	4.51	14.46	0.10	19.08	2.51	23.33	13.52	22.21	9.23	20.11	4.05		
	8.181	20.04	9.634	11.09	11.077	6.69	20.617	-25.13	14.763	-14.96	18.293	-22.57	2.032	11.82	23.179	-6.35	19.436	-21.80	20.04549	23
25	*****	*****	7.12	21.13	9.12	22.19	21.38	4.39	14.39	0.03	18.59	2.43	23.25	13.44	22.13	9.15	20.03	3.57		
	8.313	19.62	9.643	10.57	11.206	5.73	20.580	-25.33	14.768	-14.99	18.284	-22.57	2.033	11.83	23.177	-6.36	19.432	-21.81	20.17691	25
27	*****	*****	7.05	21.02	9.17	22.14	21.30	4.27	14.32	23.51	18.51	2.35	23.17	13.37	22.05	9.07	19.55	3.49		
	8.444	19.17	9.631	10.18	11.334	4.75	20.542	-25.52	14.774	-15.02	18.275	-22.58	2.034	11.83	23.175	-6.38	19.429	-21.82	20.30833	27
29	1.10	0.05	6.57	20.51	9.22	22.08	21.21	4.16	14.25	23.43	18.43	2.26	23.10	13.29	21.57	8.59	19.47	3.41		
	8.575	18.71	9.599	9.94	11.461	3.78	20.504	-25.69	14.781	-15.06	18.267	-22.59	2.035	11.84	23.173	-6.39	19.426	-21.83	20.43975	29
31	1.35	-0.06	6.47	20.39	9.27	22.03	21.12	4.04	14.17	23.36	18.35	2.18	23.02	13.21	21.50	8.50	19.39	3.33		
	8.705	18.22	9.547	9.86	11.586	2.80	20.466	-25.86	14.788	-15.11	18.259	-22.60	2.036	11.84	23.170	-6.41	19.423	-21.84	20.57117	31

SIERPIEŃ 2018

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
213	1	Śro	332	7.54065	-6.18	8.4611	17.58	1.01495	0.0504	-4.06	62.280	4.6	82	503	1252.0	2040	2242	356.8	942	2151	1
214	2	Czw	333	7.58031	-6.14	8.5004	17.43	1.01483	0.5135	0.16	61.667	5.6	74	504	1252.0	2039	2302	440.5	1051	2147	2
215	3	Pią	334	8.01596	-6.09	8.5356	17.28	1.01471	1.3905	4.43	60.949	6.6	64	506	1251.9	2037	2323	525.0	1202	2143	3
216	4	Sob	335	8.05562	-6.04	8.5747	17.12	1.01458	2.2823	9.04	60.142	7.6	54	508	1251.8	2035	2346	611.3	1314	2139	4
217	5	Nie	336	8.09527	-5.58	9.0138	16.56	1.01444	3.2014	13.06	59.278	0.7	43	509	1251.7	2033	****	700.2	1429	2135	5
218	6	Pon	337	8.13493	-5.52	9.0528	16.39	1.01430	4.1519	16.33	58.407	1.7	32	511	1251.6	2031	014	752.5	1545	2131	6
219	7	Wto	338	8.17459	-5.45	9.0918	16.22	1.01416	5.1353	19.08	57.589	2.7	22	513	1251.5	2029	049	848.7	1659	2127	7
220	8	Śro	339	8.21424	-5.37	9.1307	16.06	1.01401	6.1535	20.33	56.896	3.7	13	514	1251.4	2027	133	948.5	1809	2123	8
221	9	Czw	340	8.25390	-5.29	9.1655	15.48	1.01386	7.1918	20.35	56.400	4.7	6	516	1251.2	2025	230	1050.8	1908	2119	9
222	10	Pią	341	8.29355	-5.20	9.2043	15.31	1.01370	8.2321	19.08	56.159	5.7	2	518	1251.1	2023	340	1153.6	1957	2115	10
223	11	Sob	342	8.33321	-5.11	9.2430	15.13	1.01354	9.2603	16.20	56.207	0.0	0	519	1250.9	2021	459	1254.7	2036	2111	11
224	12	Nie	343	8.37286	-5.01	9.2817	14.55	1.01337	10.2615	12.26	56.546	1.0	2	521	1250.8	2019	623	1353.1	2107	2107	12
225	13	Pon	344	8.41252	-4.51	9.3203	14.37	1.01320	11.2331	7.50	57.145	2.0	6	523	1250.6	2017	747	1448.2	2133	2103	13
226	14	Wto	345	8.45217	-4.40	9.3548	14.19	1.01302	12.1803	2.53	57.945	3.0	13	524	1250.4	2015	909	1540.2	2156	2100	14
227	15	Śro	346	8.49183	-4.28	9.3934	13.60	1.01283	13.1025	-2.04	58.868	4.0	21	526	1250.2	2013	1028	1630.0	2218	2056	15
228	16	Czw	347	8.53148	-4.16	9.4318	13.41	1.01264	14.0119	-6.45	59.837	5.0	31	528	1250.0	2011	1145	1718.4	2241	2052	16
229	17	Pią	348	8.57114	-4.04	9.4702	13.22	1.01245	14.5128	-10.58	60.776	6.0	41	529	1249.8	2009	1258	1806.0	2305	2048	17
230	18	Sob	349	9.01079	-3.50	9.5045	13.03	1.01225	15.4124	-14.34	61.627	0.1	51	531	1249.6	2007	1408	1853.5	2332	2044	18
231	19	Nie	350	9.05045	-3.37	9.5428	12.43	1.01205	16.3130	-17.25	62.347	1.1	61	533	1249.4	2005	1514	1941.3	****	2040	19
232	20	Pon	351	9.09011	-3.23	9.5811	12.24	1.01185	17.2156	-19.25	62.909	2.1	70	535	1249.1	2002	1616	2029.5	003	2036	20
233	21	Wto	352	9.12576	-3.08	10.0153	12.04	1.01164	18.1238	-20.33	63.305	3.1	78	536	1248.9	2000	1711	2117.8	040	2032	21
234	22	Śro	353	9.16542	-2.53	10.0534	11.44	1.01143	19.0322	-20.44	63.536	4.1	86	538	1248.6	1958	1759	2206.1	124	2028	22
235	23	Czw	354	9.20507	-2.37	10.0915	11.23	1.01122	19.5346	-20.00	63.614	5.1	92	540	1248.4	1956	1840	2253.8	215	2024	23
236	24	Pią	355	9.24473	-2.21	10.1256	11.03	1.01100	20.4331	-18.23	63.558	6.1	96	541	1248.1	1954	1914	2340.7	312	2020	24
237	25	Sob	356	9.28438	-2.05	10.1636	10.42	1.01078	21.3221	-15.58	63.387	7.1	99	543	1247.8	1951	1942	****	413	2016	25
238	26	Nie	357	9.32404	-1.48	10.2015	10.21	1.01057	22.2015	-12.51	63.120	8.1	100	545	1247.5	1949	2007	026.6	518	2012	26
239	27	Pon	358	9.36369	-1.31	10.2355	10.00	1.01034	23.0721	-9.11	62.771	0.9	99	547	1247.3	1947	2028	111.4	625	2008	27
240	28	Wto	359	9.40335	-1.13	10.2734	9.39	1.01012	23.5357	-5.04	62.351	1.9	97	548	1247.0	1944	2048	155.5	733	2004	28
241	29	Śro	360	9.44300	-0.55	10.3112	9.18	1.00990	0.4034	-0.42	61.866	2.9	92	550	1246.7	1942	2108	239.4	843	2001	29
242	30	Czw	361	9.48266	-0.37	10.3450	8.57	1.00967	1.2747	3.46	61.321	3.9	86	552	1246.4	1940	2128	323.7	953	1957	30
243	31	Pią	362	9.52231	-0.18	10.3828	8.35	1.00944	2.1618	8.08	60.718	4.9	78	553	1246.1	1938	2150	409.2	1104	1953	31

Fazy Księżyca [Dm, h.mm]: 3kw 4, 20.18 Now 11, 11.58 1kw 18, 9.48 Pełn 26, 13.56

SIERPIEŃ 2018 (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	1.43	23.55	6.41	20.33	9.30	21.60	21.08	3.59	14.14	23.32	18.30	2.14	22.58	13.17	21.46	8.46	19.35	3.29		
	8.770	17.97	9.514	9.88	11.648	2.31	20.447	-25.93	14.792	-15.13	18.255	-22.60	2.037	11.84	23.169	-6.42	19.421	-21.85	20.63688	1
3	1.56	23.43	6.27	20.22	9.34	21.54	20.59	3.47	14.07	23.24	18.22	2.05	22.50	13.09	21.38	8.38	19.27	3.21		
	8.899	17.46	9.436	10.04	11.772	1.32	20.410	-26.07	14.801	-15.17	18.248	-22.61	2.037	11.84	23.166	-6.43	19.418	-21.86	20.76829	3
5	2.08	23.32	6.12	20.10	9.39	21.48	20.50	3.36	13.60	23.17	18.14	1.57	22.42	13.02	21.30	8.30	19.19	3.13		
	9.027	16.93	9.344	10.37	11.893	0.34	20.373	-26.19	14.810	-15.22	18.241	-22.61	2.038	11.85	23.164	-6.45	19.415	-21.87	20.89971	5
7	2.18	23.22	5.55	19.59	9.44	21.42	20.41	3.25	13.53	23.09	18.06	1.49	22.34	12.54	21.22	8.22	19.11	3.04		
	9.155	16.37	9.246	10.83	12.014	-0.64	20.338	-26.29	14.820	-15.28	18.234	-22.62	2.038	11.85	23.161	-6.47	19.412	-21.88	21.03114	7
9	2.27	23.13	5.38	19.49	9.48	21.36	20.31	3.15	13.46	23.01	17.58	1.40	22.26	12.46	21.14	8.14	19.03	2.56		
	9.282	15.81	9.146	11.42	12.133	-1.63	20.305	-26.37	14.831	-15.33	18.228	-22.63	2.038	11.84	23.158	-6.49	19.409	-21.89	21.16256	9
11	2.35	23.04	5.21	19.39	9.52	21.30	20.22	3.05	13.39	22.54	17.49	1.32	22.19	12.38	21.06	8.06	18.55	2.48		
	9.408	15.22	9.053	12.10	12.251	-2.60	20.273	-26.43	14.842	-15.39	18.222	-22.63	2.037	11.84	23.155	-6.51	19.406	-21.89	21.29398	11
13	2.43	22.55	5.04	19.31	9.57	21.24	20.13	2.55	13.32	22.46	17.41	1.24	22.11	12.30	20.58	7.58	18.47	2.40		
	9.534	14.62	8.974	12.81	12.367	-3.57	20.245	-26.47	14.854	-15.45	18.216	-22.64	2.037	11.84	23.152	-6.53	19.403	-21.90	21.42540	13
15	2.51	22.47	4.48	19.24	10.01	21.18	20.04	2.45	13.26	22.39	17.33	1.16	22.03	12.22	20.50	7.50	18.39	2.32		
	9.659	14.00	8.916	13.53	12.482	-4.54	20.219	-26.49	14.867	-15.52	18.211	-22.65	2.036	11.83	23.149	-6.55	19.400	-21.91	21.55681	15
17	2.58	22.39	4.35	19.18	10.05	21.12	19.55	2.36	13.19	22.31	17.25	1.07	21.55	12.14	20.42	7.41	18.31	2.24		
	9.784	13.37	8.884	14.21	12.595	-5.50	20.197	-26.49	14.880	-15.59	18.207	-22.65	2.035	11.83	23.146	-6.57	19.398	-21.92	21.68823	17
19	3.05	22.32	4.23	19.14	10.09	21.06	19.45	2.27	13.12	22.24	17.17	0.59	21.47	12.06	20.34	7.33	18.23	2.16		
	9.908	12.72	8.882	14.81	12.707	-6.45	20.178	-26.47	14.895	-15.65	18.202	-22.66	2.034	11.82	23.143	-6.59	19.395	-21.93	21.81965	19
21	3.11	22.25	4.14	19.11	10.13	20.59	19.36	2.19	13.06	22.17	17.09	0.51	21.39	11.58	20.26	7.25	18.15	2.08		
	10.031	12.06	8.914	15.29	12.818	-7.38	20.163	-26.44	14.909	-15.73	18.198	-22.66	2.033	11.81	23.140	-6.61	19.392	-21.94	21.95107	21
23	3.18	22.17	4.08	19.09	10.16	20.53	19.27	2.11	12.59	22.09	17.01	0.43	21.31	11.50	20.18	7.17	18.07	1.60		
	10.154	11.39	8.980	15.63	12.926	-8.31	20.151	-26.38	14.925	-15.80	18.195	-22.67	2.031	11.81	23.137	-6.63	19.390	-21.95	22.08249	23
25	3.24	22.10	4.05	19.08	10.20	20.46	19.18	2.03	12.53	22.02	16.53	0.35	21.23	11.42	20.10	7.09	17.59	1.52		
	10.277	10.70	9.079	15.80	13.033	-9.22	20.144	-26.31	14.940	-15.88	18.192	-22.68	2.030	11.80	23.134	-6.65	19.388	-21.95	22.21391	25
27	3.30	22.03	4.05	19.08	10.23	20.40	19.09	1.56	12.46	21.54	16.45	0.27	21.15	11.34	20.02	7.01	17.51	1.44		
	10.399	10.01	9.210	15.79	13.137	-10.12	20.140	-26.21	14.957	-15.95	18.189	-22.68	2.028	11.79	23.130	-6.67	19.385	-21.96	22.34533	27
29	3.35	21.57	4.08	19.08	10.27	20.33	19.01	1.49	12.40	21.47	16.37	0.19	21.08	11.26	19.54	6.52	17.43	1.36		
	10.520	9.30	9.370	15.57	13.240	-11.00	20.140	-26.11	14.974	-16.03	18.187	-22.69	2.026	11.77	23.127	-6.69	19.383	-21.97	22.47674	29
31	3.41	21.50	4.14	19.09	10.30	20.26	18.52	1.42	12.34	21.40	16.29	0.11	20.60	11.18	19.46	6.44	17.35	1.27		
	10.641	8.59	9.555	15.15	13.340	-11.86	20.143	-25.99	14.992	-16.12	18.186	-22.69	2.023	11.76	23.124	-6.71	19.381	-21.98	22.60816	31

WRZESIEŃ 2018

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
244	1	Sob	363	9.56197	0.01	10.4206	8.13	1.00922	3.0647	12.13	60.065	5.9	68	555	1245.7	1935	2216	456.6	1218	1949	1
245	2	Nie	364	10.00162	0.20	10.4543	7.52	1.00898	3.5952	15.47	59.378	6.9	58	557	1245.4	1933	2247	546.6	1332	1945	2
246	3	Pon	365	10.04128	0.39	10.4920	7.30	1.00875	4.5553	18.34	58.681	0.3	47	559	1245.1	1930	2326	639.9	1445	1941	3
247	4	Wto	366	10.08093	0.59	10.5257	7.08	1.00851	5.5447	20.19	58.013	1.3	35	600	1244.8	1928	****	736.4	1554	1937	4
248	5	Śro	367	10.12059	1.19	10.5634	6.45	1.00827	6.5555	20.49	57.424	2.3	25	602	1244.4	1926	016	835.6	1656	1933	5
249	6	Czw	368	10.16025	1.39	11.0010	6.23	1.00803	7.5807	19.57	56.970	3.3	15	604	1244.1	1923	118	936.3	1747	1929	6
250	7	Pią	369	10.19590	1.60	11.0346	6.01	1.00778	8.5960	17.42	56.705	4.3	8	605	1243.8	1921	231	1036.7	1829	1925	7
251	8	Sob	370	10.23556	2.20	11.0723	5.38	1.00753	10.0023	14.15	56.671	5.3	3	607	1243.4	1919	352	1135.6	1903	1921	8
252	9	Nie	371	10.27521	2.41	11.1058	5.15	1.00727	10.5836	9.54	56.889	6.3	0	609	1243.1	1916	516	1231.9	1932	1917	9
253	10	Pon	372	10.31487	3.02	11.1434	4.53	1.00702	11.5432	4.60	57.353	0.7	1	610	1242.7	1914	640	1325.8	1956	1913	10
254	11	Wto	373	10.35452	3.23	11.1810	4.30	1.00675	12.4831	-0.05	58.028	1.7	4	612	1242.4	1911	802	1417.5	2019	1909	11
255	12	Śro	374	10.39418	3.44	11.2145	4.07	1.00649	13.4102	-5.02	58.855	2.7	9	614	1242.0	1909	921	1507.6	2042	1906	12
256	13	Czw	375	10.43383	4.05	11.2520	3.44	1.00622	14.3240	-9.35	59.764	3.7	17	616	1241.7	1907	1038	1556.8	2105	1902	13
257	14	Pią	376	10.47349	4.26	11.2856	3.21	1.00595	15.2354	-13.32	60.679	4.7	25	617	1241.3	1904	1152	1645.7	2131	1858	14
258	15	Sob	377	10.51314	4.47	11.3231	2.58	1.00568	16.1503	-16.43	61.532	5.7	35	619	1241.0	1902	1301	1734.5	2201	1854	15
259	16	Nie	378	10.55280	5.09	11.3606	2.35	1.00540	17.0618	-19.03	62.267	6.7	45	621	1240.6	1859	1406	1823.5	2236	1850	16
260	17	Pon	379	10.59245	5.30	11.3941	2.12	1.00512	17.5734	-20.27	62.844	0.4	54	622	1240.2	1857	1505	1912.4	2318	1846	17
261	18	Wto	380	11.03211	5.52	11.4316	1.49	1.00484	18.4840	-20.55	63.239	1.4	64	624	1239.9	1854	1556	2001.0	****	1842	18
262	19	Śro	381	11.07176	6.13	11.4652	1.25	1.00456	19.3920	-20.26	63.444	2.4	73	626	1239.5	1852	1639	2049.1	007	1838	19
263	20	Czw	382	11.11142	6.35	11.5027	1.02	1.00428	20.2919	-19.02	63.466	3.4	80	628	1239.2	1850	1715	2136.3	102	1834	20
264	21	Pią	383	11.15108	6.56	11.5402	0.39	1.00400	21.1825	-16.49	63.324	4.4	87	629	1238.8	1847	1746	2222.5	202	1830	21
265	22	Sob	384	11.19073	7.17	11.5737	0.15	1.00372	22.0637	-13.52	63.044	5.4	93	631	1238.5	1845	1811	2307.8	307	1826	22
266	23	Nie	385	11.23038	7.38	12.0113	-0.08	1.00344	22.5404	-10.17	62.658	6.4	97	633	1238.1	1842	1833	2352.4	413	1822	23
267	24	Pon	386	11.27004	7.59	12.0448	-0.31	1.00315	23.4106	-6.13	62.199	7.4	99	635	1237.8	1840	1854	*****	522	1818	24
268	25	Wto	387	11.30569	8.20	12.0824	-0.55	1.00287	0.2807	-1.49	61.695	0.3	100	636	1237.4	1838	1913	036.7	631	1814	25
269	26	Śro	388	11.34535	8.41	12.1159	-1.18	1.00259	1.1541	2.44	61.171	1.3	98	638	1237.1	1835	1933	121.4	742	1810	26
270	27	Czw	389	11.38500	9.02	12.1535	-1.41	1.00231	2.0424	7.14	60.645	2.3	94	640	1236.7	1833	1955	207.0	855	1807	27
271	28	Pią	390	11.42466	9.22	12.1912	-2.05	1.00203	2.5450	11.29	60.127	3.3	89	641	1236.4	1830	2019	254.2	1008	1803	28
272	29	Sob	391	11.46431	9.42	12.2248	-2.28	1.00175	3.4730	15.13	59.624	4.3	81	643	1236.0	1828	2048	343.7	1123	1759	29
273	30	Nie	392	11.50397	10.02	12.2625	-2.51	1.00147	4.4241	18.12	59.140	5.3	72	645	1235.7	1825	2124	436.0	1237	1755	30

Fazy Księżyca [Dm, h.mm]: 3kw 3, 4.37 Now 9, 20.01 1kw 17, 1.15 Pełn 25, 4.52

WRZESIEŃ 2018 (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	4.18	19.09	10.31	20.23	18.48	1.39	12.31	21.36	16.25	0.07	20.56	11.14	19.43	6.40	17.31	1.23			
	10.702	8.22	9.655	14.86	13.389	-12.28	20.147	-25.92	15.001	-16.16	18.185	-22.69	2.022	11.75	23.122	-6.72	19.380	-21.98	22.67386	1	
3	3.49	21.40	4.27	19.10	10.34	20.16	18.39	1.33	12.24	21.29	16.17	23.55	20.48	11.06	19.35	6.32	17.23	1.15			
	10.822	7.49	9.868	14.12	13.486	-13.11	20.156	-25.78	15.019	-16.24	18.184	-22.70	2.019	11.74	23.119	-6.75	19.379	-21.99	22.80529	3	
5	3.54	21.34	4.38	19.10	10.36	20.09	18.31	1.27	12.18	21.22	16.09	23.47	20.40	10.58	19.27	6.24	17.16	1.07			
	10.943	6.76	10.094	13.20	13.580	-13.92	20.169	-25.62	15.038	-16.33	18.184	-22.70	2.017	11.72	23.115	-6.77	19.377	-21.99	22.93671	5	
7	3.59	21.28	4.51	19.09	10.39	20.02	18.23	1.22	12.12	21.14	16.01	23.39	20.32	10.50	19.19	6.16	17.08	0.59			
	11.063	6.01	10.329	12.10	13.671	-14.71	20.186	-25.45	15.058	-16.42	18.184	-22.71	2.014	11.71	23.112	-6.79	19.375	-22.00	23.06813	7	
9	4.04	21.21	5.05	19.09	10.41	19.55	18.14	1.16	12.06	21.07	15.54	23.31	20.24	10.41	19.11	6.07	16.60	0.51			
	11.183	5.26	10.567	10.87	13.758	-15.47	20.207	-25.26	15.078	-16.51	18.184	-22.71	2.011	11.69	23.108	-6.81	19.374	-22.01	23.19954	9	
11	4.08	21.15	5.19	19.08	10.42	19.47	18.06	1.12	11.60	20.60	15.46	23.23	20.16	10.33	19.03	5.59	16.52	0.43			
	11.303	4.50	10.806	9.52	13.842	-16.20	20.231	-25.07	15.099	-16.60	18.185	-22.72	2.007	11.67	23.105	-6.83	19.372	-22.01	23.33096	11	
13	4.13	21.09	5.33	19.06	10.44	19.40	17.58	1.07	11.54	20.53	15.38	23.16	20.08	10.25	18.55	5.51	16.44	0.35			
	11.422	3.74	11.044	8.08	13.922	-16.90	20.258	-24.86	15.120	-16.69	18.187	-22.72	2.004	11.65	23.102	-6.85	19.371	-22.02	23.46237	13	
15	4.18	21.04	5.48	19.04	10.44	19.32	17.51	1.03	11.48	20.46	15.30	23.08	20.00	10.17	18.47	5.43	16.36	0.27			
	11.542	2.97	11.279	6.58	13.997	-17.58	20.289	-24.64	15.141	-16.79	18.188	-22.73	2.000	11.63	23.098	-6.88	19.370	-22.02	23.59379	15	
17	4.22	20.58	6.02	19.01	10.45	19.24	17.43	0.59	11.42	20.38	15.23	22.60	19.52	10.09	18.39	5.35	16.28	0.20			
	11.661	2.20	11.510	5.04	14.068	-18.21	20.323	-24.40	15.163	-16.88	18.191	-22.73	1.997	11.61	23.095	-6.90	19.369	-22.03	23.72521	17	
19	4.26	20.52	6.16	18.59	10.45	19.17	17.35	0.55	11.36	20.31	15.15	22.52	19.44	10.01	18.31	5.26	16.20	0.12			
	11.781	1.42	11.736	3.46	14.133	-18.81	20.360	-24.16	15.186	-16.98	18.194	-22.74	1.993	11.59	23.092	-6.92	19.368	-22.03	23.85663	19	
21	4.31	20.46	6.30	18.55	10.44	19.09	17.28	0.51	11.30	20.24	15.07	22.45	19.36	9.52	18.23	5.18	16.12	0.04			
	11.901	0.65	11.958	1.88	14.193	-19.38	20.400	-23.91	15.209	-17.07	18.197	-22.74	1.989	11.57	23.088	-6.94	19.368	-22.04	23.98805	21	
23	4.35	20.41	6.43	18.52	10.43	19.00	17.21	0.48	11.24	20.17	14.60	22.37	19.28	9.44	18.15	5.10	16.04	23.52			
	12.020	-0.13	12.175	0.30	14.246	-19.89	20.442	-23.64	15.232	-17.17	18.201	-22.74	1.985	11.55	23.085	-6.96	19.367	-22.04	0.11947	23	
25	4.39	20.35	6.57	18.49	10.41	18.52	17.13	0.45	11.19	20.10	14.52	22.29	19.20	9.36	18.07	5.02	15.57	23.44			
	12.140	-0.91	12.388	-1.27	14.292	-20.36	20.487	-23.37	15.256	-17.27	18.205	-22.75	1.980	11.52	23.082	-6.98	19.367	-22.05	0.25089	25	
27	4.43	20.30	7.10	18.45	10.39	18.44	17.06	0.42	11.13	20.03	14.45	22.22	19.12	9.28	17.59	4.54	15.49	23.36			
	12.260	-1.69	12.597	-2.83	14.331	-20.79	20.534	-23.08	15.280	-17.37	18.210	-22.75	1.976	11.50	23.079	-7.00	19.366	-22.05	0.38230	27	
29	4.47	20.25	7.22	18.41	10.35	18.35	16.59	0.40	11.07	19.56	14.37	22.14	19.04	9.19	17.51	4.46	15.41	23.28			
	12.380	-2.47	12.802	-4.36	14.361	-21.15	20.584	-22.79	15.305	-17.47	18.215	-22.75	1.971	11.47	23.075	-7.02	19.366	-22.06	0.51372	29	

PAŹDZIERNIK 2018

Piwnice, CA UMK			← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc		Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2458																					
274	1	Pon	393	11.54363	10.21	12.3002	-3.15	1.00119	5.4017	20.13	58.681	6.3	61	647	1235.4	1823	2209	531.0	1347	1751	1
275	2	Wto	394	11.58328	10.41	12.3339	-3.38	1.00091	6.3946	21.01	58.260	0.0	50	648	1235.1	1821	2306	628.3	1450	1747	2
276	3	Śro	395	12.02294	10.60	12.3717	-4.01	1.00063	7.4011	20.32	57.897	1.0	39	650	1234.8	1818	****	727.0	1543	1743	3
277	4	Czw	396	12.06259	11.18	12.4055	-4.24	1.00035	8.4026	18.43	57.622	2.0	28	652	1234.4	1816	013	825.7	1627	1739	4
278	5	Pią	397	12.10225	11.36	12.4433	-4.47	1.00006	9.3931	15.42	57.467	3.0	18	654	1234.1	1814	129	923.2	1703	1735	5
279	6	Sob	398	12.14190	11.54	12.4812	-5.10	0.99978	10.3653	11.43	57.465	4.0	10	655	1233.8	1811	250	1018.9	1732	1731	6
280	7	Nie	399	12.18156	12.11	12.5151	-5.33	0.99950	11.3225	7.02	57.639	5.0	4	657	1233.6	1809	412	1112.5	1757	1727	7
281	8	Pon	400	12.22121	12.28	12.5531	-5.56	0.99921	12.2622	1.60	57.999	6.0	1	659	1233.3	1807	534	1204.3	1820	1723	8
282	9	Wto	401	12.26087	12.45	12.5911	-6.19	0.99893	13.1911	-3.05	58.534	0.3	0	701	1233.0	1804	655	1254.9	1842	1719	9
283	10	Śro	402	12.30052	13.01	13.0251	-6.42	0.99864	14.1123	-7.54	59.211	1.3	2	703	1232.7	1802	813	1344.8	1905	1715	10
284	11	Czw	403	12.34018	13.17	13.0632	-7.04	0.99835	15.0322	-12.12	59.983	2.3	6	704	1232.5	1800	930	1434.5	1929	1711	11
285	12	Pią	404	12.37583	13.32	13.1014	-7.27	0.99806	15.5526	-15.48	60.789	3.3	12	706	1232.2	1757	1043	1524.3	1958	1708	12
286	13	Sob	405	12.41549	13.46	13.1356	-7.49	0.99777	16.4737	-18.31	61.566	4.3	20	708	1232.0	1755	1152	1614.3	2031	1704	13
287	14	Nie	406	12.45514	14.01	13.1738	-8.12	0.99748	17.3950	-20.19	62.255	5.3	28	710	1231.7	1753	1255	1704.2	2110	1700	14
288	15	Pon	407	12.49480	14.14	13.2121	-8.34	0.99719	18.3146	-21.06	62.806	6.3	37	712	1231.5	1750	1350	1753.7	2157	1656	15
289	16	Wto	408	12.53446	14.27	13.2504	-8.56	0.99690	19.2305	-20.55	63.182	7.3	47	714	1231.3	1748	1437	1842.4	2250	1652	16
290	17	Śro	409	12.57411	14.40	13.2848	-9.18	0.99661	20.1331	-19.48	63.362	0.7	56	715	1231.1	1746	1516	1930.2	2349	1648	17
291	18	Czw	410	13.01377	14.52	13.3233	-9.40	0.99632	21.0252	-17.50	63.340	1.7	65	717	1230.9	1744	1548	2016.7	****	1644	18
292	19	Pią	411	13.05342	15.03	13.3618	-10.02	0.99603	21.5111	-15.05	63.126	2.7	74	719	1230.7	1742	1615	2102.1	052	1640	19
293	20	Sob	412	13.09308	15.14	13.4004	-10.23	0.99575	22.3840	-11.40	62.745	3.7	82	721	1230.5	1739	1638	2146.8	158	1636	20
294	21	Nie	413	13.13273	15.24	13.4351	-10.45	0.99547	23.2541	-7.42	62.233	4.7	89	723	1230.3	1737	1659	2231.1	305	1632	21
295	22	Pon	414	13.17239	15.33	13.4738	-11.06	0.99519	0.1243	-3.21	61.632	5.7	94	725	1230.2	1735	1718	2315.7	415	1628	22
296	23	Wto	415	13.21204	15.42	13.5126	-11.27	0.99491	1.0021	1.15	60.990	6.7	98	726	1230.0	1733	1738	*****	526	1624	23
297	24	Śro	416	13.25170	15.50	13.5514	-11.48	0.99463	1.4913	5.55	60.354	7.7	100	728	1229.9	1731	1758	001.3	639	1620	24
298	25	Czw	417	13.29135	15.57	13.5903	-12.09	0.99436	2.3956	10.23	59.763	0.7	99	730	1229.8	1729	1821	048.7	754	1616	25
299	26	Pią	418	13.33101	16.04	14.0253	-12.29	0.99409	3.3258	14.25	59.247	1.7	97	732	1229.7	1727	1849	138.3	910	1613	26
300	27	Sob	419	13.37066	16.10	14.0644	-12.50	0.99382	4.2836	17.44	58.823	2.7	91	734	1229.6	1724	1923	230.8	1027	1609	27
301	28	Nie	420	13.41032	16.15	14.1035	-13.10	0.99356	5.2637	20.04	58.497	3.7	84	736	1229.5	1722	2005	326.0	1140	1605	28
301	28	Nie	420	14.41130	16.15	14.1045	-13.11	0.99355	5.2905	20.09	58.486	4.7	84	636	1129.5	1622	1905	226.0	1040	1505	28
302	29	Pon	421	14.45096	16.20	14.1437	-13.30	0.99329	6.2853	21.13	58.258	5.7	74	638	1129.4	1620	1959	323.6	1146	1501	29
303	30	Wto	422	14.49062	16.23	14.1830	-13.50	0.99303	7.2920	20.58	58.115	6.7	64	639	1129.4	1618	2103	422.3	1243	1457	30
304	31	Śro	423	14.53027	16.26	14.2224	-14.10	0.99277	8.2912	19.25	58.049	7.7	53	641	1129.3	1616	2216	520.8	1329	1453	31

Fazy Księżyca [Dm, h.mm]: 3kw 2, 11.45 Now 9, 5.47 1kw 16, 20.02 Pełn 24, 18.45 3kw 31, 17.40

PAŹDZIERNIK 2018 (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	20.20	7.34	18.37	10.31	18.26	16.52	0.37	11.01	19.49	14.30	22.07	18.56	9.11	17.43	4.37	15.33	23.20		
	12.501	-3.24	13.004	-5.86	14.383	-21.46	20.636	-22.48	15.330	-17.57	18.220	-22.76	1.967	11.45	23.072	-7.04	19.366	-22.06	0.64514	1
3	4.55	20.14	7.47	18.34	10.25	18.18	16.45	0.35	10.56	19.42	14.22	21.59	18.48	9.03	17.35	4.29	15.25	23.12		
	12.621	-4.02	13.204	-7.33	14.396	-21.70	20.690	-22.16	15.355	-17.67	18.226	-22.76	1.962	11.42	23.069	-7.05	19.366	-22.06	0.77656	3
5	4.58	20.09	7.58	18.30	10.19	18.09	16.38	0.32	10.50	19.35	14.15	21.52	18.40	8.54	17.27	4.21	15.17	23.04		
	12.743	-4.79	13.402	-8.77	14.400	-21.87	20.746	-21.84	15.381	-17.77	18.233	-22.76	1.957	11.40	23.066	-7.07	19.366	-22.06	0.90798	5
7	5.02	20.05	8.10	18.26	10.11	17.60	16.32	0.30	10.44	19.28	14.07	21.44	18.32	8.46	17.19	4.13	15.10	22.57		
	12.864	-5.55	13.597	-10.16	14.394	-21.97	20.803	-21.50	15.407	-17.87	18.240	-22.76	1.952	11.37	23.063	-7.09	19.367	-22.07	1.03940	7
9	5.06	19.60	8.21	18.22	10.03	17.51	16.25	0.29	10.39	19.21	13.60	21.37	18.24	8.38	17.12	4.05	15.02	22.49		
	12.986	-6.32	13.791	-11.51	14.378	-21.99	20.862	-21.16	15.434	-17.98	18.247	-22.77	1.947	11.34	23.061	-7.11	19.367	-22.07	1.17081	9
11	5.10	19.55	8.33	18.18	9.53	17.42	16.18	0.27	10.33	19.14	13.52	21.29	18.16	8.29	17.04	3.57	14.54	22.41		
	13.109	-7.07	13.983	-12.81	14.352	-21.92	20.923	-20.80	15.460	-18.08	18.255	-22.77	1.942	11.32	23.058	-7.12	19.368	-22.07	1.30223	11
13	5.13	19.50	8.43	18.14	9.42	17.33	16.11	0.25	10.27	19.07	13.45	21.22	18.08	8.21	16.56	3.49	14.46	22.33		
	13.232	-7.82	14.175	-14.07	14.316	-21.76	20.986	-20.44	15.488	-18.18	18.263	-22.77	1.937	11.29	23.055	-7.14	19.369	-22.07	1.43365	13
15	5.17	19.46	8.54	18.10	9.29	17.24	16.05	0.24	10.22	19.00	13.38	21.14	18.00	8.13	16.48	3.41	14.38	22.25		
	13.356	-8.57	14.365	-15.28	14.271	-21.50	21.050	-20.07	15.515	-18.28	18.272	-22.77	1.932	11.26	23.053	-7.16	19.370	-22.07	1.56507	15
17	5.20	19.42	9.05	18.07	9.16	17.16	15.58	0.22	10.16	18.54	13.30	21.07	17.52	8.04	16.40	3.32	14.31	22.17		
	13.480	-9.30	14.554	-16.43	14.218	-21.15	21.115	-19.68	15.543	-18.38	18.281	-22.77	1.927	11.23	23.050	-7.17	19.371	-22.07	1.69649	17
19	5.24	19.37	9.15	18.03	9.01	17.07	15.52	0.21	10.11	18.47	13.23	20.60	17.44	7.56	16.32	3.24	14.23	22.10		
	13.605	-10.03	14.743	-17.52	14.158	-20.71	21.182	-19.29	15.571	-18.48	18.290	-22.77	1.922	11.20	23.048	-7.19	19.372	-22.08	1.82791	19
21	5.27	19.33	9.25	18.00	8.46	16.59	15.45	0.20	10.05	18.40	13.16	20.53	17.36	7.48	16.24	3.16	14.15	22.02		
	13.731	-10.74	14.930	-18.56	14.092	-20.17	21.249	-18.89	15.599	-18.59	18.300	-22.77	1.917	11.18	23.046	-7.20	19.374	-22.08	1.95932	21
23	5.31	19.29	9.35	17.57	8.29	16.51	15.39	0.19	9.60	18.33	13.09	20.45	17.28	7.39	16.16	3.08	14.07	21.54		
	13.857	-11.45	15.116	-19.53	14.022	-19.55	21.318	-18.48	15.628	-18.69	18.310	-22.77	1.911	11.15	23.043	-7.21	19.375	-22.08	2.09074	23
25	5.34	19.25	9.44	17.54	8.13	16.44	15.32	0.18	9.54	18.26	13.01	20.38	17.20	7.31	16.08	3.00	13.60	21.46		
	13.984	-12.14	15.300	-20.44	13.951	-18.85	21.387	-18.06	15.656	-18.79	18.320	-22.77	1.906	11.12	23.041	-7.22	19.377	-22.08	2.22216	25
27	5.38	19.21	9.53	17.51	7.56	16.37	15.26	0.17	9.49	18.20	12.54	20.31	17.12	7.23	16.00	2.52	13.52	21.39		
	14.112	-12.83	15.482	-21.27	13.880	-18.09	21.458	-17.63	15.685	-18.89	18.331	-22.77	1.901	11.09	23.039	-7.24	19.379	-22.08	2.35358	27
29	4.41	18.18	9.01	16.49	6.38	15.30	14.20	23.12	8.43	17.13	11.47	19.24	16.04	6.14	14.52	1.44	12.44	20.31		
	14.244	-13.51	15.664	-22.05	13.809	-17.28	21.530	-17.19	15.715	-18.99	18.343	-22.77	1.896	11.06	23.038	-7.25	19.381	-22.07	2.48500	29
31	4.44	18.14	9.09	16.46	6.21	15.23	14.13	23.12	8.38	17.06	11.40	19.17	15.56	6.06	14.44	1.36	12.36	20.23		
	14.373	-14.16	15.839	-22.73	13.745	-16.46	21.602	-16.74	15.745	-19.09	18.354	-22.77	1.890	11.03	23.036	-7.26	19.383	-22.07	2.61642	31

LISTOPAD 2018

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
305	1	Czw	424	14.56593	16.28	14.2618	-14.29	0.99252	9.2734	16.39	58.057	0.8	41	643	1129.3	1615	2334	617.9	1406	1449	1	
306	2	Pią	425	15.00558	16.29	14.3014	-14.48	0.99227	10.2357	12.55	58.140	1.8	30	645	1129.3	1613	****	712.8	1436	1445	2	
307	3	Sob	426	15.04524	16.29	14.3410	-15.07	0.99202	11.1822	8.27	58.308	2.8	21	647	1129.3	1611	054	805.4	1501	1441	3	
308	4	Nie	427	15.08489	16.29	14.3807	-15.25	0.99177	12.1111	3.34	58.569	3.8	12	649	1129.3	1609	214	856.2	1523	1437	4	
309	5	Pon	428	15.12455	16.28	14.4205	-15.44	0.99152	13.0259	-1.28	58.931	4.8	6	651	1129.3	1607	333	945.8	1545	1433	5	
310	6	Wto	429	15.16420	16.25	14.4604	-16.02	0.99128	13.5420	-6.22	59.396	5.8	2	653	1129.3	1605	451	1034.9	1606	1429	6	
311	7	Śro	430	15.20386	16.22	14.5003	-16.20	0.99103	14.4548	-10.52	59.952	6.8	0	655	1129.4	1603	608	1124.0	1629	1425	7	
312	8	Czw	431	15.24351	16.18	14.5404	-16.37	0.99079	15.3740	-14.46	60.576	0.8	1	656	1129.4	1602	723	1213.6	1656	1421	8	
313	9	Pią	432	15.28317	16.14	14.5805	-16.54	0.99055	16.3004	-17.52	61.231	1.8	4	658	1129.5	1600	835	1303.7	1726	1417	9	
314	10	Sob	433	15.32283	16.08	15.0207	-17.11	0.99031	17.2248	-20.02	61.874	2.8	8	700	1129.6	1558	942	1354.2	1803	1414	10	
315	11	Nie	434	15.36248	16.02	15.0610	-17.28	0.99007	18.1530	-21.12	62.455	3.8	14	702	1129.7	1557	1041	1444.6	1847	1410	11	
316	12	Pon	435	15.40214	15.54	15.1014	-17.44	0.98983	19.0738	-21.20	62.928	4.8	22	704	1129.8	1555	1133	1534.4	1937	1406	12	
317	13	Wto	436	15.44179	15.46	15.1419	-18.00	0.98960	19.5846	-20.30	63.250	5.8	30	706	1130.0	1554	1215	1623.0	2034	1402	13	
318	14	Śro	437	15.48145	15.37	15.1824	-18.16	0.98937	20.4837	-18.46	63.390	6.8	39	708	1130.1	1552	1250	1710.1	2136	1358	14	
319	15	Czw	438	15.52111	15.28	15.2230	-18.32	0.98914	21.3707	-16.14	63.330	7.8	48	709	1130.3	1551	1318	1755.8	2241	1354	15	
320	16	Pią	439	15.56076	15.17	15.2638	-18.47	0.98891	22.2428	-13.01	63.067	0.8	58	711	1130.5	1549	1342	1840.3	2347	1350	16	
321	17	Sob	440	16.00042	15.06	15.3046	-19.01	0.98869	23.1104	-9.14	62.612	1.8	67	713	1130.7	1548	1403	1924.1	****	1346	17	
322	18	Nie	441	16.04007	14.54	15.3454	-19.16	0.98847	23.5729	-4.60	61.996	2.8	76	715	1130.9	1546	1423	2007.9	055	1342	18	
323	19	Pon	442	16.07573	14.41	15.3904	-19.30	0.98826	0.4423	-0.27	61.262	3.8	84	717	1131.1	1545	1442	2052.6	205	1338	19	
324	20	Wto	443	16.11538	14.27	15.4314	-19.44	0.98805	1.3231	4.14	60.464	4.8	91	718	1131.3	1544	1501	2138.9	317	1334	20	
325	21	Śro	444	16.15504	14.12	15.4725	-19.57	0.98784	2.2239	8.52	59.666	5.8	96	720	1131.5	1542	1523	2227.8	431	1330	21	
326	22	Czw	445	16.19469	13.57	15.5137	-20.10	0.98764	3.1525	13.11	58.930	6.8	99	722	1131.8	1541	1548	2319.8	548	1326	22	
327	23	Pią	446	16.23435	13.40	15.5550	-20.22	0.98745	4.1115	16.53	58.312	0.2	100	724	1132.1	1540	1619	*****	707	1322	23	
328	24	Sob	447	16.27400	13.23	16.0004	-20.35	0.98726	5.1004	19.39	57.853	1.2	98	725	1132.4	1539	1659	015.2	824	1318	24	
329	25	Nie	448	16.31366	13.06	16.0418	-20.47	0.98707	6.1113	21.12	57.576	2.2	94	727	1132.7	1538	1749	113.8	936	1315	25	
330	26	Pon	449	16.35332	12.47	16.0833	-20.58	0.98689	7.1322	21.23	57.481	3.2	87	729	1133.0	1537	1852	214.1	1039	1311	26	
331	27	Wto	450	16.39297	12.28	16.1249	-21.09	0.98672	8.1458	20.08	57.552	4.2	78	730	1133.3	1536	2004	314.6	1130	1307	27	
332	28	Śro	451	16.43263	12.08	16.1706	-21.20	0.98655	9.1445	17.37	57.758	5.2	67	732	1133.6	1535	2122	413.5	1210	1303	28	
333	29	Czw	452	16.47228	11.47	16.2123	-21.30	0.98638	10.1158	14.03	58.066	6.2	56	733	1134.0	1534	2242	509.7	1242	1259	29	
334	30	Pią	453	16.51194	11.26	16.2541	-21.40	0.98622	11.0634	9.44	58.445	0.4	45	735	1134.3	1533	****	602.9	1308	1255	30	

Fazy Księżyca [Dm, h.mm]: 3kw 0, 17.40 Now 7, 17.02 1kw 15, 15.54 Pełn 23, 6.39 3kw 30, 1.19

LISTOPAD 2018 (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	9.12	16.45	6.13	15.20	14.10	23.11	8.35	17.03	11.36	19.13	15.52	6.02	14.40	1.32	12.32	20.19		
	14.438	-14.48	15.924	-23.04	13.714	-16.04	21.639	-16.52	15.759	-19.14	18.360	-22.76	1.888	11.02	23.035	-7.26	19.384	-22.07	2.68213	1
3	4.49	18.09	9.19	16.43	5.57	15.14	14.04	23.11	8.30	16.56	11.29	19.06	15.44	5.54	14.32	1.24	12.25	20.12		
	14.569	-15.11	16.089	-23.59	13.659	-15.22	21.712	-16.06	15.789	-19.24	18.372	-22.76	1.883	10.99	23.033	-7.27	19.386	-22.07	2.81355	3
5	4.53	18.06	9.24	16.41	5.42	15.08	13.58	23.10	8.24	16.49	11.22	18.59	15.36	5.45	14.25	1.16	12.17	20.04		
	14.701	-15.73	16.246	-24.05	13.613	-14.43	21.786	-15.60	15.819	-19.33	18.384	-22.76	1.878	10.96	23.032	-7.28	19.389	-22.07	2.94496	5
7	4.56	18.03	9.27	16.39	5.27	15.02	13.51	23.09	8.19	16.42	11.15	18.52	15.28	5.37	14.17	1.08	12.09	19.56		
	14.834	-16.33	16.391	-24.41	13.575	-13.67	21.860	-15.13	15.849	-19.43	18.397	-22.76	1.873	10.94	23.031	-7.29	19.391	-22.07	3.07638	7
9	4.59	18.00	9.29	16.37	5.13	14.57	13.45	23.09	8.14	16.36	11.08	18.45	15.20	5.29	14.09	1.00	12.01	19.48		
	14.968	-16.91	16.522	-24.66	13.546	-12.96	21.935	-14.65	15.879	-19.53	18.410	-22.75	1.868	10.91	23.030	-7.29	19.394	-22.07	3.20780	9
11	5.02	17.58	9.29	16.35	5.00	14.52	13.39	23.08	8.08	16.29	11.01	18.38	15.12	5.20	14.01	0.52	11.54	19.41		
	15.103	-17.47	16.632	-24.80	13.528	-12.31	22.010	-14.16	15.910	-19.62	18.423	-22.75	1.863	10.88	23.029	-7.30	19.397	-22.06	3.33922	11
13	5.05	17.55	9.26	16.32	4.49	14.47	13.33	23.08	8.03	16.22	10.53	18.31	15.04	5.12	13.53	0.44	11.46	19.33		
	15.239	-18.01	16.718	-24.80	13.520	-11.74	22.086	-13.67	15.940	-19.71	18.437	-22.74	1.858	10.86	23.028	-7.30	19.400	-22.06	3.47065	13
15	5.08	17.53	9.21	16.28	4.38	14.42	13.26	23.08	7.57	16.16	10.46	18.24	14.56	5.04	13.45	0.36	11.38	19.25		
	15.375	-18.53	16.772	-24.67	13.521	-11.24	22.162	-13.17	15.971	-19.81	18.451	-22.74	1.853	10.83	23.027	-7.31	19.403	-22.06	3.60207	15
17	5.11	17.50	9.11	16.24	4.29	14.37	13.20	23.07	7.52	16.09	10.39	18.17	14.48	4.55	13.37	0.28	11.31	19.18		
	15.513	-19.02	16.787	-24.37	13.533	-10.81	22.239	-12.66	16.002	-19.90	18.465	-22.73	1.849	10.81	23.026	-7.31	19.406	-22.05	3.73348	17
19	5.14	17.48	8.58	16.18	4.20	14.32	13.14	23.07	7.47	16.03	10.32	18.10	14.40	4.47	13.29	0.21	11.23	19.10		
	15.651	-19.50	16.758	-23.90	13.554	-10.46	22.316	-12.15	16.033	-19.99	18.479	-22.73	1.844	10.78	23.026	-7.31	19.409	-22.05	3.86490	19
21	5.17	17.46	8.41	16.10	4.12	14.28	13.08	23.07	7.41	15.56	10.25	18.03	14.32	4.39	13.21	0.13	11.15	19.02		
	15.790	-19.95	16.681	-23.23	13.583	-10.19	22.393	-11.63	16.064	-20.08	18.493	-22.72	1.840	10.76	23.026	-7.31	19.412	-22.05	3.99632	21
23	5.20	17.45	8.19	16.01	4.06	14.23	13.02	23.07	7.36	15.49	10.18	17.56	14.24	4.31	13.14	0.05	11.08	18.55		
	15.931	-20.37	16.556	-22.36	13.622	-10.00	22.471	-11.11	16.095	-20.17	18.508	-22.71	1.836	10.74	23.025	-7.31	19.416	-22.04	4.12774	23
25	5.23	17.43	7.54	15.51	4.00	14.19	12.55	23.06	7.30	15.43	10.11	17.49	14.16	4.22	13.06	23.53	10.60	18.47		
	16.072	-20.78	16.394	-21.33	13.669	-9.88	22.549	-10.58	16.126	-20.25	18.523	-22.70	1.831	10.72	23.025	-7.31	19.419	-22.04	4.25916	25
27	5.25	17.42	7.27	15.40	3.55	14.15	12.49	23.06	7.25	15.36	10.04	17.42	14.08	4.14	12.58	23.45	10.52	18.40		
	16.214	-21.15	16.212	-20.20	13.723	-9.82	22.627	-10.04	16.157	-20.34	18.538	-22.70	1.827	10.69	23.025	-7.31	19.423	-22.04	4.39059	27
29	5.28	17.41	7.01	15.29	3.51	14.10	12.43	23.06	7.19	15.30	9.57	17.35	14.00	4.06	12.50	23.37	10.45	18.32		
	16.356	-21.50	16.035	-19.09	13.785	-9.83	22.705	-9.50	16.188	-20.42	18.554	-22.69	1.824	10.67	23.026	-7.31	19.427	-22.03	4.52201	29

GRUDZIEŃ 2018

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
335	1	Sob	454	16.55159	11.04	16.2959	-21.49	0.98607	11.5901	4.57	58.870	1.4	34	736	1134.7	1533	001	653.6	1331	1251	1	
336	2	Nie	455	16.59125	10.41	16.3419	-21.59	0.98591	12.4959	-0.01	59.326	2.4	24	738	1135.1	1532	119	742.5	1351	1247	2	
337	3	Pon	456	17.03090	10.17	16.3839	-22.07	0.98576	13.4014	-4.54	59.806	3.4	15	739	1135.5	1531	236	830.4	1412	1243	3	
338	4	Wto	457	17.07056	9.53	16.4259	-22.15	0.98562	14.3028	-9.30	60.305	4.4	8	741	1135.9	1531	352	918.2	1433	1239	4	
339	5	Śro	458	17.11022	9.29	16.4721	-22.23	0.98548	15.2112	-13.35	60.820	5.4	4	742	1136.3	1530	506	1006.5	1457	1235	5	
340	6	Czw	459	17.14587	9.04	16.5142	-22.30	0.98534	16.1244	-16.58	61.346	6.4	1	743	1136.7	1530	619	1055.6	1525	1231	6	
341	7	Pią	460	17.18553	8.38	16.5605	-22.37	0.98520	17.0501	-19.29	61.870	0.2	0	745	1137.1	1529	727	1145.6	1559	1227	7	
342	8	Sob	461	17.22518	8.12	17.0027	-22.44	0.98507	17.5743	-21.01	62.370	1.2	1	746	1137.6	1529	831	1236.1	1639	1223	8	
343	9	Nie	462	17.26484	7.45	17.0451	-22.50	0.98494	18.5017	-21.32	62.819	2.2	4	747	1138.0	1529	926	1326.4	1727	1220	9	
344	10	Pon	463	17.30450	7.18	17.0914	-22.55	0.98481	19.4205	-21.03	63.184	3.2	9	748	1138.4	1528	1012	1415.8	1822	1216	10	
345	11	Wto	464	17.34415	6.50	17.1338	-23.00	0.98469	20.3237	-19.37	63.430	4.2	15	749	1138.9	1528	1050	1503.8	1922	1212	11	
346	12	Śro	465	17.38381	6.22	17.1803	-23.05	0.98457	21.2139	-17.20	63.526	5.2	23	750	1139.4	1528	1121	1550.1	2026	1208	12	
347	13	Czw	466	17.42346	5.54	17.2228	-23.09	0.98445	22.0911	-14.21	63.445	6.2	31	751	1139.8	1528	1147	1634.8	2131	1204	13	
348	14	Pią	467	17.46312	5.26	17.2653	-23.13	0.98434	22.5532	-10.47	63.171	7.2	40	752	1140.3	1528	1209	1718.3	2238	1200	14	
349	15	Sob	468	17.50278	4.57	17.3118	-23.16	0.98424	23.4115	-6.44	62.703	8.2	50	753	1140.8	1528	1228	1801.3	2346	1156	15	
350	16	Nie	469	17.54243	4.28	17.3543	-23.19	0.98413	0.2659	-2.22	62.053	1.0	59	754	1141.3	1528	1246	1844.5	****	1152	16	
351	17	Pon	470	17.58208	3.59	17.4009	-23.21	0.98404	1.1333	2.13	61.254	2.0	69	755	1141.8	1529	1305	1928.8	055	1148	17	
352	18	Wto	471	18.02174	3.29	17.4435	-23.23	0.98395	2.0149	6.51	60.352	3.0	78	756	1142.3	1529	1325	2015.3	207	1144	18	
353	19	Śro	472	18.06140	2.60	17.4901	-23.25	0.98386	2.5238	11.18	59.411	4.0	86	756	1142.7	1529	1347	2105.0	321	1140	19	
354	20	Czw	473	18.10105	2.30	17.5327	-23.26	0.98378	3.4644	15.19	58.506	5.0	93	757	1143.2	1530	1415	2158.5	438	1136	20	
355	21	Pią	474	18.14071	2.01	17.5754	-23.26	0.98371	4.4429	18.35	57.714	6.0	98	757	1143.7	1530	1450	2256.1	557	1132	21	
356	22	Sob	475	18.18036	1.31	18.0220	-23.26	0.98364	5.4538	20.45	57.104	7.0	100	758	1144.2	1531	1535	2357.1	714	1128	22	
357	23	Nie	476	18.22002	1.01	18.0646	-23.26	0.98358	6.4906	21.33	56.727	0.7	99	758	1144.7	1531	1633	*****	823	1124	23	
358	24	Pon	477	18.25568	0.31	18.1113	-23.25	0.98353	7.5308	20.50	56.609	1.7	96	759	1145.2	1532	1744	059.7	922	1121	24	
359	25	Wto	478	18.29533	0.02	18.1539	-23.23	0.98348	8.5551	18.41	56.745	2.7	90	759	1145.7	1532	1903	201.9	1009	1117	25	
360	26	Śro	479	18.33499	-0.28	18.2005	-23.21	0.98344	9.5557	15.18	57.102	3.7	81	759	1146.2	1533	2025	301.5	1045	1113	26	
361	27	Czw	480	18.37465	-0.58	18.2431	-23.19	0.98341	10.5255	11.03	57.629	4.7	71	800	1146.7	1534	2148	357.8	1114	1109	27	
362	28	Pią	481	18.41430	-1.27	18.2857	-23.16	0.98338	11.4658	6.16	58.267	5.7	61	800	1147.2	1535	2308	450.6	1138	1105	28	
363	29	Sob	482	18.45395	-1.56	18.3323	-23.13	0.98335	12.3847	1.16	58.960	0.1	49	800	1147.7	1536	****	540.7	1159	1101	29	
364	30	Nie	483	18.49361	-2.25	18.3748	-23.09	0.98333	13.2910	-3.41	59.662	1.1	38	800	1148.2	1537	025	629.0	1219	1057	30	
365	31	Pon	484	18.53327	-2.54	18.4214	-23.05	0.98332	14.1859	-8.22	60.339	2.1	28	800	1148.6	1538	141	716.4	1240	1053	31	

Fazy Księżyca [Dm, h.mm]: Nów 7, 8.20 1kw 15, 12.49 Pełn 22, 18.49 3kw 29, 10.34

GRUDZIEŃ 2018 (c.d.)

Świty, zmiery astronomie ($h_{\odot} = -18^{\circ}$; 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	6.38	15.19	3.48	14.06	12.37	23.06	7.14	15.23	9.50	17.28	13.52	3.58	12.42	23.29	10.37	18.24		
	16.500	-21.82	15.885	-18.14	13.853	-9.90	22.784	-8.96	16.220	-20.50	18.569	-22.68	1.820	10.65	23.026	-7.31	19.431	-22.03	4.65343	1
3	5.32	17.39	6.19	15.09	3.45	14.02	12.31	23.06	7.09	15.16	9.43	17.21	13.44	3.50	12.34	23.22	10.29	18.17		
	16.644	-22.12	15.778	-17.44	13.927	-10.03	22.863	-8.41	16.251	-20.59	18.585	-22.67	1.816	10.64	23.026	-7.30	19.435	-22.02	4.78484	3
5	5.35	17.38	6.06	15.00	3.43	13.58	12.24	23.06	7.03	15.10	9.36	17.14	13.36	3.41	12.26	23.14	10.22	18.09		
	16.789	-22.39	15.720	-17.03	14.007	-10.21	22.942	-7.86	16.282	-20.67	18.601	-22.66	1.813	10.62	23.027	-7.30	19.439	-22.02	4.91626	5
7	5.37	17.38	5.56	14.53	3.41	13.54	12.18	23.06	6.58	15.03	9.29	17.08	13.28	3.33	12.19	23.06	10.14	18.02		
	16.935	-22.62	15.711	-16.91	14.092	-10.43	23.021	-7.30	16.313	-20.74	18.617	-22.65	1.810	10.60	23.028	-7.29	19.443	-22.01	5.04768	7
9	5.39	17.38	5.51	14.46	3.40	13.50	12.12	23.05	6.52	14.57	9.22	17.01	13.20	3.25	12.11	22.58	10.06	17.54		
	17.081	-22.83	15.745	-17.04	14.183	-10.69	23.100	-6.75	16.345	-20.82	18.633	-22.63	1.807	10.58	23.029	-7.28	19.447	-22.00	5.17911	9
11	5.41	17.38	5.50	14.40	3.40	13.46	12.06	23.05	6.47	14.50	9.15	16.54	13.12	3.17	12.03	22.51	9.59	17.47		
	17.227	-23.01	15.816	-17.37	14.278	-10.99	23.180	-6.18	16.376	-20.90	18.650	-22.62	1.804	10.57	23.030	-7.28	19.451	-22.00	5.31053	11
13	5.43	17.38	5.51	14.35	3.40	13.42	11.60	23.05	6.41	14.44	9.08	16.47	13.04	3.09	11.55	22.43	9.51	17.39		
	17.374	-23.16	15.917	-17.84	14.377	-11.32	23.259	-5.62	16.407	-20.97	18.666	-22.61	1.801	10.56	23.031	-7.27	19.456	-21.99	5.44195	13
15	5.44	17.38	5.54	14.31	3.40	13.39	11.54	23.05	6.36	14.37	9.01	16.40	12.56	3.01	11.47	22.35	9.43	17.31		
	17.522	-23.27	16.043	-18.41	14.480	-11.68	23.339	-5.05	16.438	-21.04	18.683	-22.60	1.799	10.54	23.033	-7.26	19.460	-21.99	5.57337	15
17	5.46	17.39	5.59	14.28	3.41	13.35	11.47	23.05	6.30	14.31	8.54	16.34	12.48	2.53	11.39	22.27	9.36	17.24		
	17.669	-23.36	16.187	-19.03	14.587	-12.07	23.419	-4.48	16.469	-21.11	18.699	-22.58	1.796	10.53	23.034	-7.25	19.464	-21.98	5.70479	17
19	5.47	17.40	6.05	14.25	3.42	13.31	11.41	23.05	6.25	14.24	8.47	16.27	12.41	2.45	11.32	22.20	9.28	17.16		
	17.817	-23.41	16.347	-19.68	14.698	-12.48	23.499	-3.91	16.500	-21.18	18.716	-22.57	1.794	10.52	23.036	-7.24	19.469	-21.97	5.83621	19
21	5.48	17.40	6.12	14.23	3.43	13.28	11.35	23.05	6.19	14.18	8.40	16.20	12.33	2.37	11.24	22.12	9.20	17.09		
	17.965	-23.43	16.519	-20.34	14.813	-12.90	23.580	-3.33	16.530	-21.25	18.733	-22.55	1.792	10.51	23.037	-7.22	19.473	-21.97	5.96763	21
23	5.49	17.42	6.20	14.22	3.45	13.24	11.29	23.05	6.14	14.11	8.33	16.13	12.25	2.29	11.16	22.04	9.13	17.01		
	18.113	-23.43	16.701	-20.97	14.930	-13.34	23.660	-2.76	16.561	-21.31	18.750	-22.54	1.791	10.50	23.039	-7.21	19.478	-21.96	6.09906	23
25	5.50	17.43	6.27	14.21	3.47	13.21	11.23	23.05	6.08	14.05	8.26	16.07	12.17	2.21	11.08	21.57	9.05	16.54		
	18.261	-23.39	16.891	-21.57	15.051	-13.80	23.740	-2.18	16.592	-21.38	18.767	-22.52	1.789	10.50	23.041	-7.20	19.483	-21.95	6.23048	25
27	5.50	17.44	6.35	14.21	3.50	13.18	11.17	23.05	6.02	13.58	8.19	15.60	12.09	2.13	11.00	21.49	8.57	16.46		
	18.409	-23.32	17.087	-22.13	15.175	-14.26	23.821	-1.61	16.622	-21.44	18.783	-22.51	1.788	10.49	23.044	-7.18	19.487	-21.95	6.36190	27
29	5.51	17.46	6.43	14.22	3.52	13.15	11.11	23.05	5.57	13.52	8.12	15.53	12.01	2.05	10.52	21.41	8.50	16.39		
	18.556	-23.21	17.290	-22.63	15.302	-14.72	23.902	-1.03	16.652	-21.50	18.800	-22.49	1.787	10.49	23.046	-7.17	19.492	-21.94	6.49332	29
31	5.51	17.47	6.51	14.23	3.55	13.12	11.05	23.05	5.51	13.45	8.05	15.47	11.53	1.57	10.45	21.34	8.42	16.31		
	18.704	-23.08	17.498	-23.06	15.431	-15.19	23.982	-0.46	16.682	-21.56	18.817	-22.47	1.786	10.48	23.048	-7.15	19.497	-21.93	6.62473	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2018

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 Dzięczynienia	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 Adventu	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 2019

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 7.10.2010 r.)

Data Wielkanocy: **2019 KWIECIEŃ 21**

Dla całego roku przyjęto: TDT – UT = 73 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 22.58**, Lato **VI 21, 16.54**, Jesień **IX 23, 8.50**, Zima **XII 22, 5.19**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 31 marca do 27 października 2019 r.**

Oznaczenia:

Dr — dzień 2019 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2019

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
1	1	Wto	485	18.57292	-3.23	18.4639	-23.00	0.98331	15.0854	-12.33	60.970	3.1	20	800	1149.1	1539	255	803.9	1303	1049	1
2	2	Śro	486	19.01258	-3.51	18.5104	-22.55	0.98331	15.5925	-16.06	61.547	4.1	12	800	1149.6	1540	407	851.9	1328	1045	2
3	3	Czw	487	19.05223	-4.19	18.5528	-22.49	0.98330	16.5045	-18.50	62.064	5.1	6	759	1150.1	1541	516	940.8	1359	1041	3
4	4	Pią	488	19.09189	-4.46	18.5952	-22.43	0.98331	17.4244	-20.40	62.522	6.1	2	759	1150.5	1542	621	1030.4	1436	1037	4
5	5	Sob	489	19.13154	-5.13	19.0416	-22.37	0.98332	18.3459	-21.30	62.917	7.1	0	759	1151.0	1543	719	1120.4	1521	1033	5
6	6	Nie	490	19.17120	-5.40	19.0839	-22.30	0.98333	19.2654	-21.19	63.244	0.4	0	758	1151.4	1545	809	1210.1	1613	1029	6
7	7	Pon	491	19.21086	-6.06	19.1302	-22.22	0.98334	20.1752	-20.11	63.490	1.4	2	758	1151.9	1546	850	1258.6	1711	1026	7
8	8	Wto	492	19.25051	-6.32	19.1724	-22.15	0.98336	21.0726	-18.09	63.639	2.4	5	757	1152.3	1548	923	1345.7	1814	1022	8
9	9	Śro	493	19.29017	-6.58	19.2146	-22.06	0.98338	21.5527	-15.22	63.668	3.4	10	757	1152.7	1549	951	1431.0	1919	1018	9
10	10	Czw	494	19.32582	-7.22	19.2607	-21.58	0.98341	22.4202	-11.58	63.557	4.4	16	756	1153.1	1550	1014	1514.8	2025	1014	10
11	11	Pią	495	19.36548	-7.46	19.3028	-21.48	0.98344	23.2733	-8.05	63.287	5.4	24	755	1153.5	1552	1034	1557.4	2132	1010	11
12	12	Sob	496	19.40513	-8.10	19.3448	-21.39	0.98347	0.1235	-3.52	62.845	6.4	32	755	1153.9	1553	1052	1639.7	2239	1006	12
13	13	Nie	497	19.44479	-8.33	19.3908	-21.29	0.98351	0.5752	0.35	62.230	7.4	42	754	1154.3	1555	1110	1722.5	2348	1002	13
14	14	Pon	498	19.48444	-8.55	19.4326	-21.19	0.98356	1.4412	5.06	61.457	0.2	52	753	1154.7	1557	1128	1806.6	****	958	14
15	15	Wto	499	19.52410	-9.16	19.4744	-21.08	0.98361	2.3231	9.31	60.554	1.2	62	752	1155.0	1558	1149	1853.1	059	954	15
16	16	Śro	500	19.56376	-9.37	19.5202	-20.57	0.98366	3.2341	13.39	59.572	2.2	72	751	1155.4	1600	1213	1943.0	212	950	16
17	17	Czw	501	20.00341	-9.57	19.5619	-20.45	0.98372	4.1824	17.12	58.577	3.2	81	750	1155.7	1602	1243	2037.0	328	946	17
18	18	Pią	502	20.04307	-10.17	20.0035	-20.33	0.98379	5.1659	19.52	57.648	4.2	89	749	1156.0	1603	1321	2135.4	445	942	18
19	19	Sob	503	20.08273	-10.36	20.0450	-20.21	0.98386	6.1903	21.21	56.869	5.2	95	748	1156.3	1605	1412	2237.2	558	938	19
20	20	Nie	504	20.12238	-10.54	20.0904	-20.08	0.98394	7.2320	21.22	56.317	6.2	99	747	1156.6	1607	1516	2340.6	703	934	20
21	21	Pon	505	20.16204	-11.11	20.1318	-19.55	0.98403	8.2757	19.50	56.048	0.2	100	746	1156.9	1609	1633	*****	757	930	21
22	22	Wto	506	20.20169	-11.27	20.1731	-19.41	0.98412	9.3102	16.53	56.086	1.2	98	745	1157.2	1610	1757	043.3	840	927	22
23	23	Śro	507	20.24135	-11.43	20.2143	-19.27	0.98422	10.3122	12.48	56.419	2.2	93	743	1157.5	1612	1923	143.4	913	923	23
24	24	Czw	508	20.28100	-11.58	20.2555	-19.13	0.98432	11.2836	7.59	57.001	3.2	85	742	1157.7	1614	2047	240.1	940	919	24
25	25	Pią	509	20.32066	-12.12	20.3006	-18.58	0.98443	12.2302	2.50	57.766	4.2	76	741	1157.9	1616	2209	333.5	1003	915	25
26	26	Sob	510	20.36031	-12.25	20.3416	-18.43	0.98455	13.1523	-2.19	58.637	5.2	65	739	1158.2	1618	2328	424.2	1025	911	26
27	27	Nie	511	20.39597	-12.38	20.3825	-18.28	0.98467	14.0627	-7.12	59.540	6.2	55	738	1158.4	1620	****	513.3	1046	907	27
28	28	Pon	512	20.43562	-12.50	20.4233	-18.12	0.98479	14.5700	-11.35	60.414	0.6	44	736	1158.6	1621	044	601.5	1108	903	28
29	29	Wto	513	20.47528	-13.01	20.4641	-17.57	0.98493	15.4738	-15.20	61.214	1.6	34	735	1158.8	1623	158	649.7	1133	859	29
30	30	Śro	514	20.51494	-13.11	20.5048	-17.40	0.98506	16.3840	-18.16	61.913	2.6	25	733	1158.9	1625	308	738.3	1202	855	30
31	31	Czw	515	20.55459	-13.21	20.5454	-17.24	0.98520	17.3013	-20.19	62.496	3.6	17	732	1159.1	1627	414	827.4	1236	851	31

Fazy Księżyca [Dm, h.mm]: Nów 6, 2.28 1kw 14, 7.45 Pełn 21, 6.16 3kw 27, 22.10

STYCZEŃ 2019 (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	Zach		
1	5.51	17.48	6.55	14.24	3.56	13.11	11.02	23.05	5.48	13.42	8.02	15.43	11.49	1.53	10.41	21.30	8.38	16.27		
	18.777	-23.00	17.603	-23.26	15.497	-15.42	0.023	-0.17	16.697	-21.59	18.826	-22.46	1.786	10.48	23.050	-7.14	19.499	-21.93	6.69044	1
3	5.51	17.50	7.02	14.27	3.59	13.08	10.56	23.05	5.43	13.36	7.55	15.36	11.41	1.45	10.33	21.22	8.31	16.20		
	18.924	-22.82	17.817	-23.59	15.630	-15.88	0.104	0.41	16.727	-21.64	18.843	-22.44	1.785	10.48	23.052	-7.13	19.504	-21.92	6.82187	3
5	5.51	17.52	7.09	14.30	4.02	13.05	10.50	23.06	5.37	13.29	7.48	15.30	11.33	1.37	10.25	21.15	8.23	16.12		
	19.071	-22.61	18.034	-23.85	15.766	-16.34	0.185	0.98	16.756	-21.70	18.860	-22.43	1.785	10.48	23.055	-7.11	19.509	-21.92	6.95329	5
7	5.51	17.54	7.16	14.34	4.05	13.03	10.43	23.06	5.31	13.23	7.41	15.23	11.26	1.29	10.17	21.07	8.16	16.05		
	19.217	-22.37	18.254	-24.03	15.904	-16.79	0.267	1.56	16.785	-21.75	18.877	-22.41	1.785	10.48	23.058	-7.09	19.514	-21.91	7.08471	7
9	5.50	17.57	7.22	14.38	4.09	13.01	10.37	23.06	5.25	13.16	7.34	15.16	11.18	1.21	10.10	20.59	8.08	15.57		
	19.363	-22.11	18.477	-24.13	16.045	-17.23	0.348	2.13	16.814	-21.80	18.894	-22.39	1.785	10.48	23.061	-7.07	19.518	-21.90	7.21613	9
11	5.49	17.59	7.28	14.44	4.12	12.59	10.31	23.06	5.20	13.10	7.27	15.10	11.10	1.14	10.02	20.52	8.00	15.50		
	19.508	-21.81	18.702	-24.14	16.188	-17.66	0.430	2.71	16.843	-21.85	18.911	-22.37	1.786	10.49	23.064	-7.05	19.523	-21.89	7.34755	11
13	5.48	18.02	7.33	14.50	4.16	12.57	10.25	23.06	5.14	13.03	7.20	15.03	11.02	1.06	9.54	20.44	7.53	15.42		
	19.652	-21.48	18.929	-24.07	16.333	-18.07	0.512	3.28	16.871	-21.90	18.928	-22.35	1.786	10.49	23.067	-7.03	19.528	-21.89	7.47897	13
15	5.47	18.04	7.38	14.57	4.19	12.55	10.19	23.06	5.08	12.57	7.13	14.56	10.54	0.58	9.46	20.37	7.45	15.35		
	19.796	-21.13	19.157	-23.90	16.479	-18.47	0.594	3.84	16.899	-21.94	18.944	-22.33	1.787	10.50	23.070	-7.01	19.533	-21.88	7.61039	15
17	5.46	18.07	7.41	15.05	4.23	12.54	10.13	23.06	5.02	12.50	7.06	14.50	10.46	0.50	9.38	20.29	7.37	15.27		
	19.938	-20.75	19.387	-23.64	16.628	-18.84	0.676	4.41	16.927	-21.99	18.961	-22.31	1.788	10.50	23.074	-6.99	19.538	-21.87	7.74181	17
19	5.44	18.10	7.45	15.14	4.26	12.53	10.07	23.06	4.56	12.44	6.59	14.43	10.38	0.42	9.31	20.22	7.30	15.20		
	20.081	-20.34	19.619	-23.29	16.779	-19.20	0.759	4.97	16.955	-22.03	18.978	-22.29	1.789	10.51	23.077	-6.97	19.543	-21.86	7.87323	19
21	5.43	18.13	7.47	15.23	4.30	12.52	10.01	23.06	4.50	12.37	6.52	14.36	10.31	0.35	9.23	20.14	7.22	15.12		
	20.222	-19.91	19.851	-22.84	16.932	-19.53	0.841	5.53	16.982	-22.07	18.994	-22.26	1.791	10.52	23.081	-6.94	19.547	-21.86	8.00466	21
23	5.41	18.16	7.50	15.33	4.33	12.51	9.56	23.06	4.44	12.31	6.45	14.29	10.23	0.27	9.15	20.07	7.14	15.05		
	20.362	-19.45	20.084	-22.30	17.086	-19.84	0.924	6.09	17.009	-22.11	19.011	-22.24	1.792	10.53	23.085	-6.92	19.552	-21.85	8.13608	23
25	5.39	18.19	7.51	15.44	4.36	12.51	9.50	23.07	4.38	12.24	6.38	14.23	10.15	0.19	9.07	19.59	7.07	14.57		
	20.502	-18.97	20.318	-21.65	17.242	-20.11	1.007	6.64	17.035	-22.14	19.027	-22.22	1.794	10.54	23.088	-6.90	19.557	-21.84	8.26749	25
27	5.37	18.22	7.52	15.55	4.40	12.50	9.44	23.07	4.32	12.17	6.31	14.16	10.07	0.12	8.60	19.52	6.59	14.50		
	20.640	-18.47	20.552	-20.91	17.400	-20.36	1.090	7.19	17.061	-22.18	19.043	-22.20	1.797	10.56	23.092	-6.87	19.562	-21.83	8.39891	27
29	5.34	18.25	7.52	16.07	4.43	12.51	9.38	23.07	4.26	12.11	6.24	14.09	9.59	0.04	8.52	19.44	6.52	14.42		
	20.778	-17.94	20.786	-20.07	17.559	-20.58	1.173	7.74	17.086	-22.21	19.059	-22.18	1.799	10.57	23.096	-6.85	19.566	-21.83	8.53033	29
31	5.32	18.28	7.52	16.20	4.46	12.51	9.32	23.07	4.20	12.04	6.17	14.02	9.52	23.52	8.44	19.37	6.44	14.34		
	20.915	-17.39	21.020	-19.12	17.719	-20.77	1.257	8.28	17.112	-22.25	19.075	-22.15	1.801	10.59	23.100	-6.82	19.571	-21.82	8.66175	31

LUTY 2019

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
32	1	Pią	516	20.59425	-13.29	20.5859	-17.07	0.98534	18.2201	-21.23	62.961	4.6	10	730	1159.2	1629	514	916.9	1318	847	1	
33	2	Sob	517	21.03390	-13.37	21.0303	-16.50	0.98549	19.1340	-21.27	63.312	5.6	5	728	1159.4	1631	606	1006.3	1408	843	2	
34	3	Nie	518	21.07356	-13.44	21.0707	-16.32	0.98564	20.0438	-20.33	63.555	6.6	2	727	1159.5	1633	650	1055.0	1504	839	3	
35	4	Pon	519	21.11321	-13.50	21.1109	-16.14	0.98579	20.5428	-18.45	63.698	7.6	0	725	1159.6	1635	725	1142.3	1605	835	4	
36	5	Wto	520	21.15287	-13.56	21.1511	-15.56	0.98594	21.4254	-16.09	63.741	0.6	0	723	1159.7	1637	754	1228.4	1709	831	5	
37	6	Śro	521	21.19253	-14.00	21.1913	-15.38	0.98610	22.2955	-12.53	63.684	1.6	2	721	1159.8	1639	819	1312.7	1815	828	6	
38	7	Czw	522	21.23218	-14.04	21.2313	-15.19	0.98626	23.1544	-9.06	63.518	2.6	6	720	1159.8	1641	840	1355.7	1922	824	7	
39	8	Pią	523	21.27184	-14.07	21.2712	-15.00	0.98642	0.0047	-4.57	63.233	3.6	11	718	1159.9	1643	858	1438.0	2029	820	8	
40	9	Sob	524	21.31149	-14.09	21.3111	-14.41	0.98659	0.4539	-0.34	62.819	4.6	18	716	1159.9	1645	916	1520.1	2137	816	9	
41	10	Nie	525	21.35115	-14.11	21.3509	-14.22	0.98676	1.3102	3.54	62.270	5.6	26	714	1159.9	1647	934	1603.0	2246	812	10	
42	11	Pon	526	21.39080	-14.11	21.3906	-14.02	0.98693	2.1745	8.17	61.587	6.6	35	712	1159.9	1649	953	1647.4	2356	808	11	
43	12	Wto	527	21.43046	-14.11	21.4303	-13.42	0.98711	3.0636	12.25	60.782	7.6	45	710	1159.9	1651	1014	1734.4	****	804	12	
44	13	Śro	528	21.47011	-14.10	21.4658	-13.22	0.98729	3.5821	16.05	59.883	0.5	56	708	1159.9	1652	1040	1824.7	109	800	13	
45	14	Czw	529	21.50577	-14.08	21.5053	-13.02	0.98748	4.5332	19.01	58.937	1.5	66	706	1159.9	1654	1113	1918.9	223	756	14	
46	15	Pią	530	21.54542	-14.06	21.5447	-12.42	0.98767	5.5216	20.56	58.005	2.5	76	704	1159.8	1656	1156	2017.0	335	752	15	
47	16	Sob	531	21.58508	-14.02	21.5840	-12.21	0.98786	6.5359	21.35	57.163	3.5	85	702	1159.8	1658	1251	2118.1	443	748	16	
48	17	Nie	532	22.02474	-13.59	22.0233	-11.60	0.98806	7.5725	20.46	56.493	4.5	93	700	1159.7	1700	1401	2220.4	541	744	17	
49	18	Pon	533	22.06439	-13.54	22.0625	-11.39	0.98826	9.0054	18.28	56.067	5.5	98	658	1159.6	1702	1521	2321.9	629	740	18	
50	19	Wto	534	22.10405	-13.49	22.1016	-11.18	0.98847	10.0255	14.51	55.936	6.5	100	656	1159.6	1704	1647	****	707	736	19	
51	20	Śro	535	22.14370	-13.42	22.1407	-10.56	0.98869	11.0236	10.13	56.119	0.8	99	654	1159.5	1706	1815	021.3	737	733	20	
52	21	Czw	536	22.18336	-13.36	22.1756	-10.35	0.98890	11.5944	5.01	56.598	1.8	95	652	1159.3	1708	1941	117.8	803	729	21	
53	22	Pią	537	22.22301	-13.28	22.2146	-10.13	0.98913	12.5442	-0.23	57.320	2.8	89	649	1159.2	1710	2105	211.6	826	725	22	
54	23	Sob	538	22.26266	-13.21	22.2534	-9.51	0.98935	13.4805	-5.36	58.212	3.8	80	647	1159.1	1712	2225	303.4	848	721	23	
55	24	Nie	539	22.30232	-13.12	22.2922	-9.29	0.98959	14.4032	-10.21	59.190	4.8	71	645	1158.9	1714	2343	353.9	910	717	24	
56	25	Pon	540	22.34198	-13.03	22.3310	-9.07	0.98982	15.3238	-14.26	60.175	5.8	61	643	1158.8	1716	****	443.8	935	713	25	
57	26	Wto	541	22.38163	-12.53	22.3657	-8.44	0.99006	16.2443	-17.41	61.099	6.8	50	641	1158.6	1718	057	533.5	1003	709	26	
58	27	Śro	542	22.42129	-12.43	22.4043	-8.22	0.99030	17.1654	-19.60	61.913	1.0	40	638	1158.5	1719	206	623.4	1036	705	27	
59	28	Czw	543	22.46094	-12.32	22.4429	-7.59	0.99054	18.0904	-21.19	62.584	2.0	31	636	1158.3	1721	309	713.4	1116	701	28	

Fazy Księżyca [Dm, h.mm]: Now 4, 22.03 1kw 12, 23.26 Pełn 19, 16.53 3kw 26, 12.28

LUTY 2019 (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	18.30	7.52	16.26	4.47	12.51	9.29	23.07	4.17	12.01	6.13	13.59	9.48	23.49	8.40	19.33	6.40	14.31		
	20.983	-17.11	21.137	-18.61	17.799	-20.85	1.299	8.55	17.124	-22.26	19.083	-22.14	1.803	10.59	23.102	-6.81	19.573	-21.82	8.72746	1
3	5.28	18.33	7.51	16.39	4.50	12.52	9.23	23.07	4.11	11.54	6.06	13.52	9.40	23.41	8.32	19.25	6.32	14.23		
	21.119	-16.53	21.371	-17.52	17.961	-20.99	1.383	9.08	17.148	-22.29	19.098	-22.12	1.806	10.61	23.106	-6.78	19.578	-21.81	8.85888	3
5	5.25	18.36	7.50	16.53	4.53	12.53	9.17	23.07	4.04	11.48	5.59	13.45	9.32	23.34	8.25	19.18	6.25	14.16		
	21.253	-15.94	21.604	-16.33	18.124	-21.10	1.467	9.61	17.172	-22.32	19.114	-22.10	1.809	10.63	23.111	-6.76	19.582	-21.80	8.99030	5
7	5.22	18.40	7.48	17.07	4.55	12.55	9.12	23.07	3.58	11.41	5.52	13.39	9.24	23.26	8.17	19.11	6.17	14.08		
	21.387	-15.32	21.835	-15.04	18.288	-21.16	1.552	10.14	17.196	-22.35	19.129	-22.07	1.812	10.65	23.115	-6.73	19.587	-21.80	9.12172	7
9	5.19	18.43	7.45	17.21	4.57	12.57	9.06	23.08	3.52	11.34	5.45	13.32	9.17	23.18	8.09	19.03	6.10	14.01		
	21.520	-14.69	22.065	-13.66	18.453	-21.20	1.637	10.66	17.219	-22.38	19.144	-22.05	1.815	10.67	23.119	-6.70	19.591	-21.79	9.25314	9
11	5.15	18.46	7.42	17.35	4.59	12.59	9.00	23.08	3.46	11.28	5.38	13.25	9.09	23.11	8.01	18.56	6.02	13.53		
	21.652	-14.04	22.292	-12.20	18.618	-21.19	1.722	11.17	17.241	-22.40	19.159	-22.03	1.819	10.69	23.124	-6.67	19.595	-21.78	9.38455	11
13	5.12	18.50	7.39	17.49	5.01	13.01	8.54	23.08	3.39	11.21	5.30	13.18	9.01	23.03	7.54	18.48	5.54	13.45		
	21.783	-13.37	22.514	-10.67	18.784	-21.15	1.807	11.68	17.263	-22.42	19.173	-22.01	1.823	10.71	23.128	-6.65	19.600	-21.78	9.51597	13
15	5.08	18.53	7.35	18.03	5.02	13.04	8.49	23.08	3.33	11.14	5.23	13.11	8.53	22.56	7.46	18.41	5.47	13.38		
	21.913	-12.69	22.731	-9.07	18.950	-21.06	1.893	12.18	17.285	-22.45	19.188	-21.98	1.827	10.74	23.132	-6.62	19.604	-21.77	9.64740	15
17	5.04	18.57	7.31	18.17	5.04	13.07	8.43	23.08	3.26	11.07	5.16	13.05	8.45	22.48	7.38	18.33	5.39	13.30		
	22.042	-12.00	22.941	-7.44	19.116	-20.95	1.978	12.67	17.305	-22.47	19.202	-21.96	1.831	10.76	23.137	-6.59	19.608	-21.76	9.77882	17
19	5.01	19.01	7.26	18.30	5.05	13.10	8.38	23.08	3.20	11.01	5.09	12.58	8.38	22.41	7.30	18.26	5.31	13.23		
	22.171	-11.29	23.140	-5.80	19.283	-20.79	2.064	13.16	17.326	-22.49	19.215	-21.94	1.836	10.79	23.142	-6.56	19.612	-21.76	9.91024	19
21	4.57	19.04	7.21	18.42	5.05	13.13	8.32	23.09	3.13	10.54	5.02	12.51	8.30	22.34	7.23	18.18	5.24	13.15		
	22.299	-10.58	23.324	-4.18	19.449	-20.59	2.151	13.64	17.345	-22.50	19.229	-21.91	1.840	10.81	23.146	-6.53	19.616	-21.75	10.04165	21
23	4.52	19.08	7.14	18.52	5.06	13.17	8.27	23.09	3.07	10.47	4.54	12.44	8.22	22.26	7.15	18.11	5.16	13.07		
	22.426	-9.85	23.491	-2.62	19.616	-20.35	2.238	14.11	17.364	-22.52	19.242	-21.89	1.845	10.84	23.151	-6.50	19.620	-21.75	10.17307	23
25	4.48	19.12	7.08	19.01	5.06	13.21	8.21	23.09	2.60	10.40	4.47	12.37	8.15	22.19	7.07	18.04	5.08	12.60		
	22.553	-9.11	23.634	-1.17	19.782	-20.08	2.325	14.57	17.382	-22.54	19.255	-21.87	1.850	10.87	23.155	-6.47	19.623	-21.74	10.30449	25
27	4.44	19.15	6.60	19.07	5.06	13.25	8.16	23.09	2.53	10.33	4.40	12.30	8.07	22.11	6.59	17.56	5.01	12.52		
	22.679	-8.36	23.751	0.12	19.948	-19.77	2.412	15.03	17.400	-22.55	19.268	-21.85	1.855	10.90	23.160	-6.45	19.627	-21.74	10.43591	27

MARZEC 2019

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
60	1	Pią	544	22.50060	-12.21	22.4814	-7.36	0.99079	19.0054	-21.37	63.096	3.0	22	634	1158.1	1723	403	803.0	1203	657	1	
61	2	Sob	545	22.54026	-12.09	22.5159	-7.13	0.99104	19.5159	-20.56	63.449	4.0	15	632	1157.9	1725	449	851.9	1257	653	2	
62	3	Nie	546	22.57591	-11.57	22.5543	-6.51	0.99129	20.4159	-19.20	63.651	5.0	9	629	1157.7	1727	527	939.6	1357	649	3	
63	4	Pon	547	23.01557	-11.44	22.5927	-6.27	0.99154	21.3039	-16.54	63.716	6.0	4	627	1157.5	1729	558	1025.9	1500	645	4	
64	5	Wto	548	23.05522	-11.31	23.0311	-6.04	0.99180	22.1760	-13.46	63.661	7.0	1	625	1157.3	1731	624	1110.7	1606	641	5	
65	6	Śro	549	23.09488	-11.18	23.0653	-5.41	0.99205	23.0410	-10.04	63.501	8.0	0	622	1157.0	1733	645	1154.2	1713	637	6	
66	7	Czw	550	23.13453	-11.04	23.1036	-5.18	0.99230	23.4933	-5.56	63.250	0.8	1	620	1156.8	1735	705	1236.9	1820	634	7	
67	8	Pią	551	23.17418	-10.49	23.1418	-4.54	0.99256	0.3437	-1.33	62.913	1.8	3	618	1156.6	1736	722	1319.2	1928	630	8	
68	9	Sob	552	23.21384	-10.35	23.1800	-4.31	0.99282	1.1958	2.58	62.492	2.8	7	615	1156.3	1738	740	1401.9	2037	626	9	
69	10	Nie	553	23.25349	-10.19	23.2141	-4.08	0.99308	2.0617	7.25	61.989	3.8	13	613	1156.1	1740	758	1445.7	2147	622	10	
70	11	Pon	554	23.29315	-10.04	23.2523	-3.44	0.99333	2.5415	11.37	61.402	4.8	21	611	1155.8	1742	819	1531.4	2259	618	11	
71	12	Wto	555	23.33281	-9.48	23.2903	-3.20	0.99359	3.4432	15.23	60.735	5.8	30	608	1155.5	1744	842	1619.7	****	614	12	
72	13	Śro	556	23.37246	-9.32	23.3244	-2.57	0.99386	4.3738	18.29	60.000	6.8	40	606	1155.3	1746	912	1711.3	011	610	13	
73	14	Czw	557	23.41212	-9.16	23.3624	-2.33	0.99412	5.3344	20.40	59.220	0.0	50	604	1155.0	1747	949	1806.1	123	606	14	
74	15	Pią	558	23.45177	-8.59	23.4004	-2.09	0.99438	6.3235	21.42	58.433	1.0	61	601	1154.7	1749	1037	1903.9	230	602	15	
75	16	Sob	559	23.49143	-8.42	23.4343	-1.46	0.99465	7.3321	21.25	57.691	2.0	72	559	1154.4	1751	1139	2003.5	330	558	16	
76	17	Nie	560	23.53108	-8.25	23.4723	-1.22	0.99492	8.3452	19.43	57.057	3.0	82	556	1154.2	1753	1252	2103.4	421	554	17	
77	18	Pon	561	23.57074	-8.07	23.5102	-0.58	0.99519	9.3553	16.40	56.595	4.0	90	554	1153.9	1755	1413	2202.3	501	550	18	
78	19	Wto	562	24.01039	-7.50	23.5441	-0.35	0.99547	10.3529	12.29	56.364	5.0	96	552	1153.6	1757	1540	2259.3	534	546	19	
79	20	Śro	563	0.05005	-7.32	23.5820	-0.11	0.99575	11.3317	7.28	56.402	6.0	99	549	1153.3	1758	1707	2354.4	601	542	20	
80	21	Czw	564	0.08570	-7.14	0.0159	0.13	0.99603	12.2924	2.03	56.718	0.4	100	547	1153.0	1800	1833	*****	625	539	21	
81	22	Pią	565	0.12536	-6.56	0.0537	0.37	0.99631	13.2415	-3.26	57.291	1.4	97	544	1152.7	1802	1957	047.7	647	535	22	
82	23	Sob	566	0.16501	-6.38	0.0916	1.00	0.99659	14.1819	-8.35	58.068	2.4	92	542	1152.4	1804	2119	140.0	710	531	23	
83	24	Nie	567	0.20467	-6.20	0.1254	1.24	0.99688	15.1205	-13.07	58.979	3.4	85	540	1152.1	1806	2237	231.7	733	527	24	
84	25	Pon	568	0.24432	-6.02	0.1632	1.47	0.99717	16.0548	-16.50	59.944	4.4	76	537	1151.8	1807	2351	323.2	800	523	25	
85	26	Wto	569	0.28398	-5.44	0.2011	2.11	0.99746	16.5931	-19.34	60.888	5.4	67	535	1151.5	1809	****	414.8	832	519	26	
86	27	Śro	570	0.32363	-5.26	0.2349	2.35	0.99775	17.5302	-21.15	61.745	6.4	57	532	1151.2	1811	059	506.3	910	515	27	
87	28	Czw	571	0.36329	-5.08	0.2728	2.58	0.99804	18.4557	-21.52	62.465	0.3	47	530	1150.9	1813	158	557.2	955	511	28	
88	29	Pią	572	0.40295	-4.50	0.3106	3.21	0.99833	19.3753	-21.26	63.015	1.3	38	528	1150.6	1815	248	647.1	1048	507	29	
89	30	Sob	573	0.44260	-4.32	0.3445	3.45	0.99863	20.2829	-20.03	63.382	2.3	29	525	1150.3	1816	329	735.6	1146	503	30	
90	31	Nie	574	0.48226	-4.14	0.3823	4.08	0.99892	21.1735	-17.48	63.563	3.3	21	523	1150.0	1818	402	822.5	1249	459	31	
90	31	Nie	574	23.48127	-4.14	0.3814	4.07	0.99891	21.1534	-17.54	63.559	3.2	21	623	1250.0	1918	502	922.5	1349	559	31	

Fazy Księżyca [Dm, h.mm]: Nów 6, 17.04 1kw 14, 11.27 Pełn 21, 2.43 3kw 28, 5.10 3kw 28, 6.10

MARZEC 2019 (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^h UT)		
1	4.39	19.19	6.51	19.09	5.06	13.30	8.10	23.09	2.46	10.26	4.33	12.23	7.59	22.04	6.52	17.49	4.53	12.45			
	22.804	-7.61	23.836	1.19	20.114	-19.42	2.499	15.48	17.417	-22.57	19.280	-21.83	1.860	10.93	23.165	-6.42	19.631	-21.73	10.56733	1	
3	4.35	19.23	6.42	19.09	5.05	13.34	8.05	23.09	2.40	10.19	4.25	12.16	7.51	21.57	6.44	17.41	4.45	12.37			
	22.929	-6.84	23.886	2.02	20.279	-19.03	2.587	15.92	17.433	-22.58	19.293	-21.81	1.865	10.96	23.169	-6.39	19.634	-21.73	10.69875	3	
5	4.30	19.27	6.32	19.05	5.05	13.39	7.60	23.10	2.33	10.12	4.18	12.09	7.44	21.49	6.36	17.34	4.37	12.29			
	23.053	-6.07	23.900	2.55	20.444	-18.61	2.676	16.35	17.449	-22.59	19.304	-21.79	1.871	10.99	23.174	-6.36	19.638	-21.72	10.83017	5	
7	4.25	19.31	6.22	18.57	5.04	13.44	7.54	23.10	2.26	10.05	4.11	12.02	7.36	21.42	6.29	17.26	4.30	12.22			
	23.177	-5.30	23.878	2.77	20.608	-18.15	2.764	16.77	17.464	-22.60	19.316	-21.77	1.877	11.02	23.179	-6.33	19.641	-21.72	10.96158	7	
9	4.20	19.35	6.11	18.45	5.02	13.49	7.49	23.10	2.19	9.58	4.03	11.55	7.28	21.35	6.21	17.19	4.22	12.14			
	23.300	-4.52	23.823	2.67	20.771	-17.66	2.853	17.18	17.478	-22.61	19.327	-21.75	1.882	11.05	23.183	-6.30	19.644	-21.71	11.09300	9	
11	4.15	19.39	6.01	18.30	5.01	13.54	7.44	23.10	2.12	9.51	3.56	11.48	7.21	21.27	6.13	17.12	4.14	12.06			
	23.423	-3.73	23.741	2.27	20.934	-17.13	2.942	17.59	17.491	-22.62	19.338	-21.73	1.888	11.09	23.188	-6.27	19.647	-21.71	11.22441	11	
13	4.10	19.43	5.50	18.13	4.59	13.59	7.39	23.10	2.05	9.44	3.49	11.41	7.13	21.20	6.05	17.04	4.07	11.59			
	23.545	-2.95	23.640	1.59	21.096	-16.57	3.032	17.98	17.504	-22.63	19.348	-21.71	1.894	11.12	23.193	-6.24	19.650	-21.71	11.35583	13	
15	4.05	19.47	5.40	17.54	4.57	14.05	7.34	23.10	1.58	9.36	3.41	11.34	7.05	21.13	5.58	16.57	3.59	11.51			
	23.668	-2.16	23.530	0.72	21.257	-15.99	3.121	18.37	17.516	-22.64	19.358	-21.69	1.901	11.16	23.198	-6.21	19.653	-21.70	11.48726	15	
17	3.60	19.51	5.31	17.34	4.55	14.10	7.29	23.10	1.51	9.29	3.34	11.26	6.57	21.05	5.50	16.49	3.51	11.43			
	23.790	-1.37	23.421	-0.28	21.417	-15.37	3.212	18.74	17.527	-22.65	19.368	-21.67	1.907	11.19	23.202	-6.18	19.655	-21.70	11.61868	17	
19	3.55	19.55	5.23	17.15	4.53	14.16	7.24	23.10	1.43	9.22	3.26	11.19	6.50	20.58	5.42	16.42	3.43	11.36			
	23.911	-0.58	23.321	-1.33	21.576	-14.72	3.302	19.11	17.537	-22.65	19.377	-21.66	1.913	11.23	23.207	-6.15	19.658	-21.70	11.75009	19	
21	3.49	19.60	5.16	16.56	4.51	14.22	7.19	23.10	1.36	9.15	3.19	11.12	6.42	20.51	5.34	16.34	3.36	11.28			
	0.033	0.21	23.239	-2.34	21.735	-14.04	3.393	19.46	17.546	-22.66	19.386	-21.64	1.920	11.26	23.211	-6.13	19.660	-21.69	11.88151	21	
23	3.44	20.04	5.09	16.40	4.48	14.27	7.14	23.10	1.29	9.07	3.11	11.05	6.34	20.44	5.27	16.27	3.28	11.20			
	0.154	1.00	23.178	-3.26	21.892	-13.34	3.484	19.81	17.555	-22.66	19.395	-21.62	1.926	11.30	23.216	-6.10	19.663	-21.69	12.01292	23	
25	3.38	20.08	5.03	16.26	4.45	14.33	7.10	23.10	1.22	8.60	3.04	10.58	6.27	20.36	5.19	16.20	3.20	11.13			
	0.276	1.79	23.141	-4.05	22.049	-12.61	3.575	20.14	17.562	-22.67	19.403	-21.61	1.933	11.34	23.221	-6.07	19.665	-21.69	12.14434	25	
27	3.32	20.13	4.58	16.14	4.42	14.39	7.05	23.10	1.14	8.52	2.57	10.50	6.19	20.29	5.11	16.12	3.13	11.05			
	0.397	2.58	23.128	-4.68	22.205	-11.86	3.666	20.46	17.569	-22.67	19.411	-21.59	1.940	11.37	23.225	-6.04	19.667	-21.69	12.27576	27	
29	3.26	20.18	4.53	16.04	4.39	14.45	7.00	23.10	1.07	8.45	2.49	10.43	6.11	20.22	5.03	16.05	3.05	10.57			
	0.518	3.36	23.140	-5.15	22.360	-11.08	3.758	20.77	17.575	-22.67	19.418	-21.58	1.946	11.41	23.230	-6.01	19.669	-21.69	12.40718	29	
31	3.20	20.22	4.49	15.56	4.36	14.51	6.56	23.10	0.59	8.37	2.41	10.36	6.04	20.15	4.56	15.57	2.57	10.49			
	0.640	4.13	23.173	-5.45	22.515	-10.29	3.850	21.07	17.580	-22.68	19.425	-21.57	1.953	11.45	23.234	-5.99	19.671	-21.69	12.53860	31	
31	4.20	21.22	5.49	16.56	5.36	15.50	7.56	0.13	1.59	9.37	3.41	11.36	7.04	21.15	5.56	16.57	3.57	11.49			
	0.637	4.12	23.172	-5.44	22.511	-10.30	3.848	21.07	17.580	-22.68	19.425	-21.57	1.953	11.45	23.234	-5.99	19.671	-21.69	12.53860	31	

KWIECIEŃ 2019

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
91	1	Pon	575	23.52093	-3.57	0.4153	4.30	0.99920	22.0316	-14.57	63.575	4.2	14	620	1249.7	1920	529	1007.8	1455	555	1	
92	2	Wto	576	23.56058	-3.39	0.4532	4.53	0.99949	22.4944	-11.22	63.439	5.2	8	618	1249.4	1922	551	1051.7	1602	551	2	
93	3	Śro	577	24.00024	-3.21	0.4911	5.16	0.99978	23.3521	-7.18	63.178	6.2	4	616	1249.1	1924	611	1134.5	1709	547	3	
94	4	Czw	578	0.03589	-3.04	0.5250	5.39	1.00007	0.2037	-2.55	62.819	7.2	1	613	1248.8	1925	629	1217.2	1818	543	4	
95	5	Pią	579	0.07555	-2.47	0.5629	6.02	1.00036	1.0608	1.40	62.389	0.0	0	611	1248.5	1927	646	1260.0	1927	540	5	
96	6	Sob	580	0.11520	-2.29	1.0009	6.25	1.00064	1.5232	6.14	61.910	1.0	1	609	1248.2	1929	704	1343.8	2038	536	6	
97	7	Nie	581	0.15486	-2.13	1.0348	6.48	1.00093	2.4026	10.37	61.397	2.0	4	606	1248.0	1931	724	1429.3	2150	532	7	
98	8	Pon	582	0.19451	-1.56	1.0728	7.10	1.00121	3.3027	14.36	60.861	3.0	9	604	1247.7	1933	746	1517.2	2303	528	8	
99	9	Wto	583	0.23417	-1.39	1.1108	7.33	1.00149	4.2258	17.57	60.310	4.0	16	602	1247.4	1934	813	1607.9	****	524	9	
100	10	Śro	584	0.27382	-1.23	1.1449	7.55	1.00177	5.1809	20.25	59.747	5.0	25	559	1247.1	1936	848	1701.6	016	520	10	
101	11	Czw	585	0.31348	-1.07	1.1829	8.17	1.00205	6.1542	21.48	59.181	6.0	35	557	1246.9	1938	932	1757.8	124	516	11	
102	12	Pią	586	0.35313	-0.52	1.2210	8.39	1.00233	7.1453	21.54	58.627	7.0	46	555	1246.6	1940	1027	1855.5	226	512	12	
103	13	Sob	587	0.39279	-0.36	1.2551	9.01	1.00261	8.1442	20.40	58.108	0.6	57	552	1246.3	1942	1135	1953.6	319	508	13	
104	14	Nie	588	0.43245	-0.21	1.2933	9.22	1.00288	9.1404	18.07	57.657	1.6	68	550	1246.1	1943	1251	2050.9	401	504	14	
105	15	Pon	589	0.47210	-0.06	1.3314	9.44	1.00316	10.1215	14.25	57.316	2.6	78	548	1245.9	1945	1413	2146.6	435	500	15	
106	16	Wto	590	0.51176	0.08	1.3656	10.05	1.00344	11.0857	9.48	57.128	3.6	87	545	1245.6	1947	1538	2240.7	503	456	16	
107	17	Śro	591	0.55141	0.22	1.4039	10.27	1.00371	12.0416	4.35	57.128	4.6	94	543	1245.4	1949	1702	2333.4	526	452	17	
108	18	Czw	592	0.59106	0.36	1.4422	10.48	1.00399	12.5838	-0.53	57.339	5.6	98	541	1245.1	1950	1826	*****	548	448	18	
109	19	Pią	593	1.03072	0.49	1.4805	11.08	1.00426	13.5236	-6.15	57.762	6.6	100	539	1244.9	1952	1950	025.4	610	444	19	
110	20	Sob	594	1.07037	1.02	1.5149	11.29	1.00454	14.4638	-11.11	58.374	0.9	99	537	1244.7	1954	2111	117.2	632	441	20	
111	21	Nie	595	1.11003	1.15	1.5533	11.50	1.00482	15.4103	-15.25	59.130	1.9	95	534	1244.5	1956	2229	209.3	657	437	21	
112	22	Pon	596	1.14569	1.27	1.5917	12.10	1.00509	16.3550	-18.42	59.971	2.9	89	532	1244.3	1958	2342	301.9	727	433	22	
113	23	Wto	597	1.18534	1.39	2.0302	12.30	1.00537	17.3044	-20.55	60.829	3.9	82	530	1244.1	1959	****	354.7	802	429	23	
114	24	Śro	598	1.22500	1.50	2.0647	12.50	1.00564	18.2513	-22.00	61.638	4.9	74	528	1243.9	2001	047	447.3	845	425	24	
115	25	Czw	599	1.26465	2.00	2.1033	13.10	1.00592	19.1840	-21.59	62.339	5.9	64	526	1243.7	2003	143	538.9	936	421	25	
116	26	Pią	600	1.30431	2.10	2.1420	13.29	1.00619	20.1035	-20.55	62.888	6.9	55	524	1243.6	2005	228	629.0	1033	417	26	
117	27	Sob	601	1.34396	2.20	2.1807	13.48	1.00646	21.0042	-18.55	63.253	0.5	45	521	1243.4	2007	304	717.1	1136	413	27	
118	28	Nie	602	1.38362	2.29	2.2154	14.07	1.00673	21.4902	-16.09	63.421	1.5	36	519	1243.3	2008	333	803.3	1241	409	28	
119	29	Pon	603	1.42328	2.38	2.2542	14.26	1.00700	22.3550	-12.43	63.392	2.5	27	517	1243.1	2010	357	847.7	1348	405	29	
120	30	Wto	604	1.46293	2.46	2.2931	14.45	1.00726	23.2133	-8.45	63.183	3.5	19	515	1243.0	2012	417	930.8	1455	401	30	

Fazy Księżyca [Dm, h.mm]: Nów 5, 10.50 1kw 12, 21.06 Pełn 19, 13.12 3kw 27, 0.18

KWIECIEŃ 2019 (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	4.17	21.25	5.47	16.54	5.34	15.53	7.53	0.13	1.55	9.33	3.38	11.32	6.60	21.11	5.52	16.53	3.53	11.46		
	0.698	4.50	23.196	-5.53	22.588	-9.90	3.894	21.21	17.582	-22.68	19.428	-21.56	1.957	11.47	23.236	-5.97	19.671	-21.69	12.60431	1
3	4.11	21.30	5.43	16.49	5.31	15.59	7.49	0.13	1.48	9.26	3.30	11.24	6.52	21.04	5.44	16.46	3.45	11.38		
	0.820	5.27	23.259	-5.59	22.741	-9.07	3.987	21.49	17.586	-22.68	19.434	-21.55	1.964	11.51	23.240	-5.95	19.673	-21.69	12.73572	3
5	4.05	21.35	5.40	16.46	5.28	16.05	7.45	0.13	1.40	9.18	3.22	11.17	6.45	20.57	5.36	16.39	3.38	11.30		
	0.941	6.04	23.338	-5.49	22.894	-8.23	4.080	21.77	17.589	-22.68	19.440	-21.54	1.971	11.55	23.245	-5.92	19.674	-21.69	12.86714	5
7	3.59	21.40	5.36	16.46	5.24	16.11	7.41	0.12	1.32	9.10	3.15	11.10	6.37	20.49	5.28	16.31	3.30	11.22		
	1.063	6.79	23.433	-5.25	23.046	-7.37	4.173	22.02	17.591	-22.68	19.446	-21.53	1.978	11.59	23.249	-5.90	19.676	-21.69	12.99856	7
9	3.53	21.45	5.33	16.46	5.21	16.17	7.36	0.12	1.24	9.02	3.07	11.02	6.29	20.42	5.21	16.24	3.22	11.14		
	1.186	7.54	23.541	-4.88	23.197	-6.50	4.266	22.27	17.592	-22.68	19.450	-21.52	1.985	11.62	23.253	-5.87	19.677	-21.69	13.12998	9
11	3.46	21.51	5.29	16.48	5.17	16.23	7.32	0.11	1.17	8.55	2.60	10.54	6.22	20.35	5.13	16.16	3.14	11.07		
	1.308	8.28	23.661	-4.39	23.348	-5.62	4.359	22.51	17.592	-22.68	19.455	-21.51	1.992	11.66	23.257	-5.85	19.678	-21.69	13.26140	11
13	3.40	21.56	5.26	16.51	5.13	16.29	7.28	0.11	1.09	8.47	2.52	10.47	6.14	20.28	5.05	16.09	3.06	10.59		
	1.431	9.01	23.791	-3.78	23.498	-4.72	4.453	22.73	17.591	-22.68	19.459	-21.50	2.000	11.70	23.261	-5.82	19.679	-21.69	13.39282	13
15	3.33	22.02	5.23	16.56	5.10	16.35	7.24	0.10	1.01	8.39	2.44	10.39	6.06	20.20	4.57	16.01	2.59	10.51		
	1.554	9.73	23.931	-3.07	23.648	-3.82	4.547	22.94	17.589	-22.68	19.463	-21.50	2.007	11.74	23.265	-5.80	19.680	-21.69	13.52424	15
17	3.26	22.08	5.19	17.01	5.06	16.41	7.21	0.09	0.53	8.31	2.37	10.32	5.59	20.13	4.50	15.54	2.51	10.43		
	1.677	10.44	0.080	-2.25	23.798	-2.90	4.641	23.14	17.587	-22.68	19.466	-21.49	2.014	11.78	23.269	-5.77	19.680	-21.69	13.65565	17
19	3.19	22.14	5.16	17.07	5.02	16.47	7.17	0.09	0.45	8.23	2.29	10.24	5.51	20.06	4.42	15.46	2.43	10.35		
	1.801	11.14	0.236	-1.34	23.947	-1.98	4.735	23.32	17.583	-22.68	19.468	-21.49	2.022	11.82	23.273	-5.75	19.681	-21.70	13.78707	19
21	3.12	22.21	5.13	17.15	4.58	16.53	7.13	0.08	0.36	8.15	2.21	10.16	5.43	19.59	4.34	15.39	2.35	10.27		
	1.926	11.83	0.401	-0.35	0.096	-1.05	4.829	23.50	17.579	-22.67	19.471	-21.49	2.029	11.86	23.277	-5.73	19.681	-21.70	13.91848	21
23	3.05	22.27	5.09	17.23	4.54	16.59	7.10	0.07	0.28	8.06	2.13	10.09	5.36	19.52	4.26	15.31	2.27	10.20		
	2.051	12.50	0.572	0.73	0.245	-0.12	4.924	23.66	17.574	-22.67	19.472	-21.48	2.036	11.90	23.280	-5.71	19.681	-21.70	14.04990	23
25	2.57	22.34	5.06	17.32	4.50	17.05	7.07	0.06	0.20	7.58	2.05	10.01	5.28	19.45	4.19	15.24	2.19	10.12		
	2.176	13.16	0.751	1.89	0.394	0.81	5.018	23.80	17.568	-22.67	19.474	-21.48	2.044	11.94	23.284	-5.68	19.681	-21.70	14.18133	25
27	2.49	22.42	5.03	17.42	4.47	17.11	7.03	0.05	0.12	7.50	1.58	9.53	5.20	19.37	4.11	15.16	2.12	10.04		
	2.302	13.80	0.937	3.12	0.543	1.75	5.113	23.94	17.561	-22.66	19.475	-21.48	2.051	11.98	23.287	-5.66	19.681	-21.71	14.31275	27
29	2.41	22.49	4.60	17.52	4.43	17.17	7.00	0.03	0.03	7.42	1.50	9.45	5.13	19.30	4.03	15.08	2.04	9.56		
	2.428	14.43	1.130	4.41	0.692	2.68	5.208	24.06	17.553	-22.66	19.475	-21.48	2.058	12.02	23.291	-5.64	19.681	-21.71	14.44417	29

MAJ 2019

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
121	1	Śro	605	1.50259	2.53	2.3320	15.03	1.00752	0.0645	-4.25	62.821	4.5	12	513	1242.9	2014	435	1013.3	1603	357	1
122	2	Czw	606	1.54224	3.00	2.3709	15.21	1.00778	0.5207	0.10	62.342	5.5	7	511	1242.7	2015	452	1055.9	1712	353	2
123	3	Pią	607	1.58189	3.07	2.4059	15.39	1.00803	1.3821	4.50	61.785	6.5	2	509	1242.6	2017	510	1139.4	1823	349	3
124	4	Sob	608	2.02155	3.13	2.4450	15.56	1.00828	2.2608	9.24	61.193	7.5	0	507	1242.5	2019	528	1224.7	1936	346	4
125	5	Nie	609	2.06121	3.18	2.4841	16.14	1.00853	3.1609	13.37	60.601	0.5	0	505	1242.4	2021	550	1312.3	2051	342	5
126	6	Pon	610	2.10086	3.23	2.5233	16.31	1.00877	4.0848	17.16	60.040	1.5	2	504	1242.4	2022	615	1403.0	2205	338	6
127	7	Wto	611	2.14052	3.27	2.5626	16.47	1.00901	5.0415	20.04	59.530	2.5	7	502	1242.3	2024	647	1456.7	2317	334	7
128	8	Śro	612	2.18017	3.31	3.0018	17.04	1.00924	6.0209	21.47	59.082	3.5	13	500	1242.2	2026	728	1553.1	****	330	8
129	9	Czw	613	2.21583	3.34	3.0412	17.20	1.00948	7.0137	22.13	58.701	4.5	22	458	1242.2	2027	820	1651.0	023	326	9
130	10	Pią	614	2.25549	3.36	3.0806	17.36	1.00970	8.0131	21.18	58.387	5.5	32	456	1242.1	2029	925	1749.1	119	322	10
131	11	Sob	615	2.29514	3.38	3.1201	17.51	1.00993	9.0038	19.04	58.139	6.5	43	455	1242.1	2031	1038	1846.1	204	318	11
132	12	Nie	616	2.33480	3.40	3.1556	18.07	1.01015	9.5812	15.39	57.963	0.4	54	453	1242.1	2033	1158	1941.2	239	314	12
133	13	Pon	617	2.37445	3.40	3.1951	18.22	1.01037	10.5355	11.20	57.868	1.4	66	451	1242.1	2034	1320	2034.3	308	310	13
134	14	Wto	618	2.41411	3.41	3.2348	18.36	1.01058	11.4800	6.21	57.869	2.4	76	449	1242.1	2036	1442	2125.7	332	306	14
135	15	Śro	619	2.45376	3.40	3.2744	18.51	1.01080	12.4101	1.02	57.984	3.4	85	448	1242.1	2037	1604	2216.2	353	302	15
136	16	Czw	620	2.49342	3.40	3.3142	19.05	1.01101	13.3336	-4.18	58.227	4.4	92	446	1242.1	2039	1725	2306.6	413	258	16
137	17	Pią	621	2.53307	3.38	3.3540	19.18	1.01122	14.2624	-9.23	58.605	5.4	97	445	1242.1	2041	1846	2357.5	434	254	17
138	18	Sob	622	2.57273	3.36	3.3938	19.32	1.01142	15.1956	-13.54	59.113	6.4	100	443	1242.1	2042	2006	*****	457	250	18
139	19	Nie	623	3.01238	3.34	3.4337	19.45	1.01163	16.1420	-17.37	59.729	0.5	100	442	1242.2	2044	2122	049.4	524	247	19
140	20	Pon	624	3.05204	3.31	3.4737	19.57	1.01183	17.0926	-20.19	60.417	1.5	97	440	1242.2	2045	2232	142.1	556	243	20
141	21	Wto	625	3.09170	3.28	3.5137	20.10	1.01203	18.0442	-21.53	61.131	2.5	93	439	1242.3	2047	2333	235.3	635	239	21
142	22	Śro	626	3.13135	3.23	3.5537	20.22	1.01223	18.5921	-22.18	61.819	3.5	87	437	1242.4	2048	****	328.3	723	235	22
143	23	Czw	627	3.17101	3.19	3.5938	20.34	1.01243	19.5239	-21.36	62.429	4.5	79	436	1242.4	2050	023	419.9	819	231	23
144	24	Pią	628	3.21066	3.14	4.0340	20.45	1.01262	20.4404	-19.55	62.912	5.5	71	435	1242.5	2051	104	509.7	920	227	24
145	25	Sob	629	3.25032	3.08	4.0742	20.56	1.01281	21.3325	-17.22	63.232	6.5	62	434	1242.6	2053	136	557.1	1025	223	25
146	26	Nie	630	3.28598	3.02	4.1145	21.06	1.01300	22.2051	-14.07	63.361	7.5	53	432	1242.7	2054	202	642.4	1132	219	26
147	27	Pon	631	3.32563	2.55	4.1548	21.17	1.01318	23.0647	-10.18	63.289	0.7	43	431	1242.8	2055	223	726.0	1239	215	27
148	28	Wto	632	3.36529	2.48	4.1952	21.27	1.01336	23.5151	-6.05	63.021	1.7	34	430	1242.9	2057	242	808.4	1347	211	28
149	29	Śro	633	3.40494	2.40	4.2356	21.36	1.01354	0.3645	-1.34	62.576	2.7	25	429	1243.1	2058	259	850.5	1455	207	29
150	30	Czw	634	3.44460	2.32	4.2801	21.45	1.01371	1.2217	3.06	61.988	3.7	17	428	1243.2	2059	316	933.2	1605	203	30
151	31	Pią	635	3.48425	2.24	4.3206	21.54	1.01387	2.0916	7.44	61.302	4.7	10	427	1243.4	2100	333	1017.5	1717	159	31

Fazy Księżyca [Dm, h.mm]: Nów 5, 0.45 1kw 12, 3.12 Pełn 18, 23.11 3kw 26, 18.33

MAJ 2019 (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	2.33	22.57	4.56	18.04	4.39	17.23	6.57	0.02	23.51	7.33	1.42	9.37	5.05	19.23	3.55	15.01	1.56	9.48		
	2.555	15.05	1.331	5.76	0.842	3.62	5.302	24.17	17.544	-22.65	19.475	-21.48	2.066	12.06	23.294	-5.62	19.681	-21.72	14.57558	1
3	2.24	23.06	4.53	18.16	4.35	17.29	6.54	23.57	23.42	7.25	1.34	9.29	4.57	19.16	3.48	14.53	1.48	9.40		
	2.683	15.65	1.539	7.17	0.991	4.55	5.397	24.26	17.535	-22.65	19.474	-21.49	2.073	12.10	23.297	-5.61	19.680	-21.72	14.70700	3
5	2.15	23.15	4.50	18.29	4.31	17.35	6.51	23.55	23.34	7.16	1.26	9.21	4.50	19.09	3.40	14.46	1.40	9.32		
	2.811	16.23	1.756	8.62	1.142	5.47	5.492	24.34	17.524	-22.64	19.473	-21.49	2.080	12.14	23.300	-5.59	19.680	-21.73	14.83842	5
7	2.05	23.25	4.48	18.43	4.27	17.41	6.48	23.54	23.25	7.08	1.18	9.13	4.42	19.01	3.32	14.38	1.32	9.24		
	2.940	16.79	1.982	10.11	1.292	6.39	5.587	24.41	17.513	-22.64	19.472	-21.49	2.087	12.17	23.303	-5.57	19.679	-21.73	14.96984	7
9	1.54	23.36	4.45	18.58	4.23	17.47	6.46	23.52	23.17	6.59	1.10	9.05	4.34	18.54	3.24	14.31	1.24	9.16		
	3.070	17.33	2.218	11.63	1.443	7.30	5.682	24.47	17.502	-22.63	19.470	-21.50	2.095	12.21	23.306	-5.55	19.678	-21.74	15.10126	9
11	1.42	23.49	4.43	19.14	4.19	17.54	6.43	23.50	23.08	6.51	1.02	8.57	4.27	18.47	3.16	14.23	1.17	9.08		
	3.200	17.86	2.463	13.16	1.595	8.20	5.777	24.51	17.489	-22.62	19.468	-21.51	2.102	12.25	23.309	-5.54	19.677	-21.74	15.23268	11
13	1.28	0.16	4.41	19.31	4.16	17.60	6.41	23.48	22.59	6.42	0.54	8.49	4.19	18.40	3.09	14.15	1.09	9.00		
	3.331	18.36	2.719	14.70	1.747	9.09	5.872	24.54	17.476	-22.61	19.465	-21.51	2.109	12.29	23.311	-5.52	19.676	-21.75	15.36410	13
15	1.09	1.10	4.40	19.48	4.12	18.06	6.39	23.46	22.51	6.34	0.46	8.41	4.11	18.32	3.01	14.08	1.01	8.52		
	3.462	18.84	2.986	16.22	1.900	9.97	5.966	24.56	17.462	-22.60	19.462	-21.52	2.116	12.33	23.314	-5.51	19.675	-21.76	15.49552	15
17	*****	*****	4.39	20.06	4.08	18.12	6.36	23.44	22.42	6.25	0.38	8.33	4.04	18.25	2.53	13.60	0.53	8.44		
	3.594	19.31	3.263	17.70	2.054	10.83	6.061	24.56	17.448	-22.60	19.458	-21.53	2.123	12.36	23.316	-5.49	19.673	-21.76	15.62694	17
19	*****	*****	4.39	20.25	4.05	18.19	6.34	23.42	22.33	6.16	0.30	8.25	3.56	18.18	2.45	13.52	0.45	8.36		
	3.727	19.75	3.550	19.11	2.209	11.68	6.156	24.55	17.433	-22.59	19.454	-21.54	2.130	12.40	23.318	-5.48	19.672	-21.77	15.75836	19
21	*****	*****	4.39	20.44	4.02	18.25	6.32	23.39	22.24	6.08	0.22	8.17	3.48	18.11	2.37	13.45	0.37	8.28		
	3.860	20.16	3.845	20.44	2.364	12.51	6.250	24.53	17.417	-22.58	19.449	-21.55	2.137	12.43	23.320	-5.47	19.670	-21.78	15.88978	21
23	*****	*****	4.41	21.03	3.58	18.31	6.30	23.37	22.15	5.59	0.14	8.08	3.41	18.03	2.30	13.37	0.29	8.20		
	3.994	20.56	4.147	21.65	2.521	13.32	6.345	24.49	17.401	-22.56	19.444	-21.56	2.143	12.47	23.322	-5.46	19.668	-21.78	16.02120	23
25	*****	*****	4.43	21.22	3.55	18.37	6.28	23.34	22.06	5.50	0.06	8.00	3.33	17.56	2.22	13.29	0.21	8.12		
	4.128	20.93	4.454	22.71	2.679	14.12	6.439	24.44	17.385	-22.55	19.439	-21.58	2.150	12.50	23.324	-5.45	19.666	-21.79	16.15262	25
27	*****	*****	4.47	21.39	3.52	18.44	6.27	23.31	21.57	5.41	23.54	7.52	3.25	17.49	2.14	13.22	0.13	8.04		
	4.263	21.28	4.761	23.62	2.838	14.89	6.533	24.38	17.368	-22.54	19.433	-21.59	2.157	12.54	23.326	-5.44	19.664	-21.80	16.28404	27
29	*****	*****	4.51	21.55	3.49	18.50	6.25	23.29	21.48	5.33	23.46	7.43	3.18	17.42	2.06	13.14	0.05	7.56		
	4.399	21.60	5.066	24.34	2.998	15.63	6.627	24.31	17.351	-22.53	19.427	-21.61	2.163	12.57	23.328	-5.43	19.662	-21.81	16.41546	29
31	*****	*****	4.57	22.10	3.46	18.56	6.24	23.26	21.39	5.24	23.38	7.35	3.10	17.34	1.58	13.06	23.54	7.48		
	4.535	21.90	5.367	24.89	3.159	16.35	6.721	24.22	17.333	-22.51	19.421	-21.62	2.170	12.61	23.329	-5.42	19.660	-21.82	16.54688	31

CZERWIEC 2019

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
152	1	Sob	636	3.52391	2.15	4.3612	22.02	1.01403	2.5830	12.09	60.570	5.7	5	426	1243.5	2102	353	1104.1	1831	155	1	
153	2	Nie	637	3.56356	2.05	4.4018	22.10	1.01419	3.5036	16.06	59.848	6.7	1	425	1243.7	2103	416	1153.8	1947	151	2	
154	3	Pon	638	4.00322	1.56	4.4424	22.18	1.01433	4.4556	19.19	59.188	7.7	0	424	1243.8	2104	445	1247.2	2102	148	3	
155	4	Wto	639	4.04288	1.45	4.4831	22.25	1.01448	5.4416	21.28	58.632	1.0	1	424	1244.0	2105	523	1343.8	2213	144	4	
156	5	Śro	640	4.08253	1.35	4.5238	22.32	1.01462	6.4448	22.21	58.209	2.0	5	423	1244.2	2106	612	1442.9	2314	140	5	
157	6	Czw	641	4.12219	1.24	4.5645	22.38	1.01475	7.4607	21.49	57.931	3.0	11	422	1244.3	2107	713	1542.6	****	136	6	
158	7	Pią	642	4.16184	1.13	5.0053	22.44	1.01488	8.4644	19.52	57.795	4.0	19	422	1244.5	2108	826	1641.3	004	132	7	
159	8	Sob	643	4.20150	1.02	5.0501	22.50	1.01500	9.4530	16.41	57.788	5.0	29	421	1244.7	2109	945	1737.8	043	128	8	
160	9	Nie	644	4.24116	0.50	5.0909	22.55	1.01512	10.4153	12.31	57.890	6.0	40	421	1244.9	2110	1107	1831.6	114	124	9	
161	10	Pon	645	4.28081	0.38	5.1317	23.00	1.01523	11.3603	7.41	58.080	0.2	52	420	1245.1	2110	1229	1923.0	139	120	10	
162	11	Wto	646	4.32047	0.26	5.1726	23.05	1.01534	12.2833	2.28	58.344	1.2	63	420	1245.3	2111	1350	2012.9	200	116	11	
163	12	Śro	647	4.36012	0.14	5.2134	23.09	1.01544	13.2009	-2.49	58.672	2.2	74	419	1245.5	2112	1510	2102.0	220	112	12	
164	13	Czw	648	4.39578	0.02	5.2543	23.12	1.01554	14.1139	-7.55	59.058	3.2	83	419	1245.7	2113	1629	2151.4	240	108	13	
165	14	Pią	649	4.43543	-0.11	5.2952	23.15	1.01564	15.0343	-12.33	59.501	4.2	90	419	1245.9	2113	1748	2241.6	301	104	14	
166	15	Sob	650	4.47509	-0.24	5.3402	23.18	1.01573	15.5646	-16.30	59.998	5.2	96	419	1246.1	2114	1904	2333.0	326	100	15	
167	16	Nie	651	4.51474	-0.36	5.3811	23.20	1.01582	16.5053	-19.32	60.541	6.2	99	419	1246.4	2114	2016	*****	354	056	16	
168	17	Pon	652	4.55440	-0.49	5.4220	23.22	1.01591	17.4543	-21.31	61.113	0.1	100	419	1246.6	2115	2121	025.4	430	053	17	
169	18	Wto	653	4.59406	-1.02	5.4630	23.24	1.01599	18.4033	-22.21	61.690	1.1	99	419	1246.8	2115	2216	118.3	514	049	18	
170	19	Śro	654	5.03371	-1.15	5.5039	23.25	1.01607	19.3432	-22.03	62.240	2.1	96	419	1247.0	2115	2301	210.6	606	045	19	
171	20	Czw	655	5.07337	-1.28	5.5449	23.26	1.01615	20.2657	-20.41	62.725	3.1	91	419	1247.2	2116	2337	301.5	706	041	20	
172	21	Pią	656	5.11303	-1.41	5.5858	23.26	1.01623	21.1719	-18.25	63.108	4.1	85	419	1247.4	2116	****	350.3	810	037	21	
173	22	Sob	657	5.15268	-1.54	6.0308	23.26	1.01630	22.0535	-15.22	63.351	5.1	77	419	1247.6	2116	005	436.7	916	033	22	
174	23	Nie	658	5.19234	-2.07	6.0717	23.26	1.01636	22.5201	-11.44	63.426	6.1	69	419	1247.9	2116	028	521.0	1023	029	23	
175	24	Pon	659	5.23199	-2.20	6.1127	23.25	1.01642	23.3708	-7.38	63.313	7.1	59	420	1248.1	2116	047	603.7	1131	025	24	
176	25	Wto	660	5.27165	-2.33	6.1536	23.23	1.01648	0.2137	-3.14	63.004	0.0	50	420	1248.3	2116	105	645.5	1238	021	25	
177	26	Śro	661	5.31130	-2.45	6.1946	23.21	1.01653	1.0618	1.21	62.508	1.0	40	421	1248.5	2116	121	727.3	1346	017	26	
178	27	Czw	662	5.35096	-2.58	6.2355	23.19	1.01658	1.5201	5.58	61.847	2.0	31	421	1248.7	2116	138	810.1	1456	013	27	
179	28	Pią	663	5.39061	-3.10	6.2804	23.17	1.01662	2.3941	10.27	61.063	3.0	22	422	1248.9	2116	156	854.8	1609	009	28	
180	29	Sob	664	5.43027	-3.23	6.3213	23.14	1.01666	3.3007	14.35	60.207	4.0	14	422	1249.1	2116	217	942.5	1723	005	29	
181	30	Nie	665	5.46592	-3.35	6.3621	23.10	1.01669	4.2357	18.08	59.346	5.0	7	423	1249.3	2116	243	1033.9	1839	001	30	

Fazy Księżyca [Dm, h.mm]: Now 3, 12.02 1kw 10, 7.59 Pełn 17, 10.31 3kw 25, 11.46

CZERWIEC 2019 (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	*****	*****	5.00	22.17	3.45	18.60	6.23	23.24	21.35	5.19	23.34	7.31	3.06	17.31	1.55	13.02	23.50	7.44	
	4.603	22.04	5.514	25.10	3.240	16.70	6.767	24.18	17.324	-22.51	19.417	-21.63	2.173	12.62	23.330	-5.42	19.659	-21.82	16.61259 1
3	*****	*****	5.07	22.29	3.43	19.06	6.21	23.21	21.26	5.10	23.26	7.22	2.59	17.23	1.47	12.55	23.42	7.36	
	4.740	22.30	5.802	25.38	3.403	17.38	6.861	24.07	17.306	-22.49	19.410	-21.64	2.179	12.65	23.331	-5.41	19.657	-21.83	16.74401 3
5	*****	*****	5.15	22.38	3.40	19.12	6.20	23.18	21.17	5.02	23.17	7.14	2.51	17.16	1.39	12.47	23.34	7.28	
	4.877	22.53	6.080	25.49	3.567	18.04	6.954	23.95	17.288	-22.48	19.403	-21.66	2.185	12.69	23.332	-5.40	19.654	-21.84	16.87543 5
7	*****	*****	5.23	22.46	3.38	19.18	6.19	23.14	21.08	4.53	23.09	7.06	2.43	17.09	1.31	12.39	23.26	7.20	
	5.015	22.74	6.345	25.45	3.733	18.66	7.047	23.82	17.270	-22.46	19.395	-21.68	2.191	12.72	23.333	-5.40	19.652	-21.85	17.00686 7
9	*****	*****	5.32	22.52	3.36	19.24	6.18	23.11	20.59	4.44	23.01	6.57	2.35	17.02	1.23	12.31	23.18	7.12	
	5.152	22.92	6.596	25.27	3.900	19.25	7.140	23.68	17.252	-22.45	19.387	-21.70	2.197	12.75	23.334	-5.40	19.649	-21.86	17.13828 9
11	*****	*****	5.41	22.55	3.35	19.30	6.16	23.07	20.50	4.35	22.53	6.49	2.28	16.54	1.15	12.23	23.10	7.04	
	5.290	23.08	6.834	24.97	4.068	19.80	7.232	23.53	17.233	-22.43	19.379	-21.72	2.203	12.78	23.335	-5.39	19.647	-21.87	17.26969 11
13	*****	*****	5.50	22.57	3.33	19.36	6.15	23.04	20.40	4.26	22.44	6.40	2.20	16.47	1.08	12.16	23.02	6.55	
	5.429	23.20	7.056	24.57	4.237	20.32	7.324	23.36	17.215	-22.41	19.371	-21.74	2.208	12.81	23.336	-5.39	19.644	-21.88	17.40111 13
15	*****	*****	5.58	22.58	3.32	19.42	6.14	22.60	20.31	4.17	22.36	6.32	2.12	16.39	0.60	12.08	22.54	6.47	
	5.567	23.30	7.263	24.07	4.407	20.81	7.416	23.19	17.197	-22.40	19.362	-21.75	2.214	12.83	23.336	-5.39	19.641	-21.89	17.53253 15
17	*****	*****	6.06	22.57	3.31	19.48	6.13	22.56	20.22	4.09	22.28	6.23	2.05	16.32	0.52	11.60	22.46	6.39	
	5.706	23.37	7.455	23.49	4.578	21.25	7.507	23.00	17.179	-22.38	19.353	-21.77	2.219	12.86	23.337	-5.39	19.638	-21.90	17.66396 17
19	*****	*****	6.14	22.54	3.31	19.53	6.13	22.52	20.13	3.60	22.20	6.15	1.57	16.25	0.44	11.52	22.38	6.31	
	5.844	23.42	7.630	22.85	4.751	21.66	7.599	22.80	17.161	-22.37	19.343	-21.80	2.225	12.89	23.337	-5.39	19.635	-21.91	17.79538 19
21	*****	*****	6.21	22.51	3.31	19.58	6.12	22.48	20.04	3.51	22.11	6.06	1.49	16.17	0.36	11.44	22.30	6.23	
	5.983	23.44	7.790	22.17	4.924	22.03	7.690	22.59	17.143	-22.35	19.334	-21.82	2.230	12.91	23.337	-5.39	19.632	-21.92	17.92680 21
23	*****	*****	6.27	22.46	3.31	20.03	6.11	22.44	19.55	3.42	22.03	5.57	1.42	16.10	0.28	11.36	22.22	6.15	
	6.122	23.43	7.932	21.45	5.098	22.36	7.780	22.37	17.125	-22.33	19.324	-21.84	2.235	12.94	23.337	-5.39	19.629	-21.93	18.05822 23
25	*****	*****	6.32	22.41	3.31	20.08	6.10	22.40	19.46	3.33	21.55	5.49	1.34	16.02	0.20	11.28	22.14	6.07	
	6.260	23.39	8.058	20.72	5.274	22.64	7.870	22.14	17.108	-22.32	19.314	-21.86	2.239	12.96	23.337	-5.39	19.626	-21.94	18.18964 25
27	*****	*****	6.36	22.34	3.32	20.13	6.10	22.35	19.37	3.25	21.47	5.40	1.26	15.55	0.13	11.21	22.06	5.59	
	6.399	23.32	8.165	19.98	5.450	22.89	7.960	21.89	17.091	-22.30	19.304	-21.88	2.244	12.98	23.336	-5.40	19.623	-21.95	18.32106 27
29	*****	*****	6.38	22.26	3.33	20.17	6.09	22.31	19.28	3.16	21.38	5.31	1.18	15.47	0.05	11.13	21.58	5.50	
	6.537	23.23	8.254	19.25	5.626	23.09	8.050	21.64	17.075	-22.28	19.294	-21.90	2.248	13.01	23.336	-5.40	19.619	-21.96	18.45248 29

LIPIEC 2019

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
182	1	Pon	666	5.50558	-3.47	6.4030	23.07	1.01672	5.2124	20.46	58.546	6.0	3	423	1249.5	2115	316	1129.3	1953	2354	1	
183	2	Wto	667	5.54524	-3.58	6.4438	23.02	1.01674	6.2158	22.11	57.872	7.0	0	424	1249.7	2115	400	1228.2	2100	2350	2	
184	3	Śro	668	5.58489	-4.10	6.4846	22.58	1.01675	7.2425	22.12	57.378	0.6	1	425	1249.9	2114	457	1329.3	2157	2346	3	
185	4	Czw	669	6.02455	-4.21	6.5253	22.53	1.01675	8.2703	20.42	57.095	1.6	4	426	1250.1	2114	607	1430.4	2242	2342	4	
186	5	Pią	670	6.06421	-4.31	6.5700	22.47	1.01675	9.2813	17.49	57.032	2.6	9	427	1250.3	2113	727	1529.7	2316	2338	5	
187	6	Sob	671	6.10386	-4.42	7.0107	22.42	1.01675	10.2654	13.48	57.173	3.6	17	428	1250.4	2113	851	1626.1	2344	2334	6	
188	7	Nie	672	6.14352	-4.51	7.0514	22.35	1.01674	11.2253	8.60	57.486	4.6	27	428	1250.6	2112	1015	1719.5	****	2330	7	
189	8	Pon	673	6.18317	-5.01	7.0920	22.29	1.01672	12.1633	3.46	57.928	5.6	38	429	1250.8	2111	1138	1810.6	007	2326	8	
190	9	Wto	674	6.22283	-5.10	7.1326	22.22	1.01670	13.0839	-1.34	58.454	6.6	50	430	1250.9	2111	1259	1900.1	027	2322	9	
191	10	Śro	675	6.26248	-5.19	7.1731	22.14	1.01667	14.0002	-6.44	59.027	1.0	61	432	1251.1	2110	1418	1949.1	047	2318	10	
192	11	Czw	676	6.30214	-5.27	7.2136	22.07	1.01664	14.5127	-11.28	59.616	2.0	71	433	1251.2	2109	1536	2038.4	108	2314	11	
193	12	Pią	677	6.34179	-5.35	7.2540	21.59	1.01660	15.4332	-15.33	60.202	3.0	80	434	1251.3	2108	1652	2128.5	131	2310	12	
194	13	Sob	678	6.38145	-5.42	7.2944	21.50	1.01656	16.3633	-18.48	60.773	4.0	88	435	1251.5	2107	1804	2219.7	157	2306	13	
195	14	Nie	679	6.42111	-5.49	7.3347	21.41	1.01652	17.3025	-21.03	61.322	5.0	94	436	1251.6	2106	1911	2311.7	230	2302	14	
196	15	Pon	680	6.46076	-5.55	7.3750	21.32	1.01647	18.2438	-22.13	61.842	6.0	98	437	1251.7	2105	2009	*****	310	2258	15	
197	16	Wto	681	6.50042	-6.01	7.4153	21.22	1.01642	19.1830	-22.15	62.325	7.0	100	439	1251.8	2104	2058	003.7	358	2255	16	
198	17	Śro	682	6.54007	-6.07	7.4554	21.12	1.01637	20.1112	-21.13	62.758	0.5	100	440	1251.9	2103	2137	054.9	455	2251	17	
199	18	Czw	683	6.57573	-6.11	7.4956	21.02	1.01631	21.0210	-19.12	63.121	1.5	98	441	1251.9	2102	2207	144.4	557	2247	18	
200	19	Pią	684	7.01539	-6.16	7.5357	20.51	1.01625	21.5107	-16.22	63.393	2.5	94	443	1252.0	2100	2232	231.7	703	2243	19	
201	20	Sob	685	7.05504	-6.19	7.5757	20.40	1.01618	22.3806	-12.54	63.547	3.5	89	444	1252.1	2059	2253	316.9	810	2239	20	
202	21	Nie	686	7.09470	-6.22	8.0157	20.29	1.01612	23.2331	-8.56	63.560	4.5	82	445	1252.1	2058	2311	400.1	918	2235	21	
203	22	Pon	687	7.13435	-6.25	8.0556	20.17	1.01605	0.0755	-4.37	63.408	5.5	75	447	1252.2	2056	2327	442.0	1025	2231	22	
204	23	Wto	688	7.17401	-6.27	8.0954	20.05	1.01597	0.5203	-0.07	63.079	6.5	66	448	1252.2	2055	2343	523.3	1132	2227	23	
205	24	Śro	689	7.21366	-6.29	8.1352	19.53	1.01589	1.3640	4.27	62.570	7.5	56	450	1252.2	2054	****	605.0	1240	2223	24	
206	25	Czw	690	7.25332	-6.30	8.1750	19.40	1.01581	2.2242	8.55	61.891	0.4	46	451	1252.2	2052	001	647.9	1350	2219	25	
207	26	Pią	691	7.29297	-6.30	8.2147	19.27	1.01572	3.1101	13.07	61.070	1.4	36	453	1252.2	2051	020	733.1	1502	2215	26	
208	27	Sob	692	7.33263	-6.30	8.2543	19.14	1.01562	4.0225	16.51	60.150	2.4	27	454	1252.2	2049	043	821.6	1616	2211	27	
209	28	Nie	693	7.37228	-6.29	8.2939	18.60	1.01552	4.5727	19.49	59.193	3.4	18	456	1252.2	2047	111	914.0	1730	2207	28	
210	29	Pon	694	7.41194	-6.27	8.3334	18.46	1.01542	5.5609	21.46	58.271	4.4	10	457	1252.2	2046	149	1010.6	1840	2203	29	
211	30	Wto	695	7.45160	-6.25	8.3729	18.32	1.01531	6.5748	22.23	57.462	5.4	4	459	1252.2	2044	239	1110.6	1942	2159	30	
212	31	Śro	696	7.49125	-6.23	8.4122	18.17	1.01519	8.0059	21.30	56.838	6.4	1	501	1252.1	2042	343	1212.3	2033	2156	31	

Fazy Księżyca [Dm, h.mm]: Nów 2, 21.16 1kw 9, 12.55 Pełn 16, 23.38 3kw 25, 3.18

LIPIEC 2019 (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	*****	*****	6.39	22.18	3.35	20.21	6.08	22.27	19.19	3.07	21.30	5.23	1.11	15.40	23.53	11.05	21.50	5.42	
	6.675	23.11	8.324	18.54	5.803	23.24	8.139	21.37	17.059	-22.27	19.284	-21.92	2.253	13.03	23.336	-5.41	19.616	-21.97	18.58390 1
3	*****	*****	6.39	22.09	3.36	20.25	6.08	22.22	19.10	2.59	21.22	5.14	1.03	15.32	23.45	10.57	21.42	5.34	
	6.813	22.96	8.373	17.87	5.981	23.35	8.228	21.10	17.043	-22.25	19.274	-21.94	2.257	13.05	23.335	-5.41	19.613	-21.98	18.71533 3
5	*****	*****	6.37	21.58	3.39	20.28	6.07	22.17	19.01	2.50	21.13	5.06	0.55	15.25	23.37	10.49	21.34	5.26	
	6.950	22.79	8.402	17.25	6.159	23.41	8.316	20.82	17.028	-22.24	19.263	-21.97	2.261	13.07	23.334	-5.42	19.609	-22.00	18.84675 5
7	*****	*****	6.33	21.47	3.41	20.31	6.07	22.13	18.53	2.41	21.05	4.57	0.47	15.17	23.29	10.41	21.26	5.18	
	7.087	22.59	8.410	16.70	6.337	23.43	8.404	20.52	17.014	-22.22	19.253	-21.99	2.264	13.09	23.333	-5.43	19.606	-22.01	18.97817 7
9	*****	*****	6.27	21.36	3.44	20.33	6.06	22.08	18.44	2.33	20.57	4.48	0.40	15.10	23.21	10.33	21.18	5.10	
	7.224	22.36	8.397	16.23	6.515	23.40	8.492	20.22	17.000	-22.21	19.242	-22.01	2.268	13.10	23.332	-5.43	19.603	-22.02	19.10959 9
11	*****	*****	6.20	21.24	3.48	20.36	6.06	22.03	18.35	2.24	20.48	4.40	0.32	15.02	23.13	10.25	21.10	5.02	
	7.360	22.11	8.364	15.85	6.693	23.33	8.580	19.91	16.987	-22.20	19.232	-22.03	2.271	13.12	23.331	-5.44	19.599	-22.03	19.24100 11
13	*****	*****	6.11	21.11	3.52	20.37	6.06	21.58	18.26	2.16	20.40	4.31	0.24	14.55	23.06	10.17	21.02	4.53	
	7.496	21.83	8.311	15.57	6.871	23.21	8.667	19.59	16.975	-22.18	19.221	-22.05	2.274	13.14	23.330	-5.45	19.596	-22.04	19.37243 13
15	*****	*****	5.60	20.58	3.56	20.39	6.05	21.53	18.18	2.07	20.32	4.22	0.16	14.47	22.58	10.09	20.54	4.45	
	7.631	21.53	8.242	15.41	7.048	23.04	8.753	19.26	16.963	-22.17	19.211	-22.07	2.277	13.15	23.328	-5.46	19.593	-22.05	19.50385 15
17	*****	*****	5.47	20.45	3.60	20.40	6.05	21.48	18.09	1.59	20.23	4.14	0.09	14.40	22.50	10.01	20.46	4.37	
	7.765	21.21	8.159	15.36	7.226	22.83	8.840	18.92	16.952	-22.16	19.201	-22.09	2.280	13.16	23.327	-5.47	19.589	-22.06	19.63527 17
19	*****	*****	5.33	20.32	4.05	20.41	6.04	21.43	18.01	1.50	20.15	4.05	23.57	14.32	22.42	9.53	20.38	4.29	
	7.899	20.86	8.068	15.42	7.402	22.58	8.926	18.57	16.942	-22.15	19.190	-22.12	2.283	13.18	23.325	-5.49	19.586	-22.07	19.76670 19
21	*****	*****	5.19	20.19	4.10	20.41	6.04	21.38	17.52	1.42	20.07	3.56	23.49	14.24	22.34	9.45	20.30	4.21	
	8.032	20.48	7.974	15.59	7.578	22.28	9.011	18.21	16.932	-22.14	19.180	-22.14	2.285	13.19	23.323	-5.50	19.582	-22.08	19.89811 21
23	*****	*****	5.04	20.08	4.15	20.41	6.04	21.33	17.44	1.34	19.58	3.48	23.41	14.17	22.26	9.37	20.22	4.13	
	8.165	20.09	7.884	15.86	7.753	21.93	9.096	17.85	16.923	-22.14	19.170	-22.16	2.287	13.20	23.321	-5.51	19.579	-22.09	20.02953 23
25	*****	*****	4.49	19.57	4.20	20.41	6.03	21.28	17.35	1.25	19.50	3.39	23.33	14.09	22.18	9.29	20.14	4.05	
	8.297	19.67	7.804	16.20	7.928	21.55	9.181	17.48	16.915	-22.13	19.160	-22.18	2.289	13.21	23.319	-5.53	19.576	-22.11	20.16095 25
27	*****	*****	4.35	19.48	4.26	20.40	6.03	21.23	17.27	1.17	19.42	3.31	23.26	14.01	22.10	9.21	20.06	3.56	
	8.429	19.23	7.739	16.61	8.101	21.12	9.266	17.10	16.908	-22.13	19.150	-22.20	2.291	13.22	23.317	-5.54	19.572	-22.12	20.29237 27
29	1.05	0.05	4.21	19.40	4.32	20.39	6.03	21.17	17.19	1.09	19.33	3.22	23.18	13.53	22.02	9.13	19.58	3.48	
	8.559	18.77	7.695	17.04	8.274	20.65	9.350	16.71	16.902	-22.12	19.141	-22.21	2.293	13.22	23.315	-5.56	19.569	-22.13	20.42379 29
31	1.32	-0.04	4.09	19.34	4.38	20.38	6.02	21.12	17.11	1.01	19.25	3.14	23.10	13.46	21.54	9.04	19.50	3.40	
	8.690	18.28	7.677	17.50	8.445	20.14	9.434	16.32	16.897	-22.12	19.131	-22.23	2.294	13.23	23.313	-5.57	19.566	-22.14	20.55521 31

SIERPIEŃ 2019

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
		JD	2458																		
213	1	Czw	697	7.53091	-6.20	8.4516	18.02	1.01507	9.0356	19.06	56.458	0.3	0	502	1252.1	2041	459	1313.8	2113	2152	1
214	2	Pią	698	7.57056	-6.16	8.4909	17.47	1.01494	10.0508	15.24	56.350	1.3	2	504	1252.0	2039	624	1413.2	2144	2148	2
215	3	Sob	699	8.01022	-6.11	8.5301	17.31	1.01481	11.0349	10.41	56.516	2.3	8	506	1251.9	2037	752	1509.8	2210	2144	3
216	4	Nie	700	8.04587	-6.06	8.5652	17.16	1.01467	11.5956	5.23	56.923	3.3	15	507	1251.9	2035	918	1603.6	2232	2140	4
217	5	Pon	701	8.08553	-6.01	9.0043	16.59	1.01453	12.5400	-0.07	57.521	4.3	25	509	1251.8	2034	1043	1655.2	2252	2136	5
218	6	Wto	702	8.12519	-5.54	9.0433	16.43	1.01438	13.4647	-5.30	58.243	5.3	35	510	1251.7	2032	1205	1745.6	2313	2132	6
219	7	Śro	703	8.16484	-5.48	9.0823	16.26	1.01422	14.3902	-10.27	59.028	6.3	47	512	1251.5	2030	1324	1835.5	2335	2128	7
220	8	Czw	704	8.20450	-5.40	9.1212	16.10	1.01407	15.3124	-14.44	59.820	0.7	57	514	1251.4	2028	1442	1925.8	****	2124	8
221	9	Pią	705	8.24415	-5.32	9.1601	15.52	1.01390	16.2418	-18.12	60.576	1.7	68	515	1251.3	2026	1556	2016.6	001	2120	9
222	10	Sob	706	8.28381	-5.23	9.1948	15.35	1.01374	17.1746	-20.40	61.269	2.7	77	517	1251.1	2024	1704	2108.1	031	2116	10
223	11	Nie	707	8.32346	-5.14	9.2336	15.17	1.01357	18.1132	-22.05	61.883	3.7	85	519	1251.0	2022	1805	2159.7	108	2112	11
224	12	Pon	708	8.36312	-5.04	9.2722	14.60	1.01340	19.0503	-22.22	62.411	4.7	91	521	1250.8	2020	1856	2250.7	154	2108	12
225	13	Wto	709	8.40277	-4.54	9.3108	14.41	1.01322	19.5740	-21.35	62.851	5.7	96	522	1250.6	2018	1937	2340.4	248	2104	13
226	14	Śro	710	8.44243	-4.43	9.3454	14.23	1.01304	20.4846	-19.49	63.204	6.7	99	524	1250.5	2016	2010	****	348	2101	14
227	15	Czw	711	8.48209	-4.31	9.3839	14.05	1.01286	21.3803	-17.11	63.466	7.7	100	526	1250.3	2014	2036	028.2	453	2057	15
228	16	Pią	712	8.52174	-4.19	9.4223	13.46	1.01268	22.2528	-13.51	63.632	0.9	99	527	1250.1	2012	2058	113.9	600	2053	16
229	17	Sob	713	8.56140	-4.06	9.4607	13.27	1.01250	23.1114	-9.59	63.693	1.9	97	529	1249.9	2009	2117	157.7	707	2049	17
230	18	Nie	714	9.00105	-3.53	9.4951	13.07	1.01231	23.5549	-5.44	63.636	2.9	93	531	1249.6	2007	2133	240.0	814	2045	18
231	19	Pon	715	9.04071	-3.40	9.5334	12.48	1.01212	0.3948	-1.16	63.446	3.9	87	532	1249.4	2005	2149	321.3	921	2041	19
232	20	Wto	716	9.08036	-3.25	9.5716	12.28	1.01193	1.2355	3.17	63.110	4.9	80	534	1249.2	2003	2206	402.5	1029	2037	20
233	21	Śro	717	9.12002	-3.11	10.0058	12.09	1.01173	2.0856	7.45	62.620	5.9	71	536	1248.9	2001	2224	444.4	1137	2033	21
234	22	Czw	718	9.15567	-2.56	10.0440	11.49	1.01153	2.5539	11.59	61.976	6.9	62	538	1248.7	1959	2244	527.9	1247	2029	22
235	23	Pią	719	9.19533	-2.40	10.0821	11.28	1.01133	3.4451	15.48	61.193	7.9	52	539	1248.4	1956	2309	613.8	1358	2025	23
236	24	Sob	720	9.23498	-2.25	10.1202	11.08	1.01113	4.3712	18.59	60.298	0.8	42	541	1248.2	1954	2342	703.1	1511	2021	24
237	25	Nie	721	9.27464	-2.08	10.1542	10.47	1.01092	5.3302	21.16	59.337	1.8	31	543	1247.9	1952	****	756.3	1621	2017	25
238	26	Pon	722	9.31429	-1.52	10.1922	10.27	1.01071	6.3207	22.24	58.374	2.8	22	544	1247.6	1950	024	853.1	1726	2013	26
239	27	Wto	723	9.35395	-1.35	10.2301	10.06	1.01049	7.3336	22.08	57.484	3.8	13	546	1247.3	1947	120	952.8	1821	2009	27
240	28	Śro	724	9.39361	-1.17	10.2640	9.45	1.01027	8.3606	20.23	56.747	4.8	6	548	1247.0	1945	230	1053.8	1906	2005	28
241	29	Czw	725	9.43326	-0.60	10.3019	9.23	1.01005	9.3805	17.12	56.237	5.8	2	550	1246.7	1943	351	1154.4	1941	2002	29
242	30	Pią	726	9.47292	-0.41	10.3358	9.02	1.00982	10.3827	12.48	56.010	6.8	0	551	1246.4	1940	519	1253.0	2009	1958	30
243	31	Sob	727	9.51257	-0.23	10.3736	8.40	1.00958	11.3643	7.34	56.087	1.0	1	553	1246.1	1938	648	1349.4	2033	1954	31

Fazy Księżyca [Dm, h.mm]: Nów 1, 5.12 1kw 7, 19.31 Pełn 15, 14.29 3kw 23, 16.56 Nów 30, 12.37

SIERPIEŃ 2019 (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	1.41	23.57	4.04	19.32	4.41	20.37	6.02	21.09	17.06	0.57	19.21	3.09	23.06	13.42	21.50	9.00	19.46	3.36		
	8.754	18.03	7.678	17.73	8.531	19.87	9.476	16.12	16.894	-22.12	19.127	-22.24	2.295	13.23	23.311	-5.58	19.564	-22.14	20.62092	1
3	1.55	23.44	3.55	19.28	4.47	20.36	6.02	21.04	16.58	0.48	19.13	3.01	22.58	13.34	21.43	8.52	19.38	3.28		
	8.884	17.52	7.701	18.16	8.701	19.30	9.559	15.71	16.890	-22.12	19.118	-22.26	2.296	13.24	23.309	-5.60	19.561	-22.15	20.75234	3
5	2.06	23.33	3.48	19.26	4.53	20.34	6.01	20.58	16.50	0.40	19.04	2.52	22.50	13.26	21.35	8.44	19.30	3.20		
	9.012	16.99	7.755	18.56	8.869	18.70	9.642	15.30	16.887	-22.12	19.109	-22.28	2.296	13.24	23.306	-5.61	19.558	-22.16	20.88376	5
7	2.17	23.23	3.43	19.26	4.60	20.32	6.01	20.53	16.42	0.32	18.56	2.44	22.43	13.18	21.27	8.36	19.22	3.12		
	9.140	16.44	7.840	18.88	9.037	18.06	9.725	14.88	16.885	-22.12	19.100	-22.29	2.297	13.24	23.304	-5.63	19.555	-22.17	21.01518	7
9	2.26	23.14	3.40	19.26	5.06	20.30	6.01	20.47	16.34	0.24	18.48	2.35	22.35	13.11	21.19	8.28	19.14	3.04		
	9.267	15.87	7.955	19.12	9.203	17.39	9.807	14.46	16.883	-22.13	19.092	-22.31	2.297	13.24	23.301	-5.65	19.552	-22.18	21.14660	9
11	2.34	23.05	3.40	19.28	5.13	20.27	6.00	20.42	16.27	0.16	18.40	2.27	22.27	13.03	21.11	8.20	19.06	2.56		
	9.393	15.29	8.099	19.24	9.368	16.69	9.889	14.03	16.883	-22.13	19.084	-22.33	2.298	13.24	23.298	-5.67	19.549	-22.19	21.27802	11
13	2.42	22.56	3.42	19.30	5.19	20.24	6.00	20.36	16.19	0.09	18.31	2.18	22.19	12.55	21.03	8.12	18.58	2.47		
	9.519	14.69	8.270	19.23	9.532	15.95	9.971	13.59	16.883	-22.14	19.076	-22.34	2.298	13.24	23.296	-5.69	19.546	-22.20	21.40944	13
15	2.50	22.48	3.47	19.33	5.26	20.21	5.60	20.31	16.11	23.57	18.23	2.10	22.11	12.47	20.55	8.04	18.51	2.39		
	9.644	14.08	8.466	19.06	9.694	15.19	10.053	13.15	16.884	-22.15	19.069	-22.36	2.297	13.24	23.293	-5.71	19.543	-22.21	21.54086	15
17	2.57	22.40	3.55	19.36	5.33	20.18	5.59	20.25	16.03	23.49	18.15	2.02	22.03	12.39	20.47	7.55	18.43	2.31		
	9.769	13.45	8.682	18.71	9.856	14.39	10.134	12.70	16.886	-22.16	19.062	-22.37	2.297	13.24	23.290	-5.73	19.540	-22.22	21.67228	17
19	3.04	22.33	4.04	19.38	5.39	20.15	5.59	20.19	15.56	23.41	18.07	1.53	21.55	12.31	20.39	7.47	18.35	2.23		
	9.893	12.80	8.916	18.18	10.016	13.58	10.215	12.25	16.889	-22.17	19.055	-22.38	2.296	13.23	23.287	-5.75	19.537	-22.23	21.80369	19
21	3.11	22.25	4.16	19.41	5.46	20.12	5.59	20.13	15.48	23.33	17.59	1.45	21.48	12.23	20.31	7.39	18.27	2.15		
	10.016	12.14	9.163	17.47	10.175	12.73	10.296	11.79	16.893	-22.18	19.049	-22.40	2.295	13.23	23.283	-5.77	19.535	-22.24	21.93511	21
23	3.17	22.18	4.29	19.42	5.53	20.08	5.58	20.08	15.41	23.26	17.51	1.37	21.40	12.15	20.23	7.31	18.19	2.07		
	10.139	11.47	9.418	16.58	10.334	11.87	10.376	11.33	16.898	-22.20	19.043	-22.41	2.294	13.22	23.280	-5.79	19.532	-22.25	22.06653	23
25	3.23	22.11	4.43	19.43	5.59	20.05	5.58	20.02	15.33	23.18	17.43	1.28	21.32	12.07	20.15	7.23	18.11	1.59		
	10.262	10.79	9.677	15.53	10.491	10.98	10.457	10.86	16.903	-22.21	19.038	-22.42	2.293	13.22	23.277	-5.81	19.530	-22.25	22.19795	25
27	3.29	22.04	4.58	19.44	6.06	20.01	5.58	19.56	15.26	23.11	17.34	1.20	21.24	11.59	20.07	7.15	18.03	1.51		
	10.384	10.09	9.937	14.34	10.647	10.07	10.537	10.39	16.910	-22.23	19.033	-22.43	2.291	13.21	23.274	-5.83	19.528	-22.26	22.32937	27
29	3.35	21.57	5.14	19.43	6.13	19.57	5.57	19.50	15.19	23.03	17.26	1.12	21.16	11.51	19.59	7.06	17.55	1.43		
	10.505	9.39	10.194	13.04	10.803	9.14	10.617	9.91	16.917	-22.24	19.028	-22.44	2.290	13.20	23.271	-5.85	19.525	-22.27	22.46079	29
31	3.40	21.51	5.29	19.42	6.19	19.53	5.57	19.45	15.11	22.55	17.18	1.04	21.08	11.43	19.51	6.58	17.47	1.35		
	10.627	8.67	10.446	11.64	10.957	8.20	10.697	9.43	16.925	-22.26	19.024	-22.45	2.288	13.19	23.267	-5.87	19.523	-22.28	22.59221	31

WRZESIEŃ 2019

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
244	1	Nie	728	9.55223	-0.04	10.4114	8.19	1.00935	12.3303	1.55	56.458	2.0	6	555	1245.8	1936	816	1443.5	2054	1950	1
245	2	Pon	729	9.59188	0.15	10.4451	7.57	1.00911	13.2756	-3.45	57.079	3.0	13	556	1245.5	1933	942	1536.2	2116	1946	2
246	3	Wto	730	10.03154	0.34	10.4828	7.35	1.00886	14.2202	-9.04	57.881	4.0	22	558	1245.2	1931	1106	1628.1	2138	1942	3
247	4	Śro	731	10.07119	0.54	10.5205	7.13	1.00861	15.1556	-13.44	58.788	5.0	32	600	1244.8	1929	1227	1719.9	2202	1938	4
248	5	Czw	732	10.11085	1.14	10.5542	6.51	1.00836	16.0958	-17.32	59.724	6.0	42	602	1244.5	1926	1345	1811.8	2231	1934	5
249	6	Pią	733	10.15050	1.34	10.5918	6.28	1.00810	17.0416	-20.19	60.624	0.3	53	603	1244.2	1924	1456	1904.0	2307	1930	6
250	7	Sob	734	10.19016	1.54	11.0254	6.06	1.00785	17.5834	-21.60	61.441	1.3	63	605	1243.8	1922	1600	1956.1	2350	1926	7
251	8	Nie	735	10.22581	2.15	11.0630	5.44	1.00759	18.5225	-22.32	62.144	2.3	72	607	1243.5	1919	1654	2047.5	****	1922	8
252	9	Pon	736	10.26547	2.36	11.1006	5.21	1.00733	19.4514	-21.59	62.716	3.3	81	608	1243.2	1917	1738	2137.5	042	1918	9
253	10	Wto	737	10.30513	2.57	11.1342	4.58	1.00706	20.3633	-20.25	63.153	4.3	88	610	1242.8	1914	1813	2225.7	140	1914	10
254	11	Śro	738	10.34478	3.18	11.1717	4.36	1.00680	21.2603	-17.57	63.459	5.3	93	612	1242.5	1912	1841	2311.9	244	1910	11
255	12	Czw	739	10.38444	3.39	11.2053	4.13	1.00653	22.1344	-14.45	63.643	6.3	97	613	1242.1	1910	1904	2356.1	350	1907	12
256	13	Pią	740	10.42409	4.00	11.2428	3.50	1.00627	22.5947	-10.59	63.713	7.3	99	615	1241.7	1907	1923	*****	458	1903	13
257	14	Sob	741	10.46374	4.22	11.2803	3.27	1.00600	23.4436	-6.46	63.677	0.2	100	617	1241.4	1905	1940	038.8	605	1859	14
258	15	Nie	742	10.50340	4.43	11.3138	3.04	1.00573	0.2844	-2.18	63.538	1.2	99	619	1241.0	1902	1956	120.4	712	1855	15
259	16	Pon	743	10.54305	5.05	11.3513	2.41	1.00547	1.1248	2.17	63.295	2.2	96	620	1240.7	1900	2012	201.6	820	1851	16
260	17	Wto	744	10.58271	5.26	11.3848	2.18	1.00520	1.5730	6.49	62.945	3.2	91	622	1240.3	1857	2029	243.2	928	1847	17
261	18	Śro	745	11.02236	5.48	11.4223	1.54	1.00493	2.4332	11.09	62.482	4.2	84	624	1240.0	1855	2048	326.0	1037	1843	18
262	19	Czw	746	11.06202	6.09	11.4558	1.31	1.00466	3.3135	15.05	61.905	5.2	76	625	1239.6	1853	2111	410.6	1148	1839	19
263	20	Pią	747	11.10168	6.31	11.4933	1.08	1.00439	4.2214	18.25	61.217	6.2	67	627	1239.2	1850	2140	458.0	1259	1835	20
264	21	Sob	748	11.14133	6.52	11.5309	0.45	1.00412	5.1550	20.55	60.432	7.2	57	629	1238.9	1848	2217	548.5	1409	1831	21
265	22	Nie	749	11.18099	7.13	11.5644	0.21	1.00385	6.1221	22.23	59.576	0.3	47	631	1238.5	1845	2305	642.4	1514	1827	22
266	23	Pon	750	11.22064	7.34	12.0019	-0.02	1.00357	7.1117	22.36	58.692	1.3	36	632	1238.2	1843	****	739.1	1612	1823	23
267	24	Wto	751	11.26030	7.55	12.0355	-0.25	1.00330	8.1138	21.25	57.839	2.3	26	634	1237.8	1841	007	837.6	1659	1819	24
268	25	Śro	752	11.29595	8.16	12.0731	-0.49	1.00302	9.1213	18.50	57.086	3.3	16	636	1237.5	1838	121	936.6	1737	1815	25
269	26	Czw	753	11.33561	8.37	12.1107	-1.12	1.00274	10.1202	14.57	56.507	4.3	8	638	1237.1	1836	245	1034.9	1807	1811	26
270	27	Pią	754	11.37526	8.57	12.1443	-1.36	1.00246	11.1031	10.03	56.168	5.3	3	639	1236.8	1833	412	1131.7	1832	1808	27
271	28	Sob	755	11.41492	9.17	12.1819	-1.59	1.00218	12.0735	4.29	56.113	6.3	0	641	1236.5	1831	541	1226.7	1855	1804	28
272	29	Nie	756	11.45457	9.38	12.2155	-2.22	1.00190	13.0337	-1.21	56.357	0.6	1	643	1236.1	1828	710	1320.8	1916	1800	29
273	30	Pon	757	11.49423	9.57	12.2532	-2.46	1.00161	13.5906	-7.02	56.880	1.6	4	644	1235.8	1826	837	1414.2	1937	1756	30

Fazy Księżyca [Dm, h.mm]: 1kw 6, 5.10 Pełn 14, 6.33 3kw 22, 4.41 Now 28, 20.26

WRZESIEŃ 2019 (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	21.48	5.37	19.42	6.23	19.51	5.57	19.42	15.08	22.52	17.14	0.60	21.04	11.39	19.48	6.54	17.43	1.31			
	10.687	8.31	10.570	10.91	11.034	7.72	10.736	9.19	16.929	-22.27	19.022	-22.46	2.287	13.18	23.266	-5.88	19.522	-22.28	22.65792	1	
3	3.48	21.41	5.52	19.40	6.29	19.47	5.56	19.36	15.01	22.44	17.06	0.51	20.56	11.31	19.40	6.46	17.35	1.23			
	10.808	7.58	10.813	9.41	11.188	6.76	10.816	8.70	16.939	-22.29	19.018	-22.47	2.285	13.17	23.262	-5.90	19.520	-22.29	22.78933	3	
5	3.53	21.35	6.07	19.37	6.36	19.43	5.56	19.30	14.53	22.37	16.58	0.43	20.48	11.23	19.32	6.38	17.27	1.15			
	10.928	6.84	11.050	7.88	11.341	5.78	10.895	8.21	16.949	-22.31	19.015	-22.47	2.282	13.16	23.259	-5.93	19.518	-22.29	22.92075	5	
7	3.58	21.28	6.22	19.35	6.42	19.39	5.55	19.24	14.46	22.30	16.50	0.35	20.40	11.15	19.24	6.30	17.19	1.07			
	11.048	6.10	11.281	6.31	11.493	4.79	10.974	7.72	16.960	-22.34	19.012	-22.48	2.280	13.15	23.256	-5.95	19.517	-22.30	23.05217	7	
9	4.03	21.22	6.36	19.32	6.49	19.35	5.55	19.18	14.39	22.22	16.42	0.27	20.32	11.07	19.16	6.21	17.11	0.59			
	11.168	5.35	11.504	4.73	11.645	3.80	11.053	7.22	16.972	-22.36	19.010	-22.49	2.277	13.13	23.252	-5.97	19.515	-22.31	23.18359	9	
11	4.08	21.16	6.49	19.28	6.56	19.31	5.55	19.12	14.33	22.15	16.34	0.19	20.24	10.59	19.08	6.13	17.03	0.51			
	11.288	4.59	11.722	3.15	11.796	2.79	11.132	6.72	16.984	-22.38	19.008	-22.49	2.274	13.12	23.249	-5.99	19.514	-22.31	23.31501	11	
13	4.12	21.10	7.02	19.25	7.02	19.27	5.54	19.07	14.26	22.08	16.27	0.11	20.16	10.51	18.60	6.05	16.55	0.43			
	11.408	3.83	11.934	1.57	11.948	1.78	11.211	6.22	16.998	-22.41	19.007	-22.50	2.271	13.10	23.245	-6.01	19.512	-22.32	23.44643	13	
15	4.17	21.04	7.15	19.21	7.09	19.22	5.54	19.01	14.19	22.00	16.19	0.03	20.08	10.42	18.52	5.57	16.48	0.35			
	11.527	3.06	12.141	0.01	12.099	0.76	11.290	5.72	17.012	-22.43	19.006	-22.50	2.268	13.08	23.242	-6.04	19.511	-22.32	23.57784	15	
17	4.21	20.58	7.28	19.17	7.15	19.18	5.53	18.55	14.12	21.53	16.11	23.51	20.00	10.34	18.44	5.49	16.40	0.27			
	11.647	2.29	12.343	-1.53	12.250	-0.26	11.368	5.21	17.027	-22.46	19.005	-22.51	2.264	13.06	23.239	-6.06	19.510	-22.33	23.70926	17	
19	4.26	20.53	7.40	19.13	7.22	19.14	5.53	18.49	14.05	21.46	16.03	23.43	19.53	10.26	18.36	5.41	16.32	0.19			
	11.766	1.52	12.541	-3.05	12.401	-1.28	11.447	4.70	17.042	-22.49	19.005	-22.51	2.260	13.04	23.235	-6.08	19.509	-22.33	23.84068	19	
21	4.30	20.47	7.52	19.09	7.29	19.10	5.53	18.43	13.59	21.39	15.55	23.36	19.45	10.18	18.28	5.32	16.24	0.11			
	11.886	0.74	12.735	-4.55	12.552	-2.30	11.525	4.19	17.058	-22.51	19.006	-22.51	2.257	13.03	23.232	-6.10	19.508	-22.34	23.97210	21	
23	4.34	20.41	8.03	19.04	7.35	19.06	5.52	18.37	13.52	21.32	15.47	23.28	19.37	10.10	18.20	5.24	16.16	0.03			
	12.005	-0.03	12.925	-6.01	12.703	-3.31	11.604	3.67	17.075	-22.54	19.007	-22.52	2.253	13.00	23.229	-6.12	19.507	-22.34	0.10352	23	
25	4.38	20.36	8.14	18.60	7.42	19.01	5.52	18.31	13.45	21.25	15.40	23.20	19.29	10.01	18.12	5.16	16.08	23.51			
	12.125	-0.81	13.113	-7.43	12.855	-4.33	11.682	3.16	17.093	-22.57	19.008	-22.52	2.249	12.98	23.225	-6.14	19.507	-22.35	0.23494	25	
27	4.42	20.31	8.25	18.56	7.48	18.57	5.51	18.25	13.39	21.18	15.32	23.12	19.21	9.53	18.04	5.08	16.00	23.43			
	12.245	-1.59	13.298	-8.82	13.007	-5.34	11.761	2.64	17.111	-22.60	19.010	-22.52	2.245	12.96	23.222	-6.16	19.506	-22.35	0.36636	27	
29	4.46	20.25	8.35	18.51	7.55	18.53	5.51	18.19	13.32	21.11	15.24	23.05	19.13	9.45	17.56	4.60	15.52	23.35			
	12.365	-2.37	13.480	-10.16	13.159	-6.34	11.839	2.12	17.130	-22.63	19.013	-22.52	2.240	12.94	23.219	-6.18	19.506	-22.35	0.49777	29	

PAŹDZIERNIK 2019

Piwnice, CA UMK				← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2458																					
274	1	Wto	758	11.53388	10.17	12.2909	-3.09	1.00132	14.5432	-12.11	57.629	2.6	10	646	1235.5	1824	1002	1507.6	2001	1752	1
275	2	Śro	759	11.57354	10.36	12.3247	-3.32	1.00103	15.5014	-16.30	58.531	3.6	18	648	1235.1	1821	1125	1601.4	2029	1748	2
276	3	Czw	760	12.01319	10.55	12.3624	-3.55	1.00074	16.4612	-19.46	59.506	4.6	27	650	1234.8	1819	1242	1655.4	2102	1744	3
277	4	Pią	761	12.05285	11.14	12.4002	-4.19	1.00044	17.4205	-21.52	60.475	5.6	37	652	1234.5	1817	1352	1749.2	2144	1740	4
278	5	Sob	762	12.09250	11.32	12.4340	-4.42	1.00015	18.3720	-22.45	61.372	6.6	47	653	1234.2	1814	1451	1842.1	2233	1736	5
279	6	Nie	763	12.13216	11.50	12.4719	-5.05	0.99985	19.3119	-22.28	62.147	0.7	57	655	1233.9	1812	1539	1933.4	2331	1732	6
280	7	Pon	764	12.17182	12.07	12.5058	-5.28	0.99956	20.2331	-21.07	62.769	1.7	67	657	1233.6	1809	1617	2022.6	****	1728	7
281	8	Wto	765	12.21147	12.25	12.5437	-5.51	0.99927	21.1339	-18.51	63.222	2.7	75	659	1233.3	1807	1647	2109.5	034	1724	8
282	9	Śro	766	12.25113	12.41	12.5817	-6.13	0.99897	22.0145	-15.47	63.506	3.7	83	700	1233.1	1805	1710	2154.3	140	1720	9
283	10	Czw	767	12.29078	12.58	13.0157	-6.36	0.99868	22.4805	-12.06	63.630	4.7	89	702	1232.8	1802	1730	2237.3	247	1716	10
284	11	Pią	768	12.33044	13.14	13.0538	-6.59	0.99839	23.3306	-7.57	63.612	5.7	95	704	1232.5	1800	1747	2319.1	355	1712	11
285	12	Sob	769	12.37009	13.29	13.0919	-7.21	0.99810	0.1722	-3.29	63.471	6.7	98	706	1232.3	1758	1803	*****	502	1709	12
286	13	Nie	770	12.40575	13.44	13.1301	-7.44	0.99781	1.0131	1.09	63.228	7.7	100	708	1232.0	1756	1819	000.5	610	1705	13
287	14	Pon	771	12.44540	13.58	13.1643	-8.06	0.99752	1.4614	5.48	62.901	0.5	100	709	1231.8	1753	1835	042.1	719	1701	14
288	15	Wto	772	12.48506	14.12	13.2025	-8.29	0.99724	2.3211	10.16	62.502	1.5	98	711	1231.5	1751	1854	124.6	829	1657	15
289	16	Śro	773	12.52471	14.26	13.2409	-8.51	0.99696	3.1959	14.23	62.039	2.5	94	713	1231.3	1749	1915	209.0	940	1653	16
290	17	Czw	774	12.56437	14.38	13.2753	-9.13	0.99668	4.1008	17.55	61.517	3.5	88	715	1231.1	1746	1941	255.7	1051	1649	17
291	18	Pią	775	13.00402	14.51	13.3137	-9.35	0.99640	5.0256	20.40	60.938	4.5	81	717	1230.9	1744	2015	345.2	1202	1645	18
292	19	Sob	776	13.04368	15.02	13.3522	-9.56	0.99613	5.5817	22.24	60.307	5.5	72	719	1230.7	1742	2059	437.7	1309	1641	19
293	20	Nie	777	13.08333	15.13	13.3908	-10.18	0.99585	6.5541	22.57	59.634	6.5	62	720	1230.5	1740	2155	532.6	1408	1637	20
294	21	Pon	778	13.12299	15.23	13.4254	-10.39	0.99558	7.5416	22.10	58.941	7.5	51	722	1230.4	1738	2303	629.2	1457	1633	21
295	22	Wto	779	13.16265	15.33	13.4641	-11.01	0.99531	8.5302	20.03	58.260	0.9	40	724	1230.2	1736	****	726.2	1537	1629	22
296	23	Śro	780	13.20230	15.41	13.5029	-11.22	0.99503	9.5109	16.40	57.635	1.9	29	726	1230.1	1733	020	822.7	1608	1625	23
297	24	Czw	781	13.24196	15.50	13.5417	-11.43	0.99476	10.4808	12.13	57.122	2.9	19	728	1229.9	1731	144	917.9	1634	1621	24
298	25	Pią	782	13.28161	15.57	13.5806	-12.04	0.99449	11.4402	6.58	56.777	3.9	11	730	1229.8	1729	309	1011.9	1656	1617	25
299	26	Sob	783	13.32127	16.04	14.0156	-12.24	0.99423	12.3912	1.15	56.649	4.9	4	732	1229.7	1727	436	1105.1	1717	1614	26
300	27	Nie	784	13.36092	16.10	14.0547	-12.45	0.99396	13.3412	-4.33	56.769	5.9	1	733	1229.6	1725	603	1158.0	1737	1610	27
300	27	Nie	784	14.36191	16.10	14.0557	-12.45	0.99395	13.3630	-4.47	56.780	6.9	1	633	1129.6	1625	503	1058.0	1637	1510	27
301	28	Pon	785	14.40156	16.15	14.0948	-13.06	0.99368	14.3155	-10.15	57.164	0.3	0	635	1129.5	1623	630	1151.4	1659	1506	28
302	29	Wto	786	14.44122	16.19	14.1340	-13.26	0.99341	15.2809	-15.03	57.777	1.3	2	637	1129.4	1621	756	1245.6	1725	1502	29
303	30	Śro	787	14.48087	16.23	14.1733	-13.45	0.99314	16.2511	-18.52	58.566	2.3	7	639	1129.4	1619	918	1340.8	1756	1458	30
304	31	Czw	788	14.52053	16.26	14.2127	-14.05	0.99288	17.2239	-21.30	59.464	3.3	14	641	1129.3	1617	1034	1436.4	1834	1454	31

Fazy Księżyca [Dm, h.mm]: 1kw 5, 18.47 Pełn 13, 23.08 3kw 21, 14.39 Now 28, 4.39

PAŹDZIERNIK 2019 (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	4.50	20.20	8.46	18.47	8.02	18.49	5.51	18.13	13.26	21.04	15.16	22.57	19.05	9.37	17.48	4.52	15.45	23.27		
	12.486	-3.15	13.659	-11.46	13.312	-7.33	11.918	1.60	17.150	-22.66	19.016	-22.52	2.236	12.92	23.216	-6.20	19.506	-22.36	0.62919	1
3	4.54	20.15	8.56	18.42	8.09	18.45	5.50	18.07	13.19	20.57	15.09	22.49	18.57	9.28	17.40	4.43	15.37	23.19		
	12.607	-3.92	13.837	-12.71	13.466	-8.32	11.996	1.09	17.170	-22.69	19.019	-22.52	2.231	12.89	23.213	-6.22	19.506	-22.36	0.76061	3
5	4.58	20.10	9.05	18.38	8.15	18.41	5.50	18.01	13.13	20.50	15.01	22.42	18.49	9.20	17.32	4.35	15.29	23.12		
	12.728	-4.69	14.012	-13.91	13.621	-9.29	12.075	0.57	17.191	-22.71	19.023	-22.51	2.227	12.87	23.210	-6.24	19.506	-22.36	0.89203	5
7	5.02	20.05	9.14	18.33	8.22	18.37	5.49	17.55	13.07	20.44	14.53	22.34	18.41	9.12	17.24	4.27	15.21	23.04		
	12.849	-5.46	14.184	-15.06	13.776	-10.24	12.153	0.04	17.212	-22.74	19.027	-22.51	2.222	12.84	23.207	-6.26	19.506	-22.36	1.02345	7
9	5.05	20.00	9.23	18.29	8.29	18.33	5.49	17.50	13.00	20.37	14.46	22.26	18.33	9.03	17.17	4.19	15.13	22.56		
	12.971	-6.22	14.353	-16.15	13.932	-11.19	12.232	-0.48	17.234	-22.77	19.032	-22.51	2.217	12.82	23.204	-6.28	19.506	-22.37	1.15487	9
11	5.09	19.56	9.32	18.25	8.36	18.29	5.49	17.44	12.54	20.30	14.38	22.19	18.25	8.55	17.09	4.11	15.05	22.48		
	13.094	-6.98	14.518	-17.18	14.089	-12.11	12.310	-1.00	17.257	-22.80	19.037	-22.50	2.212	12.79	23.201	-6.29	19.507	-22.37	1.28628	11
13	5.13	19.51	9.40	18.20	8.43	18.26	5.48	17.38	12.48	20.23	14.31	22.11	18.17	8.47	17.01	4.03	14.58	22.40		
	13.217	-7.73	14.680	-18.14	14.247	-13.02	12.389	-1.52	17.280	-22.83	19.043	-22.50	2.207	12.77	23.198	-6.31	19.508	-22.37	1.41770	13
15	5.16	19.46	9.47	18.16	8.49	18.22	5.48	17.32	12.41	20.17	14.23	22.04	18.09	8.38	16.53	3.55	14.50	22.32		
	13.340	-8.48	14.836	-19.02	14.407	-13.90	12.468	-2.04	17.304	-22.86	19.049	-22.49	2.202	12.74	23.196	-6.33	19.508	-22.37	1.54911	15
17	5.20	19.42	9.54	18.12	8.56	18.19	5.47	17.26	12.35	20.10	14.16	21.57	18.01	8.30	16.45	3.46	14.42	22.25		
	13.465	-9.21	14.986	-19.82	14.567	-14.77	12.547	-2.55	17.328	-22.89	19.055	-22.48	2.197	12.71	23.193	-6.34	19.509	-22.37	1.68053	17
19	5.23	19.38	9.59	18.07	9.03	18.15	5.47	17.20	12.29	20.04	14.08	21.49	17.53	8.22	16.37	3.38	14.34	22.17		
	13.589	-9.94	15.128	-20.54	14.729	-15.60	12.626	-3.07	17.352	-22.92	19.062	-22.48	2.192	12.69	23.191	-6.36	19.511	-22.37	1.81196	19
21	5.27	19.34	10.03	18.03	9.10	18.12	5.47	17.14	12.23	19.57	14.01	21.42	17.45	8.13	16.29	3.30	14.26	22.09		
	13.715	-10.66	15.260	-21.16	14.892	-16.42	12.706	-3.59	17.378	-22.94	19.070	-22.47	2.186	12.66	23.188	-6.37	19.512	-22.37	1.94338	21
23	5.30	19.30	10.06	17.59	9.17	18.09	5.46	17.08	12.17	19.51	13.53	21.34	17.37	8.05	16.21	3.22	14.19	22.01		
	13.841	-11.36	15.379	-21.68	15.056	-17.20	12.785	-4.11	17.403	-22.97	19.077	-22.46	2.181	12.63	23.186	-6.39	19.513	-22.37	2.07480	23
25	5.34	19.26	10.07	17.54	9.24	18.07	5.46	17.02	12.11	19.44	13.46	21.27	17.29	7.57	16.13	3.14	14.11	21.53		
	13.968	-12.06	15.481	-22.07	15.222	-17.96	12.865	-4.62	17.429	-23.00	19.086	-22.45	2.176	12.61	23.184	-6.40	19.515	-22.37	2.20621	25
27	5.37	19.22	10.06	17.49	9.31	18.04	5.46	16.57	12.05	19.38	13.38	21.20	17.20	7.48	16.05	3.06	14.03	21.46		
	14.096	-12.74	15.564	-22.32	15.389	-18.68	12.945	-5.13	17.456	-23.02	19.094	-22.44	2.171	12.58	23.182	-6.41	19.516	-22.37	2.33763	27
27	4.37	18.22	9.06	16.50	8.31	17.04	4.46	15.57	11.05	18.38	12.38	20.20	16.20	6.48	15.05	2.06	13.03	20.46		
	14.099	-12.76	15.565	-22.33	15.393	-18.70	12.947	-5.14	17.457	-23.02	19.094	-22.44	2.170	12.58	23.182	-6.41	19.516	-22.37	2.33763	27
29	4.41	18.18	9.02	16.44	8.38	17.02	4.46	15.51	10.59	18.31	12.31	20.13	16.12	6.40	14.57	1.58	12.55	20.38		
	14.228	-13.43	15.621	-22.42	15.561	-19.39	13.027	-5.65	17.484	-23.05	19.103	-22.43	2.165	12.55	23.180	-6.42	19.518	-22.37	2.46905	29
31	4.44	18.15	8.55	16.39	8.45	16.60	4.45	15.45	10.53	18.25	12.24	20.05	16.04	6.32	14.49	1.50	12.48	20.30		
	14.357	-14.08	15.646	-22.32	15.731	-20.04	13.107	-6.16	17.511	-23.07	19.113	-22.42	2.160	12.52	23.178	-6.43	19.520	-22.37	2.60047	31

LISTOPAD 2019

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2458																					
305	1	Pią	789	14.56019	16.28	14.2521	-14.24	0.99261	18.1946	-22.51	60.394	4.3	22	643	1129.3	1615	1141	1531.5	1921	1450	1
306	2	Sob	790	14.59584	16.29	14.2916	-14.43	0.99235	19.1539	-22.56	61.284	5.3	31	645	1129.3	1613	1235	1625.1	2017	1446	2
307	3	Nie	791	15.03550	16.30	14.3312	-15.02	0.99208	20.0933	-21.51	62.071	6.3	41	647	1129.3	1611	1318	1716.3	2119	1442	3
308	4	Pon	792	15.07515	16.29	14.3709	-15.21	0.99182	21.0101	-19.46	62.709	0.0	50	648	1129.3	1609	1351	1804.8	2226	1438	4
309	5	Wto	793	15.11481	16.28	14.4107	-15.39	0.99156	21.5003	-16.51	63.168	1.0	60	650	1129.3	1607	1416	1850.7	2334	1434	5
310	6	Śro	794	15.15446	16.27	14.4505	-15.57	0.99131	22.3655	-13.16	63.433	2.0	69	652	1129.3	1606	1437	1934.4	****	1430	6
311	7	Czw	795	15.19412	16.24	14.4905	-16.15	0.99105	23.2211	-9.12	63.507	3.0	77	654	1129.4	1604	1455	2016.5	041	1426	7
312	8	Pią	796	15.23377	16.20	14.5305	-16.33	0.99080	0.0628	-4.45	63.405	4.0	85	656	1129.4	1602	1511	2057.8	149	1422	8
313	9	Sob	797	15.27343	16.16	14.5706	-16.50	0.99056	0.5031	-0.06	63.153	5.0	91	658	1129.5	1600	1526	2139.2	257	1418	9
314	10	Nie	798	15.31308	16.11	15.0107	-17.07	0.99031	1.3505	4.36	62.783	6.0	96	700	1129.6	1559	1542	2221.5	406	1415	10
315	11	Pon	799	15.35274	16.05	15.0510	-17.24	0.99008	2.2055	9.13	62.330	7.0	99	702	1129.7	1557	1559	2305.4	516	1411	11
316	12	Wto	800	15.39240	15.58	15.0913	-17.40	0.98984	3.0840	13.31	61.825	8.0	100	703	1129.8	1555	1619	2351.8	627	1407	12
317	13	Śro	801	15.43205	15.50	15.1318	-17.56	0.98961	3.5855	17.18	61.298	0.9	99	705	1129.9	1554	1644	****	740	1403	13
318	14	Czw	802	15.47171	15.41	15.1723	-18.12	0.98939	4.5154	20.19	60.769	1.9	96	707	1130.1	1552	1715	041.2	853	1359	14
319	15	Pią	803	15.51136	15.32	15.2129	-18.28	0.98917	5.4730	22.20	60.252	2.9	91	709	1130.2	1551	1755	133.5	1003	1355	15
320	16	Sob	804	15.55102	15.22	15.2536	-18.43	0.98895	6.4505	23.08	59.754	3.9	84	711	1130.4	1549	1848	228.5	1105	1351	16
321	17	Nie	805	15.59067	15.11	15.2943	-18.58	0.98874	7.4338	22.38	59.278	4.9	76	713	1130.6	1548	1952	325.0	1158	1347	17
322	18	Pon	806	16.03033	14.59	15.3352	-19.12	0.98853	8.4201	20.47	58.827	5.9	66	714	1130.8	1547	2106	421.7	1240	1343	18
323	19	Wto	807	16.06599	14.46	15.3801	-19.26	0.98833	9.3919	17.41	58.410	6.9	55	716	1131.0	1545	2226	517.6	1313	1339	19
324	20	Śro	808	16.10564	14.32	15.4212	-19.40	0.98813	10.3507	13.33	58.041	0.6	43	718	1131.2	1544	2349	611.8	1340	1335	20
325	21	Czw	809	16.14530	14.17	15.4623	-19.54	0.98793	11.2929	8.36	57.746	1.6	32	720	1131.5	1543	****	704.4	1402	1331	21
326	22	Pią	810	16.18495	14.02	15.5035	-20.07	0.98773	12.2254	3.08	57.554	2.6	22	721	1131.7	1541	113	755.7	1422	1327	22
327	23	Sob	811	16.22461	13.46	15.5447	-20.19	0.98754	13.1604	-2.32	57.498	3.6	13	723	1132.0	1540	237	846.7	1441	1323	23
328	24	Nie	812	16.26426	13.29	15.5901	-20.32	0.98735	14.0945	-8.05	57.607	4.6	6	725	1132.3	1539	401	938.1	1501	1319	24
329	25	Pon	813	16.30392	13.11	16.0315	-20.44	0.98717	15.0434	-13.09	57.897	5.6	2	727	1132.6	1538	526	1030.7	1524	1316	25
330	26	Wto	814	16.34357	12.53	16.0730	-20.55	0.98698	16.0047	-17.25	58.367	6.6	0	728	1132.9	1537	649	1124.9	1551	1312	26
331	27	Śro	815	16.38323	12.33	16.1146	-21.07	0.98680	16.5814	-20.37	58.993	0.8	1	730	1133.2	1536	810	1220.5	1625	1308	27
332	28	Czw	816	16.42289	12.13	16.1603	-21.17	0.98663	17.5614	-22.34	59.734	1.8	4	731	1133.5	1535	922	1316.7	1708	1304	28
333	29	Pią	817	16.46254	11.53	16.2020	-21.28	0.98645	18.5343	-23.12	60.533	2.8	9	733	1133.9	1534	1024	1412.2	1801	1300	29
334	30	Sob	818	16.50220	11.31	16.2438	-21.38	0.98628	19.4934	-22.34	61.328	3.8	16	735	1134.2	1534	1113	1505.8	1902	1256	30

Fazy Księżyca [Dm, h.mm]: 1kw 4, 11.23 Pełn 12, 14.34 3kw 19, 22.11 Nów 26, 16.06

LISTOPAD 2019 (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	8.50	16.36	8.48	16.59	4.45	15.42	10.50	18.22	12.20	20.02	16.00	6.28	14.45	1.46	12.44	20.26			
	14.423	-14.41	15.645	-22.19	15.816	-20.36	13.147	-6.42	17.525	-23.08	19.118	-22.41	2.157	12.51	23.177	-6.44	19.521	-22.36	2.666	18	1
3	4.49	18.10	8.38	16.29	8.54	16.57	4.45	15.36	10.43	18.15	12.12	19.55	15.52	6.19	14.37	1.38	12.36	20.19			
	14.553	-15.04	15.613	-21.76	15.988	-20.96	13.228	-6.92	17.553	-23.10	19.128	-22.40	2.152	12.48	23.175	-6.45	19.523	-22.36	2.797	60	3
5	4.52	18.06	8.20	16.22	9.01	16.56	4.45	15.31	10.37	18.09	12.05	19.48	15.44	6.11	14.30	1.30	12.28	20.11			
	14.685	-15.66	15.539	-21.06	16.162	-21.52	13.309	-7.42	17.581	-23.13	19.138	-22.38	2.147	12.46	23.174	-6.46	19.525	-22.36	2.929	02	5
7	4.55	18.03	7.59	16.13	9.07	16.54	4.44	15.25	10.32	18.03	11.58	19.40	15.36	6.03	14.22	1.22	12.20	20.03			
	14.818	-16.26	15.424	-20.10	16.336	-22.04	13.390	-7.92	17.610	-23.15	19.149	-22.37	2.142	12.43	23.172	-6.47	19.528	-22.36	3.060	44	7
9	4.59	18.01	7.34	16.05	9.13	16.54	4.44	15.19	10.26	17.56	11.50	19.33	15.28	5.54	14.14	1.14	12.13	19.55			
	14.952	-16.84	15.277	-18.90	16.512	-22.52	13.472	-8.42	17.639	-23.17	19.160	-22.35	2.136	12.40	23.171	-6.47	19.530	-22.35	3.191	85	9
11	5.02	17.58	7.08	15.56	9.19	16.53	4.44	15.13	10.20	17.50	11.43	19.26	15.20	5.46	14.06	1.06	12.05	19.48			
	15.086	-17.40	15.113	-17.55	16.689	-22.96	13.554	-8.91	17.669	-23.18	19.171	-22.34	2.131	12.38	23.170	-6.48	19.533	-22.35	3.323	27	11
13	5.05	17.55	6.42	15.47	9.25	16.53	4.44	15.08	10.14	17.44	11.36	19.19	15.12	5.38	13.58	0.58	11.57	19.40			
	15.222	-17.94	14.952	-16.17	16.866	-23.35	13.636	-9.40	17.699	-23.20	19.183	-22.32	2.126	12.35	23.169	-6.49	19.536	-22.35	3.454	69	13
15	5.08	17.53	6.18	15.38	9.30	16.53	4.43	15.02	10.08	17.38	11.29	19.12	15.04	5.29	13.50	0.50	11.50	19.32			
	15.358	-18.46	14.814	-14.93	17.045	-23.70	13.718	-9.88	17.729	-23.22	19.195	-22.30	2.121	12.33	23.168	-6.49	19.539	-22.34	3.586	12	15
17	5.11	17.51	5.59	15.31	9.36	16.54	4.43	14.57	10.02	17.32	11.21	19.05	14.56	5.21	13.42	0.42	11.42	19.25			
	15.495	-18.96	14.716	-13.97	17.225	-24.00	13.801	-10.36	17.759	-23.23	19.207	-22.28	2.116	12.30	23.167	-6.49	19.542	-22.34	3.717	54	17
19	5.14	17.49	5.44	15.23	9.41	16.55	4.43	14.51	9.56	17.25	11.14	18.58	14.48	5.13	13.34	0.34	11.34	19.17			
	15.634	-19.44	14.665	-13.35	17.405	-24.25	13.884	-10.84	17.790	-23.25	19.220	-22.26	2.112	12.28	23.166	-6.50	19.545	-22.34	3.848	96	19
21	5.17	17.47	5.34	15.17	9.45	16.56	4.43	14.45	9.50	17.19	11.07	18.51	14.40	5.04	13.26	0.26	11.26	19.10			
	15.773	-19.89	14.662	-13.09	17.586	-24.46	13.967	-11.31	17.821	-23.26	19.233	-22.24	2.107	12.25	23.166	-6.50	19.548	-22.33	3.980	38	21
23	5.19	17.45	5.29	15.11	9.49	16.58	4.42	14.40	9.44	17.13	10.60	18.44	14.32	4.56	13.19	0.18	11.19	19.02			
	15.913	-20.32	14.702	-13.15	17.768	-24.62	14.051	-11.77	17.852	-23.27	19.246	-22.22	2.102	12.23	23.165	-6.50	19.551	-22.33	4.111	79	23
25	5.22	17.43	5.28	15.06	9.53	16.60	4.42	14.34	9.38	17.07	10.52	18.37	14.24	4.48	13.11	0.11	11.11	18.54			
	16.054	-20.73	14.779	-13.48	17.949	-24.72	14.136	-12.24	17.884	-23.28	19.259	-22.20	2.098	12.21	23.165	-6.50	19.555	-22.32	4.243	21	25
27	5.25	17.42	5.30	15.01	9.57	17.03	4.42	14.29	9.32	17.01	10.45	18.31	14.16	4.40	13.03	0.03	11.03	18.47			
	16.196	-21.11	14.885	-14.02	18.132	-24.78	14.220	-12.69	17.915	-23.29	19.273	-22.18	2.094	12.18	23.165	-6.50	19.558	-22.32	4.374	64	27
29	5.27	17.41	5.34	14.57	9.60	17.06	4.42	14.24	9.26	16.55	10.38	18.24	14.08	4.31	12.55	23.51	10.56	18.39			
	16.339	-21.46	15.016	-14.70	18.314	-24.78	14.305	-13.14	17.947	-23.29	19.287	-22.16	2.089	12.16	23.165	-6.50	19.562	-22.31	4.506	06	29

GRUDZIEŃ 2019

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]							
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2458																		
335	1	Nie	819	16.54185	11.09	16.2856	-21.47	0.98611	20.4301	-20.48	62.057	4.8	24	736	1134.6	1533	1151	1556.6	2008	1252	1
336	2	Pon	820	16.58151	10.47	16.3316	-21.56	0.98594	21.3342	-18.07	62.665	5.8	33	738	1135.0	1532	1220	1644.4	2117	1248	2
337	3	Wto	821	17.02117	10.23	16.3735	-22.05	0.98578	22.2146	-14.43	63.108	6.8	42	739	1135.4	1531	1243	1729.4	2225	1244	3
338	4	Śro	822	17.06082	9.60	16.4156	-22.13	0.98562	23.0743	-10.45	63.358	0.2	52	740	1135.8	1531	1302	1812.2	2334	1240	4
339	5	Czw	823	17.10048	9.35	16.4617	-22.21	0.98547	23.5213	-6.24	63.403	1.2	61	742	1136.2	1530	1318	1853.6	****	1236	5
340	6	Pią	824	17.14013	9.10	16.5038	-22.29	0.98532	0.3604	-1.48	63.246	2.2	70	743	1136.6	1530	1333	1934.6	041	1232	6
341	7	Sob	825	17.17579	8.45	16.5500	-22.36	0.98517	1.2006	2.54	62.907	3.2	78	744	1137.0	1529	1348	2016.2	149	1228	7
342	8	Nie	826	17.21544	8.19	16.5923	-22.42	0.98503	2.0512	7.34	62.419	4.2	86	746	1137.4	1529	1405	2059.2	258	1224	8
343	9	Pon	827	17.25510	7.53	17.0346	-22.48	0.98490	2.5210	12.02	61.824	5.2	92	747	1137.9	1529	1423	2144.5	409	1221	9
344	10	Wto	828	17.29475	7.26	17.0809	-22.54	0.98477	3.4144	16.04	61.170	6.2	97	748	1138.3	1529	1445	2233.0	522	1217	10
345	11	Śro	829	17.33441	6.58	17.1233	-22.59	0.98465	4.3422	19.26	60.508	7.2	99	749	1138.8	1528	1514	2324.9	636	1213	11
346	12	Czw	830	17.37407	6.31	17.1657	-23.04	0.98453	5.3007	21.52	59.882	0.2	100	750	1139.2	1528	1551	*****	749	1209	12
347	13	Pią	831	17.41372	6.03	17.2122	-23.08	0.98443	6.2826	23.06	59.329	1.2	98	751	1139.7	1528	1640	020.2	856	1205	13
348	14	Sob	832	17.45338	5.34	17.2547	-23.12	0.98432	7.2812	22.59	58.872	2.2	94	752	1140.2	1528	1741	117.7	955	1201	14
349	15	Nie	833	17.49304	5.06	17.3012	-23.16	0.98422	8.2758	21.27	58.521	3.2	88	753	1140.6	1528	1854	215.9	1041	1157	15
350	16	Pon	834	17.53269	4.37	17.3437	-23.18	0.98413	9.2628	18.37	58.275	4.2	79	754	1141.1	1528	2014	313.3	1118	1153	16
351	17	Wto	835	17.57235	4.08	17.3903	-23.21	0.98405	10.2260	14.40	58.124	5.2	70	755	1141.6	1529	2137	408.7	1146	1149	17
352	18	Śro	836	18.01200	3.38	17.4329	-23.23	0.98396	11.1727	9.53	58.057	6.2	59	755	1142.1	1529	2259	501.7	1209	1145	18
353	19	Czw	837	18.05166	3.09	17.4755	-23.24	0.98389	12.1018	4.35	58.065	0.3	47	756	1142.6	1529	****	552.7	1229	1141	19
354	20	Pią	838	18.09131	2.39	17.5221	-23.25	0.98382	13.0217	-0.58	58.143	1.3	36	757	1143.1	1529	022	642.5	1248	1137	20
355	21	Sob	839	18.13097	2.09	17.5648	-23.26	0.98375	13.5417	-6.26	58.296	2.3	25	757	1143.6	1530	144	732.2	1306	1133	21
356	22	Nie	840	18.17062	1.39	18.0114	-23.26	0.98369	14.4706	-11.33	58.532	3.3	16	758	1144.1	1530	306	822.6	1327	1129	22
357	23	Pon	841	18.21028	1.10	18.0540	-23.26	0.98363	15.4120	-16.01	58.859	4.3	9	758	1144.6	1531	427	914.4	1351	1125	23
358	24	Wto	842	18.24594	0.40	18.1007	-23.25	0.98358	16.3708	-19.34	59.283	5.3	4	759	1145.1	1532	547	1008.1	1421	1122	24
359	25	Śro	843	18.28559	0.10	18.1433	-23.24	0.98353	17.3412	-21.59	59.798	6.3	1	759	1145.6	1532	703	1103.2	1459	1118	25
360	26	Czw	844	18.32525	-0.20	18.1860	-23.22	0.98348	18.3139	-23.08	60.389	0.2	0	759	1146.1	1533	809	1158.8	1547	1114	26
361	27	Pią	845	18.36490	-0.50	18.2326	-23.20	0.98344	19.2820	-22.59	61.027	1.2	2	800	1146.6	1534	904	1253.5	1645	1110	27
362	28	Sob	846	18.40456	-1.20	18.2752	-23.17	0.98340	20.2311	-21.38	61.671	2.2	5	800	1147.1	1535	948	1346.1	1750	1106	28
363	29	Nie	847	18.44422	-1.49	18.3218	-23.14	0.98337	21.1528	-19.15	62.276	3.2	11	800	1147.6	1535	1021	1435.8	1858	1102	29
364	30	Pon	848	18.48387	-2.18	18.3644	-23.10	0.98334	22.0459	-16.03	62.794	4.2	17	800	1148.0	1536	1046	1522.6	2008	1058	30
365	31	Wto	849	18.52353	-2.47	18.4109	-23.06	0.98331	22.5201	-12.14	63.179	5.2	25	800	1148.5	1537	1107	1606.6	2117	1054	31

Fazy Księżyca [Dm, h.mm]: 1kw 4, 7.58 Pełn 12, 6.12 3kw 19, 5.57 Nów 26, 6.13

GRUDZIEŃ 2019 (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	5.39	14.53	10.02	17.09	4.42	14.18	9.20	16.49	10.31	18.17	14.00	4.23	12.47	23.43	10.48	18.31		
	16.482	-21.79	15.165	-15.48	18.495	-24.74	14.391	-13.59	17.979	-23.30	19.302	-22.13	2.085	12.14	23.165	-6.50	19.566	-22.31	4.63748	1
3	5.32	17.39	5.47	14.50	10.05	17.13	4.42	14.13	9.14	16.43	10.24	18.10	13.52	4.15	12.39	23.35	10.40	18.24		
	16.626	-22.09	15.328	-16.32	18.677	-24.65	14.476	-14.02	18.012	-23.30	19.316	-22.11	2.081	12.12	23.166	-6.50	19.569	-22.30	4.76890	3
5	5.34	17.39	5.55	14.47	10.07	17.17	4.42	14.08	9.09	16.37	10.17	18.03	13.44	4.07	12.31	23.27	10.33	18.16		
	16.771	-22.36	15.503	-17.19	18.858	-24.50	14.563	-14.45	18.044	-23.30	19.331	-22.08	2.078	12.10	23.166	-6.49	19.573	-22.29	4.90032	5
7	5.37	17.38	6.03	14.45	10.08	17.21	4.41	14.02	9.03	16.31	10.09	17.56	13.36	3.59	12.23	23.20	10.25	18.09		
	16.917	-22.60	15.688	-18.06	19.039	-24.31	14.649	-14.88	18.077	-23.30	19.346	-22.06	2.074	12.08	23.167	-6.49	19.577	-22.29	5.03174	7
9	5.39	17.38	6.13	14.43	10.09	17.26	4.41	13.57	8.57	16.25	10.02	17.50	13.28	3.50	12.16	23.12	10.17	18.01		
	17.063	-22.81	15.880	-18.92	19.219	-24.06	14.736	-15.30	18.110	-23.30	19.361	-22.03	2.071	12.07	23.167	-6.48	19.581	-22.28	5.16316	9
11	5.41	17.38	6.22	14.41	10.10	17.31	4.41	13.52	8.51	16.20	9.55	17.43	13.20	3.42	12.08	23.04	10.10	17.54		
	17.209	-22.99	16.077	-19.74	19.398	-23.77	14.824	-15.71	18.143	-23.30	19.376	-22.00	2.067	12.05	23.168	-6.47	19.586	-22.27	5.29458	11
13	5.42	17.38	6.32	14.40	10.10	17.36	4.41	13.47	8.45	16.14	9.48	17.36	13.13	3.34	11.60	22.56	10.02	17.46		
	17.356	-23.14	16.280	-20.53	19.576	-23.44	14.912	-16.11	18.176	-23.30	19.392	-21.97	2.064	12.03	23.169	-6.47	19.590	-22.27	5.42601	13
15	5.44	17.38	6.41	14.40	10.10	17.42	4.41	13.42	8.39	16.08	9.41	17.30	13.05	3.26	11.52	22.49	9.54	17.38		
	17.503	-23.26	16.488	-21.26	19.753	-23.05	15.000	-16.51	18.209	-23.29	19.407	-21.95	2.061	12.02	23.171	-6.46	19.594	-22.26	5.55743	15
17	5.45	17.39	6.51	14.40	10.09	17.48	4.41	13.37	8.33	16.02	9.34	17.23	12.57	3.18	11.44	22.41	9.47	17.31		
	17.651	-23.35	16.699	-21.93	19.928	-22.62	15.089	-16.89	18.242	-23.28	19.423	-21.92	2.059	12.01	23.172	-6.45	19.598	-22.25	5.68885	17
19	5.47	17.39	7.00	14.40	10.08	17.54	4.41	13.32	8.27	15.56	9.27	17.16	12.49	3.10	11.36	22.33	9.39	17.23		
	17.799	-23.41	16.914	-22.54	20.103	-22.15	15.178	-17.27	18.275	-23.27	19.439	-21.89	2.056	11.99	23.173	-6.44	19.603	-22.25	5.82027	19
21	5.48	17.40	7.09	14.41	10.07	18.00	4.40	13.27	8.21	15.50	9.19	17.09	12.41	3.02	11.29	22.25	9.31	17.16		
	17.947	-23.43	17.132	-23.08	20.276	-21.63	15.268	-17.64	18.308	-23.26	19.455	-21.86	2.054	11.98	23.175	-6.43	19.607	-22.24	5.95169	21
23	5.49	17.41	7.18	14.43	10.05	18.06	4.40	13.23	8.15	15.45	9.12	17.03	12.33	2.54	11.21	22.18	9.24	17.08		
	18.095	-23.43	17.352	-23.55	20.447	-21.07	15.358	-18.00	18.342	-23.25	19.471	-21.82	2.052	11.97	23.177	-6.42	19.612	-22.23	6.08311	23
25	5.50	17.43	7.27	14.46	10.04	18.13	4.40	13.18	8.09	15.39	9.05	16.56	12.25	2.46	11.13	22.10	9.16	17.01		
	18.243	-23.39	17.576	-23.94	20.617	-20.48	15.449	-18.36	18.375	-23.24	19.487	-21.79	2.050	11.96	23.179	-6.40	19.616	-22.22	6.21453	25
27	5.50	17.44	7.35	14.49	10.01	18.19	4.40	13.13	8.03	15.33	8.58	16.49	12.17	2.38	11.05	22.02	9.08	16.53		
	18.391	-23.33	17.802	-24.25	20.786	-19.84	15.540	-18.70	18.409	-23.22	19.504	-21.76	2.048	11.96	23.181	-6.39	19.621	-22.22	6.34595	27
29	5.51	17.45	7.42	14.53	9.59	18.26	4.40	13.09	7.57	15.27	8.51	16.43	12.09	2.30	10.57	21.55	9.01	16.46		
	18.538	-23.23	18.030	-24.48	20.953	-19.17	15.632	-19.04	18.442	-23.20	19.520	-21.73	2.046	11.95	23.183	-6.37	19.626	-22.21	6.47738	29
31	5.51	17.47	7.49	14.58	9.57	18.33	4.40	13.04	7.51	15.22	8.44	16.36	12.01	2.22	10.50	21.47	8.53	16.38		
	18.686	-23.10	18.259	-24.61	21.118	-18.46	15.724	-19.36	18.475	-23.18	19.537	-21.69	2.045	11.94	23.185	-6.36	19.630	-22.20	6.60880	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2019

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 Adventu	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

Kalendarz astronomiczny 2020

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 7.10.2010 r.)

Data Wielkanocy: **2020 KWIECIEŃ 12**

Dla całego roku przyjęto: TDT – UT = 74 s

Pory roku [miesiąc dzień, godz. mm] (czas zimowy): Wiosna **III 20, 4.50**, Lato **VI 20, 22.43**, Jesień **IX 22, 14.31**, Zima **XII 21, 11.03**

Dane w czasie letnim odróżniono kolorem brązowym; czas ten obowiązuje **od 29 marca do 25 października 2020 r.**

Oznaczenia:

Dr — dzień 2020 roku (1 stycznia Dr = 1)

Dm — dzień miesiąca

Dt — dzień tygodnia

JD — data juliańska modulo 1000 o 12^h UT

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

ST — prawdziwy czas gwiazdowy

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

α — rektascensja (Słońca lub Księżyca)

δ — deklinacja (Słońca lub Księżyca)

R — odległość (Słońca lub Księżyca)

j astr — jednostka astronomiczna

ρ_{\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 2020

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
1	1	Śro	850	18.56318	-3.16	18.4535	-23.01	0.98329	23.3707	-7.59	63.395	6.2	34	800	1149.0	1538	1124	1648.7	2225	1050	1	
2	2	Czw	851	19.00284	-3.44	18.4960	-22.56	0.98327	0.2102	-3.28	63.416	7.2	43	800	1149.5	1540	1139	1729.6	2332	1046	2	
3	3	Pią	852	19.04249	-4.12	18.5424	-22.51	0.98325	1.0436	1.12	63.231	0.3	52	759	1149.9	1541	1154	1810.4	****	1042	3	
4	4	Sob	853	19.08215	-4.39	18.5848	-22.45	0.98325	1.4844	5.51	62.845	1.3	62	759	1150.4	1542	1210	1852.1	040	1038	4	
5	5	Nie	854	19.12180	-5.07	19.0312	-22.38	0.98324	2.3420	10.22	62.280	2.3	71	759	1150.9	1543	1227	1935.7	149	1034	5	
6	6	Pon	855	19.16146	-5.33	19.0735	-22.32	0.98325	3.2217	14.33	61.573	3.3	80	758	1151.3	1544	1247	2022.1	300	1030	6	
7	7	Wto	856	19.20112	-5.59	19.1158	-22.24	0.98326	4.1317	18.11	60.774	4.3	87	758	1151.7	1546	1312	2112.1	413	1027	7	
8	8	Śro	857	19.24077	-6.25	19.1620	-22.17	0.98327	5.0745	21.01	59.947	5.3	93	757	1152.2	1547	1344	2206.0	527	1023	8	
9	9	Czw	858	19.28043	-6.50	19.2042	-22.08	0.98330	6.0534	22.46	59.155	6.3	98	757	1152.6	1549	1428	2303.3	638	1019	9	
10	10	Pią	859	19.32009	-7.15	19.2503	-21.60	0.98333	7.0552	23.11	58.462	7.3	100	756	1153.0	1550	1525	*****	742	1015	10	
11	11	Sob	860	19.35574	-7.39	19.2924	-21.51	0.98336	8.0713	22.09	57.918	0.7	99	756	1153.4	1552	1635	002.7	835	1011	11	
12	12	Nie	861	19.39540	-8.03	19.3344	-21.41	0.98340	9.0757	19.39	57.557	1.7	96	755	1153.8	1553	1755	102.3	916	1007	12	
13	13	Pon	862	19.43505	-8.26	19.3803	-21.32	0.98345	10.0652	15.54	57.391	2.7	91	754	1154.2	1555	1920	200.5	948	1003	13	
14	14	Wto	863	19.47471	-8.48	19.4222	-21.21	0.98350	11.0325	11.11	57.409	3.7	83	753	1154.5	1556	2045	256.1	1014	959	14	
15	15	Śro	864	19.51436	-9.10	19.4640	-21.11	0.98356	11.5746	5.52	57.585	4.7	73	752	1154.9	1558	2209	349.1	1035	955	15	
16	16	Czw	865	19.55402	-9.31	19.5058	-20.59	0.98363	12.5033	0.17	57.883	5.7	62	752	1155.3	1559	2332	440.1	1055	951	16	
17	17	Pią	866	19.59367	-9.51	19.5515	-20.48	0.98370	13.4236	-5.15	58.268	6.7	51	751	1155.6	1601	****	530.0	1113	947	17	
18	18	Sob	867	20.03333	-10.11	19.5931	-20.36	0.98378	14.3448	-10.26	58.709	0.9	40	750	1155.9	1603	054	619.8	1133	943	18	
19	19	Nie	868	20.07298	-10.30	20.0347	-20.24	0.98386	15.2751	-15.01	59.182	1.9	29	748	1156.2	1605	214	710.4	1156	939	19	
20	20	Pon	869	20.11264	-10.48	20.0802	-20.11	0.98395	16.2211	-18.45	59.676	2.9	20	747	1156.5	1606	334	802.4	1223	935	20	
21	21	Wto	870	20.15230	-11.06	20.1216	-19.58	0.98403	17.1745	-21.26	60.182	3.9	12	746	1156.8	1608	449	855.7	1257	931	21	
22	22	Śro	871	20.19195	-11.23	20.1629	-19.44	0.98413	18.1404	-22.56	60.699	4.9	6	745	1157.1	1610	558	950.0	1340	928	22	
23	23	Czw	872	20.23161	-11.39	20.2042	-19.31	0.98423	19.1013	-23.10	61.223	5.9	2	744	1157.4	1612	656	1044.3	1433	924	23	
24	24	Pią	873	20.27127	-11.54	20.2454	-19.16	0.98433	20.0511	-22.12	61.744	6.9	0	742	1157.6	1613	743	1137.2	1535	920	24	
25	25	Sob	874	20.31092	-12.09	20.2905	-19.02	0.98443	20.5807	-20.08	62.248	0.6	0	741	1157.9	1615	820	1228.0	1642	916	25	
26	26	Nie	875	20.35058	-12.22	20.3315	-18.47	0.98454	21.4834	-17.10	62.710	1.6	2	740	1158.1	1617	848	1315.9	1752	912	26	
27	27	Pon	876	20.39023	-12.35	20.3725	-18.32	0.98465	22.3631	-13.31	63.102	2.6	6	738	1158.3	1619	910	1401.1	1902	908	27	
28	28	Wto	877	20.42589	-12.47	20.4133	-18.16	0.98476	23.2221	-9.21	63.391	3.6	12	737	1158.5	1621	929	1444.0	2010	904	28	
29	29	Śro	878	20.46554	-12.59	20.4541	-18.00	0.98488	0.0638	-4.53	63.543	4.6	18	735	1158.7	1623	945	1525.4	2118	900	29	
30	30	Czw	879	20.50520	-13.09	20.4948	-17.44	0.98500	0.5009	-0.15	63.531	5.6	26	734	1158.9	1625	1000	1606.0	2225	856	30	
31	31	Pią	880	20.54485	-13.19	20.5354	-17.28	0.98513	1.3340	4.23	63.334	6.6	35	732	1159.1	1627	1015	1646.8	2333	852	31	

Fazy Księżyca [Dm, h.mm]: 1kw 3, 5.45 Pełn 10, 20.21 3kw 17, 13.58 Now 24, 22.42

STYCZEŃ 2020 (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		
1	5.51	17.48	7.53	15.01	9.55	18.36	4.40	13.02	7.48	15.19	8.40	16.33	11.57	2.18	10.46	21.43	8.49	16.34		
	18.760	-23.02	18.375	-24.65	21.200	-18.09	15.770	-19.52	18.492	-23.17	19.545	-21.68	2.045	11.94	23.186	-6.35	19.633	-22.20	6.67451	1
3	5.51	17.50	7.59	15.07	9.52	18.43	4.39	12.57	7.42	15.13	8.33	16.26	11.49	2.10	10.38	21.36	8.42	16.27		
	18.907	-22.85	18.608	-24.65	21.363	-17.34	15.863	-19.83	18.526	-23.15	19.562	-21.64	2.044	11.94	23.189	-6.34	19.637	-22.19	6.80592	3
5	5.51	17.52	8.04	15.13	9.49	18.50	4.39	12.53	7.36	15.07	8.26	16.20	11.41	2.02	10.30	21.28	8.34	16.19		
	19.053	-22.64	18.841	-24.56	21.525	-16.55	15.956	-20.13	18.559	-23.13	19.578	-21.61	2.043	11.93	23.191	-6.32	19.642	-22.18	6.93734	5
7	5.51	17.54	8.09	15.21	9.46	18.56	4.39	12.49	7.30	15.02	8.19	16.13	11.34	1.54	10.22	21.20	8.26	16.12		
	19.199	-22.41	19.076	-24.37	21.684	-15.73	16.050	-20.41	18.592	-23.11	19.595	-21.57	2.042	11.93	23.194	-6.30	19.647	-22.17	7.06877	7
9	5.50	17.56	8.13	15.30	9.42	19.03	4.38	12.45	7.24	14.56	8.12	16.06	11.26	1.46	10.14	21.13	8.19	16.04		
	19.345	-22.14	19.312	-24.09	21.842	-14.89	16.144	-20.69	18.625	-23.08	19.612	-21.53	2.042	11.93	23.197	-6.28	19.652	-22.16	7.20019	9
11	5.49	17.59	8.16	15.39	9.38	19.10	4.38	12.41	7.18	14.50	8.05	15.60	11.18	1.38	10.07	21.05	8.11	15.57		
	19.490	-21.85	19.549	-23.71	21.999	-14.02	16.238	-20.96	18.658	-23.05	19.629	-21.50	2.042	11.93	23.200	-6.26	19.656	-22.16	7.33161	11
13	5.48	18.01	8.19	15.49	9.35	19.16	4.38	12.37	7.12	14.45	7.58	15.53	11.10	1.30	9.59	20.58	8.03	15.49		
	19.634	-21.53	19.786	-23.22	22.154	-13.12	16.333	-21.21	18.691	-23.02	19.646	-21.46	2.042	11.93	23.203	-6.24	19.661	-22.15	7.46303	13
15	5.47	18.04	8.21	15.59	9.31	19.23	4.37	12.33	7.06	14.39	7.50	15.47	11.02	1.22	9.51	20.50	7.56	15.42		
	19.778	-21.18	20.023	-22.63	22.307	-12.21	16.428	-21.46	18.724	-22.99	19.662	-21.42	2.042	11.94	23.206	-6.22	19.666	-22.14	7.59445	15
17	5.46	18.07	8.22	16.11	9.26	19.30	4.37	12.29	6.60	14.33	7.43	15.40	10.54	1.15	9.43	20.43	7.48	15.34		
	19.921	-20.80	20.259	-21.94	22.459	-11.27	16.524	-21.69	18.757	-22.96	19.679	-21.39	2.043	11.94	23.209	-6.20	19.671	-22.13	7.72587	17
19	5.45	18.09	8.23	16.23	9.22	19.36	4.36	12.25	6.53	14.28	7.36	15.33	10.46	1.07	9.35	20.35	7.41	15.27		
	20.063	-20.39	20.495	-21.15	22.610	-10.32	16.620	-21.91	18.790	-22.93	19.696	-21.35	2.044	11.95	23.213	-6.18	19.676	-22.12	7.85729	19
21	5.43	18.12	8.23	16.35	9.18	19.43	4.36	12.22	6.47	14.22	7.29	15.27	10.39	0.59	9.28	20.27	7.33	15.19		
	20.204	-19.97	20.730	-20.26	22.759	-9.34	16.717	-22.11	18.822	-22.89	19.712	-21.31	2.045	11.95	23.216	-6.16	19.680	-22.11	7.98871	21
23	5.41	18.15	8.22	16.48	9.13	19.49	4.35	12.18	6.41	14.16	7.22	15.20	10.31	0.51	9.20	20.20	7.25	15.12		
	20.345	-19.51	20.962	-19.26	22.908	-8.36	16.814	-22.31	18.854	-22.86	19.729	-21.27	2.046	11.96	23.220	-6.13	19.685	-22.11	8.12013	23
25	5.39	18.18	8.21	17.01	9.09	19.56	4.34	12.15	6.35	14.11	7.15	15.14	10.23	0.44	9.12	20.12	7.18	15.04		
	20.485	-19.03	21.192	-18.16	23.055	-7.36	16.911	-22.49	18.886	-22.82	19.746	-21.23	2.048	11.97	23.223	-6.11	19.690	-22.10	8.25156	25
27	5.37	18.21	8.19	17.14	9.04	20.02	4.33	12.12	6.29	14.05	7.08	15.07	10.15	0.36	9.04	20.05	7.10	14.57		
	20.624	-18.53	21.419	-16.98	23.201	-6.34	17.009	-22.66	18.918	-22.78	19.762	-21.19	2.049	11.98	23.227	-6.09	19.695	-22.09	8.38298	27
29	5.35	18.24	8.16	17.27	8.59	20.08	4.33	12.09	6.22	13.59	7.00	15.00	10.07	0.28	8.57	19.57	7.02	14.49		
	20.761	-18.01	21.640	-15.70	23.346	-5.32	17.107	-22.82	18.950	-22.74	19.779	-21.16	2.051	11.99	23.231	-6.06	19.699	-22.08	8.51439	29
31	5.32	18.28	8.13	17.40	8.55	20.15	4.32	12.05	6.16	13.54	6.53	14.54	9.59	0.21	8.49	19.50	6.55	14.42		
	20.898	-17.46	21.854	-14.36	23.489	-4.29	17.205	-22.96	18.981	-22.70	19.795	-21.12	2.053	12.00	23.235	-6.04	19.704	-22.07	8.64581	31

LUTY 2020

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
32	1	Sob	881	20.58451	-13.27	20.5760	-17.11	0.98526	2.1806	8.55	62.942	7.6	44	730	1159.2	1629	1031	1728.8	****	848	1	
33	2	Nie	882	21.02416	-13.35	21.0204	-16.54	0.98539	3.0417	13.10	62.360	0.4	54	729	1159.3	1631	1049	1812.9	042	844	2	
34	3	Pon	883	21.06382	-13.43	21.0608	-16.36	0.98553	3.5303	16.57	61.613	1.4	64	727	1159.5	1632	1111	1900.1	153	840	3	
35	4	Wto	884	21.10348	-13.49	21.1011	-16.19	0.98568	4.4504	20.04	60.739	2.4	73	725	1159.6	1634	1139	1951.0	305	836	4	
36	5	Śro	885	21.14313	-13.54	21.1413	-16.01	0.98583	5.4035	22.15	59.794	3.4	82	724	1159.7	1636	1216	2045.8	416	832	5	
37	6	Czw	886	21.18279	-13.59	21.1814	-15.42	0.98598	6.3919	23.14	58.850	4.4	89	722	1159.7	1638	1305	2143.8	523	829	6	
38	7	Pią	887	21.22244	-14.03	21.2214	-15.24	0.98614	7.4016	22.49	57.984	5.4	95	720	1159.8	1640	1409	2243.7	621	825	7	
39	8	Sob	888	21.26210	-14.06	21.2614	-15.05	0.98631	8.4157	20.53	57.271	6.4	99	718	1159.8	1642	1526	2343.6	708	821	8	
40	9	Nie	889	21.30175	-14.08	21.3013	-14.46	0.98648	9.4251	17.33	56.776	0.1	100	716	1159.9	1644	1651	*****	745	817	9	
41	10	Pon	890	21.34141	-14.09	21.3411	-14.27	0.98665	10.4156	13.01	56.536	1.1	98	714	1159.9	1646	1819	042.0	814	813	10	
42	11	Wto	891	21.38106	-14.10	21.3808	-14.07	0.98684	11.3854	7.41	56.563	2.1	93	713	1159.9	1648	1947	138.1	838	809	11	
43	12	Śro	892	21.42072	-14.10	21.4204	-13.47	0.98702	12.3401	1.55	56.836	3.1	86	711	1159.9	1650	2114	231.9	859	805	12	
44	13	Czw	893	21.46037	-14.09	21.4600	-13.27	0.98722	13.2756	-3.52	57.310	4.1	77	709	1159.9	1652	2239	324.1	918	801	13	
45	14	Pią	894	21.50003	-14.08	21.4955	-13.07	0.98741	14.2126	-9.20	57.928	5.1	66	707	1159.9	1654	****	415.5	938	757	14	
46	15	Sob	895	21.53568	-14.05	21.5349	-12.47	0.98761	15.1513	-14.10	58.629	6.1	55	705	1159.8	1656	002	506.9	1000	753	15	
47	16	Nie	896	21.57534	-14.02	21.5743	-12.26	0.98782	16.0943	-18.08	59.360	0.5	44	703	1159.8	1658	123	559.1	1025	749	16	
48	17	Pon	897	22.01500	-13.59	22.0136	-12.05	0.98803	17.0503	-21.04	60.078	1.5	34	701	1159.7	1700	241	652.2	1057	745	17	
49	18	Wto	898	22.05465	-13.54	22.0528	-11.44	0.98824	18.0052	-22.48	60.754	2.5	24	658	1159.7	1702	351	746.0	1137	741	18	
50	19	Śro	899	22.09431	-13.49	22.0919	-11.23	0.98845	18.5630	-23.19	61.374	3.5	16	656	1159.6	1704	452	839.7	1227	737	19	
51	20	Czw	900	22.13396	-13.44	22.1310	-11.01	0.98867	19.5107	-22.37	61.929	4.5	9	654	1159.5	1706	542	932.4	1325	734	20	
52	21	Pią	901	22.17362	-13.37	22.1700	-10.40	0.98889	20.4357	-20.49	62.418	5.5	4	652	1159.4	1708	621	1023.2	1431	730	21	
53	22	Sob	902	22.21327	-13.30	22.2050	-10.18	0.98911	21.3434	-18.05	62.838	6.5	1	650	1159.3	1709	651	1111.5	1539	726	22	
54	23	Nie	903	22.25293	-13.23	22.2439	-9.56	0.98933	22.2253	-14.35	63.187	7.5	0	648	1159.1	1711	715	1157.3	1649	722	23	
55	24	Pon	904	22.29259	-13.14	22.2827	-9.34	0.98956	23.0907	-10.32	63.457	0.8	1	646	1159.0	1713	734	1240.9	1758	718	24	
56	25	Wto	905	22.33224	-13.05	22.3215	-9.12	0.98979	23.5344	-6.06	63.633	1.8	3	643	1158.8	1715	751	1322.7	1906	714	25	
57	26	Śro	906	22.37189	-12.56	22.3602	-8.50	0.99002	0.3723	-1.28	63.698	2.8	7	641	1158.7	1717	806	1403.5	2014	710	26	
58	27	Czw	907	22.41155	-12.46	22.3949	-8.27	0.99025	1.2045	3.13	63.633	3.8	13	639	1158.5	1719	821	1444.0	2121	706	27	
59	28	Pią	908	22.45120	-12.35	22.4335	-8.05	0.99048	2.0437	7.48	63.418	4.8	19	637	1158.3	1721	836	1525.2	2229	702	28	
60	29	Sob	909	22.49086	-12.24	22.4720	-7.42	0.99071	2.4944	12.07	63.038	5.8	28	634	1158.2	1723	853	1607.9	2339	658	29	

Fazy Księżyca [Dm, h.mm]: 1kw 2, 2.42 Pełn 9, 8.33 3kw 15, 23.17 Nów 23, 16.32

LUTY 2020 (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	5.31	18.29	8.11	17.47	8.52	20.18	4.31	12.04	6.13	13.51	6.50	14.50	9.55	0.17	8.45	19.46	6.51	14.38		
	20.967	-17.18	21.958	-13.67	23.561	-3.77	17.254	-23.03	18.997	-22.68	19.803	-21.10	2.054	12.01	23.237	-6.02	19.706	-22.07	8.71152	1
3	5.28	18.33	8.07	17.59	8.47	20.24	4.30	12.01	6.07	13.45	6.43	14.44	9.48	0.09	8.37	19.39	6.43	14.30		
	21.102	-16.61	22.156	-12.25	23.704	-2.73	17.353	-23.16	19.028	-22.64	19.819	-21.06	2.057	12.02	23.241	-6.00	19.711	-22.06	8.84294	3
5	5.25	18.36	8.02	18.10	8.42	20.30	4.29	11.58	6.00	13.39	6.35	14.37	9.40	0.02	8.29	19.31	6.36	14.23		
	21.237	-16.01	22.341	-10.81	23.845	-1.69	17.452	-23.27	19.059	-22.60	19.835	-21.02	2.060	12.04	23.245	-5.97	19.715	-22.05	8.97436	5
7	5.22	18.39	7.56	18.20	8.37	20.36	4.28	11.56	5.54	13.34	6.28	14.31	9.32	23.50	8.22	19.24	6.28	14.15		
	21.371	-15.40	22.507	-9.40	23.986	-0.64	17.551	-23.37	19.090	-22.55	19.851	-20.98	2.062	12.06	23.249	-5.94	19.720	-22.05	9.10578	7
9	5.19	18.43	7.49	18.29	8.32	20.42	4.27	11.53	5.48	13.28	6.21	14.24	9.24	23.42	8.14	19.16	6.20	14.08		
	21.504	-14.77	22.650	-8.05	0.127	0.41	17.650	-23.45	19.120	-22.51	19.867	-20.94	2.066	12.07	23.253	-5.92	19.724	-22.04	9.23720	9
11	5.16	18.46	7.42	18.34	8.27	20.48	4.25	11.51	5.41	13.22	6.14	14.17	9.17	23.35	8.06	19.09	6.13	14.00		
	21.636	-14.12	22.763	-6.81	0.266	1.45	17.750	-23.52	19.150	-22.46	19.882	-20.90	2.069	12.09	23.258	-5.89	19.729	-22.03	9.36862	11
13	5.12	18.49	7.33	18.37	8.22	20.54	4.24	11.48	5.35	13.17	6.07	14.11	9.09	23.27	7.58	19.01	6.05	13.53		
	21.767	-13.46	22.842	-5.76	0.406	2.50	17.849	-23.58	19.179	-22.42	19.898	-20.86	2.072	12.11	23.262	-5.86	19.733	-22.03	9.50004	13
15	5.09	18.53	7.23	18.36	8.17	21.00	4.22	11.46	5.28	13.11	5.59	14.04	9.01	23.20	7.51	18.54	5.57	13.45		
	21.897	-12.78	22.883	-4.93	0.544	3.54	17.949	-23.62	19.209	-22.37	19.913	-20.82	2.076	12.13	23.266	-5.83	19.737	-22.02	9.63145	15
17	5.05	18.57	7.12	18.31	8.12	21.06	4.21	11.44	5.22	13.05	5.52	13.57	8.53	23.12	7.43	18.46	5.50	13.37		
	22.027	-12.09	22.882	-4.38	0.683	4.58	18.049	-23.65	19.238	-22.32	19.928	-20.78	2.080	12.15	23.271	-5.81	19.741	-22.01	9.76288	17
19	5.01	19.00	7.00	18.22	8.07	21.12	4.19	11.42	5.15	12.59	5.45	13.51	8.46	23.05	7.35	18.39	5.42	13.30		
	22.155	-11.38	22.840	-4.14	0.821	5.61	18.149	-23.67	19.266	-22.28	19.943	-20.74	2.084	12.18	23.275	-5.78	19.745	-22.01	9.89430	19
21	4.57	19.04	6.48	18.09	8.02	21.18	4.17	11.40	5.09	12.53	5.38	13.44	8.38	22.57	7.27	18.32	5.34	13.22		
	22.283	-10.66	22.761	-4.23	0.958	6.63	18.250	-23.67	19.295	-22.23	19.958	-20.71	2.088	12.20	23.280	-5.75	19.749	-22.00	10.02572	21
23	4.53	19.07	6.36	17.52	7.56	21.24	4.15	11.38	5.02	12.48	5.30	13.37	8.30	22.50	7.20	18.24	5.27	13.15		
	22.411	-9.94	22.652	-4.63	1.096	7.64	18.350	-23.66	19.322	-22.18	19.972	-20.67	2.093	12.22	23.284	-5.72	19.753	-21.99	10.15714	23
25	4.49	19.11	6.24	17.33	7.51	21.30	4.13	11.37	4.56	12.42	5.23	13.30	8.22	22.42	7.12	18.17	5.19	13.07		
	22.537	-9.20	22.524	-5.28	1.233	8.64	18.450	-23.63	19.350	-22.13	19.987	-20.63	2.097	12.25	23.289	-5.69	19.757	-21.99	10.28855	25
27	4.44	19.15	6.13	17.13	7.46	21.36	4.11	11.35	4.49	12.36	5.16	13.24	8.15	22.35	7.04	18.09	5.11	12.59		
	22.664	-8.45	22.391	-6.11	1.370	9.63	18.551	-23.59	19.377	-22.08	20.001	-20.59	2.102	12.28	23.294	-5.66	19.761	-21.98	10.41997	27
29	4.40	19.19	6.02	16.52	7.41	21.42	4.08	11.34	4.42	12.30	5.09	13.17	8.07	22.28	6.56	18.02	5.04	12.52		
	22.789	-7.70	22.265	-7.03	1.507	10.61	18.651	-23.53	19.404	-22.03	20.015	-20.56	2.107	12.30	23.298	-5.63	19.764	-21.98	10.55139	29

MARZEC 2020

Piwnice, CA UMK		← Dane na godz. 12 czasu strefowego (= 11 lub 10 ^h UT) →												Czas strefowy [hhmm.]							
..... Dzień		ST	Δα	α _☉	δ _☉	R _☉	α _☾	δ _☾	R _☾	Faza ☾	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ _☉	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2458																					
61	1	Nie	910	22.53052	-12.13	22.5105	-7.19	0.99095	3.3653	16.01	62.488	6.8	37	632	1158.0	1725	912	1652.9	****	654	1
62	2	Pon	911	22.57017	-12.01	22.5449	-6.56	0.99119	4.2641	19.19	61.776	7.8	46	630	1157.8	1727	936	1741.0	049	650	2
63	3	Wto	912	23.00583	-11.48	22.5833	-6.33	0.99143	5.1935	21.47	60.922	0.6	56	628	1157.5	1728	1008	1832.5	159	646	3
64	4	Śro	913	23.04548	-11.35	23.0217	-6.10	0.99168	6.1537	23.12	59.968	1.6	66	625	1157.3	1730	1050	1927.5	306	642	4
65	5	Czw	914	23.08514	-11.21	23.0560	-5.47	0.99192	7.1414	23.20	58.971	2.6	76	623	1157.1	1732	1146	2025.0	407	638	5
66	6	Pią	915	23.12479	-11.07	23.0942	-5.23	0.99218	8.1428	22.03	58.004	3.6	85	621	1156.9	1734	1255	2123.9	458	635	6
67	7	Sob	916	23.16445	-10.53	23.1324	-5.00	0.99243	9.1501	19.19	57.151	4.6	92	618	1156.6	1736	1416	2222.6	539	631	7
68	8	Nie	917	23.20410	-10.38	23.1706	-4.37	0.99269	10.1448	15.16	56.492	5.6	97	616	1156.4	1738	1543	2320.0	611	627	8
69	9	Pon	918	23.24376	-10.23	23.2047	-4.13	0.99295	11.1312	10.09	56.095	6.6	100	614	1156.1	1740	1713	*****	637	623	9
70	10	Wto	919	23.28341	-10.07	23.2429	-3.50	0.99322	12.1009	4.21	55.998	0.7	99	611	1155.9	1741	1843	015.9	659	619	10
71	11	Śro	920	23.32307	-9.51	23.2809	-3.26	0.99348	13.0605	-1.42	56.206	1.7	95	609	1155.6	1743	2012	110.2	720	615	11
72	12	Czw	921	23.36272	-9.35	23.3150	-3.03	0.99376	14.0135	-7.34	56.689	2.7	89	607	1155.3	1745	2140	203.8	740	611	12
73	13	Pią	922	23.40238	-9.19	23.3530	-2.39	0.99403	14.5714	-12.53	57.389	3.7	81	604	1155.1	1747	2306	257.3	801	607	13
74	14	Sob	923	23.44203	-9.02	23.3910	-2.15	0.99431	15.5325	-17.19	58.232	4.7	71	602	1154.8	1749	****	351.3	826	603	14
75	15	Nie	924	23.48169	-8.45	23.4249	-1.52	0.99459	16.5010	-20.39	59.142	5.7	60	559	1154.5	1751	028	446.0	856	559	15
76	16	Pon	925	23.52135	-8.28	23.4629	-1.28	0.99487	17.4708	-22.44	60.049	0.1	49	557	1154.2	1752	144	541.0	934	555	16
77	17	Wto	926	23.56100	-8.11	23.5008	-1.04	0.99515	18.4336	-23.32	60.901	1.1	39	555	1153.9	1754	249	635.7	1021	551	17
78	18	Śro	927	24.00066	-7.54	23.5347	-0.40	0.99544	19.3846	-23.05	61.661	2.1	29	552	1153.6	1756	343	729.2	1118	547	18
79	19	Czw	928	0.04031	-7.36	23.5726	-0.17	0.99572	20.3158	-21.29	62.306	3.1	21	550	1153.3	1758	424	820.6	1222	543	19
80	20	Pią	929	0.07597	-7.18	0.0105	0.07	0.99601	21.2249	-18.56	62.829	4.1	14	547	1153.1	1800	456	909.4	1329	539	20
81	21	Sob	930	0.11562	-7.01	0.0444	0.31	0.99629	22.1117	-15.35	63.230	5.1	8	545	1152.8	1802	521	955.6	1439	536	21
82	22	Nie	931	0.15528	-6.43	0.0823	0.54	0.99658	22.5738	-11.37	63.515	6.1	3	543	1152.5	1803	541	1039.5	1548	532	22
83	23	Pon	932	0.19493	-6.25	0.1201	1.18	0.99686	23.4223	-7.15	63.690	7.1	1	540	1152.2	1805	558	1121.5	1656	528	23
84	24	Wto	933	0.23459	-6.07	0.1540	1.42	0.99715	0.2605	-2.36	63.761	0.1	0	538	1151.9	1807	613	1202.4	1804	524	24
85	25	Śro	934	0.27424	-5.49	0.1918	2.05	0.99743	1.0926	2.07	63.728	1.1	1	535	1151.6	1809	628	1242.9	1912	520	25
86	26	Czw	935	0.31390	-5.31	0.2257	2.29	0.99771	1.5307	6.47	63.588	2.1	4	533	1151.3	1811	642	1323.8	2020	516	26
87	27	Pią	936	0.35355	-5.13	0.2635	2.52	0.99800	2.3751	11.14	63.334	3.1	8	531	1151.0	1812	658	1405.9	2129	512	27
88	28	Sob	937	0.39321	-4.55	0.3014	3.16	0.99828	3.2416	15.17	62.957	4.1	14	528	1150.7	1814	716	1449.9	2239	508	28
89	29	Nie	938	0.43286	-4.37	0.3352	3.39	0.99856	4.1257	18.45	62.450	5.1	22	526	1150.4	1816	738	1536.4	2349	504	29
89	29	Nie	938	23.43188	-4.37	0.3343	3.38	0.99855	4.1052	18.37	62.474	5.0	21	626	1250.4	1916	838	1636.4	****	604	29
90	30	Pon	939	23.47153	-4.19	0.3722	4.01	0.99883	5.0205	21.21	61.841	6.0	30	623	1250.1	1918	906	1725.9	049	600	30
91	31	Wto	940	23.51119	-4.01	0.4101	4.25	0.99911	5.5560	23.07	61.086	7.0	40	621	1249.8	1920	943	1818.4	157	556	31

Fazy Księżyca [Dm, h.mm]: 1kw 2, 20.57 Pełn 9, 18.47 3kw 16, 10.34 Nów 24, 10.28 Nów 24, 11.28

MARZEC 2020 (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	19.21	5.57	16.43	7.38	21.45	4.07	11.33	4.39	12.27	5.05	13.13	8.03	22.24	6.53	17.58	4.60	12.48			
	22.851	-7.32	22.208	-7.50	1.575	11.09	18.701	-23.50	19.417	-22.01	20.021	-20.54	2.109	12.32	23.301	-5.62	19.766	-21.97	10.61710	1	
3	4.33	19.24	5.49	16.24	7.33	21.51	4.05	11.32	4.32	12.21	4.58	13.07	7.55	22.17	6.45	17.51	4.52	12.40			
	22.976	-6.55	22.111	-8.42	1.712	12.04	18.802	-23.43	19.443	-21.96	20.035	-20.50	2.115	12.35	23.305	-5.59	19.770	-21.97	10.74852	3	
5	4.28	19.28	5.41	16.07	7.28	21.56	4.02	11.31	4.26	12.15	4.50	12.60	7.48	22.09	6.37	17.43	4.44	12.33			
	23.100	-5.78	22.041	-9.25	1.848	12.97	18.902	-23.34	19.468	-21.91	20.048	-20.47	2.120	12.37	23.310	-5.56	19.773	-21.96	10.87994	5	
7	4.23	19.32	5.35	15.53	7.23	22.02	3.60	11.29	4.19	12.09	4.43	12.53	7.40	22.02	6.29	17.36	4.37	12.25			
	23.223	-5.00	22.000	-9.96	1.984	13.89	19.002	-23.24	19.493	-21.86	20.061	-20.43	2.125	12.40	23.315	-5.53	19.776	-21.96	11.01136	7	
9	4.19	19.36	5.30	15.41	7.17	22.08	3.57	11.28	4.12	12.03	4.36	12.46	7.32	21.54	6.22	17.28	4.29	12.18			
	23.347	-4.22	21.988	-10.54	2.121	14.78	19.102	-23.12	19.517	-21.81	20.073	-20.40	2.131	12.43	23.319	-5.50	19.780	-21.95	11.14277	9	
11	4.14	19.40	5.25	15.32	7.12	22.14	3.54	11.28	4.05	11.57	4.28	12.39	7.24	21.47	6.14	17.21	4.21	12.10			
	23.469	-3.44	22.003	-10.96	2.256	15.66	19.202	-22.99	19.541	-21.76	20.086	-20.36	2.137	12.47	23.324	-5.47	19.783	-21.95	11.27419	11	
13	4.08	19.44	5.21	15.25	7.07	22.19	3.51	11.27	3.59	11.51	4.21	12.32	7.17	21.40	6.06	17.14	4.14	12.02			
	23.592	-2.65	22.042	-11.23	2.392	16.51	19.302	-22.85	19.565	-21.71	20.098	-20.33	2.143	12.50	23.329	-5.44	19.786	-21.95	11.40560	13	
15	4.03	19.48	5.18	15.20	7.02	22.25	3.48	11.26	3.52	11.45	4.13	12.25	7.09	21.32	5.58	17.06	4.06	11.55			
	23.714	-1.86	22.104	-11.36	2.527	17.33	19.402	-22.69	19.588	-21.66	20.109	-20.30	2.149	12.53	23.333	-5.41	19.788	-21.94	11.53702	15	
17	3.58	19.53	5.15	15.17	6.57	22.30	3.45	11.25	3.45	11.38	4.06	12.18	7.01	21.25	5.51	16.59	3.58	11.47			
	23.836	-1.07	22.185	-11.36	2.662	18.13	19.501	-22.53	19.610	-21.62	20.121	-20.27	2.155	12.56	23.338	-5.38	19.791	-21.94	11.66844	17	
19	3.52	19.57	5.12	15.16	6.52	22.36	3.42	11.25	3.38	11.32	3.59	12.11	6.54	21.18	5.43	16.51	3.50	11.39			
	23.957	-0.28	22.282	-11.22	2.797	18.91	19.600	-22.34	19.632	-21.57	20.132	-20.23	2.161	12.60	23.343	-5.35	19.794	-21.94	11.79987	19	
21	3.47	20.01	5.09	15.16	6.47	22.41	3.38	11.24	3.31	11.26	3.51	12.04	6.46	21.11	5.35	16.44	3.43	11.31			
	0.079	0.51	22.394	-10.95	2.931	19.65	19.700	-22.15	19.653	-21.52	20.143	-20.21	2.168	12.63	23.347	-5.32	19.796	-21.93	11.93128	21	
23	3.41	20.06	5.07	15.18	6.42	22.46	3.35	11.24	3.24	11.20	3.44	11.57	6.38	21.03	5.27	16.36	3.35	11.24			
	0.200	1.30	22.518	-10.57	3.064	20.37	19.798	-21.94	19.674	-21.48	20.153	-20.18	2.174	12.66	23.352	-5.30	19.799	-21.93	12.06270	23	
25	3.36	20.10	5.04	15.21	6.37	22.51	3.31	11.23	3.17	11.13	3.36	11.50	6.31	20.56	5.20	16.29	3.27	11.16			
	0.322	2.09	22.653	-10.08	3.197	21.06	19.897	-21.72	19.694	-21.44	20.163	-20.15	2.181	12.70	23.356	-5.27	19.801	-21.93	12.19411	25	
27	3.30	20.15	5.01	15.25	6.33	22.56	3.28	11.23	3.10	11.07	3.29	11.43	6.23	20.49	5.12	16.22	3.19	11.08			
	0.443	2.87	22.797	-9.49	3.329	21.72	19.995	-21.49	19.713	-21.39	20.173	-20.12	2.187	12.74	23.361	-5.24	19.803	-21.93	12.32553	27	
29	3.24	20.19	4.59	15.30	6.28	23.00	3.24	11.23	3.03	11.00	3.21	11.36	6.15	20.42	5.04	16.14	3.12	11.01			
	0.565	3.65	22.949	-8.79	3.459	22.34	20.093	-21.25	19.732	-21.35	20.182	-20.10	2.194	12.77	23.365	-5.21	19.805	-21.93	12.45695	29	
29	4.24	21.19	5.59	16.29	7.28	0.04	4.24	12.23	4.03	12.00	4.21	12.36	7.15	21.42	6.04	17.14	4.12	12.01			
	0.562	3.64	22.946	-8.81	3.457	22.33	20.091	-21.25	19.732	-21.35	20.182	-20.10	2.194	12.77	23.365	-5.21	19.805	-21.93	12.45695	29	
31	4.18	21.24	5.56	16.35	7.23	0.09	4.20	12.22	3.56	11.54	4.14	12.29	7.08	21.34	5.56	17.07	4.04	11.53			
	0.683	4.41	23.105	-8.02	3.586	22.93	20.189	-21.00	19.750	-21.31	20.191	-20.07	2.201	12.81	23.370	-5.18	19.807	-21.93	12.58837	31	

KWIECIEŃ 2020

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
92	1	Śro	941	23.55085	-3.44	0.4439	4.48	0.99939	6.5217	23.42	60.229	8.0	50	619	1249.5	1921	1032	1913.3	259	552	1	
93	2	Czw	942	23.59050	-3.26	0.4818	5.11	0.99967	7.5013	22.59	59.307	1.0	60	616	1249.2	1923	1134	2009.7	352	548	2	
94	3	Pią	943	0.03016	-3.08	0.5157	5.34	0.99996	8.4850	20.54	58.374	2.0	71	614	1248.9	1925	1247	2106.6	436	544	3	
95	4	Sob	944	0.06581	-2.51	0.5536	5.57	1.00024	9.4714	17.28	57.499	3.0	81	612	1248.6	1927	1410	2202.9	510	541	4	
96	5	Nie	945	0.10547	-2.34	0.5915	6.19	1.00052	10.4451	12.53	56.759	4.0	89	609	1248.3	1929	1537	2258.2	537	537	5	
97	6	Pon	946	0.14512	-2.16	1.0255	6.42	1.00081	11.4134	7.23	56.232	5.0	96	607	1248.0	1930	1706	2352.6	600	533	6	
98	7	Wto	947	0.18478	-1.60	1.0635	7.05	1.00109	12.3740	1.22	55.976	6.0	99	604	1247.7	1932	1836	*****	620	529	7	
99	8	Śro	948	0.22443	-1.43	1.1014	7.27	1.00138	13.3344	-4.45	56.027	0.3	100	602	1247.5	1934	2006	046.6	640	525	8	
100	9	Czw	949	0.26409	-1.26	1.1355	7.49	1.00167	14.3020	-10.34	56.381	1.3	97	600	1247.2	1936	2136	141.0	700	521	9	
101	10	Pią	950	0.30374	-1.10	1.1735	8.12	1.00196	15.2753	-15.38	57.002	2.3	92	557	1246.9	1938	2304	236.2	724	517	10	
102	11	Sob	951	0.34340	-0.55	1.2116	8.34	1.00224	16.2624	-19.38	57.826	3.3	85	555	1246.7	1939	****	332.5	752	513	11	
103	12	Nie	952	0.38305	-0.39	1.2457	8.55	1.00253	17.2525	-22.21	58.774	4.3	76	553	1246.4	1941	026	429.7	827	509	12	
104	13	Pon	953	0.42271	-0.24	1.2838	9.17	1.00282	18.2403	-23.40	59.764	5.3	66	551	1246.1	1943	139	526.8	912	505	13	
105	14	Wto	954	0.46236	-0.09	1.3220	9.39	1.00311	19.2117	-23.37	60.723	6.3	56	548	1245.9	1945	239	622.6	1007	501	14	
106	15	Śro	955	0.50202	0.06	1.3602	10.00	1.00340	20.1614	-22.20	61.592	0.5	45	546	1245.7	1946	326	716.1	1110	457	15	
107	16	Czw	956	0.54168	0.20	1.3944	10.21	1.00369	21.0824	-19.60	62.331	1.5	36	544	1245.4	1948	401	806.5	1218	453	16	
108	17	Pią	957	0.58133	0.33	1.4327	10.42	1.00397	21.5746	-16.48	62.915	2.5	27	542	1245.2	1950	428	853.8	1328	449	17	
109	18	Sob	958	1.02099	0.47	1.4710	11.03	1.00426	22.4440	-12.58	63.338	3.5	19	539	1245.0	1952	449	938.4	1438	445	18	
110	19	Nie	959	1.06064	0.60	1.5054	11.24	1.00454	23.2940	-8.40	63.602	4.5	12	537	1244.8	1954	507	1020.8	1546	442	19	
111	20	Pon	960	1.10030	1.12	1.5438	11.45	1.00482	0.1327	-4.03	63.718	5.5	6	535	1244.5	1955	522	1101.8	1654	438	20	
112	21	Wto	961	1.13595	1.24	1.5823	12.05	1.00509	0.5643	0.42	63.703	6.5	3	533	1244.3	1957	536	1142.2	1802	434	21	
113	22	Śro	962	1.17560	1.36	2.0208	12.25	1.00537	1.4014	5.28	63.574	7.5	0	531	1244.2	1959	550	1223.1	1911	430	22	
114	23	Czw	963	1.21526	1.47	2.0553	12.45	1.00564	2.2442	10.03	63.345	0.3	0	528	1244.0	2001	605	1304.7	2020	426	23	
115	24	Pią	964	1.25492	1.57	2.0939	13.05	1.00590	3.1047	14.18	63.026	1.3	2	526	1243.8	2003	622	1348.2	2130	422	24	
116	25	Sob	965	1.29457	2.08	2.1325	13.24	1.00617	3.5901	18.00	62.623	2.3	5	524	1243.6	2004	643	1434.2	2241	418	25	
117	26	Nie	966	1.33423	2.17	2.1712	13.44	1.00643	4.4944	20.59	62.139	3.3	10	522	1243.5	2006	708	1522.8	2350	414	26	
118	27	Pon	967	1.37388	2.27	2.2060	14.03	1.00669	5.4257	23.00	61.575	4.3	17	520	1243.3	2008	742	1614.3	****	410	27	
119	28	Wto	968	1.41354	2.35	2.2447	14.22	1.00694	6.3817	23.54	60.934	5.3	25	518	1243.2	2010	826	1707.9	054	406	28	
120	29	Śro	969	1.45320	2.43	2.2836	14.40	1.00720	7.3502	23.33	60.225	6.3	35	516	1243.0	2011	922	1802.9	150	402	29	
121	30	Czw	970	1.49285	2.51	2.3225	14.59	1.00745	8.3213	21.52	59.467	7.3	45	514	1242.9	2013	1030	1858.2	236	358	30	

Fazy Księżyca [Dm, h.mm]: 1kw 1, 12.21 Pełn 8, 4.35 3kw 15, 0.56 Nów 23, 4.26 1kw 30, 22.38

KWIECIEŃ 2020 (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	4.15	21.27	5.55	16.39	7.21	0.11	4.18	12.22	3.53	11.51	4.10	12.25	7.04	21.31	5.53	17.03	4.00	11.49		
	0.744	4.80	23.187	-7.60	3.650	23.21	20.238	-20.87	19.758	-21.29	20.195	-20.06	2.204	12.82	23.372	-5.17	19.808	-21.93	12.65408	1
3	4.09	21.32	5.52	16.46	7.16	0.15	4.14	12.22	3.45	11.44	4.03	12.18	6.56	21.23	5.45	16.56	3.52	11.41		
	0.866	5.56	23.356	-6.67	3.777	23.76	20.335	-20.59	19.775	-21.25	20.203	-20.04	2.211	12.86	23.376	-5.14	19.809	-21.93	12.78550	3
5	4.03	21.37	5.49	16.54	7.12	0.18	4.10	12.22	3.38	11.37	3.55	12.11	6.48	21.16	5.37	16.48	3.44	11.33		
	0.988	6.32	23.531	-5.67	3.902	24.27	20.432	-20.31	19.792	-21.21	20.211	-20.01	2.218	12.90	23.381	-5.12	19.811	-21.93	12.91692	5
7	3.57	21.42	5.46	17.03	7.07	0.22	4.06	12.22	3.31	11.31	3.48	12.03	6.41	21.09	5.29	16.41	3.37	11.26		
	1.110	7.08	23.711	-4.58	4.025	24.75	20.528	-20.02	19.807	-21.18	20.219	-19.99	2.226	12.94	23.385	-5.09	19.812	-21.93	13.04833	7
9	3.50	21.47	5.43	17.12	7.03	0.25	4.02	12.22	3.24	11.24	3.40	11.56	6.33	21.02	5.22	16.33	3.29	11.18		
	1.232	7.82	23.897	-3.41	4.145	25.19	20.624	-19.71	19.822	-21.14	20.226	-19.97	2.233	12.97	23.389	-5.06	19.813	-21.93	13.17975	9
11	3.44	21.53	5.40	17.23	6.58	0.28	3.58	12.22	3.17	11.17	3.32	11.49	6.25	20.55	5.14	16.26	3.21	11.10		
	1.354	8.56	0.088	-2.17	4.263	25.60	20.720	-19.40	19.837	-21.11	20.233	-19.95	2.240	13.01	23.393	-5.04	19.815	-21.93	13.31117	11
13	3.37	21.59	5.37	17.33	6.54	0.30	3.53	12.22	3.09	11.10	3.25	11.41	6.18	20.47	5.06	16.18	3.13	11.02		
	1.477	9.29	0.285	-0.85	4.378	25.98	20.816	-19.07	19.850	-21.08	20.239	-19.94	2.247	13.05	23.397	-5.01	19.816	-21.93	13.44259	13
15	3.30	22.04	5.34	17.45	6.50	0.32	3.49	12.22	3.02	11.03	3.17	11.34	6.10	20.40	4.58	16.11	3.06	10.54		
	1.601	10.00	0.487	0.53	4.489	26.32	20.911	-18.74	19.863	-21.05	20.245	-19.92	2.255	13.09	23.401	-4.99	19.816	-21.93	13.57401	15
17	3.23	22.11	5.31	17.57	6.46	0.33	3.45	12.22	2.55	10.56	3.10	11.27	6.03	20.33	4.51	16.03	2.58	10.47		
	1.724	10.71	0.695	1.97	4.596	26.62	21.005	-18.39	19.875	-21.02	20.251	-19.91	2.262	13.12	23.405	-4.97	19.817	-21.93	13.70543	17
19	3.16	22.17	5.28	18.10	6.41	0.34	3.40	12.22	2.47	10.49	3.02	11.19	5.55	20.26	4.43	15.56	2.50	10.39		
	1.848	11.40	0.909	3.48	4.698	26.89	21.100	-18.04	19.886	-21.00	20.256	-19.89	2.269	13.16	23.409	-4.94	19.818	-21.94	13.83685	19
21	3.09	22.23	5.25	18.24	6.37	0.34	3.36	12.22	2.40	10.42	2.54	11.12	5.47	20.19	4.35	15.48	2.42	10.31		
	1.973	12.08	1.131	5.03	4.796	27.13	21.193	-17.68	19.896	-20.97	20.260	-19.88	2.277	13.20	23.413	-4.92	19.818	-21.94	13.96826	21
23	3.02	22.30	5.22	18.39	6.33	0.34	3.31	12.22	2.33	10.35	2.47	11.04	5.40	20.11	4.27	15.41	2.34	10.23		
	2.098	12.75	1.359	6.64	4.889	27.33	21.287	-17.31	19.906	-20.95	20.265	-19.87	2.284	13.24	23.417	-4.90	19.818	-21.94	14.09968	23
25	2.54	22.37	5.19	18.54	6.29	0.33	3.26	12.22	2.25	10.28	2.39	10.57	5.32	20.04	4.19	15.33	2.26	10.15		
	2.224	13.41	1.595	8.28	4.975	27.49	21.380	-16.93	19.915	-20.93	20.268	-19.86	2.292	13.28	23.420	-4.87	19.818	-21.95	14.23110	25
27	2.46	22.44	5.16	19.10	6.24	0.31	3.22	12.22	2.18	10.21	2.31	10.49	5.24	19.57	4.12	15.26	2.19	10.07		
	2.350	14.05	1.840	9.95	5.055	27.62	21.472	-16.54	19.923	-20.92	20.272	-19.85	2.299	13.31	23.424	-4.85	19.818	-21.95	14.36252	27
29	2.38	22.52	5.14	19.27	6.20	0.28	3.17	12.22	2.10	10.13	2.23	10.41	5.17	19.50	4.04	15.18	2.11	9.59		
	2.477	14.67	2.093	11.64	5.129	27.72	21.564	-16.15	19.930	-20.90	20.275	-19.85	2.306	13.35	23.427	-4.83	19.818	-21.95	14.49394	29

MAJ 2020

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2458																			
122	1	Pią	971	1.53251	2.58	2.3614	15.17	1.00769	9.2903	18.54	58.692	0.6	56	512	1242.8	2015	1148	1952.8	312	354	1	
123	2	Sob	972	1.57216	3.05	2.4004	15.35	1.00794	10.2500	14.48	57.944	1.6	67	510	1242.7	2017	1310	2046.4	340	350	2	
124	3	Nie	973	2.01182	3.11	2.4354	15.52	1.00818	11.2004	9.44	57.281	2.6	78	508	1242.6	2018	1436	2139.2	404	346	3	
125	4	Pon	974	2.05147	3.17	2.4745	16.09	1.00843	12.1436	4.01	56.765	3.6	87	506	1242.5	2020	1603	2231.5	424	343	4	
126	5	Wto	975	2.09113	3.22	2.5137	16.27	1.00867	13.0914	-2.02	56.456	4.6	94	504	1242.4	2022	1731	2324.4	442	339	5	
127	6	Śro	976	2.13078	3.26	2.5529	16.43	1.00891	14.0443	-8.00	56.400	5.6	98	502	1242.3	2024	1900	*****	501	335	6	
128	7	Czw	977	2.17044	3.30	2.5921	16.60	1.00915	15.0139	-13.30	56.617	6.6	100	500	1242.2	2025	2030	018.6	522	331	7	
129	8	Pią	978	2.21009	3.34	3.0315	17.16	1.00939	16.0018	-18.07	57.097	1.0	99	458	1242.2	2027	2157	114.6	547	327	8	
130	9	Sob	979	2.24575	3.36	3.0708	17.32	1.00962	17.0020	-21.31	57.799	2.0	95	457	1242.1	2029	2318	212.4	619	323	9	
131	10	Nie	980	2.28540	3.39	3.1103	17.48	1.00986	18.0051	-23.29	58.661	3.0	88	455	1242.1	2030	****	311.2	700	319	10	
132	11	Pon	981	2.32506	3.40	3.1458	18.03	1.01009	19.0030	-23.59	59.607	4.0	80	453	1242.1	2032	027	409.7	752	315	11	
133	12	Wto	982	2.36472	3.41	3.1853	18.18	1.01032	19.5760	-23.06	60.560	5.0	71	451	1242.1	2034	122	506.1	853	311	12	
134	13	Śro	983	2.40437	3.42	3.2249	18.33	1.01055	20.5228	-21.02	61.450	6.0	62	450	1242.1	2035	202	559.4	1002	307	13	
135	14	Czw	984	2.44403	3.42	3.2646	18.47	1.01077	21.4340	-18.01	62.222	7.0	52	448	1242.1	2037	233	649.1	1113	303	14	
136	15	Pią	985	2.48368	3.41	3.3043	19.01	1.01100	22.3151	-14.17	62.837	0.8	42	447	1242.1	2039	256	735.3	1224	259	15	
137	16	Sob	986	2.52334	3.40	3.3441	19.15	1.01122	23.1737	-10.03	63.271	1.8	33	445	1242.1	2040	314	818.8	1334	255	16	
138	17	Nie	987	2.56299	3.38	3.3839	19.29	1.01143	0.0144	-5.28	63.520	2.8	24	443	1242.1	2042	330	900.3	1443	251	17	
139	18	Pon	988	3.00265	3.35	3.4238	19.42	1.01164	0.4502	-0.43	63.589	3.8	16	442	1242.2	2043	344	940.8	1551	248	18	
140	19	Wto	989	3.04230	3.32	3.4638	19.54	1.01185	1.2821	4.05	63.497	4.8	10	441	1242.2	2045	358	1021.3	1659	244	19	
141	20	Śro	990	3.08196	3.29	3.5038	20.07	1.01205	2.1229	8.47	63.268	5.8	5	439	1242.3	2046	413	1102.5	1808	240	20	
142	21	Czw	991	3.12162	3.25	3.5439	20.19	1.01225	2.5812	13.11	62.930	6.8	2	438	1242.3	2048	429	1145.4	1919	236	21	
143	22	Pią	992	3.16127	3.20	3.5840	20.31	1.01244	3.4606	17.07	62.511	7.8	0	436	1242.4	2049	448	1230.9	2030	232	22	
144	23	Sob	993	3.20093	3.15	4.0242	20.42	1.01263	4.3638	20.22	62.034	0.7	0	435	1242.5	2051	511	1319.1	2141	228	23	
145	24	Nie	994	3.24058	3.09	4.0644	20.53	1.01281	5.2949	22.42	61.520	1.7	3	434	1242.6	2052	542	1410.3	2248	224	24	
146	25	Pon	995	3.28024	3.03	4.1047	21.04	1.01299	6.2516	23.55	60.981	2.7	7	433	1242.7	2054	623	1504.0	2348	220	25	
147	26	Wto	996	3.31590	2.56	4.1450	21.14	1.01316	7.2208	23.52	60.427	3.7	13	432	1242.8	2055	715	1559.0	****	216	26	
148	27	Śro	997	3.35555	2.49	4.1853	21.24	1.01333	8.1921	22.30	59.864	4.7	22	430	1242.9	2056	820	1654.3	037	212	27	
149	28	Czw	998	3.39521	2.42	4.2258	21.34	1.01350	9.1555	19.51	59.300	5.7	31	429	1243.1	2058	935	1748.6	116	208	28	
150	29	Pią	999	3.43486	2.34	4.2702	21.43	1.01366	10.1113	16.04	58.746	6.7	42	428	1243.2	2059	1055	1841.5	146	204	29	
151	30	Sob	000	3.47452	2.25	4.3107	21.52	1.01381	11.0510	11.20	58.224	0.3	53	427	1243.3	2100	1218	1932.9	210	200	30	
152	31	Nie	001	3.51417	2.17	4.3512	22.00	1.01396	11.5810	5.55	57.764	1.3	64	426	1243.5	2101	1341	2023.5	230	156	31	

Fazy Księżyca [Dm, h.mm]: 1kw 0, 22.38 Pełn 7, 12.45 3kw 14, 16.03 Nów 22, 19.39 1kw 30, 5.30

MAJ 2020 (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	2.30	23.00	5.12	19.45	6.15	0.25	3.12	12.22	2.02	10.06	2.16	10.34	5.09	19.43	3.56	15.10	2.03	9.51		
	2.604	15.28	2.354	13.33	5.194	27.78	21.656	-15.75	19.936	-20.89	20.277	-19.84	2.314	13.39	23.430	-4.81	19.818	-21.96	14.62536	1
3	2.21	23.09	5.10	20.03	6.11	0.21	3.07	12.22	1.55	9.59	2.08	10.26	5.01	19.35	3.48	15.03	1.55	9.43		
	2.732	15.87	2.624	14.99	5.251	27.81	21.747	-15.34	19.941	-20.88	20.279	-19.84	2.321	13.43	23.434	-4.79	19.818	-21.96	14.75678	3
5	2.11	23.19	5.09	20.22	6.06	0.16	3.02	12.23	1.47	9.51	2.00	10.18	4.54	19.28	3.41	14.55	1.47	9.36		
	2.860	16.44	2.902	16.61	5.299	27.81	21.838	-14.92	19.946	-20.87	20.281	-19.84	2.329	13.46	23.437	-4.78	19.817	-21.97	14.88820	5
7	2.01	23.29	5.08	20.41	6.01	0.10	2.57	12.23	1.39	9.43	1.52	10.10	4.46	19.21	3.33	14.48	1.39	9.28		
	2.989	17.00	3.186	18.15	5.337	27.76	21.928	-14.50	19.950	-20.87	20.282	-19.84	2.336	13.50	23.440	-4.76	19.816	-21.98	15.01962	7
9	1.50	23.41	5.07	21.00	5.55	0.03	2.52	12.23	1.32	9.36	1.44	10.03	4.38	19.14	3.25	14.40	1.31	9.20		
	3.119	17.53	3.475	19.60	5.365	27.68	22.018	-14.08	19.952	-20.87	20.282	-19.84	2.343	13.54	23.443	-4.74	19.816	-21.98	15.15104	9
11	1.37	23.55	5.08	21.19	5.49	23.51	2.47	12.23	1.24	9.28	1.37	9.55	4.31	19.07	3.17	14.33	1.24	9.12		
	3.249	18.05	3.766	20.91	5.382	27.56	22.107	-13.65	19.954	-20.87	20.283	-19.84	2.351	13.58	23.445	-4.72	19.815	-21.99	15.28246	11
13	1.21	0.27	5.09	21.37	5.43	23.42	2.42	12.23	1.16	9.20	1.29	9.47	4.23	18.59	3.09	14.25	1.16	9.04		
	3.380	18.55	4.057	22.08	5.387	27.40	22.196	-13.21	19.955	-20.87	20.282	-19.84	2.358	13.61	23.448	-4.71	19.814	-21.99	15.41388	13
15	*****	*****	5.10	21.54	5.37	23.32	2.37	12.23	1.08	9.12	1.21	9.39	4.15	18.52	3.02	14.17	1.08	8.56		
	3.512	19.02	4.344	23.09	5.382	27.20	22.284	-12.77	19.955	-20.87	20.282	-19.85	2.365	13.65	23.451	-4.69	19.813	-22.00	15.54530	15
17	*****	*****	5.13	22.10	5.31	23.20	2.32	12.23	1.01	9.04	1.13	9.31	4.08	18.45	2.54	14.10	0.60	8.48		
	3.644	19.48	4.624	23.93	5.364	26.96	22.372	-12.32	19.955	-20.88	20.280	-19.86	2.372	13.68	23.453	-4.68	19.811	-22.01	15.67672	17
19	*****	*****	5.16	22.24	5.24	23.08	2.26	12.23	0.53	8.56	1.05	9.23	4.00	18.38	2.46	14.02	0.52	8.40		
	3.777	19.91	4.897	24.59	5.335	26.66	22.460	-11.88	19.953	-20.89	20.279	-19.87	2.380	13.72	23.456	-4.66	19.810	-22.02	15.80814	19
21	*****	*****	5.19	22.36	5.16	22.55	2.21	12.23	0.45	8.48	0.57	9.15	3.53	18.31	2.38	13.54	0.44	8.32		
	3.911	20.32	5.158	25.09	5.294	26.33	22.547	-11.42	19.951	-20.90	20.277	-19.87	2.387	13.75	23.458	-4.65	19.808	-22.02	15.93956	21
23	*****	*****	5.23	22.46	5.09	22.40	2.16	12.22	0.37	8.40	0.49	9.07	3.45	18.23	2.31	13.47	0.36	8.24		
	4.045	20.70	5.407	25.42	5.243	25.94	22.633	-10.97	19.947	-20.92	20.274	-19.89	2.394	13.79	23.460	-4.64	19.807	-22.03	16.07098	23
25	*****	*****	5.28	22.53	5.01	22.25	2.10	12.22	0.29	8.32	0.41	8.59	3.37	18.16	2.23	13.39	0.28	8.16		
	4.180	21.07	5.642	25.61	5.181	25.50	22.719	-10.51	19.943	-20.94	20.272	-19.90	2.401	13.82	23.462	-4.63	19.805	-22.04	16.20240	25
27	*****	*****	5.33	22.59	4.53	22.09	2.05	12.22	0.21	8.23	0.33	8.50	3.30	18.09	2.15	13.31	0.20	8.08		
	4.315	21.40	5.862	25.66	5.111	25.01	22.804	-10.05	19.938	-20.95	20.268	-19.91	2.407	13.86	23.464	-4.62	19.803	-22.05	16.33383	27
29	*****	*****	5.38	23.03	4.45	21.52	1.60	12.22	0.13	8.15	0.25	8.42	3.22	18.02	2.07	13.24	0.13	7.60		
	4.451	21.72	6.066	25.59	5.034	24.48	22.889	-9.59	19.932	-20.98	20.264	-19.93	2.414	13.89	23.465	-4.61	19.801	-22.06	16.46524	29
31	*****	*****	5.43	23.05	4.37	21.34	1.54	12.22	0.05	8.07	0.17	8.34	3.14	17.54	1.59	13.16	0.05	7.52		
	4.587	22.01	6.252	25.41	4.951	23.92	22.974	-9.13	19.925	-21.00	20.260	-19.94	2.421	13.92	23.467	-4.60	19.799	-22.07	16.59666	31

CZERWIEC 2020

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2459																					
153	1	Pon	002	3.55383	2.08	4.3918	22.08	1.01411	12.5054	0.07	57.402	2.3	75	425	1243.6	2102	1506	2114.2	248	152	1
154	2	Wto	003	3.59348	1.58	4.4324	22.16	1.01426	13.4415	-5.46	57.179	3.3	85	425	1243.8	2104	1632	2205.9	306	149	2
155	3	Śro	004	4.03314	1.48	4.4730	22.23	1.01440	14.3902	-11.22	57.134	4.3	92	424	1243.9	2105	1759	2259.5	325	145	3
156	4	Czw	005	4.07280	1.38	4.5137	22.30	1.01454	15.3550	-16.19	57.292	5.3	97	423	1244.1	2106	1927	2355.5	347	141	4
157	5	Pią	006	4.11245	1.27	4.5544	22.37	1.01467	16.3447	-20.15	57.660	6.3	100	422	1244.3	2107	2051	*****	414	137	5
158	6	Sob	007	4.15211	1.17	4.5952	22.43	1.01480	17.3515	-22.52	58.222	0.6	99	422	1244.5	2108	2207	053.6	450	133	6
159	7	Nie	008	4.19176	1.05	5.0359	22.49	1.01493	18.3600	-24.01	58.939	1.6	97	421	1244.7	2109	2310	152.9	536	129	7
160	8	Pon	009	4.23142	0.54	5.0807	22.54	1.01506	19.3530	-23.41	59.757	2.6	92	421	1244.8	2109	2358	251.4	634	125	8
161	9	Wto	010	4.27108	0.42	5.1216	22.59	1.01518	20.3222	-22.02	60.611	3.6	85	420	1245.0	2110	0**	347.5	742	121	9
162	10	Śro	011	4.31073	0.30	5.1624	23.03	1.01531	21.2553	-19.17	61.434	4.6	77	420	1245.2	2111	033	440.0	854	117	10
163	11	Czw	012	4.35039	0.18	5.2033	23.08	1.01542	22.1601	-15.43	62.166	5.6	68	420	1245.4	2112	100	528.7	1007	113	11
164	12	Pią	013	4.39004	0.06	5.2442	23.11	1.01553	23.0312	-11.33	62.758	6.6	58	419	1245.6	2112	120	614.1	1118	109	12
165	13	Sob	014	4.42570	-0.07	5.2851	23.15	1.01564	23.4810	-7.01	63.175	0.1	49	419	1245.9	2113	137	656.7	1228	105	13
166	14	Nie	015	4.46535	-0.19	5.3300	23.17	1.01575	0.3150	-2.16	63.397	1.1	39	419	1246.1	2114	152	737.8	1337	101	14
167	15	Pon	016	4.50501	-0.32	5.3710	23.20	1.01585	1.1504	2.33	63.421	2.1	30	419	1246.3	2114	206	818.2	1445	057	15
168	16	Wto	017	4.54467	-0.45	5.4119	23.22	1.01594	1.5847	7.18	63.260	3.1	22	419	1246.5	2115	220	859.0	1553	053	16
169	17	Śro	018	4.58432	-0.58	5.4529	23.24	1.01603	2.4351	11.49	62.935	4.1	14	419	1246.7	2115	235	941.1	1703	050	17
170	18	Czw	019	5.02398	-1.11	5.4938	23.25	1.01611	3.3102	15.56	62.482	5.1	8	419	1246.9	2115	252	1025.5	1815	046	18
171	19	Pią	020	5.06363	-1.25	5.5348	23.26	1.01619	4.2054	19.26	61.939	6.1	4	419	1247.2	2116	314	1112.8	1927	042	19
172	20	Sob	021	5.10329	-1.38	5.5758	23.26	1.01626	5.1345	22.06	61.348	7.1	1	419	1247.4	2116	342	1203.4	2037	038	20
173	21	Nie	022	5.14295	-1.51	6.0208	23.26	1.01633	6.0919	23.42	60.746	0.1	0	419	1247.6	2116	419	1256.9	2141	034	21
174	22	Pon	023	5.18260	-2.04	6.0617	23.26	1.01639	7.0648	24.02	60.168	1.1	1	419	1247.8	2116	508	1352.6	2235	030	22
175	23	Wto	024	5.22226	-2.17	6.1027	23.25	1.01644	8.0459	22.60	59.637	2.1	5	420	1248.0	2116	610	1449.0	2317	026	23
176	24	Śro	025	5.26191	-2.30	6.1436	23.24	1.01649	9.0238	20.37	59.167	3.1	11	420	1248.2	2116	723	1544.6	2350	022	24
177	25	Czw	026	5.30157	-2.43	6.1846	23.22	1.01653	9.5849	17.02	58.766	4.1	19	420	1248.5	2116	843	1638.5	****	018	25
178	26	Pią	027	5.34123	-2.55	6.2255	23.20	1.01657	10.5313	12.29	58.433	5.1	29	421	1248.7	2116	1005	1730.4	016	014	26
179	27	Sob	028	5.38088	-3.08	6.2704	23.17	1.01660	11.4604	7.14	58.171	6.1	39	421	1248.9	2116	1128	1820.7	037	010	27
180	28	Nie	029	5.42054	-3.20	6.3113	23.15	1.01663	12.3802	1.34	57.980	0.1	51	422	1249.1	2116	1251	1910.3	055	006	28
181	29	Pon	030	5.46019	-3.32	6.3521	23.11	1.01665	13.2960	-4.12	57.870	1.1	62	423	1249.3	2116	1415	2000.2	113	002	29
182	30	Wto	031	5.49585	-3.44	6.3929	23.08	1.01666	14.2253	-9.47	57.853	2.1	73	423	1249.5	2115	1539	2051.4	131	2355	30

Fazy Księżyca [Dm, h.mm]: Pełn 5, 21.12 3kw 13, 8.24 Now 21, 8.41 1kw 28, 10.16

CZERWIEC 2020 (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 (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	23.05	4.33	21.25	1.52	12.22	23.57	8.02	0.13	8.30	3.10	17.51	1.55	13.12	23.57	7.47		
	4.655	22.14	6.339	25.28	4.909	23.62	23.015	-8.90	19.921	-21.01	20.258	-19.95	2.424	13.94	23.468	-4.60	19.798	-22.07	16.66237	1
3	****	****	5.49	23.04	4.25	21.08	1.46	12.21	23.48	7.54	0.05	8.22	3.03	17.43	1.48	13.04	23.49	7.39		
	4.792	22.39	6.499	24.97	4.822	23.01	23.099	-8.43	19.913	-21.04	20.253	-19.97	2.431	13.97	23.469	-4.59	19.796	-22.08	16.79379	3
5	****	****	5.53	23.01	4.17	20.50	1.41	12.21	23.40	7.45	23.53	8.13	2.55	17.36	1.40	12.56	23.41	7.31		
	4.929	22.61	6.641	24.58	4.737	22.38	23.182	-7.97	19.904	-21.07	20.248	-19.99	2.437	14.00	23.470	-4.58	19.793	-22.09	16.92521	5
7	****	****	5.56	22.57	4.08	20.32	1.35	12.20	23.32	7.37	23.45	8.05	2.47	17.29	1.32	12.49	23.33	7.23		
	5.067	22.81	6.763	24.13	4.654	21.75	23.265	-7.50	19.895	-21.10	20.243	-20.01	2.443	14.03	23.472	-4.58	19.791	-22.10	17.05663	7
9	****	****	5.58	22.51	4.00	20.15	1.30	12.20	23.24	7.28	23.37	7.57	2.40	17.21	1.24	12.41	23.25	7.15		
	5.204	22.98	6.864	23.64	4.575	21.13	23.347	-7.04	19.884	-21.14	20.237	-20.03	2.450	14.06	23.473	-4.57	19.788	-22.11	17.18806	9
11	****	****	5.60	22.44	3.53	19.59	1.24	12.20	23.15	7.19	23.29	7.48	2.32	17.14	1.16	12.33	23.17	7.07		
	5.342	23.13	6.945	23.11	4.504	20.53	23.428	-6.58	19.873	-21.17	20.230	-20.06	2.456	14.09	23.474	-4.57	19.786	-22.12	17.31948	11
13	****	****	5.59	22.35	3.45	19.43	1.19	12.19	23.07	7.10	23.21	7.40	2.24	17.07	1.08	12.25	23.09	6.59		
	5.481	23.24	7.005	22.56	4.440	19.96	23.509	-6.11	19.861	-21.21	20.224	-20.08	2.462	14.12	23.474	-4.56	19.783	-22.13	17.45090	13
15	****	****	5.58	22.26	3.37	19.28	1.13	12.18	22.59	7.01	23.13	7.31	2.17	16.59	1.01	12.18	23.01	6.51		
	5.619	23.33	7.042	22.01	4.386	19.44	23.589	-5.65	19.849	-21.25	20.217	-20.11	2.467	14.15	23.475	-4.56	19.780	-22.14	17.58232	15
17	****	****	5.55	22.14	3.30	19.15	1.08	12.18	22.50	6.52	23.05	7.23	2.09	16.52	0.53	12.10	22.53	6.43		
	5.758	23.39	7.057	21.45	4.342	18.97	23.669	-5.20	19.835	-21.29	20.210	-20.13	2.473	14.18	23.475	-4.56	19.777	-22.16	17.71374	17
19	****	****	5.51	22.02	3.23	19.02	1.02	12.17	22.42	6.43	22.57	7.14	2.01	16.45	0.45	12.02	22.45	6.35		
	5.897	23.43	7.050	20.91	4.308	18.55	23.748	-4.74	19.821	-21.33	20.202	-20.16	2.479	14.20	23.476	-4.56	19.774	-22.17	17.84516	19
21	****	****	5.45	21.49	3.16	18.50	0.56	12.16	22.34	6.34	22.49	7.06	1.54	16.37	0.37	11.54	22.37	6.27		
	6.035	23.44	7.023	20.40	4.285	18.19	23.826	-4.29	19.807	-21.37	20.194	-20.19	2.484	14.23	23.476	-4.56	19.771	-22.18	17.97658	21
23	****	****	5.38	21.35	3.10	18.40	0.51	12.16	22.25	6.25	22.40	6.57	1.46	16.30	0.29	11.46	22.29	6.18		
	6.174	23.41	6.977	19.92	4.273	17.88	23.903	-3.84	19.792	-21.42	20.186	-20.22	2.489	14.25	23.476	-4.56	19.768	-22.19	18.10801	23
25	****	****	5.29	21.21	3.03	18.30	0.45	12.15	22.17	6.16	22.32	6.49	1.38	16.23	0.21	11.38	22.21	6.10		
	6.313	23.37	6.914	19.50	4.271	17.64	23.980	-3.39	19.776	-21.46	20.177	-20.25	2.494	14.28	23.476	-4.56	19.765	-22.20	18.23943	25
27	****	****	5.19	21.06	2.57	18.21	0.40	12.14	22.08	6.07	22.24	6.40	1.30	16.15	0.13	11.30	22.13	6.02		
	6.451	23.29	6.839	19.13	4.280	17.45	0.056	-2.95	19.760	-21.51	20.169	-20.28	2.499	14.30	23.476	-4.57	19.762	-22.21	18.37085	27
29	****	****	5.08	20.51	2.51	18.14	0.34	12.13	21.60	5.58	22.16	6.31	1.23	16.08	0.06	11.22	22.05	5.54		
	6.589	23.19	6.756	18.83	4.298	17.32	0.132	-2.52	19.744	-21.56	20.160	-20.31	2.504	14.32	23.475	-4.57	19.759	-22.22	18.50227	29

LIPIEC 2020

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
183	1	Śro	032	5.53550	-3.55	6.4338	23.03	1.01668	15.1728	-14.50	57.945	3.1	83	424	1249.7	2115	1704	2144.8	151	2351	1	
184	2	Czw	033	5.57516	-4.07	6.4745	22.59	1.01669	16.1414	-19.02	58.161	4.1	91	425	1249.9	2115	1828	2240.6	215	2347	2	
185	3	Pią	034	6.01481	-4.17	6.5153	22.54	1.01669	17.1301	-22.05	58.510	5.1	96	426	1250.0	2114	1946	2338.3	245	2343	3	
186	4	Sob	035	6.05447	-4.28	6.5560	22.49	1.01669	18.1259	-23.45	58.990	6.1	99	426	1250.2	2114	2055	*****	326	2339	4	
187	5	Nie	036	6.09413	-4.38	7.0007	22.43	1.01669	19.1246	-23.59	59.582	0.2	100	427	1250.4	2113	2149	036.7	418	2335	5	
188	6	Pon	037	6.13378	-4.48	7.0413	22.37	1.01669	20.1050	-22.48	60.256	1.2	98	428	1250.6	2112	2231	134.0	522	2331	6	
189	7	Wto	038	6.17344	-4.58	7.0819	22.30	1.01668	21.0605	-20.25	60.968	2.2	94	429	1250.7	2112	2301	228.6	633	2327	7	
190	8	Śro	039	6.21310	-5.07	7.1225	22.24	1.01667	21.5801	-17.05	61.666	3.2	89	430	1250.9	2111	2324	319.6	747	2323	8	
191	9	Czw	040	6.25275	-5.16	7.1630	22.16	1.01665	22.4646	-13.03	62.298	4.2	82	431	1251.0	2110	2342	406.9	900	2319	9	
192	10	Pią	041	6.29241	-5.24	7.2035	22.09	1.01663	23.3256	-8.34	62.816	5.2	74	432	1251.1	2109	2358	451.2	1012	2315	10	
193	11	Sob	042	6.33206	-5.32	7.2440	22.01	1.01661	0.1717	-3.50	63.179	6.2	65	433	1251.3	2108	0**	533.2	1121	2311	11	
194	12	Nie	043	6.37172	-5.39	7.2844	21.52	1.01658	1.0043	0.60	63.357	7.2	55	435	1251.4	2107	012	614.0	1229	2307	12	
195	13	Pon	044	6.41137	-5.46	7.3247	21.43	1.01655	1.4408	5.47	63.336	0.4	46	436	1251.5	2106	026	654.5	1338	2303	13	
196	14	Wto	045	6.45103	-5.53	7.3650	21.34	1.01651	2.2828	10.22	63.115	1.4	36	437	1251.6	2105	040	735.8	1447	2259	14	
197	15	Śro	046	6.49068	-5.59	7.4053	21.25	1.01647	3.1435	14.37	62.711	2.4	27	438	1251.7	2104	057	818.9	1557	2256	15	
198	16	Czw	047	6.53034	-6.05	7.4455	21.15	1.01642	4.0312	18.20	62.154	3.4	19	440	1251.8	2103	116	904.6	1709	2252	16	
199	17	Pią	048	6.56600	-6.10	7.4857	21.05	1.01637	4.5451	21.18	61.485	4.4	12	441	1251.9	2102	141	953.6	1820	2248	17	
200	18	Sob	049	7.00565	-6.14	7.5258	20.54	1.01631	5.4936	23.17	60.756	5.4	6	442	1252.0	2101	214	1046.0	1927	2244	18	
201	19	Nie	050	7.04531	-6.18	7.5659	20.43	1.01624	6.4657	24.04	60.022	6.4	2	444	1252.1	2059	258	1141.4	2026	2240	19	
202	20	Pon	051	7.08496	-6.22	8.0059	20.32	1.01617	7.4550	23.28	59.336	7.4	0	445	1252.1	2058	356	1238.5	2114	2236	20	
203	21	Wto	052	7.12462	-6.25	8.0458	20.20	1.01610	8.4451	21.28	58.746	0.7	1	447	1252.2	2057	506	1335.7	2151	2232	21	
204	22	Śro	053	7.16428	-6.27	8.0857	20.08	1.01601	9.4246	18.08	58.283	1.7	4	448	1252.2	2055	626	1431.7	2220	2228	22	
205	23	Czw	054	7.20393	-6.29	8.1255	19.56	1.01592	10.3853	13.43	57.965	2.7	9	449	1252.2	2054	750	1525.5	2242	2224	23	
206	24	Pią	055	7.24359	-6.30	8.1653	19.43	1.01583	11.3308	8.30	57.793	3.7	17	451	1252.2	2052	915	1617.4	2302	2220	24	
207	25	Sob	056	7.28324	-6.30	8.2050	19.30	1.01573	12.2558	2.49	57.756	4.7	26	452	1252.3	2051	1039	1707.8	2320	2216	25	
208	26	Nie	057	7.32290	-6.30	8.2446	19.17	1.01562	13.1810	-3.00	57.835	5.7	37	454	1252.3	2049	1203	1757.7	2337	2212	26	
209	27	Pon	058	7.36255	-6.30	8.2842	19.03	1.01551	14.1038	-8.38	58.009	6.7	49	456	1252.2	2048	1327	1848.2	2356	2208	27	
210	28	Wto	059	7.40221	-6.28	8.3238	18.49	1.01540	15.0413	-13.47	58.261	0.9	60	457	1252.2	2046	1451	1940.1	****	2204	28	
211	29	Śro	060	7.44186	-6.26	8.3632	18.35	1.01528	15.5930	-18.08	58.579	1.9	71	459	1252.2	2045	1613	2034.0	018	2200	29	
212	30	Czw	061	7.48152	-6.24	8.4026	18.21	1.01516	16.5637	-21.26	58.956	2.9	80	500	1252.1	2043	1732	2129.9	046	2157	30	
213	31	Pią	062	7.52117	-6.21	8.4420	18.06	1.01503	17.5507	-23.27	59.390	3.9	88	502	1252.1	2041	1843	2226.9	122	2153	31	

Fazy Księżyca [Dm, h.mm]: Pełn 5, 6.44 3kw 13, 1.29 Nów 20, 19.33 1kw 27, 14.32

LIPIEC 2020 (c.d.)

Światy, 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	****	****	4.57	20.36	2.46	18.07	0.28	12.12	21.51	5.49	22.08	6.23	1.15	16.00	23.54	11.15	21.57	5.46		
	6.727	23.06	6.670	18.61	4.325	17.24	0.206	-2.09	19.727	-21.60	20.151	-20.34	2.509	14.35	23.475	-4.57	19.756	-22.23	18.63369	1
3	****	****	4.45	20.23	2.40	18.01	0.22	12.10	21.43	5.39	21.59	6.14	1.07	15.53	23.46	11.07	21.49	5.38		
	6.865	22.90	6.588	18.48	4.362	17.21	0.280	-1.66	19.710	-21.65	20.141	-20.37	2.513	14.37	23.474	-4.58	19.752	-22.25	18.76511	3
5	****	****	4.33	20.10	2.35	17.56	0.17	12.09	21.34	5.30	21.51	6.06	0.60	15.45	23.38	10.59	21.41	5.30		
	7.002	22.72	6.513	18.44	4.406	17.22	0.353	-1.24	19.692	-21.70	20.132	-20.40	2.517	14.39	23.474	-4.59	19.749	-22.26	18.89653	5
7	****	****	4.21	19.59	2.30	17.52	0.11	12.08	21.25	5.21	21.43	5.57	0.52	15.38	23.30	10.51	21.33	5.21		
	7.139	22.51	6.453	18.49	4.459	17.27	0.425	-0.83	19.675	-21.74	20.122	-20.44	2.521	14.41	23.473	-4.59	19.746	-22.27	19.02796	7
9	****	****	4.10	19.49	2.25	17.48	0.05	12.06	21.17	5.12	21.35	5.48	0.44	15.30	23.22	10.43	21.25	5.13		
	7.275	22.27	6.410	18.61	4.519	17.35	0.496	-0.42	19.657	-21.79	20.112	-20.47	2.525	14.43	23.472	-4.60	19.742	-22.28	19.15938	9
11	****	****	3.59	19.42	2.20	17.45	23.56	12.05	21.08	5.02	21.27	5.40	0.36	15.23	23.14	10.35	21.17	5.05		
	7.411	22.01	6.388	18.82	4.586	17.46	0.566	-0.02	19.639	-21.84	20.102	-20.50	2.529	14.44	23.471	-4.61	19.739	-22.29	19.29079	11
13	****	****	3.50	19.36	2.16	17.42	23.50	12.03	20.60	4.53	21.18	5.31	0.29	15.15	23.07	10.27	21.10	4.57		
	7.546	21.72	6.390	19.09	4.659	17.59	0.635	0.37	19.620	-21.89	20.092	-20.53	2.533	14.46	23.470	-4.62	19.736	-22.30	19.42221	13
15	****	****	3.41	19.32	2.12	17.40	23.44	12.01	20.51	4.44	21.10	5.22	0.21	15.08	22.59	10.19	21.02	4.49		
	7.681	21.41	6.416	19.41	4.739	17.74	0.703	0.76	19.602	-21.93	20.082	-20.57	2.536	14.47	23.468	-4.63	19.732	-22.32	19.55363	15
17	****	****	3.34	19.29	2.08	17.38	23.38	11.60	20.42	4.35	21.02	5.13	0.13	15.00	22.51	10.11	20.54	4.41		
	7.816	21.08	6.469	19.77	4.824	17.91	0.770	1.13	19.584	-21.98	20.072	-20.60	2.539	14.49	23.467	-4.64	19.729	-22.33	19.68505	17
19	****	****	3.28	19.29	2.05	17.37	23.32	11.58	20.34	4.25	20.54	5.05	0.05	14.52	22.43	10.03	20.46	4.33		
	7.950	20.72	6.548	20.14	4.915	18.10	0.836	1.50	19.566	-22.02	20.062	-20.63	2.542	14.50	23.465	-4.65	19.726	-22.34	19.81648	19
21	****	****	3.24	19.30	2.01	17.36	23.26	11.55	20.25	4.16	20.45	4.56	23.54	14.45	22.35	9.55	20.38	4.24		
	8.083	20.34	6.654	20.51	5.011	18.29	0.900	1.86	19.548	-22.07	20.051	-20.67	2.545	14.52	23.464	-4.66	19.722	-22.35	19.94790	21
23	****	****	3.22	19.32	1.58	17.36	23.20	11.53	20.16	4.07	20.37	4.47	23.46	14.37	22.27	9.47	20.30	4.16		
	8.215	19.93	6.786	20.86	5.111	18.48	0.964	2.21	19.530	-22.11	20.041	-20.70	2.547	14.53	23.462	-4.68	19.719	-22.36	20.07932	23
25	****	****	3.21	19.36	1.55	17.35	23.14	11.51	20.08	3.57	20.29	4.39	23.38	14.30	22.19	9.39	20.22	4.08		
	8.347	19.50	6.943	21.15	5.215	18.68	1.025	2.54	19.512	-22.16	20.031	-20.73	2.550	14.54	23.460	-4.69	19.715	-22.37	20.21074	25
27	****	****	3.23	19.41	1.52	17.35	23.08	11.48	19.59	3.48	20.21	4.30	23.30	14.22	22.11	9.31	20.14	3.60		
	8.478	19.06	7.125	21.37	5.324	18.87	1.085	2.87	19.495	-22.20	20.021	-20.77	2.552	14.55	23.458	-4.70	19.712	-22.38	20.34216	27
29	1.19	0.03	3.26	19.46	1.50	17.36	23.02	11.46	19.51	3.39	20.12	4.21	23.22	14.14	22.03	9.23	20.06	3.52		
	8.609	18.59	7.329	21.48	5.437	19.06	1.144	3.19	19.478	-22.24	20.010	-20.80	2.554	14.56	23.456	-4.72	19.709	-22.39	20.47358	29
31	1.39	23.59	3.32	19.51	1.48	17.36	22.56	11.43	19.42	3.30	20.04	4.13	23.15	14.06	21.55	9.14	19.58	3.44		
	8.739	18.10	7.555	21.47	5.553	19.24	1.201	3.50	19.461	-22.28	20.000	-20.83	2.556	14.56	23.454	-4.73	19.706	-22.41	20.60500	31

SIERPIEŃ 2020

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2459																		
214	1	Sob	063	7.56083	-6.17	8.4812	17.51	1.01490	18.5359	-24.05	59.878	4.9	94	504	1252.0	2039	1942	2323.7	209	2149	1
215	2	Nie	064	8.00049	-6.12	8.5204	17.35	1.01477	19.5152	-23.20	60.413	5.9	98	505	1252.0	2038	2027	*****	307	2145	2
216	3	Pon	065	8.04014	-6.07	8.5556	17.19	1.01463	20.4735	-21.19	60.982	6.9	100	507	1251.9	2036	2101	018.7	415	2141	3
217	4	Wto	066	8.07580	-6.02	8.5947	17.03	1.01449	21.4026	-18.16	61.562	0.8	99	508	1251.8	2034	2127	110.8	528	2137	4
218	5	Śro	067	8.11545	-5.55	9.0337	16.47	1.01435	22.3015	-14.25	62.123	1.8	97	510	1251.7	2032	2147	159.6	642	2133	5
219	6	Czw	068	8.15511	-5.49	9.0727	16.31	1.01421	23.1723	-10.02	62.628	2.8	92	512	1251.6	2030	2203	245.2	755	2129	6
220	7	Pią	069	8.19476	-5.41	9.1116	16.14	1.01406	0.0227	-5.19	63.041	3.8	87	513	1251.4	2028	2218	328.3	906	2125	7
221	8	Sob	070	8.23442	-5.33	9.1504	15.57	1.01391	0.4615	-0.28	63.323	4.8	79	515	1251.3	2026	2231	409.6	1015	2121	8
222	9	Nie	071	8.27407	-5.25	9.1852	15.39	1.01376	1.2938	4.22	63.443	5.8	71	517	1251.2	2024	2245	450.2	1123	2117	9
223	10	Pon	072	8.31373	-5.15	9.2240	15.22	1.01360	2.1326	9.02	63.377	6.8	62	518	1251.0	2022	2301	531.0	1232	2113	10
224	11	Wto	073	8.35338	-5.06	9.2627	15.04	1.01344	2.5833	13.23	63.116	7.8	53	520	1250.8	2020	2318	612.9	1341	2109	11
225	12	Śro	074	8.39304	-4.56	9.3013	14.46	1.01328	3.4544	17.15	62.663	0.7	43	522	1250.7	2018	2340	656.9	1451	2105	12
226	13	Czw	075	8.43270	-4.45	9.3359	14.28	1.01311	4.3538	20.28	62.037	1.7	34	523	1250.5	2016	****	743.8	1602	2102	13
227	14	Pią	076	8.47235	-4.33	9.3744	14.09	1.01294	5.2837	22.48	61.275	2.7	24	525	1250.3	2014	009	834.1	1710	2058	14
228	15	Sob	077	8.51201	-4.22	9.4129	13.50	1.01276	6.2432	24.01	60.425	3.7	16	527	1250.1	2012	047	927.6	1812	2054	15
229	16	Nie	078	8.55166	-4.09	9.4513	13.31	1.01258	7.2243	23.56	59.552	4.7	9	529	1249.9	2010	138	1023.8	1905	2050	16
230	17	Pon	079	8.59132	-3.57	9.4857	13.12	1.01239	8.2158	22.26	58.722	5.7	4	530	1249.7	2008	243	1121.3	1947	2046	17
231	18	Wto	080	9.03098	-3.43	9.5240	12.53	1.01220	9.2100	19.31	58.004	6.7	1	532	1249.5	2006	400	1218.5	2019	2042	18
232	19	Śro	081	9.07063	-3.29	9.5623	12.33	1.01200	10.1850	15.22	57.454	0.3	0	534	1249.2	2004	525	1314.5	2045	2038	19
233	20	Czw	082	9.11029	-3.15	10.0005	12.13	1.01180	11.1500	10.13	57.112	1.3	2	535	1249.0	2001	652	1408.6	2106	2034	20
234	21	Pią	083	9.14594	-3.00	10.0347	11.53	1.01159	12.0941	4.28	56.993	2.3	7	537	1248.8	1959	820	1501.0	2124	2030	21
235	22	Sob	084	9.18560	-2.45	10.0728	11.33	1.01138	13.0326	-1.33	57.088	3.3	15	539	1248.5	1957	946	1552.5	2142	2026	22
236	23	Nie	085	9.22525	-2.29	10.1109	11.13	1.01117	13.5702	-7.25	57.367	4.3	24	541	1248.2	1955	1113	1644.0	2201	2022	23
237	24	Pon	086	9.26491	-2.13	10.1449	10.52	1.01095	14.5115	-12.49	57.787	5.3	35	542	1248.0	1952	1238	1736.4	2222	2018	24
238	25	Wto	087	9.30456	-1.57	10.1829	10.31	1.01073	15.4640	-17.26	58.304	6.3	46	544	1247.7	1950	1403	1830.1	2248	2014	25
239	26	Śro	088	9.34422	-1.40	10.2209	10.11	1.01050	16.4331	-20.59	58.877	0.7	57	546	1247.4	1948	1523	1925.5	2321	2010	26
240	27	Czw	089	9.38387	-1.22	10.2548	9.50	1.01027	17.4128	-23.16	59.472	1.7	68	547	1247.1	1946	1636	2021.8	****	2006	27
241	28	Pią	090	9.42353	-1.05	10.2927	9.28	1.01004	18.3942	-24.12	60.066	2.7	78	549	1246.8	1943	1738	2118.0	004	2003	28
242	29	Sob	091	9.46319	-0.46	10.3305	9.07	1.00980	19.3708	-23.46	60.645	3.7	86	551	1246.5	1941	1827	2212.9	059	1959	29
243	30	Nie	092	9.50284	-0.28	10.3643	8.46	1.00957	20.3240	-22.03	61.202	4.7	92	553	1246.2	1939	1903	2305.2	203	1955	30
244	31	Pon	093	9.54250	-0.09	10.4021	8.24	1.00933	21.2537	-19.15	61.731	5.7	97	554	1245.9	1936	1931	2354.5	314	1951	31

Fazy Księżyca [Dm, h.mm]: Pełn 3, 17.59 3kw 11, 18.45 Nów 19, 4.42 1kw 25, 19.58

SIERPIEŃ 2020 (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	3.36	19.54	1.47	17.36	22.53	11.41	19.38	3.25	19.60	4.08	23.11	14.03	21.51	9.10	19.54	3.40		
	8.803	17.84	7.675	21.42	5.612	19.32	1.229	3.65	19.453	-22.29	19.995	-20.84	2.556	14.57	23.452	-4.74	19.704	-22.41	20.67071	1
3	1.59	23.40	3.44	19.60	1.45	17.37	22.47	11.38	19.29	3.16	19.52	3.60	23.03	13.55	21.44	9.02	19.46	3.31		
	8.932	17.32	7.927	21.18	5.734	19.49	1.284	3.94	19.437	-22.33	19.986	-20.88	2.558	14.57	23.450	-4.76	19.701	-22.42	20.80213	3
5	2.10	23.29	3.55	20.05	1.44	17.37	22.41	11.35	19.21	3.07	19.43	3.51	22.55	13.47	21.36	8.54	19.38	3.23		
	9.060	16.79	8.193	20.77	5.858	19.64	1.336	4.22	19.421	-22.37	19.976	-20.91	2.559	14.58	23.448	-4.77	19.698	-22.43	20.93355	5
7	2.20	23.19	4.08	20.09	1.43	17.38	22.34	11.32	19.12	2.58	19.35	3.42	22.47	13.39	21.28	8.46	19.30	3.15		
	9.188	16.23	8.467	20.18	5.985	19.77	1.387	4.48	19.406	-22.40	19.966	-20.93	2.560	14.58	23.445	-4.79	19.695	-22.44	21.06497	7
9	2.29	23.10	4.22	20.13	1.42	17.39	22.28	11.28	19.04	2.49	19.27	3.34	22.39	13.31	21.20	8.38	19.22	3.07		
	9.315	15.66	8.746	19.42	6.115	19.88	1.436	4.74	19.392	-22.43	19.957	-20.96	2.561	14.59	23.442	-4.81	19.691	-22.45	21.19639	9
11	2.37	23.02	4.37	20.15	1.41	17.39	22.22	11.24	18.55	2.40	19.19	3.25	22.32	13.24	21.12	8.30	19.14	2.59		
	9.441	15.07	9.027	18.50	6.248	19.97	1.483	4.98	19.378	-22.46	19.947	-20.99	2.561	14.59	23.440	-4.83	19.688	-22.46	21.32780	11
13	2.45	22.53	4.53	20.17	1.41	17.40	22.15	11.20	18.47	2.31	19.11	3.16	22.24	13.16	21.04	8.22	19.06	2.51		
	9.566	14.46	9.304	17.43	6.383	20.04	1.527	5.20	19.365	-22.49	19.938	-21.02	2.562	14.59	23.437	-4.85	19.686	-22.47	21.45922	13
15	2.53	22.45	5.09	20.18	1.41	17.41	22.09	11.16	18.38	2.23	19.02	3.08	22.16	13.08	20.56	8.14	18.58	2.43		
	9.691	13.84	9.577	16.23	6.521	20.09	1.569	5.42	19.352	-22.52	19.930	-21.05	2.562	14.59	23.434	-4.87	19.683	-22.48	21.59065	15
17	2.60	22.38	5.26	20.18	1.41	17.41	22.02	11.12	18.30	2.14	18.54	2.59	22.08	13.00	20.48	8.05	18.50	2.35		
	9.816	13.20	9.843	14.93	6.660	20.11	1.608	5.62	19.340	-22.55	19.921	-21.07	2.562	14.59	23.431	-4.89	19.680	-22.49	21.72207	17
19	3.07	22.30	5.41	20.17	1.42	17.42	21.56	11.07	18.22	2.05	18.46	2.51	22.00	12.52	20.40	7.57	18.42	2.27		
	9.940	12.55	10.100	13.55	6.801	20.10	1.645	5.80	19.329	-22.57	19.913	-21.10	2.561	14.59	23.428	-4.91	19.677	-22.50	21.85349	19
21	3.13	22.23	5.57	20.16	1.43	17.42	21.49	11.02	18.13	1.57	18.38	2.42	21.52	12.44	20.32	7.49	18.34	2.18		
	10.063	11.89	10.349	12.11	6.944	20.07	1.679	5.97	19.319	-22.59	19.905	-21.12	2.561	14.58	23.425	-4.93	19.675	-22.51	21.98490	21
23	3.19	22.16	6.12	20.13	1.44	17.43	21.42	10.57	18.05	1.48	18.30	2.34	21.44	12.36	20.24	7.41	18.26	2.10		
	10.186	11.21	10.590	10.62	7.089	20.00	1.710	6.13	19.309	-22.61	19.897	-21.14	2.560	14.58	23.422	-4.95	19.672	-22.52	22.11632	23
25	3.25	22.09	6.27	20.11	1.46	17.43	21.35	10.52	17.57	1.39	18.22	2.25	21.37	12.28	20.16	7.33	18.18	2.02		
	10.308	10.52	10.822	9.10	7.234	19.91	1.739	6.27	19.301	-22.63	19.890	-21.17	2.559	14.57	23.419	-4.97	19.670	-22.53	22.24774	25
27	3.31	22.02	6.41	20.08	1.47	17.43	21.28	10.46	17.49	1.31	18.13	2.17	21.29	12.20	20.08	7.25	18.10	1.54		
	10.430	9.83	11.047	7.56	7.382	19.78	1.764	6.40	19.293	-22.65	19.883	-21.19	2.558	14.57	23.416	-4.99	19.667	-22.53	22.37916	27
29	3.37	21.55	6.55	20.05	1.49	17.43	21.21	10.40	17.40	1.23	18.05	2.08	21.21	12.12	20.00	7.16	18.02	1.46		
	10.552	9.12	11.263	6.01	7.530	19.63	1.786	6.51	19.286	-22.66	19.876	-21.21	2.557	14.56	23.412	-5.01	19.665	-22.54	22.51058	29
31	3.42	21.48	7.08	20.01	1.52	17.43	21.14	10.34	17.32	1.14	17.57	2.00	21.13	12.04	19.52	7.08	17.54	1.38		
	10.673	8.40	11.473	4.46	7.679	19.43	1.804	6.60	19.280	-22.68	19.870	-21.23	2.555	14.55	23.409	-5.03	19.663	-22.55	22.64200	31

WRZESIEŃ 2020

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 10 ^h UT)											Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.				
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm	
			2459																			
245	1	Wto	094	9.58215	0.10	10.4359	8.02	1.00909	22.1545	-15.36	62.224	6.7	99	556	1245.6	1934	1952	*****	427	1947	1	
246	2	Śro	095	10.02181	0.29	10.4736	7.40	1.00885	23.0318	-11.20	62.671	0.2	100	558	1245.3	1932	2009	040.8	540	1943	2	
247	3	Czw	096	10.06146	0.49	10.5113	7.18	1.00860	23.4846	-6.40	63.053	1.2	99	559	1244.9	1929	2024	124.4	652	1939	3	
248	4	Pią	097	10.10112	1.09	10.5449	6.56	1.00836	0.3250	-1.48	63.351	2.2	95	601	1244.6	1927	2038	206.3	802	1935	4	
249	5	Sob	098	10.14077	1.29	10.5826	6.34	1.00812	1.1615	3.05	63.539	3.2	91	603	1244.3	1925	2051	247.0	910	1931	5	
250	6	Nie	099	10.18042	1.50	11.0202	6.12	1.00787	1.5948	7.50	63.592	4.2	85	605	1243.9	1922	2106	327.6	1019	1927	6	
251	7	Pon	100	10.22008	2.10	11.0538	5.49	1.00762	2.4416	12.18	63.486	5.2	77	606	1243.6	1920	2122	408.9	1128	1923	7	
252	8	Wto	101	10.25574	2.31	11.0914	5.26	1.00737	3.3022	16.20	63.206	6.2	69	608	1243.2	1917	2142	451.7	1237	1919	8	
253	9	Śro	102	10.29539	2.52	11.1249	5.04	1.00712	4.1845	19.44	62.744	7.2	59	610	1242.9	1915	2207	536.8	1347	1915	9	
254	10	Czw	103	10.33505	3.13	11.1625	4.41	1.00687	5.0949	22.20	62.107	0.0	50	611	1242.5	1913	2240	624.8	1456	1911	10	
255	11	Pią	104	10.37470	3.34	11.2000	4.18	1.00662	6.0341	23.56	61.317	1.0	40	613	1242.2	1910	2324	715.9	1600	1907	11	
256	12	Sob	105	10.41436	3.55	11.2336	3.55	1.00636	6.5958	24.20	60.412	2.0	30	615	1241.8	1908	****	809.8	1656	1904	12	
257	13	Nie	106	10.45401	4.16	11.2711	3.32	1.00610	7.5751	23.23	59.450	3.0	21	616	1241.5	1905	021	905.6	1741	1900	13	
258	14	Pon	107	10.49367	4.38	11.3046	3.09	1.00584	8.5618	21.02	58.500	4.0	13	618	1241.1	1903	132	1002.3	1817	1856	14	
259	15	Wto	108	10.53333	4.59	11.3421	2.46	1.00557	9.5420	17.21	57.641	5.0	6	620	1240.8	1901	253	1058.5	1845	1852	15	
260	16	Śro	109	10.57298	5.20	11.3757	2.23	1.00530	10.5122	12.31	56.949	6.0	2	622	1240.4	1858	420	1153.7	1908	1848	16	
261	17	Czw	110	11.01264	5.42	11.4132	1.60	1.00503	11.4718	6.50	56.490	7.0	0	623	1240.1	1856	549	1247.6	1927	1844	17	
262	18	Pią	111	11.05229	6.03	11.4507	1.37	1.00476	12.4230	0.41	56.302	1.0	1	625	1239.7	1853	718	1340.7	1945	1840	18	
263	19	Sob	112	11.09194	6.24	11.4842	1.13	1.00448	13.3737	-5.31	56.396	2.0	6	627	1239.3	1851	848	1433.8	2004	1836	19	
264	20	Nie	113	11.13160	6.46	11.5217	0.50	1.00420	14.3320	-11.21	56.749	3.0	13	629	1239.0	1848	1017	1527.6	2024	1832	20	
265	21	Pon	114	11.17125	7.07	11.5553	0.27	1.00392	15.3009	-16.25	57.311	4.0	22	630	1238.6	1846	1146	1622.8	2049	1828	21	
266	22	Wto	115	11.21091	7.28	11.5928	0.03	1.00363	16.2814	-20.25	58.019	5.0	32	632	1238.3	1844	1311	1719.3	2120	1824	22	
267	23	Śro	116	11.25057	7.49	12.0304	-0.20	1.00335	17.2714	-23.06	58.808	6.0	43	634	1237.9	1841	1429	1816.6	2200	1820	23	
268	24	Czw	117	11.29022	8.10	12.0639	-0.43	1.00306	18.2618	-24.21	59.615	0.3	54	635	1237.6	1839	1536	1913.7	2252	1816	24	
269	25	Pią	118	11.32588	8.31	12.1015	-1.07	1.00277	19.2419	-24.12	60.395	1.3	64	637	1237.2	1836	1628	2009.3	2354	1812	25	
270	26	Sob	119	11.36553	8.51	12.1351	-1.30	1.00248	20.2015	-22.44	61.115	2.3	74	639	1236.9	1834	1707	2102.2	****	1809	26	
271	27	Nie	120	11.40519	9.12	12.1727	-1.53	1.00219	21.1328	-20.09	61.755	3.3	82	641	1236.6	1831	1737	2152.0	103	1805	27	
272	28	Pon	121	11.44484	9.32	12.2104	-2.17	1.00190	22.0346	-16.41	62.307	4.3	89	642	1236.2	1829	1759	2238.7	216	1801	28	
273	29	Wto	122	11.48450	9.52	12.2440	-2.40	1.00161	22.5125	-12.32	62.769	5.3	94	644	1235.9	1827	1817	2322.6	329	1757	29	
274	30	Śro	123	11.52415	10.12	12.2817	-3.03	1.00132	23.3657	-7.57	63.140	6.3	98	646	1235.6	1824	1832	*****	440	1753	30	

Fazy Księżyca [Dm, h.mm]: Pełn 2, 7.22 3kw 10, 11.26 Nów 17, 13.00 1kw 24, 3.55

WRZESIEŃ 2020 (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	3.45	21.45	7.14	19.59	1.53	17.42	21.10	10.31	17.28	1.10	17.53	1.56	21.09	12.00	19.48	7.04	17.50	1.34		
	10.733	8.04	11.576	3.69	7.754	19.33	1.813	6.65	19.277	-22.68	19.867	-21.24	2.554	14.55	23.407	-5.04	19.662	-22.55	22.70771	1
3	3.50	21.39	7.26	19.55	1.56	17.42	21.02	10.24	17.20	1.02	17.45	1.47	21.01	11.52	19.41	6.56	17.42	1.26		
	10.853	7.30	11.776	2.15	7.904	19.09	1.826	6.72	19.272	-22.69	19.861	-21.25	2.552	14.54	23.404	-5.06	19.660	-22.56	22.83912	3
5	3.55	21.32	7.38	19.51	1.59	17.41	20.55	10.17	17.12	0.54	17.37	1.39	20.53	11.44	19.33	6.48	17.34	1.18		
	10.974	6.56	11.971	0.64	8.056	18.81	1.836	6.78	19.268	-22.70	19.855	-21.27	2.550	14.53	23.401	-5.09	19.658	-22.57	22.97054	5
7	4.00	21.26	7.50	19.46	2.02	17.40	20.47	10.10	17.04	0.46	17.29	1.31	20.45	11.36	19.25	6.40	17.27	1.10		
	11.094	5.82	12.161	-0.86	8.207	18.51	1.842	6.82	19.265	-22.71	19.850	-21.29	2.548	14.52	23.397	-5.11	19.656	-22.57	23.10196	7
9	4.05	21.20	8.01	19.41	2.06	17.39	20.39	10.02	16.56	0.38	17.21	1.23	20.37	11.28	19.17	6.31	17.19	1.02		
	11.214	5.06	12.345	-2.33	8.360	18.17	1.845	6.85	19.263	-22.71	19.846	-21.30	2.546	14.51	23.394	-5.13	19.654	-22.58	23.23338	9
11	4.10	21.14	8.11	19.37	2.09	17.38	20.31	9.54	16.48	0.30	17.13	1.14	20.29	11.20	19.09	6.23	17.11	0.54		
	11.333	4.30	12.526	-3.77	8.512	17.79	1.844	6.86	19.262	-22.72	19.842	-21.31	2.543	14.49	23.391	-5.15	19.653	-22.59	23.36480	11
13	4.14	21.08	8.21	19.32	2.13	17.37	20.23	9.46	16.40	0.22	17.05	1.06	20.21	11.12	19.01	6.15	17.03	0.46		
	11.453	3.54	12.701	-5.18	8.665	17.38	1.839	6.85	19.262	-22.72	19.838	-21.33	2.540	14.48	23.387	-5.17	19.651	-22.59	23.49622	13
15	4.19	21.02	8.31	19.27	2.18	17.35	20.15	9.38	16.33	0.14	16.57	0.58	20.13	11.04	18.53	6.07	16.55	0.38		
	11.573	2.77	12.873	-6.55	8.818	16.94	1.830	6.83	19.262	-22.72	19.834	-21.34	2.537	14.46	23.384	-5.20	19.650	-22.60	23.62764	15
17	4.23	20.56	8.41	19.22	2.22	17.33	20.06	9.29	16.25	0.06	16.49	0.50	20.05	10.56	18.45	5.59	16.47	0.30		
	11.692	2.00	13.041	-7.88	8.971	16.47	1.817	6.79	19.264	-22.72	19.832	-21.35	2.534	14.45	23.381	-5.22	19.649	-22.60	23.75905	17
19	4.27	20.51	8.50	19.17	2.26	17.32	19.58	9.20	16.17	23.55	16.41	0.42	19.57	10.48	18.37	5.51	16.39	0.22		
	11.812	1.22	13.204	-9.16	9.124	15.97	1.801	6.75	19.266	-22.72	19.829	-21.35	2.530	14.43	23.377	-5.24	19.648	-22.61	23.89047	19
21	4.32	20.45	8.58	19.11	2.31	17.30	19.49	9.10	16.09	23.47	16.33	0.34	19.49	10.39	18.29	5.42	16.31	0.14		
	11.931	0.45	13.363	-10.39	9.277	15.43	1.781	6.68	19.270	-22.71	19.827	-21.36	2.527	14.41	23.374	-5.26	19.647	-22.61	0.02189	21
23	4.36	20.39	9.06	19.06	2.36	17.27	19.40	9.01	16.02	23.39	16.25	0.26	19.41	10.31	18.21	5.34	16.23	0.06		
	12.051	-0.33	13.518	-11.57	9.430	14.87	1.757	6.61	19.274	-22.71	19.826	-21.37	2.523	14.40	23.371	-5.28	19.646	-22.61	0.15331	23
25	4.40	20.34	9.14	19.01	2.41	17.25	19.31	8.51	15.54	23.32	16.17	0.18	19.33	10.23	18.13	5.26	16.15	23.54		
	12.171	-1.11	13.667	-12.69	9.582	14.28	1.730	6.52	19.279	-22.70	19.824	-21.37	2.519	14.38	23.367	-5.30	19.645	-22.62	0.28473	25
27	4.44	20.29	9.21	18.55	2.46	17.22	19.22	8.41	15.47	23.24	16.09	0.10	19.25	10.15	18.05	5.18	16.08	23.46		
	12.291	-1.89	13.810	-13.75	9.735	13.65	1.700	6.43	19.285	-22.69	19.824	-21.37	2.515	14.36	23.364	-5.32	19.645	-22.62	0.41615	27
29	4.48	20.23	9.27	18.50	2.51	17.20	19.13	8.30	15.39	23.17	16.01	0.02	19.17	10.06	17.57	5.10	15.60	23.39		
	12.411	-2.67	13.947	-14.73	9.887	13.00	1.668	6.32	19.293	-22.68	19.824	-21.38	2.511	14.34	23.361	-5.34	19.644	-22.62	0.54757	29

PAŹDZIERNIK 2020

Piwnice, CA UMK			← Dane na godz. 12 czasu strefowego (= 10 lub 11 ^b UT) →									 Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2459																		
275	1	Czw	124	11.56381	10.31	12.3154	-3.27	1.00103	0.2102	-3.05	63.422	7.3	100	648	1235.2	1822	1845	004.6	550	1749	1
276	2	Pią	125	12.00346	10.50	12.3532	-3.50	1.00075	1.0424	1.51	63.611	0.5	100	649	1234.9	1819	1858	045.4	659	1745	2
277	3	Sob	126	12.04312	11.09	12.3909	-4.13	1.00046	1.4747	6.42	63.700	1.5	98	651	1234.6	1817	1912	125.9	808	1741	3
278	4	Nie	127	12.08277	11.28	12.4247	-4.36	1.00017	2.3155	11.18	63.677	2.5	94	653	1234.3	1815	1927	206.8	917	1737	4
279	5	Pon	128	12.12243	11.46	12.4626	-4.59	0.99989	3.1727	15.30	63.528	3.5	89	655	1234.0	1812	1945	249.0	1027	1733	5
280	6	Wto	129	12.16208	12.03	12.5005	-5.22	0.99961	4.0457	19.06	63.239	4.5	83	656	1233.7	1810	2008	333.1	1137	1729	6
281	7	Śro	130	12.20174	12.21	12.5344	-5.45	0.99933	4.5448	21.56	62.799	5.5	75	658	1233.4	1808	2037	419.6	1246	1725	7
282	8	Czw	131	12.24139	12.38	12.5724	-6.08	0.99904	5.4704	23.50	62.205	6.5	66	700	1233.1	1805	2115	508.8	1351	1721	8
283	9	Pią	132	12.28105	12.54	13.0104	-6.31	0.99876	6.4132	24.36	61.464	7.5	56	702	1232.8	1803	2206	600.6	1449	1717	9
284	10	Sob	133	12.32071	13.10	13.0444	-6.53	0.99848	7.3732	24.07	60.600	0.4	46	704	1232.6	1801	2310	654.3	1537	1713	10
285	11	Nie	134	12.36036	13.25	13.0825	-7.16	0.99820	8.3416	22.19	59.651	1.4	36	705	1232.3	1758	****	749.0	1616	1710	11
286	12	Pon	135	12.40002	13.40	13.1207	-7.39	0.99792	9.3054	19.12	58.676	2.4	25	707	1232.1	1756	025	843.8	1646	1706	12
287	13	Wto	136	12.43567	13.55	13.1549	-8.01	0.99764	10.2658	14.52	57.745	3.4	16	709	1231.8	1754	147	937.9	1709	1702	13
288	14	Śro	137	12.47533	14.09	13.1932	-8.23	0.99736	11.2221	9.33	56.940	4.4	9	711	1231.6	1752	314	1031.3	1729	1658	14
289	15	Czw	138	12.51498	14.22	13.2315	-8.45	0.99708	12.1722	3.33	56.340	5.4	3	713	1231.4	1749	442	1124.3	1748	1654	15
290	16	Pią	139	12.55464	14.35	13.2659	-9.07	0.99680	13.1238	-2.46	56.011	6.4	0	714	1231.2	1747	612	1217.5	1805	1650	16
291	17	Sob	140	12.59429	14.47	13.3043	-9.29	0.99652	14.0851	-8.58	55.987	0.6	1	716	1231.0	1745	744	1311.8	1825	1646	17
292	18	Nie	141	13.03395	14.58	13.3429	-9.51	0.99623	15.0637	-14.36	56.270	1.6	4	718	1230.8	1743	916	1407.9	1847	1642	18
293	19	Pon	142	13.07360	15.09	13.3814	-10.13	0.99595	16.0609	-19.15	56.825	2.6	10	720	1230.6	1740	1047	1505.9	1916	1638	19
294	20	Wto	143	13.11326	15.19	13.4200	-10.34	0.99567	17.0702	-22.34	57.591	3.6	18	722	1230.4	1738	1212	1605.3	1953	1634	20
295	21	Śro	144	13.15292	15.29	13.4547	-10.56	0.99538	18.0817	-24.22	58.488	4.6	28	724	1230.3	1736	1326	1704.9	2041	1630	21
296	22	Czw	145	13.19257	15.38	13.4935	-11.17	0.99510	19.0828	-24.38	59.438	5.6	38	726	1230.1	1734	1426	1802.9	2142	1626	22
297	23	Pią	146	13.23223	15.46	13.5323	-11.38	0.99482	20.0618	-23.28	60.370	6.6	49	727	1230.0	1732	1510	1858.0	2251	1622	23
298	24	Sob	147	13.27188	15.54	13.5712	-11.59	0.99454	21.0058	-21.06	61.228	0.9	59	729	1229.8	1730	1543	1949.5	****	1618	24
299	25	Nie	148	13.31154	16.01	14.0102	-12.19	0.99426	21.5215	-17.46	61.976	1.9	69	731	1229.7	1728	1606	2037.2	004	1614	25
299	25	Nie	148	14.31252	16.01	14.0111	-12.20	0.99425	21.5419	-17.37	62.004	1.9	69	631	1129.7	1628	1506	1937.2	****	1514	25
300	26	Pon	149	14.35218	16.07	14.0502	-12.41	0.99397	22.4225	-13.33	62.614	2.9	78	633	1129.6	1625	1525	2021.8	018	1511	26
301	27	Wto	150	14.39183	16.13	14.0853	-13.01	0.99370	23.2806	-9.01	63.084	3.9	85	635	1129.5	1623	1540	2104.1	130	1507	27
302	28	Śro	151	14.43149	16.18	14.1245	-13.21	0.99342	0.1208	-4.11	63.417	4.9	91	637	1129.5	1621	1554	2144.9	240	1503	28
303	29	Czw	152	14.47114	16.22	14.1637	-13.41	0.99315	0.5521	0.46	63.622	5.9	96	639	1129.4	1619	1607	2225.1	349	1459	29
304	30	Pią	153	14.51080	16.25	14.2030	-14.00	0.99289	1.3831	5.41	63.711	6.9	99	640	1129.3	1617	1620	2305.7	458	1455	30
305	31	Sob	154	14.55045	16.27	14.2425	-14.20	0.99263	2.2224	10.24	63.693	7.9	100	642	1129.3	1615	1634	2347.4	607	1451	31

Fazy Księżyca [Dm, h.mm]: Pełn 1, 23.05 3kw 10, 2.39 Nów 16, 21.31 1kw 23, 15.23 1kw 23, 14.23 Pełn 31, 15.49

PAŹDZIERNIK 2020 (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	9.32	18.44	2.56	17.17	19.03	8.20	15.32	23.10	15.54	23.50	19.09	9.58	17.49	5.02	15.52	23.31		
	12.532	-3.44	14.074	-15.63	10.039	12.33	1.632	6.21	19.300	-22.66	19.824	-21.38	2.507	14.32	23.358	-5.36	19.644	-22.63	0.67898	1
3	4.56	20.13	9.36	18.38	3.01	17.14	18.54	8.09	15.24	23.03	15.46	23.43	19.01	9.50	17.41	4.53	15.44	23.23		
	12.653	-4.22	14.192	-16.43	10.190	11.63	1.595	6.09	19.309	-22.65	19.825	-21.38	2.502	14.29	23.354	-5.38	19.644	-22.63	0.81040	3
5	4.59	20.08	9.39	18.32	3.07	17.11	18.44	7.58	15.17	22.55	15.38	23.35	18.53	9.42	17.33	4.45	15.36	23.15		
	12.774	-4.99	14.298	-17.13	10.341	10.90	1.556	5.97	19.319	-22.63	19.826	-21.38	2.498	14.27	23.351	-5.40	19.644	-22.63	0.94182	5
7	5.03	20.03	9.40	18.26	3.12	17.08	18.35	7.47	15.09	22.48	15.30	23.27	18.45	9.33	17.25	4.37	15.28	23.07		
	12.896	-5.75	14.389	-17.71	10.492	10.15	1.515	5.85	19.329	-22.61	19.828	-21.37	2.493	14.25	23.348	-5.42	19.644	-22.63	1.07324	7
9	5.07	19.59	9.40	18.20	3.18	17.05	18.25	7.36	15.02	22.41	15.22	23.19	18.37	9.25	17.18	4.29	15.20	22.59		
	13.018	-6.51	14.463	-18.15	10.643	9.38	1.473	5.72	19.341	-22.59	19.830	-21.37	2.488	14.23	23.345	-5.44	19.644	-22.63	1.20466	9
11	5.11	19.54	9.37	18.13	3.23	17.02	18.15	7.25	14.55	22.34	15.15	23.12	18.29	9.17	17.10	4.21	15.13	22.51		
	13.140	-7.27	14.515	-18.43	10.794	8.59	1.431	5.60	19.353	-22.57	19.833	-21.36	2.484	14.20	23.343	-5.46	19.645	-22.64	1.33608	11
13	5.14	19.49	9.31	18.07	3.29	16.58	18.06	7.14	14.47	22.27	15.07	23.04	18.21	9.09	17.02	4.13	15.05	22.43		
	13.264	-8.02	14.541	-18.51	10.944	7.77	1.388	5.47	19.366	-22.54	19.836	-21.36	2.479	14.18	23.340	-5.48	19.645	-22.64	1.46750	13
15	5.18	19.45	9.22	17.59	3.34	16.55	17.56	7.03	14.40	22.21	14.59	22.56	18.13	9.00	16.54	4.05	14.57	22.36		
	13.388	-8.76	14.537	-18.37	11.094	6.95	1.345	5.36	19.379	-22.52	19.839	-21.35	2.474	14.15	23.337	-5.49	19.646	-22.64	1.59891	15
17	5.21	19.40	9.09	17.52	3.40	16.51	17.46	6.52	14.33	22.14	14.52	22.49	18.05	8.52	16.46	3.56	14.49	22.28		
	13.512	-9.49	14.500	-17.96	11.244	6.10	1.303	5.25	19.394	-22.49	19.843	-21.34	2.468	14.13	23.334	-5.51	19.647	-22.64	1.73033	17
19	5.25	19.36	8.53	17.44	3.46	16.48	17.36	6.41	14.26	22.07	14.44	22.41	17.57	8.44	16.38	3.48	14.41	22.20		
	13.637	-10.21	14.427	-17.27	11.393	5.24	1.262	5.15	19.409	-22.46	19.848	-21.33	2.463	14.10	23.332	-5.52	19.648	-22.64	1.86175	19
21	5.28	19.32	8.32	17.36	3.52	16.44	17.27	6.30	14.19	22.00	14.36	22.34	17.49	8.35	16.30	3.40	14.34	22.12		
	13.763	-10.93	14.321	-16.28	11.543	4.37	1.223	5.06	19.425	-22.43	19.853	-21.32	2.458	14.08	23.329	-5.54	19.649	-22.63	1.99317	21
23	5.32	19.28	8.09	17.28	3.58	16.40	17.17	6.20	14.12	21.54	14.29	22.26	17.41	8.27	16.22	3.32	14.26	22.04		
	13.890	-11.63	14.189	-15.02	11.692	3.48	1.185	4.98	19.442	-22.40	19.858	-21.31	2.453	14.05	23.327	-5.55	19.650	-22.63	2.12459	23
25	5.35	19.24	7.43	17.20	4.03	16.37	17.07	6.09	14.04	21.47	14.21	22.19	17.33	8.19	16.14	3.24	14.18	21.57		
	14.017	-12.32	14.043	-13.57	11.842	2.58	1.150	4.92	19.459	-22.36	19.864	-21.29	2.447	14.03	23.325	-5.57	19.652	-22.63	2.25601	25
25	4.35	18.24	6.43	16.20	3.04	15.37	16.07	5.09	13.05	20.47	13.21	21.19	16.33	7.19	15.14	2.24	13.18	20.57		
	14.020	-12.34	14.040	-13.54	11.845	2.56	1.149	4.92	19.460	-22.36	19.864	-21.29	2.447	14.03	23.325	-5.57	19.652	-22.63	2.25601	25
27	4.39	18.21	6.18	16.12	3.10	15.33	15.58	4.59	12.57	20.41	13.13	21.12	16.25	7.10	15.06	2.16	13.10	20.49		
	14.148	-13.01	13.897	-12.03	11.994	1.66	1.116	4.87	19.478	-22.32	19.870	-21.28	2.442	14.00	23.323	-5.58	19.653	-22.63	2.38743	27
29	4.42	18.17	5.55	16.05	3.16	15.29	15.48	4.49	12.50	20.34	13.06	21.04	16.17	7.02	14.58	2.08	13.02	20.41		
	14.277	-13.68	13.775	-10.64	12.144	0.75	1.086	4.84	19.497	-22.28	19.877	-21.26	2.437	13.97	23.320	-5.59	19.655	-22.63	2.51884	29
31	4.45	18.13	5.35	15.58	3.22	15.25	15.39	4.40	12.43	20.28	12.58	20.57	16.09	6.54	14.50	1.60	12.55	20.33		
	14.407	-14.33	13.688	-9.50	12.294	-0.17	1.059	4.82	19.516	-22.24	19.884	-21.24	2.431	13.95	23.319	-5.61	19.657	-22.63	2.65026	31

LISTOPAD 2020

Piwnice, CA UMK				Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]							
..... Dzień				ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.		
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.'	j astr	h.mmss	°.'	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
2459																					
306	1	Nie	155	14.59011	16.29	14.2819	-14.39	0.99237	3.0740	14.44	63.575	0.8	99	644	1129.3	1614	1651	*****	717	1447	1
307	2	Pon	156	15.02577	16.30	14.3215	-14.58	0.99211	3.5452	18.32	63.359	1.8	97	646	1129.3	1612	1711	031.0	827	1443	2
308	3	Wto	157	15.06542	16.30	14.3612	-15.17	0.99186	4.4420	21.35	63.041	2.8	93	648	1129.3	1610	1738	116.9	937	1439	3
309	4	Śro	158	15.10508	16.29	14.4009	-15.35	0.99161	5.3605	23.42	62.617	3.8	87	650	1129.3	1608	1813	205.3	1044	1435	4
310	5	Czw	159	15.14473	16.27	14.4407	-15.53	0.99137	6.2949	24.44	62.084	4.8	80	652	1129.3	1606	1859	256.1	1145	1431	5
311	6	Pią	160	15.18439	16.25	14.4806	-16.11	0.99113	7.2449	24.33	61.440	5.8	71	654	1129.3	1604	1957	348.6	1236	1427	6
312	7	Sob	161	15.22405	16.21	14.5206	-16.29	0.99089	8.2017	23.06	60.695	6.8	62	656	1129.4	1603	2107	442.0	1317	1423	7
313	8	Nie	162	15.26370	16.17	14.5607	-16.46	0.99065	9.1527	20.23	59.868	7.8	51	657	1129.5	1601	2224	535.2	1348	1419	8
314	9	Pon	163	15.30336	16.12	15.0009	-17.03	0.99042	10.0951	16.31	58.996	0.9	40	659	1129.5	1559	2346	627.7	1413	1416	9
315	10	Wto	164	15.34301	16.06	15.0411	-17.20	0.99019	11.0328	11.39	58.131	1.9	30	701	1129.6	1557	****	719.4	1434	1412	10
316	11	Śro	165	15.38267	15.59	15.0815	-17.36	0.98996	11.5642	6.00	57.338	2.9	20	703	1129.8	1556	111	810.4	1451	1408	11
317	12	Czw	166	15.42232	15.52	15.1219	-17.53	0.98973	12.5015	-0.07	56.691	3.9	11	705	1129.9	1554	237	901.7	1508	1404	12
318	13	Pią	167	15.46198	15.43	15.1624	-18.09	0.98951	13.4456	-6.21	56.261	4.9	5	707	1130.0	1553	406	954.1	1526	1400	13
319	14	Sob	168	15.50163	15.34	15.2030	-18.24	0.98929	14.4136	-12.17	56.104	5.9	1	709	1130.2	1551	537	1048.7	1546	1356	14
320	15	Nie	169	15.54129	15.24	15.2437	-18.39	0.98907	15.4045	-17.29	56.246	0.2	0	710	1130.4	1550	710	1146.1	1611	1352	15
321	16	Pon	170	15.58094	15.12	15.2844	-18.54	0.98885	16.4217	-21.29	56.679	1.2	2	712	1130.5	1548	841	1246.0	1643	1348	16
322	17	Wto	171	16.02060	15.01	15.3253	-19.09	0.98863	17.4516	-23.60	57.363	2.2	7	714	1130.7	1547	1004	1347.6	1727	1344	17
323	18	Śro	172	16.06026	14.48	15.3702	-19.23	0.98842	18.4804	-24.51	58.230	3.2	14	716	1131.0	1546	1114	1448.8	1824	1340	18
324	19	Czw	173	16.09591	14.34	15.4112	-19.37	0.98821	19.4850	-24.08	59.198	4.2	23	718	1131.2	1544	1207	1547.6	1933	1336	19
325	20	Pią	174	16.13557	14.20	15.4523	-19.51	0.98800	20.4614	-22.02	60.185	5.2	32	719	1131.4	1543	1245	1642.4	2047	1332	20
326	21	Sob	175	16.17522	14.05	15.4935	-20.04	0.98779	21.3944	-18.51	61.120	6.2	43	721	1131.7	1542	1312	1732.8	2203	1328	21
327	22	Nie	176	16.21488	13.49	15.5347	-20.16	0.98759	22.2931	-14.53	61.944	0.3	53	723	1131.9	1541	1333	1819.2	2317	1324	22
328	23	Pon	177	16.25454	13.32	15.5801	-20.29	0.98739	23.1615	-10.24	62.619	1.3	62	724	1132.2	1539	1349	1902.6	****	1320	23
329	24	Wto	178	16.29419	13.15	16.0215	-20.41	0.98719	0.0049	-5.36	63.124	2.3	71	726	1132.5	1538	1403	1943.9	028	1317	24
330	25	Śro	179	16.33385	12.56	16.0629	-20.53	0.98700	0.4408	-0.38	63.454	3.3	80	728	1132.8	1537	1416	2024.1	138	1313	25
331	26	Czw	180	16.37350	12.38	16.1045	-21.04	0.98681	1.2707	4.19	63.615	4.3	87	729	1133.1	1536	1428	2104.4	247	1309	26
332	27	Pią	181	16.41316	12.18	16.1501	-21.15	0.98663	2.1039	9.07	63.625	5.3	92	731	1133.4	1535	1442	2145.5	356	1305	27
333	28	Sob	182	16.45281	11.58	16.1918	-21.25	0.98645	2.5529	13.36	63.505	6.3	97	733	1133.8	1535	1457	2228.4	505	1301	28
334	29	Nie	183	16.49247	11.37	16.2335	-21.35	0.98628	3.4216	17.36	63.277	7.3	99	734	1134.1	1534	1516	2313.7	616	1257	29
335	30	Pon	184	16.53212	11.15	16.2754	-21.45	0.98612	4.3126	20.54	62.964	0.1	100	736	1134.5	1533	1541	*****	727	1253	30

Fazy Księżyca [Dm, h.mm]: Pełn 0, 15.49 3kw 8, 14.46 Nów 15, 6.07 1kw 22, 5.45 Pełn 30, 10.30

LISTOPAD 2020 (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		
1	4.47	18.12	5.27	15.55	3.25	15.23	15.34	4.35	12.40	20.25	12.55	20.53	16.05	6.49	14.46	1.56	12.51	20.30		
	14.472	-14.65	13.661	-9.06	12.369	-0.63	1.047	4.82	19.526	-22.22	19.888	-21.23	2.429	13.94	23.318	-5.61	19.658	-22.63	2.71597	1
3	4.50	18.08	5.15	15.50	3.31	15.20	15.25	4.26	12.33	20.18	12.47	20.46	15.57	6.41	14.38	1.48	12.43	20.22		
	14.603	-15.28	13.641	-8.47	12.519	-1.56	1.024	4.83	19.547	-22.18	19.896	-21.21	2.423	13.91	23.316	-5.62	19.660	-22.62	2.84739	3
5	4.53	18.05	5.08	15.44	3.37	15.16	15.16	4.17	12.26	20.12	12.39	20.39	15.49	6.33	14.31	1.40	12.35	20.14		
	14.735	-15.89	13.665	-8.27	12.670	-2.49	1.005	4.86	19.568	-22.13	19.904	-21.19	2.418	13.88	23.314	-5.63	19.662	-22.62	2.97881	5
7	4.57	18.02	5.04	15.39	3.43	15.12	15.07	4.08	12.19	20.06	12.32	20.32	15.41	6.24	14.23	1.32	12.28	20.06		
	14.868	-16.48	13.729	-8.42	12.821	-3.41	0.989	4.90	19.589	-22.09	19.912	-21.17	2.413	13.86	23.313	-5.64	19.664	-22.62	3.11024	7
9	4.60	17.60	5.05	15.35	3.49	15.08	14.58	4.00	12.12	19.60	12.24	20.24	15.33	6.16	14.15	1.24	12.20	19.59		
	15.002	-17.05	13.827	-8.86	12.972	-4.34	0.976	4.96	19.612	-22.04	19.921	-21.15	2.407	13.83	23.311	-5.65	19.667	-22.61	3.24166	9
11	5.03	17.57	5.08	15.31	3.55	15.05	14.49	3.52	12.05	19.54	12.17	20.17	15.25	6.08	14.07	1.16	12.12	19.51		
	15.137	-17.61	13.951	-9.53	13.124	-5.26	0.967	5.04	19.634	-21.98	19.931	-21.13	2.402	13.81	23.310	-5.65	19.669	-22.61	3.37307	11
13	5.06	17.54	5.14	15.27	4.01	15.01	14.40	3.45	11.59	19.47	12.10	20.10	15.17	5.59	13.59	1.08	12.04	19.43		
	15.273	-18.14	14.097	-10.36	13.277	-6.18	0.961	5.14	19.658	-21.93	19.940	-21.10	2.397	13.78	23.309	-5.66	19.672	-22.60	3.50449	13
15	5.09	17.52	5.21	15.23	4.08	14.57	14.31	3.37	11.52	19.41	12.02	20.03	15.09	5.51	13.51	1.00	11.57	19.36		
	15.410	-18.66	14.258	-11.31	13.430	-7.10	0.959	5.25	19.682	-21.87	19.950	-21.07	2.392	13.76	23.308	-5.67	19.675	-22.60	3.63591	15
17	5.12	17.50	5.29	15.20	4.14	14.54	14.23	3.30	11.45	19.35	11.55	19.56	15.01	5.43	13.43	0.52	11.49	19.28		
	15.548	-19.15	14.431	-12.34	13.584	-8.00	0.960	5.38	19.706	-21.82	19.961	-21.05	2.387	13.73	23.307	-5.67	19.678	-22.59	3.76733	17
19	5.15	17.48	5.38	15.17	4.20	14.50	14.15	3.23	11.38	19.29	11.47	19.49	14.53	5.34	13.35	0.44	11.41	19.20		
	15.687	-19.62	14.614	-13.40	13.739	-8.90	0.964	5.53	19.731	-21.76	19.971	-21.02	2.382	13.71	23.306	-5.68	19.681	-22.59	3.89876	19
21	5.18	17.46	5.48	15.14	4.27	14.47	14.06	3.17	11.31	19.24	11.40	19.42	14.45	5.26	13.27	0.36	11.33	19.13		
	15.826	-20.06	14.805	-14.48	13.895	-9.78	0.972	5.69	19.756	-21.70	19.983	-20.99	2.377	13.68	23.306	-5.68	19.684	-22.58	4.03018	21
23	5.21	17.44	5.59	15.11	4.33	14.43	13.58	3.10	11.25	19.18	11.32	19.35	14.37	5.18	13.19	0.28	11.26	19.05		
	15.967	-20.48	15.000	-15.56	14.052	-10.65	0.983	5.86	19.782	-21.63	19.994	-20.96	2.372	13.66	23.305	-5.68	19.687	-22.58	4.16160	23
25	5.23	17.43	6.09	15.09	4.40	14.40	13.50	3.04	11.18	19.12	11.25	19.28	14.29	5.10	13.12	0.20	11.18	18.58		
	16.108	-20.88	15.201	-16.61	14.210	-11.50	0.997	6.06	19.808	-21.57	20.006	-20.93	2.367	13.64	23.305	-5.68	19.690	-22.57	4.29301	25
27	5.26	17.42	6.20	15.07	4.46	14.37	13.42	2.59	11.11	19.06	11.18	19.21	14.21	5.01	13.04	0.13	11.10	18.50		
	16.250	-21.25	15.405	-17.63	14.369	-12.34	1.014	6.26	19.835	-21.50	20.018	-20.89	2.363	13.61	23.305	-5.68	19.694	-22.57	4.42443	27
29	5.28	17.41	6.31	15.05	4.52	14.34	13.34	2.53	11.04	19.00	11.10	19.14	14.13	4.53	12.56	0.05	11.03	18.42		
	16.393	-21.59	15.612	-18.61	14.529	-13.16	1.033	6.48	19.862	-21.43	20.030	-20.86	2.358	13.59	23.304	-5.68	19.697	-22.56	4.55585	29

GRUDZIEŃ 2020

Piwnice, CA UMK			Dane na godz. 12 czasu strefowego (= 11 ^h UT)										Czas strefowy [hhmm.]								
..... Dzień			ST	$\Delta\alpha$	α_{\odot}	δ_{\odot}	R_{\odot}	α_{ζ}	δ_{ζ}	R_{ζ}	Faza ζ	Słońce			Księżyc			Gal.			
Dr	Dm	Dt	JD	h.mmss	m.ss	h.mmss	°.	j astr	h.mmss	°.	ρ_{\oplus}	dni	%	Wsch	Gór	Zach	Wsch	Gór	Zach	Gór	Dm
			2459																		
336	1	Wto	185	16.57178	10.53	16.3213	-21.54	0.98596	5.2304	23.19	62.580	1.1	99	737	1134.9	1532	1613	001.7	836	1249	1
337	2	Śro	186	17.01144	10.30	16.3632	-22.03	0.98580	6.1650	24.39	62.137	2.1	96	739	1135.3	1532	1655	052.3	940	1245	2
338	3	Czw	187	17.05109	10.06	16.4052	-22.11	0.98565	7.1159	24.47	61.641	3.1	91	740	1135.6	1531	1750	144.8	1035	1241	3
339	4	Pią	188	17.09075	9.42	16.4513	-22.19	0.98551	8.0730	23.38	61.094	4.1	85	741	1136.1	1530	1856	238.3	1119	1237	4
340	5	Sob	189	17.13041	9.17	16.4934	-22.27	0.98537	9.0227	21.13	60.500	5.1	76	743	1136.5	1530	2011	331.5	1153	1233	5
341	6	Nie	190	17.17006	8.52	16.5356	-22.34	0.98524	9.5615	17.41	59.863	6.1	67	744	1136.9	1529	2130	423.6	1219	1229	6
342	7	Pon	191	17.20572	8.26	16.5819	-22.41	0.98511	10.4847	13.10	59.198	7.1	56	745	1137.3	1529	2251	514.3	1240	1225	7
343	8	Wto	192	17.24537	7.59	17.0242	-22.47	0.98498	11.4024	7.53	58.531	0.4	45	746	1137.8	1529	****	603.8	1258	1221	8
344	9	Śro	193	17.28502	7.33	17.0705	-22.53	0.98486	12.3150	2.05	57.900	1.4	34	748	1138.2	1529	014	652.9	1314	1218	9
345	10	Czw	194	17.32468	7.05	17.1129	-22.58	0.98475	13.2359	-3.56	57.355	2.4	23	749	1138.7	1528	138	742.5	1330	1214	10
346	11	Pią	195	17.36434	6.38	17.1553	-23.03	0.98464	14.1753	-9.51	56.951	3.4	14	750	1139.1	1528	305	833.9	1348	1210	11
347	12	Sob	196	17.40399	6.10	17.2018	-23.07	0.98453	15.1422	-15.18	56.741	4.4	7	751	1139.6	1528	434	928.0	1409	1206	12
348	13	Nie	197	17.44365	5.41	17.2443	-23.11	0.98442	16.1353	-19.49	56.765	5.4	2	752	1140.1	1528	605	1025.6	1436	1202	13
349	14	Pon	198	17.48330	5.12	17.2908	-23.15	0.98432	17.1604	-23.03	57.041	6.4	0	753	1140.5	1528	732	1126.2	1514	1158	14
350	15	Wto	199	17.52296	4.43	17.3333	-23.18	0.98422	18.1938	-24.41	57.556	0.8	1	754	1141.0	1528	851	1228.3	1604	1154	15
351	16	Śro	200	17.56262	4.14	17.3759	-23.20	0.98413	19.2236	-24.39	58.272	1.8	4	754	1141.5	1528	954	1329.8	1708	1150	16
352	17	Czw	201	18.00227	3.45	17.4225	-23.23	0.98404	20.2301	-23.04	59.127	2.8	10	755	1142.0	1529	1040	1428.3	1823	1146	17
353	18	Pią	202	18.04193	3.15	17.4651	-23.24	0.98395	21.1937	-20.13	60.048	3.8	17	756	1142.5	1529	1113	1522.4	1941	1142	18
354	19	Sob	203	18.08159	2.45	17.5118	-23.25	0.98387	22.1207	-16.25	60.958	4.8	26	757	1143.0	1529	1137	1612.0	2058	1138	19
355	20	Nie	204	18.12124	2.16	17.5544	-23.26	0.98379	23.0057	-11.59	61.791	5.8	35	757	1143.5	1530	1155	1657.6	2212	1134	20
356	21	Pon	205	18.16090	1.46	18.0010	-23.26	0.98371	23.4654	-7.10	62.491	6.8	45	758	1144.0	1530	1210	1740.4	2324	1130	21
357	22	Wto	206	18.20055	1.16	18.0437	-23.26	0.98364	0.3059	-2.11	63.020	0.5	55	758	1144.5	1531	1223	1821.3	****	1126	22
358	23	Śro	207	18.24021	0.46	18.0903	-23.25	0.98358	1.1411	2.49	63.356	1.5	64	759	1145.0	1531	1236	1901.6	033	1123	23
359	24	Czw	208	18.27586	0.16	18.1330	-23.24	0.98352	1.5729	7.41	63.495	2.5	73	759	1145.5	1532	1249	1942.3	142	1119	24
360	25	Pią	209	18.31552	-0.13	18.1756	-23.22	0.98347	2.4146	12.17	63.447	3.5	81	759	1146.0	1533	1304	2024.4	251	1115	25
361	26	Sob	210	18.35518	-0.43	18.2222	-23.20	0.98342	3.2751	16.26	63.236	4.5	88	759	1146.5	1534	1321	2108.6	401	1111	26
362	27	Nie	211	18.39483	-1.12	18.2648	-23.18	0.98338	4.1619	19.59	62.891	5.5	93	800	1147.0	1534	1343	2155.7	512	1107	27
363	28	Pon	212	18.43449	-1.42	18.3114	-23.15	0.98334	5.0728	22.42	62.449	6.5	97	800	1147.4	1535	1412	2245.8	623	1103	28
364	29	Wto	213	18.47414	-2.11	18.3539	-23.11	0.98331	6.0109	24.23	61.946	7.5	100	800	1147.9	1536	1451	2338.4	730	1059	29
365	30	Śro	214	18.51380	-2.40	18.4005	-23.07	0.98329	6.5644	24.51	61.413	0.3	100	800	1148.4	1537	1542	*****	829	1055	30
366	31	Czw	215	18.55346	-3.08	18.4430	-23.03	0.98327	7.5307	24.01	60.878	1.3	98	800	1148.9	1538	1646	032.5	917	1051	31

Fazy Księżyca [Dm, h.mm]: 3kw 8, 1.36 Now 14, 17.16 1kw 22, 0.41 Pełn 30, 4.28

GRUDZIEŃ 2020 (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		
1	5.31	17.40	6.42	15.04	4.59	14.31	13.26	2.48	10.58	18.55	11.03	19.08	14.05	4.45	12.48	23.53	10.55	18.35		
	16.537	-21.90	15.823	-19.54	14.690	-13.96	1.056	6.71	19.889	-21.36	20.043	-20.82	2.354	13.57	23.305	-5.68	19.701	-22.55	4.68728	1
3	5.33	17.39	6.53	15.03	5.05	14.28	13.19	2.43	10.51	18.49	10.56	19.01	13.57	4.37	12.40	23.45	10.47	18.27		
	16.681	-22.19	16.036	-20.41	14.853	-14.74	1.081	6.96	19.917	-21.28	20.056	-20.79	2.350	13.55	23.305	-5.68	19.705	-22.55	4.81870	3
5	5.35	17.38	7.03	15.02	5.12	14.26	13.11	2.38	10.44	18.43	10.48	18.54	13.49	4.28	12.32	23.37	10.40	18.20		
	16.826	-22.45	16.252	-21.22	15.016	-15.49	1.108	7.21	19.945	-21.21	20.069	-20.75	2.345	13.53	23.305	-5.67	19.709	-22.54	4.95012	5
7	5.37	17.38	7.14	15.02	5.18	14.23	13.04	2.34	10.37	18.38	10.41	18.47	13.41	4.20	12.24	23.29	10.32	18.12		
	16.972	-22.68	16.470	-21.96	15.181	-16.22	1.138	7.47	19.974	-21.13	20.082	-20.71	2.342	13.51	23.306	-5.67	19.713	-22.53	5.08154	7
9	5.39	17.38	7.24	15.03	5.25	14.21	12.56	2.29	10.31	18.32	10.34	18.40	13.33	4.12	12.17	23.22	10.24	18.04		
	17.118	-22.88	16.691	-22.63	15.348	-16.92	1.171	7.75	20.003	-21.05	20.096	-20.67	2.338	13.50	23.306	-5.66	19.717	-22.53	5.21296	9
11	5.41	17.38	7.34	15.04	5.31	14.19	12.49	2.25	10.24	18.27	10.26	18.34	13.25	4.04	12.09	23.14	10.16	17.57		
	17.265	-23.05	16.914	-23.23	15.515	-17.59	1.205	8.03	20.032	-20.97	20.110	-20.63	2.334	13.48	23.307	-5.66	19.721	-22.52	5.34438	11
13	5.43	17.38	7.43	15.05	5.38	14.17	12.41	2.21	10.17	18.21	10.19	18.27	13.17	3.56	12.01	23.06	10.09	17.49		
	17.412	-23.19	17.139	-23.75	15.685	-18.23	1.242	8.32	20.061	-20.88	20.124	-20.59	2.331	13.46	23.308	-5.65	19.725	-22.51	5.47580	13
15	5.44	17.38	7.52	15.08	5.44	14.15	12.34	2.17	10.11	18.16	10.12	18.20	13.09	3.47	11.53	22.58	10.01	17.42		
	17.559	-23.30	17.366	-24.19	15.855	-18.84	1.281	8.63	20.091	-20.80	20.139	-20.55	2.328	13.45	23.309	-5.64	19.729	-22.50	5.60723	15
17	5.46	17.39	8.01	15.11	5.50	14.14	12.27	2.13	10.04	18.10	10.05	18.13	13.01	3.39	11.45	22.51	9.53	17.34		
	17.707	-23.38	17.595	-24.54	16.026	-19.42	1.322	8.93	20.121	-20.71	20.153	-20.51	2.324	13.43	23.310	-5.63	19.733	-22.49	5.73865	17
19	5.47	17.40	8.09	15.14	5.56	14.13	12.20	2.10	9.57	18.05	9.57	18.07	12.53	3.31	11.37	22.43	9.46	17.27		
	17.855	-23.42	17.826	-24.81	16.199	-19.96	1.365	9.25	20.152	-20.62	20.168	-20.47	2.322	13.42	23.312	-5.62	19.738	-22.49	5.87007	19
21	5.48	17.41	8.17	15.19	6.02	14.12	12.13	2.06	9.51	17.59	9.50	18.00	12.45	3.23	11.29	22.35	9.38	17.19		
	18.003	-23.44	18.058	-24.99	16.373	-20.46	1.410	9.57	20.182	-20.53	20.183	-20.42	2.319	13.41	23.313	-5.61	19.742	-22.48	6.00149	21
23	5.49	17.42	8.23	15.25	6.08	14.11	12.06	2.03	9.44	17.54	9.43	17.53	12.37	3.15	11.22	22.27	9.30	17.12		
	18.151	-23.42	18.292	-25.08	16.549	-20.92	1.456	9.90	20.213	-20.43	20.198	-20.38	2.316	13.39	23.315	-5.60	19.746	-22.47	6.13291	23
25	5.50	17.43	8.30	15.31	6.14	14.11	11.59	2.00	9.37	17.49	9.35	17.47	12.29	3.07	11.14	22.20	9.23	17.04		
	18.299	-23.37	18.527	-25.07	16.725	-21.34	1.504	10.23	20.244	-20.34	20.213	-20.33	2.314	13.38	23.317	-5.59	19.751	-22.46	6.26433	25
27	5.51	17.45	8.35	15.38	6.19	14.11	11.52	1.57	9.31	17.43	9.28	17.40	12.21	2.59	11.06	22.12	9.15	16.57		
	18.447	-23.29	18.763	-24.96	16.902	-21.73	1.554	10.57	20.275	-20.24	20.229	-20.28	2.312	13.37	23.319	-5.58	19.756	-22.45	6.39575	27
29	5.51	17.46	8.40	15.46	6.24	14.11	11.46	1.54	9.24	17.38	9.21	17.34	12.13	2.51	10.58	22.04	9.08	16.49		
	18.594	-23.18	19.000	-24.76	17.081	-22.07	1.605	10.91	20.306	-20.14	20.244	-20.24	2.310	13.37	23.321	-5.56	19.760	-22.44	6.52717	29
31	5.51	17.48	8.44	15.55	6.29	14.12	11.39	1.52	9.17	17.33	9.14	17.27	12.06	2.43	10.50	21.57	8.60	16.41		
	18.742	-23.04	19.236	-24.45	17.260	-22.36	1.658	11.26	20.337	-20.04	20.260	-20.19	2.309	13.36	23.323	-5.55	19.765	-22.43	6.65860	31

Święta państwowe i kościelne w Polsce oraz inne ważniejsze dni w roku 2020

Nowy Rok	Śro	1 styczeń	Zesłania Ducha Świętego	Nie	31 maj
Najświętszej Maryi Panny Rodzicielki	Śro	1 styczeń	Dzień Dziecka	Pon	1 czerwiec
Objawienia Pańskiego (Trzech Króli)	Pon	6 styczeń	Trójcy Najświętszej	Nie	7 czerwiec
Juliański Nowy Rok	Wto	14 styczeń	Dzień Dziękczynienia	Nie	7 czerwiec
Dzień Babci	Wto	21 styczeń	Boże Ciało	Czw	11 czerwiec
Dzień Dziadka	Śro	22 styczeń	Najświętszego Serca Pana Jezusa	Pią	19 czerwiec
Ofiarowania Pańskiego	Nie	2 luty	Dzień Ojca	Wto	23 czerwiec
Matki Boskiej Gromnicznej	Nie	2 luty	Noc Świętojańska	Wto	23 czerwiec
Walentynki	Pią	14 luty	Św. Piotra i Pawła	Pon	29 czerwiec
Święto UMK	Śro	19 luty	Wniebowzięcia N.M.P.	Sob	15 sierpień
Tłusty czwartek	Czw	20 luty	Święto Wojska Polskiego	Sob	15 sierpień
Środa Popielcowa	Śro	26 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	5 kwiecień	Dzień Papieski	Nie	11 październik
Niedziela Wielkanocna	Nie	12 kwiecień	Dzień Edukacji Narodowej	Śro	14 październik
Niedziela Miłosierdzia Bożego	Nie	19 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
Dzień Polskiej Niezapominajki	Pią	15 maj	Niepokalane Poczęcie N.M.P.	Wto	8 grudzień
Wniebowstąpienia Pańskiego	Czw	21 maj	Boże Narodzenie	Pią	25 grudzień
Dzień Matki	Wto	26 maj	Sylwester	Czw	31 grudzień

Daty i godziny wstępowania Słońca w poszczególne znaki zodiaku (czas środk.-europ.)

(Dzień miesiąca znajduje się w kolumnie numeru miesiąca, M, przed hh.mm; dla M = 3, 6, 9 i 12 są to jednocześnie początki pór roku)

Rok\M	Wodnik		Ryby		Baran		Byk		Bliźn.		Rak		Lew		Panna		Waga		Skorp.		Strzel.		Kozior.	
	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
2000	20	19.23	19	9.33	20	8.35	19	19.39	20	18.49	21	2.48	22	13.43	22	20.49	22	18.28	23	3.47	22	1.19	21	14.37
2001	20	1.16	18	15.27	20	14.31	20	1.36	21	0.44	21	8.38	22	19.26	23	2.27	23	0.05	23	9.26	22	7.00	21	20.21
2002	20	7.02	18	21.13	20	20.16	20	7.21	21	6.30	21	14.25	23	1.15	23	8.17	23	5.55	23	15.18	22	12.54	22	2.14
2003	20	12.53	19	3.01	21	2.00	20	13.03	21	12.13	21	20.11	23	7.04	23	14.08	23	11.47	23	21.08	22	18.43	22	8.04
2004	20	18.42	19	8.50	20	7.48	19	18.50	20	17.59	21	1.57	22	12.50	22	19.53	22	17.30	23	2.48	22	0.21	21	13.41
2005	20	0.21	18	14.32	20	13.33	20	0.37	20	23.47	21	7.46	22	18.40	23	1.45	22	23.23	23	8.42	22	6.15	21	19.35
2006	20	6.15	18	20.25	20	19.25	20	6.26	21	5.31	21	13.26	23	0.18	23	7.23	23	5.03	23	14.26	22	12.01	22	1.22
2007	20	12.00	19	2.09	21	1.07	20	12.07	21	11.12	21	19.06	23	5.60	23	13.07	23	10.51	23	20.15	22	17.49	22	7.07
2008	20	17.43	19	7.49	20	6.48	19	17.51	20	17.01	21	0.59	22	11.55	22	19.02	22	16.44	23	2.09	21	23.44	21	13.04
2009	19	23.40	18	13.46	20	12.44	19	23.44	20	22.51	21	6.45	22	17.36	23	0.39	22	22.19	23	7.44	22	5.22	21	18.46
2010	20	5.27	18	19.35	20	18.32	20	5.30	21	4.34	21	12.28	22	23.21	23	6.27	23	4.09	23	13.35	22	11.14	22	0.38
2011	20	11.18	19	1.25	21	0.20	20	11.17	21	10.21	21	18.16	23	5.12	23	12.20	23	10.04	23	19.30	22	17.08	22	6.30
2012	20	17.09	19	7.17	20	6.14	19	17.12	20	16.15	21	0.08	22	11.00	22	18.07	22	15.49	23	1.13	21	22.50	21	12.11
2013	19	22.51	18	13.01	20	12.01	19	23.03	20	22.09	21	6.04	22	16.55	23	0.01	22	21.44	23	7.09	22	4.48	21	18.11
2014	20	4.51	18	18.59	20	17.57	20	4.55	21	3.59	21	11.51	22	22.41	23	5.46	23	3.29	23	12.57	22	10.38	22	0.03
2015	20	10.43	19	0.49	20	23.45	20	10.42	21	9.44	21	17.37	23	4.30	23	11.37	23	9.20	23	18.46	22	16.25	22	5.48
2016	20	16.27	19	6.33	20	5.30	19	16.29	20	15.36	20	23.34	22	10.30	22	17.38	22	15.21	23	0.45	21	22.22	21	11.44
2017	19	22.23	18	12.31	20	11.28	19	22.27	20	21.31	21	5.24	22	16.15	22	23.20	22	21.01	23	6.26	22	4.04	21	17.28
2018	20	4.09	18	18.18	20	17.15	20	4.12	21	3.14	21	11.07	22	21.60	23	5.08	23	2.54	23	12.22	22	10.00	21	23.22
2019	20	9.59	19	0.04	20	22.58	20	9.55	21	8.59	21	16.54	23	3.50	23	11.02	23	8.50	23	18.19	22	15.58	22	5.19
2020	20	15.54	19	5.57	20	4.49	19	15.45	20	14.49	20	22.43	22	9.37	22	16.45	22	14.31	22	23.59	21	21.40	21	11.02
2021	19	21.40	18	11.44	20	10.37	19	21.33	20	20.37	21	4.32	22	15.26	22	22.34	22	20.21	23	5.51	22	3.33	21	16.59
2022	20	3.38	18	17.42	20	16.33	20	3.24	21	2.22	21	10.13	22	21.07	23	4.16	23	2.03	23	11.35	22	9.20	21	22.47
2023	20	9.29	18	23.34	20	22.24	20	9.13	21	8.09	21	15.57	23	2.50	23	10.01	23	7.50	23	17.21	22	15.02	22	4.27
2024	20	15.07	19	5.13	20	4.06	19	14.59	20	13.59	20	21.51	22	8.44	22	15.55	22	13.43	22	23.14	21	20.56	21	10.20
2025	19	20.59	18	11.06	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	2.35	21	16.02

Fazy Księżyca w latach 2000 – 2025

Oznaczenia: M - miesiąc, D - dzień miesiąca, H - godzina, m - minuta [czas środkowo-europejski, tj. UT+1 godz., kalendarz gregorianki]

Rok	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m																																				
NÓW																																																																
2000	1	6	19	13.6	2	5	14	3.2	3	6	6	16.7	4	4	19	11.9	5	4	5	11.9	6	2	13	13.9	7	12	0	19.9	7	31	324.9	8	29	11	19.2	9	27	20	53.0	10	27	8	57.9	11	26	0	11.2	12	25	18	21.5													
2001	12	14	6.8	223	9	21.1	3	25	2	20.9	4	23	16	25.5	5	23	3	45.9	6	21	12	57.6	7	20	20	44.2	8	19	3	55.1	9	17	1	12	7.3	10	16	20	23.2	11	15	7	39.9	12	14	2	14	7.3																
2002	11	3	14	28.6	2	12	8	40.9	3	14	3	2.4	4	12	20	21.0	5	12	1	14.4	6	11	0	46.4	7	10	1	12	5.9	8	8	20	15.0	9	7	4	10.0	10	6	12	17.4	11	4	21	34.1	12	4	8	34.2															
2003	1	22	12	2.7	2	1	11	48.2	3	3	3	34.8	4	12	0	18.5	5	1	13	14.7	6	5	3	19.8	7	6	29	19	38.5	8	7	29	7	52.6	9	8	27	18	26.2	10	9	26	4	9.0	11	25	1	35	0.2	12	23	35	8.9	12	23	10	42.9							
2004	12	12	4.8	220	10	17.7	3	20	23	41.3	4	19	14	21.1	5	19	5	51.9	6	17	21	26.7	7	17	1	22	3.7	8	16	2	23.7	9	14	1	52	8.8	10	14	3	48.0	11	12	1	52	6.9	12	12	2	28.7															
2005	11	0	13	2.5	2	8	23	27.7	3	10	10	10.3	4	8	21	31.9	5	8	9	45.3	6	6	22	55.0	7	6	13	2.4	8	5	4	4.5	9	3	19	45.3	10	3	11	27.7	11	2	2	24.4	12	1	16	0.7	12	31	4	11.5												
2006	12	9	15	14.4	2	28	1	30.6	3	29	1	15.0	4	27	20	43.8	5	27	6	25.4	6	2	5	17.5	7	2	5	30.7	8	2	3	20.9	9	2	2	24.5.0	10	2	2	6	14.0	11	2	0	31	7.8	12	2	0	5.6														
2007	1	19	5	0.4	2	17	17	14.0	3	19	3	42.3	4	17	12	35.9	5	16	20	26.9	6	15	4	12.9	7	14	13	3.6	8	1	3	0.8	9	1	11	13	44.1	10	1	6	0.5	11	1	0	2.9	12	1	9	18	40.1														
2008	1	8	12	36.8	2	7	4	44.2	3	7	18	14.0	4	6	4	55.0	5	5	13	18.0	6	3	20	22.4	7	3	3	18.3	8	8	1	11	12.4	9	8	30	20	57.9	10	9	29	9	12.1	11	10	29	13.7	12	11	7	54.4	12	27	13	22.3									
2009	12	6	8	55.1	2	25	2	34.8	3	26	17	5.7	4	25	4	22.3	5	24	13	10.6	6	2	22	03	4.8	7	2	2	33	4.4	8	2	0	11.2	9	1	18	19	44.1	10	1	18	6	32.8	11	1	16	20	13.4	12	1	16	13.1	1.8										
2010	1	15	8	11.1	2	14	3	51.1	3	1	5	22.0	4	1	4	13	28.7	5	1	4	2.0	6	1	2	12	14.3	7	1	1	20	40.2	8	1	0	11	29.6	9	1	8	11	29.6	10	1	7	19	44.1	11	6	5	51.6	12	5	1	8	35.4									
2011	1	4	10	2.4	2	3	3	30.4	3	4	21	45.6	4	3	1	53.2	5	3	7	50.5	6	1	2	2.3	7	1	9	5	3.7	8	7	30	19	39.6	9	8	2	9	12.6	10	8	2	12	8.5	11	2	6	25	0.5	12	7	9	9.4	12	24	19	6.3							
2012	12	3	8	39.1	2	21	2	33	4.4	3	22	15	36.9	4	21	8	18.1	5	2	1	46.8	6	1	9	16.2	7	1	9	5	23.9	8	1	17	16	54.3	9	1	6	3	10.5	10	1	5	13	2.2	11	1	13	23	7.8	12	1	3	94	1.2									
2013	1	11	20	43.2	2	21	0	819.9	3	11	20	50.8	4	10	10	35.1	5	10	12	8.2	6	8	1	6	56.2	7	8	8	14.2	8	6	2	25	0.6	9	5	1	23	6.0	10	5	1	34.3	11	3	1	34	9.7	12	3	1	22.1												
2014	1	11	23	13.8	2	13	0	22	38.3	3	1	8	59.4	4	3	30	19	44.5	5	2	9	714.1	6	2	9	13	9.9	7	6	2	7	26	23	41.5	8	2	5	15	12.6	9	2	4	7	13.6	10	2	3	22	56.4	11	2	1	33	2.0	12	2	2	35.6						
2015	12	0	14	13.5	2	19	0	47.0	3	20	10	36.0	4	18	1	95	6.6	5	1	8	53.0	6	1	6	15.5	7	1	6	15.5	8	1	8	14	553.1	9	1	9	13	741.0	10	1	3	1	5.5	11	1	1	18	46.9	12	1	1	12	9.1										
2016	1	11	0	230.2	2	8	1	5	38.6	3	9	2	54.1	4	7	1	22	3.4	5	6	20	29.3	6	5	3	59.3	7	4	1	2	0.8	8	2	2	14	4.3	9	1	1	11.3	10	3	0	18	38.1	11	2	9	13	18.1	12	2	9	75	3.0									
2017	12	8	1	6.8	2	26	1	55	8.1	3	28	3	56.9	4	2	6	13	5.8	5	2	5	20	44.2	6	2	4	3	0.5	7	2	3	10	45.2	8	2	1	19	29.9	9	2	0	29.6	10	1	9	20	11.8	11	1	1	8	730.1												
2018	1	17	3	17.0	2	1	5	22.4	3	1	7	14	11.3	4	1	6	2	56.8	5	1	5	12	47.4	6	1	3	20	42.8	7	1	3	3	47.6	8	1	1	10	57.4	9	9	1	9	19.1	10	9	4	46.6	11	7	1	7	820.1												
2019	1	6	2	27.8	2	4	2	2.2	3	6	17	3.7	4	5	9	50.1	5	4	2	3	45.0	6	3	1	1.5	7	2	2	0	15.8	8	1	4	11.4	9	8	30	1	136.8	10	9	2	8	1926.1	11	10	2	8	438.2	12	1	2	6	12.8	12	2	6	12.8						
2020	12	4	2	24.1	2	23	1	6	31.6	3	24	10	27.9	4	2	3	25.5	5	2	2	18	38.4	6	2	1	7	41.0	7	2	0	18	32.6	8	1	9	34	1.2	9	1	7	11	59.8	10	1	6	20	30.8	11	1	5	6	8	12	14	17	16.2								
2021	1	13	5	59.8	2	1	1	20.5	3	1	3	13	120.8	4	1	2	30.5	5	1	1	19	59.4	6	1	0	11	52.4	7	1	0	21	6.3	8	8	1	44	9.8	9	7	1	51.4	10	6	1	2	5.0	11	4	2	2	14.2	12	4	8	42.7									
2022	1	2	1	9	33.1	2	1	6	45.7	3	2	1	834.5	4	1	7	24.0	5	4	3	0	21	27.6	6	5	3	0	12	29.8	7	6	2	9	351.8	8	7	2	8	1854.5	9	8	2	7	916.6	10	9	2	5	2254.0	11	10	2	5	148.2	12	1	2	3	356.8	12	2	3	1	116.5
2023	12	1	2	12	153.1	2	2	0	8	5.4	3	2	11	822.7	4	2	0	512.1	5	1	9	16	52.8	6	1	8	536.7	7	1	7	1	931.4	8	1	6	1	037.8	9	1	5	2	39.4	10	1	4	1	854.7	11	1	1	3	1026.9	12	1	3	0	31.6							
2024	1	1	1	1	257.0	2	9	2	3	58.7	3	1	0	959.9	4	8	1	920.4	5	8	4	21.5	6	6	1	337.3	7	5	2	3	56.9	8	4	1	2	12.5	9	3	2	55.0	10	2	1	9	48.9	11	1	1	3	46.8	12	1	7	21.0	12	3	0	2	326.4					
2025	12	9	1	3	35.5	2	2	8	144.4	3	2	9	1	157.5	4	2	7	20	30.8	5	2	7	4	1.8	6	2	5	1	131.1	7	2	4	2	0	10.6	8	2	3	7	6.0	9	2	1	2	053.6	10	2	1	1	324.8	11	2	0	7	46.8	12	2	0	2	43.0				

1-KWADRA

2000	11	4	14	34.1	2	1	3	021.3	3	1	3	13	758.7	4	1	1	14	30.3	5	1	0	21.0	6	5	9	4	29.1	7	8	1	3	52.7	8	7	2	1.5	9	5	1	7	27.3	10	5	1	1	59.2	11	4	8	2	6.7	12	4	4	55.3							
2001	1	2	3	3	3.3	2	1	5	2.2	3	3	3	3.1	4	1	1	14	9.2	5	4	3	0	18.7	6	4	3	0	18.7	7	6	2	9	23.1	8	6	2	8	19.4	9	7	2	11	8.0	10	8	2	5	20	54.8	11	2	3	8.0	12	2	2	2	156.3				
2002	12	1	1	8	46.4	2	2	0	13	1.6	3	2	2	328.1	4	2	0	13	48.3	5	1	9	20	42.0	6	1	8	1	29.2	7	1	7	1	547.0	8	1	5	4	7.0	9	8	1	5	11	12.2	10	9	1	3	19	8.0	11	1	1	1	2	152.0	12	1	1	1	648.4
2003	1	10	14	14.5	2	9	1	2	11.1	3	1	1	815.1	4	1	0	39.9	5	9	1	2	53.0	6	7	2	1	27.5	7	7	3	3	2.2	8	5	8	27.4	9	3	1	3	334.0	10	2	2	0	9.3	11	1	5	2	4.5	12	1	3	0	18	15.9	12	3	0	11	3.2
2004	12	9	7	3.3	2	2	8	424.0	3	2	9	0	47.8	4	2	7	18	32.3																																												

Rok	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m	M	D	H	m																				
PEL尼亚																																																				
2000	121	540	.4	219	1726	.6	320	544	.3	418	1841	.5	518	834	.4	616	2327	.0	716	1455	.2	815	612	.6	913	2036	.7	1013	952	.8	1111	2214	.6	1211	110	2	.8															
2001	1	92	124	.4	2	8	811	.3	3	918	22	.8	4	8	422	.0	5	714	52	.5	6	6	239	.2	7	516	3	.7	8	4	655	.7	9	224	24	.9	10	214	48	.6	11	1	640	.8	1130	214	8	1230	1140	.5		
2002	128	2350	.3	227	1016	.4	328	1924	.9	427	359	.9	526	1251	.2	624	2242	.2	724	10	6	9	822	2329	.1	921	1459	.1	1021	819	.8	1120	233	.6	121	920	10	.0														
2003	118	1147	.4	217	050	.9	318	1134	.3	416	2035	.6	516	435	.7	614	1215	.6	713	2021	.3	812	548	.1	910	1736	.1	1010	827	.3	11	9	213	.2	12	8	213	.6														
2004	1	716	40	.0	2	6	946	.8	3	7	014	.1	4	512	2	.6	5	421	33	.3	6	3	519	.5	7	212	8	.8	8	731	19	5	0	830	322	.2	928	14	9	1	1028	4	7	2	1126	21	7	2	1226	16	6	2
2005	125	1132	.2	224	553	.5	325	2158	.4	424	11	6	3	523	2118	.0	622	513	.6	721	12	0	2	819	1853	.0	918	3	0	6	1017	1313	.6	1116	157	.4	1215	17	15	.4												
2006	114	1048	.0	213	544	.0	315	035	.3	413	1740	.1	513	750	.9	611	119	2	9	711	4	1	6	8	91153	.8	9	719	41	.9	10	7	412	.5	11	513	58	.0	12	5	124	.8										
2007	1	314	57	.2	2	2	645	.2	3	4	016	.9	4	218	14	.9	5	211	9	.4	6	1	2	3	5	630	1448	.5	730	147	.5	828	1134	.9	926	2044	.8	1026	551	.4	1124	1529	.8	1224	215	.3						
2008	122	1434	.5	221	430	.3	321	1939	.8	420	1125	.2	520	311	.2	618	1830	.3	718	858	.9	816	2216	.3	915	1013	.1	1014	21	2	2	1113	717	.2	1212	1737	.2															
2009	111	426	.5	2	915	48	.8	311	337	.6	4	91555	.6	5	9	5	1	2	6	719	11	4	7	710	21	2	8	6	154	6	9	417	2	3	10	4	7	9	8	11	220	13	6	12	2	830	3	123	120	12	5	
2010	130	717	.2	228	1737	.6	330	325	.2	428	1318	.3	528	0	7	0	626	1230	.1	726	236	.3	824	18	4	2	923	1016	.9	1023	236	.2	1121	1827	.0	1221	913	.2														
2011	119	2221	.2	218	935	.2	319	19	9	8	418	343	.6	517	12	8	3	615	2113	.3	715	739	.3	813	1957	.2	912	1026	.4	1012	3	5	5	1110	2115	.9	1210	1536	.2													
2012	1	9	829	.9	2	72	253	.6	3	810	39	.3	4	620	18	.5	5	6	435	0	6	412	11	4	7	319	51	6	8	2	427	3	831	1457	.8	930	418	.3	1029	2049	.2	1128	1545	.8	1228	1121	.0					
2013	127	538	.1	225	2125	.9	327	1027	.1	425	2057	.0	525	524	.7	623	1231	.1	722	1915	.4	821	244	.5	919	1212	.6	1019	037	.4	1117	1615	.5	1217	1027	.9																
2014	116	552	.1	215	052	.9	316	18	8	2	415	842	.1	514	2015	.7	613	511	.1	712	1224	.6	810	19	9	2	9	9	237	.8	10	811	50	2	11	62	322	.5	12	61	326	.5										
2015	1	5	553	.0	2	4	0	8	7	3	519	5	2	4	413	5	5	4	441	9	6	217	18	.8	7	2	319	4	731	1142	.6	829	1935	.0	928	350	.2	1027	13	4	8	1125	2343	.9	1225	1211	.2					
2016	124	245	.5	222	1919	.7	323	13	0	7	422	623	.4	521	2214	.3	620	12	2	1	719	2356	.4	818	1026	.4	916	20	4	8	1016	522	.7	1114	1451	.9	1214	1	5	2												
2017	112	1233	.6	211	132	.6	312	1553	.5	411	7	7	8	510	2242	.2	6	914	9	4	7	9	5	6	4	8	719	10	4	9	6	8	2	5	10	519	39	7	11	4	622	5	12	31	646	7						
2018	1	2	323	.6	131	1426	.1	3	2	151	0	331	1336	.6	430	157	.9	529	1519	.3	628	552	.8	727	2120	.1	826	1255	.9	925	352	.1	1024	1744	.8	1123	638	.9	1222	1848	.3											
2019	121	615	.8	219	1653	.0	321	242	.2	419	1211	.8	518	2211	.0	617	930	.3	716	2237	.9	815	1329	.0	914	532	.5	1013	22	7	6	1112	1434	.1	1212	611	.9															
2020	110	2020	.9	2	9	832	.7	3	918	47	.2	4	8	334	.6	5	711	44	.7	6	520	12	0	7	5	544	0	8	316	58	.4	9	2	621	.7	10	122	4	9	1031	1548	.9	1130	1029	.4	1230	427	.8				
2021	128	2015	.8	227	916	.9	328	1947	.6	427	431	.2	526	1213	.6	624	1939	.3	724	336	.6	822	13	1	7	921	054	.3	1020	1556	.4	1119	957	.3	1219	535	.2															
2022	118	048	.1	216	1756	.2	318	817	.1	416	1954	.6	516	513	.6	614	1251	.2	713	1937	.1	812	235	.2	910	1058	.6	10	92	15	4	11	812	1	7	12	8	5	7	8												
2023	1	7	0	7	4	2	519	28	.2	3	713	40	.0	4	6	534	.1	5	518	33	.6	6	4	441	.3	7	312	38	.2	8	119	31	.3	831	235	.2	929	1057	.0	1028	2123	.7	1127	1015	.9	1227	132	.8				
2024	125	1853	.6	224	1330	.1	325	759	.9	424	048	.6	523	1452	.7	622	2	7	4	721	1116	.7	819	1925	.3	918	334	.0	1017	1226	.0	1115	2228	.1	1215	10	1	3														
2025	113	2326	.5	212	1453	.0	314	754	.2	413	121	.8	512	1755	.5	611	843	.4	710	2136	.3	8	9	854	.6	9	719	8	3	10	7	447	.0	11	514	18	.9	12	5	013	.7											

3-KWADRA

2000	128	856	.7	227	453	.5	328	120	.6	426	2030	.0	526	1254	.9	625	2	0	0	724	12	1	9	822	1950	.5	921	228	.3	1020	859	.1	1118	1624	.5	1218	141	.3											
2001	116	1334	.6	215	423	.5	316	2145	.2	415	1631	.1	515	1110	.6	614	428	.2	713	1945	.1	812	853	.0	910	1959	.3	1010	519	.5	11	813	21	2	12	720	51	.7											
2002	1	6	454	.7	2	414	33	.0	3	6	224	.5	4	416	29	.0	5	4	816	0	6	3	1	5	1	7	218	19	1	8	1112	1	9	831	331	.1	929	18	2	7	1029	627	5	1127	1646	.2	1227	130	.9
2003	125	933	.0	223	1745	.8	325	251	.0	423	1318	.2	523	130	.5	621	1544	.9	721	8	1	1	820	148	.0	918	20	2	7	1018	1331	.1	1117	514	.8	1216	1842	.0											
2004	115	545	.5	213	1439	.5	313	22	0	7	412	446	.1	511	12	4	0	6	921	2	2	7	9	833	.4	8	723	1	1	9	616	10	.5	10	611	11	7	11	5	653	.3	12	5	152	.5				
2005	1	318	45	.4	2	2	826	.6	3	318	36	.3	4	2	150	.3	5	1	724	1	530	1247	.2	628	1923	.2	728	418	8	826	1618	.0	925	740	.7	1025	216	5	1123	2311	.0	1223	2035	.9					
2006	122	1613	.5	221	816	.5	322	2010	.3	421	428	.2	520	1020	.4	618	15	8	2	717	2012	.4	816	250	.6	914	1215	.2	1014	125	.4	1112	1845	.2	1212	1531	.5												
2007	111	1344	.3	210	1050	.9	312	453	.8	410	19	3	9	510	526	.7	6	812	42	.5	7	717	53	.4	8	522	19	5	9	4	332	.2	10	311	5	6	11	122	18	0	12	113	43	.9	1231	850	.7		
2008	130	6	2	7	229	318	.0	329	2247	.1	428	1511	.8	528	356	.3	626	13	9	6	725	1941	.4	824	049	4	922	6	4	2	1021	1254	.5	1119	2230	.6	1219	1129	.2										
2009	118	345	.6	216	2237	.0	318	1847	.1	417	1436	.1	517	825	.7	615	2314	.3	715	1052	.9	813	1954	.9	912	315	.5	1011	955	.7	11	916	55	7	12	9	113	.2											
2010	1	711	39	.3	2	6	048	.3	3	716	41	.6	4	610	36	.6	5	6	514	7	6	423	12	.8	7	415	34	.9	8	3	558	.4	9	118	21	.5	10	1	451	.8	1030	1345	.6	1128	2136	.3	1228	518	.3
2011	126	1357	.1	225	026	.1	326	13	7	1	425	346	.6	524	1951	.9	623	1248	.0	723	6	1	7	821	2254	.3	920	1438</																					

ZAĆMIENIA SŁOŃCA I KSIĘŻYCA w latach 2000 – 2025

widoczne w Piwnicach

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

Oznaczenia:

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 pół-trwania całkowitego zaćmienia (τ_p) [minuty] i oznaczono go literą τ), 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		POCZĄTEK		MAX.		KONIEC		FAZA		V	Az	Średnice		Wsch.	TT-UT
Rok	M D d	CET	h	CET	h	CET	h	f	%	deg	Ds	Dm	/Zach.		
2003	531Sa	330	0	426	7	527	15	0.853	79p	16	242	31.55	29.66	331.9	1.19
2005	10 3Mo	910	25	1018	31	1129	33	0.434	32p	233	338	31.97	30.41	553.7	1.23
2006	329We	1054	39	1155	40	1256	39	0.490	38p	140	2	32.04	33.55	1811.3	1.25
2008	8 1Fr	948	47	1045	52	1144	55	0.349	24p	43	333	31.52	32.93	407.2	1.28
2011	1 4Tu	813	1	934	9	1101	13	0.821	76p	10	328	32.53	30.69	803.6	1.33
2015	320Fr	945	30	1054	35	1205	37	0.757	70p	347	342	32.12	33.74	552.9	1.41
2021	610Th	1047	58	1149	60	1252	57	0.229	13p	344	2	31.51	29.97	2006.2	1.52
2022	1025Tu	1011	23	1119	25	1228	24	0.503	39p	37	357	32.17	31.98	633.7	1.54
2025	329Sa	1143	40	1226	40	1309	38	0.205	11p	315	12	32.04	33.71	1812.1	1.59

CIENIOWE ZAĆMIENIA KSIĘŻYCA

DATA				POCZĄTEK				MAKSIMUM				KONIEC				FAZA		Dp	Dc	Dk	TT-UT	W/Z	Long	Lat	lp.			
Rok	M	D	d	CET	h	Az	V	P	CET	h	Az	V	P	CET	h	Az	V	P	f	%	[arcmin]	[s]	CET	[deg]				
2000	12	Fr		402	31	80	40	79	543	17	100	328	7	725	3	118	260	294	1.33	39t	157.3	90.9	33.1	69	749	291.9	19.8	1
2001	1	Tu		1942	34	278	154	114	2120	47	302	216	183	2259	57	334	268	252	1.19	31t	158.5	92.0	33.4	70	1530	56.7	22.4	2
2003	5	Fr		303	5	48	106	134	440	-7	67	164	200	617	-21	84	226	266	1.13	26t	157.5	92.8	33.4	72	350	304.2	-18.6	3
2003	11	Su		032	50	25	26	41	218	40	58	305	338	404	26	82	235	274	1.02	12t	143.4	77.4	29.5	72	712	336.5	16.3	4
2004	5	Tu		1948	4	306	126	95	2130	14	327	43	23	2312	19	351	316	310	1.31	38t	156.3	91.5	33.1	73	1912	51.5	-16.5	5
2004	10	28	Th	214	37	56	50	81	404	23	81	117	155	554	7	103	191	228	1.31	41t	147.2	81.4	30.5	73	647	309.8	13.4	6
2006	9	Th		1905	5	290	32	358	1951	12	300	3	332	2037	17	310	334	306	0.19	12	157.7	92.8	33.4	75	1826	77.2	-6.7	7
2007	3	Sa		2230	40	331	154	137	2421	43	8	204	208	2611	36	42	256	280	1.24	37t	144.3	78.4	29.7	76	3034	12.9	6.9	8
2008	2	Th		243	35	54	63	93	426	21	77	350	27	609	6	97	283	320	1.11	25t	149.7	83.6	31.1	77	652	311.8	10.5	9
2008	8	16	Sa	2035	11	313	126	99	2210	20	334	171	155	2344	23	358	212	211	0.81	85	147.3	82.8	30.7	77	1903	43.3	-12.9	10
2009	1	23	Th	1952	37	279	213	173	2022	41	286	229	190	2053	45	293	244	207	0.08	3	157.7	91.2	33.2	78	1514	70.4	24.0	11
2010	1	22	Tu	732	3	126	81	114	917	-8	146	164	185	1101	-14	169	250	257	1.26	37t	152.1	85.7	31.7	79	759	235.4	23.7	12
2011	6	15	We	1923	-6	303	125	92	2112	6	325	199	177	2302	12	349	269	261	1.70	50t	151.7	87.4	31.9	80	2009	57.0	-23.2	13
2011	1	21	10	1345	-10	210	86	67	1532	0	232	31	1	1718	14	251	332	294	1.11	26t	145.9	79.5	30.1	80	1529	140.3	22.6	14
2013	4	25	Th	2052	12	318	47	22	2107	14	321	37	14	2123	15	325	27	6	0.02	0	155.0	90.1	32.7	82	1901	57.4	-14.4	15
2015	9	28	Mo	207	28	45	28	54	347	16	68	308	342	527	3	88	234	271	1.28	36t	158.0	92.8	33.5	84	547	316.1	1.5	16
2017	8	7	Mo	1822	-8	286	175	138	1920	0	297	202	169	2018	7	308	228	199	0.25	17	145.6	81.2	30.3	87	1922	86.2	-15.4	17
2018	7	27	Fr	1924	-3	300	122	89	2121	10	324	194	172	2319	17	351	261	255	1.61	52t	142.4	78.1	29.4	88	1943	56.3	-19.0	18
2019	1	21	Mo	433	27	87	78	118	612	13	105	149	187	751	0	124	224	256	1.20	31t	158.4	91.9	33.4	89	753	284.8	20.3	19
2019	7	16	Tu	2101	6	321	70	46	2230	12	341	8	356	2360	14	1	305	305	0.66	66	144.4	80.1	30.0	89	2002	39.0	-21.9	20
2022	5	16	Mo	327	2	53	65	96	511	-12	72	342	20	655	-27	91	264	303	1.42	43t	155.9	91.3	33.0	92	343	296.2	-19.3	21
2023	1	02	28	2034	37	303	165	133	2114	42	313	182	155	2153	46	325	197	176	0.13	6	154.0	88.2	32.3	93	1612	52.1	14.1	22
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	95	530	318.1	-2.6	23
2025	9	7	Su	1726	-8	271	83	46	1911	7	291	6	332	2056	20	313	283	257	1.37	41t	153.5	88.7	32.3	96	1821	86.8	-6.0	24

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	lp.
Rok M D d																				
2000 121Fr	543.5	17	100	328	7	2.332	102t	321.3	1.329	100	203.9	77.7	157.3	90.9	33.1	69	749	291.9	19.8	1
2001 1 9Tu	2120.4	47	302	216	183	2.188	98t	314.1	1.193	100	196.9	61.9	158.5	92.0	33.4	70	1530	56.7	22.4	2
2002 624Mo	2227.0	9	341	16	4	0.236	17	137.2	-0.788	0	0.0	0.0	149.8	85.5	31.4	71	2020	38.8	-24.8	3
20021120We	246.5	39	66	306	341	0.887	93	269.2	-0.223	0	0.0	0.0	144.7	78.6	29.8	71	728	330.1	18.7	4
2003 516Fr	440.0	-7	67	164	200	2.100	96t	309.6	1.132	100	194.5	52.5	157.5	92.8	33.4	72	350	304.2	-18.6	5
200311 8Sa	2618.4	40	58	305	338	2.141	115t	366.9	1.021	100	211.9	23.9	143.4	77.4	29.5	72	3112	336.5	16.3	6
2004 5 4Tu	2130.0	14	327	43	23	2.288	101t	318.8	1.308	100	203.8	76.2	156.3	91.5	33.1	73	1912	51.5	-16.5	7
20041028Th	404.0	23	81	117	155	2.390	115t	357.2	1.312	100	219.2	81.1	147.2	81.4	30.5	73	647	309.8	13.4	8
2006 314Tu	2447.3	38	16	199	209	1.057	30t	292.1	-0.057	0	0.0	0.0	143.4	77.7	29.5	75	3011	5.9	3.1	9
2006 9 7Th	1951.1	12	300	3	332	1.158	42t	258.0	0.189	12	92.4	0.0	157.7	92.8	33.4	75	1826	77.2	-6.7	10
2007 3 3Sa	2420.7	43	8	204	208	2.346	218t	369.0	1.236	100	221.5	73.9	144.3	78.4	29.7	76	3034	12.9	6.9	11
2008 221Th	425.9	21	77	350	27	2.172	107t	342.4	1.110	100	206.0	50.8	149.7	83.6	31.1	77	652	311.8	10.5	12
2008 816Sa	2209.8	20	334	171	155	1.863	98t	334.1	0.812	85	188.8	0.0	147.3	82.8	30.7	77	1903	43.3	-12.9	13
2009 2 9Mo	1538.0	-10	234	54	24	0.926	96	243.0	-0.084	0	0.0	0.0	156.1	89.8	32.8	78	1653	143.6	13.5	14
2009 8 6Th	138.9	17	28	141	158	0.429	39	196.6	-0.662	0	0.0	0.0	142.9	78.4	29.5	78	426	351.3	-15.6	15
20091231Th	2022.5	41	286	229	190	1.081	31t	254.9	0.081	3	61.7	0.0	157.7	91.2	33.2	78	1514	70.4	24.0	16
20101221Tu	916.6	-8	146	164	185	2.307	108t	338.4	1.260	100	209.2	73.1	152.1	85.7	31.7	79	759	235.4	23.7	17
2011 615We	2112.5	6	325	199	177	2.713	111t	339.2	1.704	100	219.8	100.7	151.7	87.4	31.9	80	2009	57.0	-23.2	18
20111210Sa	1531.5	0	232	31	1	2.213	114t	359.9	1.109	100	212.7	52.0	145.9	79.5	30.1	80	1529	140.3	22.6	19
20121128We	1532.8	-1	234	27	356	0.943	97	280.8	-0.184	0	0.0	0.0	143.3	77.1	29.4	81	1540	138.9	20.5	20
2013 425Th	2107.2	14	321	37	14	1.012	13t	251.7	0.019	0	30.8	0.0	155.0	90.1	32.7	82	1901	57.4	-14.4	21
20131018Fr	2450.0	44	28	147	164	0.791	84	243.8	-0.268	0	0.0	0.0	148.9	83.3	31.0	82	3042	358.4	11.0	22
2015 928Mo	346.9	16	68	308	342	2.255	99t	313.7	1.281	100	200.5	72.6	158.0	92.8	33.5	84	547	316.1	1.5	23
2016 916Fr	1954.0	15	299	14	342	0.934	97	243.3	-0.059	0	0.0	0.0	155.2	90.2	32.8	86	1802	75.5	-3.3	24
2017 210Fr	2543.6	44	37	351	13	1.015	14t	263.4	-0.031	0	0.0	0.0	151.7	85.5	31.7	87	3113	352.4	13.1	25
2017 8 7Mo	1920.1	0	297	202	169	1.315	66t	305.0	0.250	17	116.3	0.0	145.6	81.2	30.3	87	1922	86.2	-15.4	26
2018 131We	1429.5	-14	217	32	10	2.320	102t	320.3	1.320	100	203.3	76.7	157.4	91.1	33.2	88	1635	160.9	17.0	27
2018 727Fr	2121.4	10	324	194	172	2.706	124t	377.4	1.612	100	235.1	103.5	142.4	78.1	29.4	88	1943	56.3	-19.0	28
2019 121Mo	611.9	13	105	149	187	2.194	99t	314.6	1.200	100	197.3	62.8	158.4	91.9	33.4	89	753	284.8	20.3	29
2019 716Tu	2230.5	12	341	8	356	1.731	96t	337.5	0.657	66	178.6	0.0	144.4	80.1	30.0	89	2002	39.0	-21.9	30
2020 110Fr	2009.7	38	283	222	183	0.922	96	248.8	-0.112	0	0.0	0.0	153.7	87.2	32.2	90	1530	74.5	23.0	31
2020 6 5Fr	2024.7	3	314	219	192	0.594	60	203.2	-0.401	0	0.0	0.0	153.5	89.1	32.4	90	1956	68.7	-21.5	32
20211119Fr	1002.6	-16	158	327	341	2.099	114t	365.2	0.978	99	208.9	0.0	143.5	77.4	29.5	91	709	220.8	19.2	33
2022 516Mo	511.1	-12	72	342	20	2.398	103t	321.7	1.418	100	207.8	85.5	155.9	91.3	33.0	92	343	296.2	-19.3	34
2023 5 5Fr	1822.5	-9	289	59	23	0.990	100	261.8	-0.041	0	0.0	0.0	150.2	85.3	31.4	93	1927	98.2	-17.2	35
20231028Sa	2113.7	42	313	182	155	1.144	42t	268.5	0.127	6	78.9	0.0	154.0	88.2	32.3	93	1612	52.1	14.1	36
2024 918We	343.8	14	64	298	331	1.063	27t	250.0	0.090	4	64.5	0.0	157.7	92.7	33.4	95	530	318.1	-2.6	37
2025 314Fr	758.4	-16	117	177	209	2.286	117t	366.2	1.182	100	218.7	66.1	144.4	78.6	29.8	96	605	257.9	2.7	38
2025 9 7Su	1911.3	7	291	6	332	2.370	105t	329.8	1.366	100	210.0	82.8	153.5	88.7	32.3	96	1821	86.8	-6.0	39