

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	ANG.POS.			HELIOGRÁFICAS		DATA	ANG.POS.			HELIOGRÁFICAS	
	DO	EIXO		LT.	LG.		DO	EIXO		LT.	LG.
		G		G	G			G		G	G
JAN. 0	+	2.81	-2.82	84.07		JAN. 31	-11.52	-5.90	35.86		
1		2.32	2.94	70.89		FEV. 1	11.93	5.97	22.69		
2		1.84	3.06	57.72		2	12.34	6.04	9.53		
3		1.35	3.17	44.55		3	12.74	6.11	356.36		
4		0.87	3.29	31.38		4	13.14	6.18	343.20		
5	+	0.38	-3.40	18.21		5	-13.53	-6.25	330.03		
6	-	0.10	3.52	5.04		6	13.92	6.31	316.86		
7		0.58	3.63	351.87		7	14.31	6.37	303.70		
8		1.07	3.74	338.71		8	14.68	6.43	290.53		
9		1.55	3.85	325.54		9	15.06	6.49	277.36		
10	-	2.03	-3.96	312.37		10	-15.43	-6.55	264.19		
11		2.50	4.06	299.20		11	15.79	6.60	251.03		
12		2.98	4.17	286.03		12	16.15	6.65	237.86		
13		3.46	4.27	272.86		13	16.50	6.70	224.69		
14		3.93	4.38	259.69		14	16.85	6.75	211.52		
15	-	4.40	-4.48	246.52		15	-17.19	-6.80	198.36		
16		4.87	4.58	233.36		16	17.52	6.84	185.19		
17		5.33	4.68	220.19		17	17.85	6.88	172.02		
18		5.80	4.78	207.02		18	18.18	6.92	158.85		
19		6.26	4.87	193.85		19	18.50	6.96	145.68		
20	-	6.71	-4.97	180.69		20	-18.81	-6.99	132.52		
21		7.17	5.06	167.52		21	19.12	7.03	119.35		
22		7.62	5.15	154.35		22	19.42	7.06	106.18		
23		8.07	5.24	141.19		23	19.72	7.09	93.01		
24		8.51	5.33	128.02		24	20.01	7.11	80.13		
25	-	8.95	-5.42	114.86		25	-20.29	-7.13	66.67		
26		9.39	5.50	101.69		26	20.57	7.16	53.50		
27		9.82	5.58	88.52		27	20.84	7.18	40.33		
28		10.25	5.67	75.36		28	21.10	7.19	27.16		
29		10.68	5.75	62.19		29	21.36	7.21	13.98		
30	-11.10	-5.82	49.03			MAR. 1	-21.61	-7.22	0.81		
31	-11.52	-5.90	35.86			2	-21.86	-7.23	347.64		

INÍCIO DA ROTAÇÃO SINÓDICA NÚMERO 2227 6.38 JAN.
2228 2.72 FEV.

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

ANG. POS. HELIOGRÁFICAS				ANG. POS. HELIOGRÁFICAS						
DATA	DO	EIXO	LT.	DATA	DO	EIXO	LT.			
		G	G			G	G			
MAR.	1	-21.61	-7.22	0.81	ABR.	1	-6.53	312.18		
	2	21.86	7.23	347.64		2	26.19	6.47	298.99	
	3	22.10	7.24	334.47		3	26.22	6.42	285.79	
	4	22.33	7.24	321.29		4	26.24	6.36	272.60	
	5	22.56	7.25	308.12		5	26.25	6.30	259.40	
	6	-22.78	-7.25	294.94		6	-26.26	-6.24	246.21	
	7	23.00	7.25	281.77		7	26.26	6.17	233.01	
	8	23.20	7.25	268.59		8	26.25	6.10	219.81	
	9	23.40	7.24	255.41		9	26.24	6.04	206.61	
	10	23.60	7.23	242.24		10	26.21	5.97	193.41	
	11	-23.79	-7.22	229.06		11	-26.18	-5.90	180.21	
	12	23.97	7.21	215.88		12	26.15	5.82	167.01	
	13	24.14	7.20	202.70		13	26.10	5.75	153.81	
	14	24.31	7.18	189.52		14	26.05	5.67	140.61	
	15	24.47	7.16	176.34		15	25.99	5.59	127.40	
	16	-24.63	-7.14	163.16		16	-25.93	-5.51	114.20	
	17	24.77	7.12	149.98		17	25.85	5.43	100.99	
	18	24.91	7.10	136.80		18	25.77	5.35	87.79	
	19	25.05	7.07	123.62		19	25.68	5.26	74.58	
	20	25.17	7.04	110.43		20	25.59	5.18	61.37	
	21	-25.30	-7.01	97.25		21	-25.48	-5.09	48.16	
	22	25.41	6.98	84.06		22	25.37	5.00	34.96	
	23	25.51	6.94	70.88		23	25.25	4.91	21.75	
	24	25.61	6.90	57.69		24	25.13	4.82	8.54	
	25	25.71	6.86	44.51		25	25.00	4.73	355.33	
	26	-25.79	-6.82	31.32		26	-24.86	-4.63	342.11	
	27	25.87	6.78	18.13		27	24.71	4.54	328.90	
	28	25.94	6.73	4.94		28	24.55	4.44	315.69	
	29	26.01	6.68	351.75		29	24.39	4.35	302.47	
	30	26.06	6.63	338.56		30	24.22	4.25	289.26	
	31	-26.11	-6.58	325.37		MAIO	1	-24.05	-4.15	276.04
ABR.	1	-26.16	-6.53	312.18			2	-23.86	-4.04	262.82

INÍCIO DA ROTAÇÃO SINÓDICA NÚMERO 2229 1.06 MAR.
 2230 28.37 MAR.
 2231 24.65 ABR.

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

ANG.POS. HELIOGRÁFICAS				ANG.POS. HELIOGRÁFICAS			
DATA	DO	EIXO	LT.	DATA	DO	EIXO	LT.
		G	G			G	G
MAIO 1		-24.05	-4.15	JUN. 1		-15.27	-0.64
2		23.86	4.04	2		14.89	0.52
3		23.67	3.94	3		14.51	0.40
4		23.48	3.84	4		14.12	0.28
5		23.27	3.73	5		13.73	0.16
6		-23.06	-3.63	6		-13.34	-0.04
7		22.84	3.52	7		12.94	+0.08
8		22.61	3.42	8		12.54	0.21
9		22.38	3.31	9		12.13	0.33
10		22.14	3.20	10		11.72	0.45
11		-21.90	-3.09	11		-11.30	+0.57
12		21.64	2.98	12		10.89	0.69
13		21.38	2.87	13		10.47	0.81
14		21.12	2.75	14		10.04	0.93
15		20.84	2.64	15		9.61	1.05
16		-20.56	-2.53	16		- 9.18	+1.17
17		20.28	2.41	17		8.75	1.28
18		19.98	2.30	18		8.32	1.40
19		19.68	2.18	19		7.88	1.52
20		19.38	2.07	20		7.44	1.64
21		-19.07	-1.95	21		- 7.00	+1.76
22		18.75	1.83	22		6.55	1.87
23		18.43	1.71	23		6.11	1.99
24		18.10	1.60	24		5.66	2.10
25		17.76	1.48	25		5.21	2.22
26		-17.42	-1.36	26		- 4.76	+2.33
27		17.08	1.24	27		4.31	2.45
28		16.73	1.12	28		3.86	2.56
29		16.37	1.00	29		3.41	2.67
30		16.01	0.88	30		2.96	2.78
31		-15.64	-0.76	JUL. 1		- 2.50	+2.89
JUN. 1		-15.27	-0.64	2		- 2.05	+3.00

INÍCIO DA ROTAÇÃO SINÓDICA NÚMERO 2232 21.87 MAIO
2233 18.08 JUN.

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

ANG. POS. HELIOGRÁFICAS					ANG. POS. HELIOGRÁFICAS				
DATA	DO	EIXO	LT.	LG.	DATA	DO	EIXO	LT.	LG.
		G	G	G			G	G	G
JUL. 1	-	2.50	+2.89	188.95	AGO. 1	+10.96	+5.80	138.76	
2		2.05	3.00	175.71	2	11.36	5.87	125.54	
3		1.60	3.11	162.48	3	11.75	5.94	112.31	
4		1.14	3.22	149.24	4	12.13	6.01	99.09	
5		0.69	3.33	136.00	5	12.52	6.08	85.86	
6	-	0.24	+3.44	122.77	6	+12.90	+6.14	72.64	
7	+	0.21	3.54	109.53	7	13.27	6.20	59.41	
8		0.67	3.65	96.30	8	13.64	6.27	46.19	
9		1.12	3.75	83.06	9	14.01	6.33	32.97	
10		1.57	3.85	69.83	10	14.37	6.38	19.75	
11	+	2.01	+3.95	56.59	11	+14.73	+6.44	6.53	
12		2.46	4.05	43.36	12	15.08	6.50	353.31	
13		2.91	4.15	30.13	13	15.43	6.55	340.09	
14		3.35	4.25	16.89	14	15.78	6.60	326.87	
15		3.80	4.35	3.66	15	16.12	6.65	313.65	
16	+	4.24	+4.44	350.43	16	+16.45	+6.70	300.43	
17		4.68	4.54	337.20	17	16.78	6.74	287.21	
18		5.12	4.63	323.96	18	17.11	6.79	274.00	
19		5.55	4.73	310.73	19	17.43	6.83	260.78	
20		5.98	4.82	297.50	20	17.75	6.87	247.57	
21	+	6.41	+4.91	284.27	21	+18.06	+6.91	234.35	
22		6.84	4.99	271.04	22	18.36	6.94	221.14	
23		7.27	5.08	257.81	23	18.67	6.98	207.92	
24		7.69	5.17	244.58	24	18.96	7.01	194.71	
25		8.11	5.25	231.35	25	19.25	7.04	181.50	
26	+	8.53	+5.33	218.13	26	+19.54	+7.07	168.28	
27		8.94	5.41	204.90	27	19.82	7.09	155.07	
28		9.35	5.49	191.67	28	20.10	7.12	141.86	
29		9.76	5.57	178.44	29	20.37	7.14	128.65	
30		10.17	5.65	165.21	30	20.63	7.16	115.44	
31	+10.57		+5.72	151.99	31	+20.89	+7.18	102.23	
AGO. 1	+10.96		+5.80	138.76	SET. 1	+21.14	+7.20	89.02	

INÍCIO DA ROTAÇÃO SINÓDICA NÚMERO 2234 15.28 JUL.
2235 11.49 AGO.

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	ANG.POS.		HELIOGRÁFICAS		DATA	ANG.POS.		HELIOGRÁFICAS	
	DO	EIXO G	LT. G	LG. G		DO	EIXO G	LT. G	LG. G
SET. 1		+21.14	+7.20	89.02	OUT. 1		+25.97	+6.71	52.95
2		21.39	7.21	75.81	2		26.03	6.66	39.76
3		21.64	7.22	62.60	3		26.09	6.61	26.56
4		21.87	7.23	49.39	4		26.13	6.56	13.37
5		22.10	7.24	36.18	5		26.17	6.50	0.17
6		+22.33	+7.24	22.97	6		+26.20	+6.45	346.98
7		22.55	7.25	9.77	7		26.23	6.39	333.78
8		22.76	7.25	356.56	8		26.25	6.33	320.59
9		22.97	7.25	343.36	9		26.26	6.27	307.40
10		23.17	7.25	330.15	10		26.26	6.20	294.21
11		+23.37	+7.24	316.95	11		+26.26	+6.14	281.01
12		23.56	7.24	303.74	12		26.25	6.07	267.82
13		23.75	7.23	290.54	13		26.23	6.00	254.63
14		23.92	7.22	277.34	14		26.20	5.93	241.44
15		24.10	7.20	264.13	15		26.17	5.86	228.25
16		+24.26	+7.19	250.93	16		+26.12	+5.78	215.06
17		24.42	7.17	237.73	17		26.07	5.71	201.87
18		24.58	7.15	224.53	18		26.02	5.63	188.68
19		24.72	7.13	211.33	19		25.95	5.55	175.49
20		24.86	7.11	198.13	20		25.88	5.46	162.30
21		+25.00	+7.08	184.93	21		+25.80	+5.38	149.11
22		25.12	7.05	171.73	22		25.71	5.30	135.92
23		25.25	7.02	158.53	23		25.62	5.21	122.73
24		25.36	6.99	145.33	24		25.52	5.12	109.55
25		25.47	6.96	132.14	25		25.41	5.03	96.36
26		+25.57	+6.92	118.94	26		+25.29	+4.94	83.17
27		25.66	6.88	105.74	27		25.16	4.85	69.98
28		25.75	6.84	92.54	28		25.03	4.75	56.79
29		25.83	6.80	79.35	29		24.89	4.66	43.61
30		25.91	6.75	66.15	30		24.74	4.56	30.42
OUT. 1		+25.97	+6.71	52.95	31		+24.58	+4.46	17.23
2		+26.03	+6.66	39.76	NOV. 1		+24.41	+4.36	4.05

INÍCIO DA ROTAÇÃO SINÓDICA NÚMERO 2236 7.74 SET.
2237 5.01 OUT.

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	ANG.POS.		HELIOGRÁFICAS		DATA	ANG.POS.		HELIOGRÁFICAS	
	DO	EIXO	LT.	LG.		DO	EIXO	LT.	LG.
		G	G	G			G	G	G
NOV. 1		+24.41	+4.36	4.05	DEZ. 1		+15.93	+0.86	328.57
2		24.24	4.26	350.86	2		15.54	0.73	315.39
3		24.06	4.15	337.67	3		15.15	0.60	302.21
4		23.87	4.05	324.49	4		14.75	0.47	289.03
5		23.67	3.94	311.30	5		14.34	0.35	275.86
6		+23.47	+3.84	298.12	6		+13.93	+0.22	262.68
7		23.26	3.73	284.93	7		13.51	+0.09	249.50
8		23.04	3.62	271.75	8		13.09	-0.04	236.32
9		22.81	3.51	258.56	9		12.67	0.17	223.15
10		22.57	3.40	245.38	10		12.23	0.29	209.97
11		+22.33	+3.28	232.19	11		+11.80	-0.42	196.79
12		22.08	3.17	219.01	12		11.36	0.55	183.62
13		21.82	3.06	205.83	13		10.91	0.68	170.44
14		21.55	2.94	192.65	14		10.47	0.81	157.27
15		21.28	2.82	179.46	15		10.01	0.93	144.09
16		+21.00	+2.71	166.28	16		+ 9.56	-1.06	130.92
17		20.71	2.59	153.10	17		9.10	1.19	117.75
18		20.41	2.47	139.92	18		8.64	1.31	104.57
19		20.11	2.35	126.73	19		8.17	1.44	91.40
20		19.80	2.23	113.55	20		7.71	1.57	78.22
21		+19.48	+2.10	100.37	21		+ 7.24	-1.69	65.05
22		19.15	1.98	87.19	22		6.76	1.82	51.88
23		18.82	1.86	74.01	23		6.29	1.94	38.70
24		18.48	1.74	60.83	24		5.81	2.06	25.53
25		18.14	1.61	47.65	25		5.33	2.19	12.36
26		+17.79	+1.49	34.47	26		+ 4.85	-2.31	359.19
27		17.43	1.36	21.29	27		4.37	2.43	346.01
28		17.06	1.24	8.11	28		3.89	2.55	332.84
29		16.69	1.11	354.93	29		3.41	2.67	319.67
30		16.32	0.98	341.75	30		2.92	2.79	306.50
DEZ. 1		+15.93	+0.86	328.57	31		+ 2.44	-2.91	293.33
2		+15.54	+0.73	315.39	32		+ 1.96	-3.03	280.16

INÍCIO DA ROTAÇÃO SINÓDICA NÚMERO 2238 1.31 NOV.
2239 28.62 NOV.
2240 25.94 DEZ.

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG. POS.		FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
JAN.	0	4.8	+1.97	+5.69	0	+4 0	323.27	-0.03	337.48	251.4	0.22
	1	5.8	+0.77	6.36	0	4 0	335.44	0.05	336.33	249.1	0.30
	2	6.8	-0.50	6.75	0	4 0	347.61	0.06	336.18	247.7	0.39
	3	7.8	1.77	6.86	0	4 -1	359.77	0.08	336.97	247.1	0.48
	4	8.8	2.97	6.68	0	4 1	11.93	0.10	338.65	247.5	0.58
	5	9.8	-4.03	+6.20	-1	+4 -1	24.08	-0.12	341.18	248.8	0.67
	6	10.8	4.88	5.43	1	4 1	36.22	0.15	344.57	251.1	0.76
	7	11.8	5.45	4.38	1	4 1	48.36	0.17	348.78	254.5	0.84
	8	12.8	5.71	3.09	1	4 1	60.50	0.20	353.77	259.1	0.91
	9	13.8	5.62	+1.60	1	4 1	72.63	0.23	359.37	265.0	0.96
	10	14.8	-5.17	-0.01	-1	+4 -1	84.75	-0.26	5.29	273.9	0.99
	11	15.8	4.39	1.67	1	4 1	96.88	0.30	11.07	72.3	1.00
	12	16.8	3.32	3.24	1	4 1	109.00	0.33	16.19	96.0	0.98
	13	17.8	2.05	4.63	1	4 1	121.13	0.37	20.17	102.7	0.94
	14	18.8	-0.68	5.72	-1	4 -1	133.26	0.41	22.74	107.1	0.87
	15	19.8	+0.70	-6.44	0	+4 0	145.40	-0.44	23.81	110.0	0.78
	16	20.8	2.00	6.75	0	4 0	157.54	0.48	23.44	111.4	0.67
	17	21.8	3.13	6.63	0	4 0	169.69	0.51	21.77	111.4	0.56
	18	22.8	4.05	6.11	0	4 0	181.85	0.54	18.95	110.1	0.45
	19	23.8	4.73	5.24	0	4 0	194.01	0.58	15.14	107.5	0.34
	20	24.8	+5.16	-4.09	0	+4 0	206.18	-0.61	10.50	103.7	0.24
	21	25.8	5.34	2.72	0	4 0	218.36	0.64	5.25	98.7	0.15
	22	26.8	5.30	-1.24	0	4 0	230.54	0.67	359.66	92.7	0.09
	23	27.8	5.04	+0.30	0	4 0	242.72	0.69	354.06	85.2	0.04
	24	28.8	4.58	1.79	0	4 0	254.91	0.72	348.83	73.1	0.01
	25	0.1	+3.94	+3.17	0	+4 0	267.10	-0.74	344.29	321.0	0.00
	26	1.1	3.13	4.38	0	4 0	279.29	0.77	340.69	266.6	0.01
	27	2.1	2.16	5.38	-1	4 0	291.48	0.79	338.13	258.3	0.04
	28	3.1	+1.06	6.12	1	4 0	303.67	0.80	336.64	254.0	0.09
	29	4.1	-0.16	6.59	1	4 0	315.85	0.82	336.17	251.4	0.15
	30	5.1	-1.43	+6.77	-1	+4 0	328.03	-0.84	336.66	250.1	0.22
	31	6.1	2.72	6.67	1	4 0	340.21	0.85	338.03	249.9	0.31
FEV.	1	7.1	3.96	6.28	1	4 -1	352.38	0.87	340.25	250.7	0.40
	2	8.1	5.08	5.61	1	4 1	4.54	0.88	343.29	252.5	0.49
	3	9.1	6.01	4.68	1	4 1	16.70	0.90	347.12	255.3	0.59
	4	10.1	-6.67	+3.51	-1	+4 -1	28.85	-0.91	351.71	259.3	0.69
	5	11.1	6.98	2.13	1	4 1	41.00	0.93	356.98	264.4	0.78
	6	12.1	6.88	+0.60	1	4 1	53.14	0.95	2.72	270.7	0.86
	7	13.1	6.33	-1.02	1	4 1	65.28	0.98	8.58	278.4	0.93
	8	14.1	5.33	2.62	1	4 1	77.41	1.00	14.06	288.9	0.98
	9	15.1	-3.93	-4.08	-1	+4 -1	89.54	-1.03	18.62	323.4	1.00
	10	16.1	-2.23	-5.29	-1	+4 0	101.67	-1.05	21.86	87.9	0.99

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG. POS.		FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
FEV. 10	16.1	-2.23	-5.29	-1	+4	0	101.67	-1.05	21.86	87.9	0.99
11	17.1	-0.37	6.15	1	4	0	113.80	1.08	23.55	102.2	0.96
12	18.1	+1.49	6.58	1	4	0	125.94	1.10	23.67	106.9	0.90
13	19.1	3.19	6.56	1	4	0	138.08	1.13	22.35	108.5	0.81
14	20.1	4.60	6.12	1	4	0	150.22	1.15	19.76	108.2	0.71
15	21.1	+5.65	-5.30	-1	+4	0	162.38	-1.18	16.12	106.2	0.60
16	22.1	6.31	4.18	1	4	+1	174.54	1.20	11.61	102.9	0.49
17	23.1	6.59	2.86	1	4	1	186.70	1.22	6.47	98.4	0.38
18	24.1	6.53	-1.42	1	4	1	198.88	1.24	0.95	93.0	0.28
19	25.1	6.18	+0.07	1	4	1	211.06	1.26	355.39	86.9	0.20
20	26.1	+5.60	+1.53	-1	+4	+1	223.25	-1.29	350.11	80.3	0.12
21	27.1	4.84	2.89	1	4	+1	235.44	1.30	345.43	73.0	0.07
22	28.1	3.94	4.10	1	4	0	247.64	1.32	341.61	63.5	0.03
23	29.1	2.92	5.11	1	4	0	259.84	1.34	338.79	41.5	0.01
24	0.4	1.81	5.88	1	4	0	272.04	1.35	337.01	296.6	0.00
25	1.4	+0.62	+6.39	-1	+4	0	284.24	-1.36	336.25	264.4	0.02
26	2.4	-0.63	6.62	1	4	0	296.43	1.37	336.47	256.9	0.05
27	3.4	1.92	6.56	1	4	0	308.63	1.38	337.59	254.0	0.10
28	4.4	3.22	6.22	2	4	0	320.82	1.39	339.55	253.3	0.16
29	5.4	4.47	5.61	2	4	-1	333.01	1.39	342.32	254.1	0.24
MAR. 1	6.4	-5.63	+4.75	-2	+4	-1	345.20	-1.40	345.85	256.1	0.32
2	7.4	6.63	3.67	2	4	1	357.38	1.40	350.12	259.3	0.42
3	8.4	7.39	2.39	2	4	1	9.55	1.41	355.04	263.5	0.52
4	9.4	7.82	+0.96	2	4	1	21.72	1.41	0.48	268.8	0.62
5	10.4	7.83	-0.56	2	4	1	33.88	1.42	6.18	274.9	0.72
6	11.4	-7.37	-2.10	-2	+4	-1	46.04	-1.43	11.73	281.6	0.81
7	12.4	6.40	3.57	2	4	1	58.19	1.43	16.67	288.9	0.89
8	13.4	4.93	4.84	2	4	-1	70.33	1.44	20.52	297.6	0.95
9	14.4	3.06	5.81	2	4	0	82.47	1.45	22.93	315.0	0.99
10	15.4	-0.94	6.38	2	4	0	94.62	1.46	23.76	60.6	1.00
11	16.4	+1.24	-6.50	-1	+4	0	106.76	-1.47	23.03	98.1	0.97
12	17.4	3.28	6.15	1	4	0	118.91	1.48	20.86	103.9	0.92
13	18.4	5.01	5.39	1	4	+1	131.06	1.49	17.47	104.3	0.85
14	19.4	6.31	4.29	1	4	1	143.21	1.49	13.07	102.3	0.75
15	20.4	7.12	2.96	1	4	1	155.38	1.50	7.94	98.6	0.65
16	21.4	+7.46	-1.50	-1	+4	+1	167.55	-1.51	2.37	93.8	0.54
17	22.4	7.37	-0.01	1	4	1	179.73	1.52	356.70	88.2	0.44
18	23.4	6.93	+1.45	1	4	1	191.91	1.53	351.29	82.4	0.34
19	24.4	6.21	2.80	1	4	1	204.10	1.54	346.45	76.6	0.25
20	25.4	5.28	4.00	1	4	1	216.30	1.55	342.44	71.0	0.17
21	26.4	+4.20	+5.01	-1	+4	+1	228.51	-1.55	339.40	65.4	0.10
22	27.4	+3.04	+5.79	-1	+4	0	240.72	-1.56	337.38	59.2	0.05

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG. POS.		FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
MAR. 22	27.4	+3.04	+5.79	-1	+4	0	240.72	-1.56	337.38	59.2	0.05
23	28.4	1.81	6.30	1	4	0	252.93	1.56	336.39	49.7	0.02
24	29.4	+0.54	6.54	2	4	0	265.14	1.56	336.36	17.4	0.00
25	0.6	-0.74	6.50	2	4	0	277.36	1.56	337.26	283.8	0.01
26	1.6	2.02	6.18	2	4	0	289.57	1.56	339.01	263.1	0.02
27	2.6	-3.28	+5.59	-2	+4	0	301.79	-1.56	341.57	258.6	0.06
28	3.6	4.49	4.75	2	4	0	314.00	1.55	344.89	258.2	0.11
29	4.6	5.60	3.69	2	4	-1	326.20	1.54	348.94	260.0	0.18
30	5.6	6.58	2.46	2	4	1	338.41	1.53	353.64	263.2	0.26
31	6.6	7.35	+1.08	2	4	1	350.61	1.53	358.85	267.6	0.35
ABR. 1	7.6	-7.84	-0.38	-2	+4	-1	2.80	-1.52	4.36	272.8	0.45
2	8.6	7.96	1.86	2	4	1	14.99	1.51	9.85	278.6	0.56
3	9.6	7.63	3.28	2	4	-1	27.17	1.50	14.89	284.5	0.67
4	10.6	6.82	4.56	2	4	0	39.34	1.49	19.08	290.2	0.77
5	11.6	5.51	5.58	2	4	0	51.51	1.48	22.04	295.7	0.86
6	12.6	-3.76	-6.26	-2	+4	0	63.67	-1.47	23.55	301.4	0.93
7	13.6	-1.70	6.52	2	4	0	75.83	1.46	23.52	310.6	0.98
8	14.6	+0.50	6.30	2	4	0	87.99	1.45	21.99	4.7	1.00
9	15.6	2.63	5.64	1	4	0	100.15	1.44	19.09	91.4	0.99
10	16.6	4.51	4.59	1	4	+1	112.31	1.43	15.01	99.1	0.95
11	17.6	+5.98	-3.25	-1	+4	+1	124.48	-1.43	10.00	98.4	0.88
12	18.6	6.97	1.75	1	4	1	136.65	1.42	4.37	94.8	0.80
13	19.6	7.46	-0.19	1	4	1	148.82	1.41	358.50	90.0	0.70
14	20.6	7.48	+1.34	1	4	1	161.01	1.40	352.81	84.5	0.60
15	21.6	7.10	2.74	1	4	1	173.20	1.40	347.68	79.1	0.50
16	22.6	+6.39	+3.98	-1	+4	+1	185.40	-1.39	343.38	74.0	0.40
17	23.6	5.44	5.02	1	4	1	197.60	1.39	340.07	69.4	0.30
18	24.6	4.31	5.81	1	4	1	209.82	1.39	337.81	65.5	0.22
19	25.6	3.08	6.35	1	4	+1	222.03	1.38	336.57	62.2	0.15
20	26.6	1.80	6.61	1	4	0	234.26	1.37	336.32	59.0	0.09
21	27.6	+0.51	+6.58	-1	+4	0	246.48	-1.37	336.99	55.2	0.04
22	28.6	-0.77	6.27	1	4	0	258.71	1.36	338.53	46.8	0.01
23	29.6	2.00	5.69	2	4	0	270.94	1.35	340.89	354.6	0.00
24	0.9	3.17	4.86	2	4	0	283.17	1.33	344.04	273.2	0.01
25	1.9	4.26	3.80	2	4	0	295.41	1.32	347.93	264.1	0.03
26	2.9	-5.23	+2.55	-2	+4	0	307.63	-1.30	352.49	264.1	0.08
27	3.9	6.06	+1.17	2	4	0	319.86	1.28	357.59	267.0	0.14
28	4.9	6.70	-0.29	2	4	0	332.08	1.26	3.03	271.3	0.22
29	5.9	7.09	1.76	2	4	0	344.30	1.24	8.48	276.4	0.31
30	6.9	7.17	3.17	2	4	0	356.51	1.22	13.58	281.7	0.41
MAIO 1	7.9	-6.89	-4.45	-2	+4	0	8.72	-1.19	17.92	286.9	0.52
2	8.9	-6.21	-5.50	-1	+4	0	20.92	-1.17	21.19	291.4	0.63

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG. POS.		FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
		D	G	G	(0.01	G)	G	G	G	G	
MAIO	1	7.9	-6.89	-4.45	-2	+4 0	8.72	-1.19	17.92	286.9	0.52
	2	8.9	6.21	5.50	1	4 0	20.92	1.17	21.19	291.4	0.63
	3	9.9	5.11	6.25	1	4 0	33.11	1.15	23.15	295.2	0.73
	4	10.9	3.63	6.61	1	4 0	45.29	1.13	23.69	298.0	0.83
	5	11.9	-1.86	6.53	1	4 0	57.47	1.10	22.79	300.3	0.91
	6	12.9	+0.06	-6.00	-1	+4 0	69.65	-1.08	20.51	303.4	0.97
	7	13.9	1.97	5.05	1	4 +1	81.83	1.05	16.97	319.6	1.00
	8	14.9	3.71	3.76	1	4 1	94.00	1.03	12.32	83.0	0.99
	9	15.9	5.15	2.25	1	4 1	106.18	1.00	6.85	93.8	0.97
	10	16.9	6.17	-0.62	1	4 1	118.36	0.98	0.90	91.7	0.91
	11	17.9	+6.75	+0.99	-1	+4 +1	130.54	-0.96	354.93	87.1	0.84
	12	18.9	6.88	2.51	1	4 1	142.73	0.94	349.40	82.0	0.75
	13	19.9	6.60	3.84	1	4 1	154.93	0.92	344.68	76.9	0.66
	14	20.9	5.98	4.96	1	4 1	167.13	0.91	340.97	72.5	0.56
	15	21.9	5.09	5.83	1	4 1	179.34	0.89	338.37	68.8	0.46
	16	22.9	+3.99	+6.42	-1	+4 +1	191.56	-0.88	336.84	66.0	0.36
	17	23.9	2.78	6.72	1	4 +1	203.78	0.86	336.33	63.9	0.28
	18	24.9	1.49	6.74	1	4 0	216.01	0.85	336.75	62.7	0.20
	19	25.9	+0.21	6.47	1	4 0	228.25	0.84	338.06	62.1	0.13
	20	26.9	-1.03	5.92	1	4 0	240.48	0.82	340.20	61.9	0.07
	21	27.9	-2.19	+5.11	-1	+4 0	252.73	-0.80	343.14	61.3	0.03
	22	28.9	3.23	4.06	1	4 0	264.97	0.78	346.85	55.4	0.01
	23	0.3	4.14	2.81	1	4 0	277.21	0.76	351.28	294.9	0.00
	24	1.3	4.88	+1.42	1	4 0	289.46	0.74	356.30	268.8	0.02
	25	2.3	5.45	-0.07	1	4 0	301.70	0.72	1.73	270.0	0.05
JUN.	26	3.3	-5.81	-1.58	-1	+4 0	313.94	-0.69	7.25	274.1	0.11
	27	4.3	5.93	3.04	1	4 0	326.18	0.66	12.47	279.1	0.18
	28	5.3	5.80	4.35	1	4 0	338.41	0.63	17.00	284.0	0.27
	29	6.3	5.38	5.44	1	4 0	350.64	0.60	20.49	288.4	0.37
	30	7.3	4.68	6.24	1	4 0	2.86	0.57	22.74	292.0	0.48
	31	8.3	-3.70	-6.68	-1	+4 0	15.07	-0.54	23.65	294.4	0.60
	1	9.3	2.48	6.71	1	4 0	27.28	0.51	23.20	295.7	0.71
	2	10.3	-1.07	6.31	1	4 +1	39.48	0.48	21.44	295.8	0.81
	3	11.3	+0.43	5.50	-1	4 1	51.67	0.44	18.43	294.7	0.89
	4	12.3	1.92	4.32	0	4 1	63.86	0.41	14.30	292.8	0.95
	5	13.3	+3.29	-2.86	0	+4 +1	76.05	-0.37	9.22	292.2	0.99
	6	14.3	4.44	-1.25	0	4 1	88.24	0.34	3.45	74.7	1.00
	7	15.3	5.28	+0.42	0	4 1	100.43	0.31	357.40	90.0	0.98
	8	16.3	5.78	2.02	0	4 1	112.62	0.28	351.57	85.9	0.94
	9	17.3	5.90	3.47	0	4 1	124.81	0.25	346.40	80.8	0.88
	10	18.3	+5.67	+4.71	0	+4 +1	137.01	-0.22	342.22	76.1	0.80
	11	19.3	+5.11	+5.68	0	+4 +1	149.21	-0.20	339.17	72.1	0.71

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG. POS.		FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
JUN. 11	19.3	+5.11	+5.68	0	+4	+1	149.21	-0.20	339.17	72.1	0.71
12	20.3	4.29	6.37	0	4	1	161.42	0.18	337.25	69.1	0.62
13	21.3	3.24	6.76	0	4	1	173.64	0.16	336.42	66.9	0.53
14	22.3	2.06	6.85	0	4	1	185.86	0.14	336.56	65.8	0.43
15	23.3	+0.80	6.65	0	4	+1	198.09	0.13	337.61	65.5	0.34
16	24.3	-0.47	+6.17	0	+4	0	210.32	-0.11	339.49	66.1	0.25
17	25.3	1.68	5.41	0	4	0	222.56	0.09	342.18	67.6	0.17
18	26.3	2.77	4.42	0	4	0	234.81	0.08	345.65	70.1	0.11
19	27.3	3.69	3.20	0	4	0	247.05	0.06	349.86	73.6	0.05
20	28.3	4.40	1.82	0	4	0	259.30	0.03	354.75	78.2	0.02
21	29.3	-4.88	+0.32	0	+4	0	271.56	-0.01	0.14	84.8	0.00
22	0.7	5.11	-1.22	0	4	0	283.81	+0.01	5.74	267.9	0.01
23	1.7	5.09	2.72	0	4	0	296.06	0.04	11.16	274.2	0.03
24	2.7	4.81	4.10	0	4	0	308.31	0.07	15.96	279.9	0.08
25	3.7	4.30	5.27	0	4	0	320.56	0.09	19.77	284.9	0.16
26	4.7	-3.58	-6.14	0	+4	0	332.80	+0.12	22.32	288.8	0.24
27	5.7	2.69	6.65	0	4	0	345.03	0.16	23.53	291.6	0.35
28	6.7	1.67	6.77	0	4	+1	357.26	0.19	23.39	293.1	0.46
29	7.7	-0.57	6.47	0	4	1	9.48	0.22	21.97	293.2	0.58
30	8.7	+0.56	5.76	0	4	1	21.69	0.26	19.36	292.0	0.69
JUL. 1	9.7	+1.66	-4.70	0	+4	+1	33.90	+0.29	15.66	289.4	0.79
2	10.7	2.69	3.35	0	4	1	46.10	0.33	10.99	285.3	0.87
3	11.7	3.58	1.81	0	4	1	58.30	0.37	5.56	279.7	0.94
4	12.7	4.30	-0.17	+1	4	1	70.49	0.40	359.67	271.8	0.98
5	13.7	4.80	+1.45	1	4	1	82.68	0.44	353.77	241.8	1.00
6	14.7	+5.05	+2.97	+1	+4	+1	94.88	+0.47	348.31	92.2	0.99
7	15.7	5.02	4.29	1	4	1	107.07	0.50	343.71	82.9	0.96
8	16.7	4.71	5.36	1	4	1	119.27	0.53	340.20	77.2	0.91
9	17.7	4.13	6.15	1	4	1	131.47	0.55	337.85	73.1	0.85
10	18.7	3.31	6.64	1	4	1	143.67	0.57	336.63	70.3	0.77
11	19.7	+2.28	+6.82	+1	+4	+1	155.88	+0.59	336.45	68.5	0.68
12	20.7	+1.10	6.71	1	4	1	168.09	0.61	337.21	67.9	0.59
13	21.7	-0.16	6.30	1	4	+1	180.32	0.62	338.82	68.2	0.50
14	22.7	1.43	5.63	+1	4	0	192.54	0.64	341.23	69.5	0.40
15	23.7	2.64	4.71	0	4	0	204.77	0.65	344.41	71.8	0.31
16	24.7	-3.70	+3.57	0	+4	0	217.01	+0.67	348.35	75.2	0.23
17	25.7	4.55	2.25	0	4	0	229.25	0.68	352.98	79.8	0.15
18	26.7	5.12	+0.80	0	4	0	241.50	0.70	358.21	85.8	0.08
19	27.7	5.38	-0.73	0	4	0	253.75	0.71	3.79	93.7	0.04
20	28.7	5.29	2.26	0	4	0	266.00	0.73	9.38	108.6	0.01
21	0.3	-4.87	-3.69	0	+4	0	278.25	+0.75	14.51	243.6	0.00
22	1.3	-4.13	-4.93	+1	+4	0	290.51	+0.77	18.73	275.0	0.02

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG.	POS.	FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
JUL. 22	1.3	-4.13	-4.93	+1	+4	0	290.51	+0.77	18.73	275.0	0.02
23	2.3	3.15	5.89	1	3	0	302.76	0.79	21.72	283.0	0.07
24	3.3	2.00	6.50	1	3	+1	315.00	0.82	23.31	287.6	0.14
25	4.3	-0.77	6.69	1	3	1	327.24	0.84	23.50	290.1	0.22
26	5.3	+0.45	6.47	1	3	1	339.48	0.87	22.37	290.9	0.33
27	6.3	+1.59	-5.84	+1	+3	+1	351.71	+0.90	20.02	290.2	0.44
28	7.3	2.59	4.85	1	3	1	3.93	0.93	16.59	288.1	0.55
29	8.3	3.43	3.59	1	3	1	16.14	0.96	12.21	284.5	0.67
30	9.3	4.09	2.12	1	3	1	28.35	0.99	7.06	279.6	0.77
31	10.3	4.57	-0.55	1	4	1	40.55	1.02	1.39	273.4	0.85
AGO. 1	11.3	+4.85	+1.03	+1	+4	+1	52.74	+1.06	355.57	265.9	0.92
2	12.3	4.96	2.53	2	4	1	64.94	1.09	350.03	256.3	0.97
3	13.3	4.86	3.88	2	4	1	77.13	1.11	345.18	236.3	0.99
4	14.3	4.57	5.00	2	4	1	89.31	1.14	341.31	116.0	1.00
5	15.3	4.08	5.86	2	4	1	101.50	1.16	338.57	84.8	0.98
6	16.3	+3.37	+6.42	+2	+4	+1	113.70	+1.18	336.97	76.8	0.94
7	17.3	2.47	6.68	2	4	1	125.89	1.20	336.45	72.9	0.89
8	18.3	1.40	6.63	1	4	1	138.09	1.21	336.90	71.0	0.82
9	19.3	+0.18	6.30	1	4	1	150.29	1.22	338.23	70.4	0.75
10	20.3	-1.11	5.70	1	4	+1	162.49	1.23	340.38	71.0	0.66
11	21.3	-2.41	+4.86	+1	+4	0	174.71	+1.24	343.28	72.7	0.57
12	22.3	3.65	3.80	1	4	0	186.92	1.24	346.92	75.5	0.47
13	23.3	4.74	2.56	1	4	0	199.14	1.25	351.25	79.3	0.38
14	24.3	5.59	+1.18	1	4	0	211.37	1.25	356.21	84.3	0.28
15	25.3	6.13	-0.29	1	4	0	223.61	1.26	1.63	90.3	0.19
16	26.3	-6.27	-1.79	+1	+4	0	235.84	+1.27	7.22	97.4	0.12
17	27.3	5.99	3.23	1	3	0	248.08	1.27	12.57	105.9	0.06
18	28.3	5.26	4.52	1	3	0	260.33	1.28	17.21	119.0	0.02
19	29.3	4.14	5.56	1	3	+1	272.57	1.29	20.74	180.5	0.00
20	0.9	2.72	6.26	1	3	1	284.82	1.30	22.88	271.0	0.01
21	1.9	-1.11	-6.56	+1	+3	+1	297.06	+1.32	23.55	283.2	0.05
22	2.9	+0.54	6.41	1	3	1	309.30	1.33	22.79	287.2	0.12
23	3.9	2.09	5.84	2	3	1	321.54	1.34	20.72	288.1	0.20
24	4.9	3.43	4.90	2	3	1	333.76	1.36	17.50	286.9	0.30
25	5.9	4.49	3.67	2	3	1	345.98	1.38	13.28	284.1	0.42
26	6.9	+5.25	-2.24	+2	+3	+2	358.20	+1.40	8.27	279.8	0.53
27	7.9	5.71	-0.70	2	3	2	10.40	1.42	2.72	274.4	0.64
28	8.9	5.90	+0.84	2	3	2	22.60	1.44	356.95	268.1	0.74
29	9.9	5.86	2.32	2	3	2	34.80	1.46	351.39	261.3	0.83
30	10.9	5.62	3.65	2	4	2	46.99	1.48	346.40	254.1	0.90
31	11.9	+5.21	+4.77	+2	+4	+2	59.17	+1.50	342.31	245.9	0.95
SET. 1	12.9	+4.63	+5.65	+2	+4	+1	71.35	+1.52	339.29	233.3	0.98

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG.	POS.	FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
SET. 1	12.9	+4.63	+5.65	+2	+4	+1	71.35	+1.52	339.29	233.3	0.98
2	13.9	3.90	6.25	2	4	1	83.53	1.53	337.38	186.0	1.00
3	14.9	3.02	6.54	2	4	1	95.71	1.54	336.55	96.1	0.99
4	15.9	1.99	6.54	2	4	1	107.89	1.55	336.71	80.0	0.97
5	16.9	+0.82	6.25	2	4	1	120.07	1.55	337.78	75.2	0.93
6	17.9	-0.45	+5.70	+2	+4	+1	132.26	+1.55	339.68	73.7	0.87
7	18.9	1.78	4.89	2	4	1	144.44	1.55	342.34	74.1	0.80
8	19.9	3.13	3.88	2	4	+1	156.63	1.55	345.72	75.9	0.72
9	20.9	4.42	2.70	2	4	0	168.83	1.54	349.79	78.9	0.63
10	21.9	5.56	+1.38	2	4	0	181.03	1.53	354.47	83.0	0.54
11	22.9	-6.46	-0.03	+2	+3	0	193.24	+1.53	359.65	88.1	0.44
12	23.9	7.04	1.47	2	3	0	205.45	1.52	5.10	94.0	0.34
13	24.9	7.20	2.88	2	3	0	217.67	1.51	10.48	100.4	0.25
14	25.9	6.88	4.17	2	3	0	229.89	1.51	15.38	107.2	0.16
15	26.9	6.06	5.27	2	3	+1	242.12	1.50	19.37	114.5	0.09
16	27.9	-4.75	-6.06	+2	+3	+1	254.35	+1.50	22.11	123.9	0.03
17	28.9	3.05	6.47	2	3	1	266.58	1.49	23.41	150.7	0.01
18	0.5	-1.11	6.43	2	3	1	278.81	1.49	23.21	260.8	0.01
19	1.5	+0.90	5.95	2	3	1	291.04	1.49	21.60	281.0	0.04
20	2.5	2.80	5.05	2	3	1	303.27	1.49	18.69	284.3	0.10
21	3.5	+4.43	-3.82	+2	+3	+2	315.49	+1.49	14.65	283.4	0.18
22	4.5	5.70	2.36	2	3	2	327.71	1.50	9.71	280.2	0.27
23	5.5	6.55	-0.80	2	3	2	339.92	1.50	4.15	275.5	0.38
24	6.5	7.01	+0.77	2	3	2	352.12	1.51	358.31	269.8	0.49
25	7.5	7.11	2.26	2	3	2	4.32	1.51	352.62	263.7	0.60
26	8.5	+6.91	+3.60	+3	+3	+2	16.50	+1.52	347.48	257.6	0.70
27	9.5	6.47	4.73	3	3	2	28.69	1.53	343.19	251.7	0.79
28	10.5	5.82	5.61	3	3	2	40.86	1.53	339.94	246.2	0.86
29	11.5	5.01	6.21	3	4	2	53.03	1.53	337.79	240.8	0.92
30	12.5	4.07	6.53	2	4	1	65.20	1.53	336.70	234.0	0.97
OUT. 1	13.5	+3.00	+6.55	+2	+4	+1	77.37	+1.53	336.61	219.4	0.99
2	14.5	1.84	6.28	2	4	1	89.53	1.53	337.45	141.3	1.00
3	15.5	+0.59	5.74	2	4	1	101.70	1.52	339.12	87.7	0.99
4	16.5	-0.74	4.95	2	4	1	113.86	1.51	341.57	79.3	0.96
5	17.5	2.09	3.95	2	4	1	126.03	1.49	344.75	77.9	0.91
6	18.5	-3.44	+2.78	+2	+3	+1	138.20	+1.48	348.61	79.3	0.85
7	19.5	4.73	1.48	2	3	1	150.37	1.46	353.10	82.3	0.78
8	20.5	5.88	+0.09	2	3	+1	162.55	1.44	358.08	86.5	0.70
9	21.5	6.82	-1.32	2	3	0	174.73	1.42	3.37	91.6	0.60
10	22.5	7.45	2.70	2	3	0	186.91	1.40	8.68	97.3	0.50
11	23.5	-7.69	-3.98	+2	+3	+1	199.11	+1.38	13.65	103.1	0.40
12	24.5	-7.46	-5.10	+2	+3	+1	211.31	+1.36	17.91	108.7	0.30

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG.	POS.	FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
OUT. 12	24.5	-7.46	-5.10	+2	+3	+1	211.31	+1.36	17.91	108.7	0.30
13	25.5	6.72	5.95	2	3	1	223.51	1.34	21.10	113.9	0.20
14	26.5	5.47	6.46	2	3	1	235.72	1.32	22.99	118.7	0.12
15	27.5	3.78	6.56	2	3	1	247.93	1.31	23.45	123.9	0.05
16	28.5	-1.77	6.21	2	3	1	260.15	1.29	22.47	135.0	0.01
17	0.2	+0.37	-5.41	+2	+3	+1	272.37	+1.27	20.10	233.7	0.00
18	1.2	2.47	4.22	2	3	2	284.58	1.26	16.46	277.1	0.02
19	2.2	4.34	2.74	2	3	2	296.80	1.25	11.73	279.6	0.07
20	3.2	5.85	-1.11	2	3	2	309.00	1.23	6.18	276.8	0.14
21	4.2	6.93	+0.55	2	3	2	321.21	1.22	0.19	272.0	0.24
22	5.2	+7.55	+2.13	+2	+3	+2	333.40	+1.21	354.23	266.2	0.34
23	6.2	7.73	3.54	2	3	2	345.59	1.20	348.77	260.4	0.44
24	7.2	7.55	4.73	3	3	2	357.78	1.20	344.17	254.9	0.55
25	8.2	7.05	5.65	3	3	2	9.95	1.19	340.64	250.1	0.65
26	9.2	6.30	6.29	3	3	2	22.12	1.18	338.22	246.2	0.74
27	10.2	+5.36	+6.63	+2	+3	+2	34.29	+1.17	336.90	242.9	0.82
28	11.2	4.27	6.68	2	3	2	46.45	1.16	336.58	240.3	0.88
29	12.2	3.07	6.43	2	3	1	58.60	1.15	337.19	237.8	0.94
30	13.2	1.80	5.90	2	3	1	70.75	1.13	338.65	234.0	0.98
31	14.2	+0.49	5.13	2	3	1	82.90	1.11	340.90	219.8	1.00
NOV. 1	15.2	-0.84	+4.13	+2	+3	+1	95.05	+1.09	343.90	109.6	1.00
2	16.2	2.16	2.95	2	3	1	107.20	1.07	347.60	84.4	0.98
3	17.2	3.44	1.63	2	3	1	119.35	1.04	351.94	82.9	0.95
4	18.2	4.63	+0.23	2	3	1	131.50	1.01	356.81	85.4	0.90
5	19.2	5.68	-1.19	2	3	1	143.65	0.98	2.02	89.6	0.83
6	20.2	-6.54	-2.59	+2	+3	+1	155.81	+0.95	7.30	94.7	0.75
7	21.2	7.13	3.88	1	3	1	167.97	0.92	12.31	100.0	0.66
8	22.2	7.38	5.01	1	3	1	180.14	0.89	16.70	105.2	0.56
9	23.2	7.24	5.91	1	3	1	192.31	0.86	20.14	109.8	0.45
10	24.2	6.66	6.50	1	3	1	204.49	0.83	22.42	113.6	0.35
11	25.2	-5.63	-6.72	+1	+3	+1	216.68	+0.80	23.41	116.5	0.24
12	26.2	4.19	6.51	2	3	1	228.87	0.77	23.03	118.4	0.15
13	27.2	2.42	5.87	2	3	1	241.07	0.75	21.31	119.4	0.07
14	28.2	-0.45	4.80	2	3	2	253.27	0.72	18.29	121.2	0.02
15	29.2	+1.56	3.39	2	3	2	265.47	0.69	14.05	146.3	0.00
16	0.8	+3.44	-1.75	+2	+3	+2	277.67	+0.67	8.78	273.3	0.01
17	1.8	5.06	-0.02	2	3	2	289.87	0.64	2.80	274.3	0.05
18	2.8	6.30	+1.68	2	3	2	302.07	0.62	356.59	269.7	0.11
19	3.8	7.11	3.23	2	3	2	314.26	0.60	350.70	264.0	0.19
20	4.8	7.48	4.55	2	3	2	326.45	0.58	345.61	258.5	0.28
21	5.8	+7.42	+5.59	+2	+3	+2	338.63	+0.56	341.61	253.6	0.38
22	6.8	+7.00	+6.32	+2	+3	+2	350.80	+0.54	338.82	249.6	0.48

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	IDADE	TERRA		LIB.FIS.			SOL		ANG. POS.		FASE
		LG.	LT.	LG.	LT.	AP.	CO-LG.	LT.	EIXO	L.I.	
	D	G	G	(0.01	G)		G	G	G	G	
NOV. 22	6.8	+7.00	+6.32	+2	+3	+2	350.80	+0.54	338.82	249.6	0.48
23	7.8	6.28	6.73	2	3	2	2.97	0.52	337.18	246.6	0.58
24	8.8	5.31	6.82	2	3	2	15.13	0.51	336.61	244.6	0.67
25	9.8	4.16	6.62	2	3	2	27.28	0.49	336.99	243.5	0.76
26	10.8	2.89	6.14	2	3	1	39.43	0.46	338.23	243.3	0.83
27	11.8	+1.57	+5.39	+2	+3	+1	51.57	+0.44	340.27	243.8	0.90
28	12.8	+0.23	4.42	2	3	1	63.71	0.42	343.06	245.0	0.95
29	13.8	-1.07	3.25	1	3	1	75.85	0.39	346.58	246.2	0.98
30	14.8	2.30	1.93	1	3	1	87.99	0.36	350.77	240.8	1.00
DEZ. 1	15.8	3.42	+0.52	1	3	1	100.12	0.33	355.55	87.1	1.00
2	16.8	-4.41	-0.94	+1	+3	+1	112.26	+0.30	0.74	86.9	0.98
3	17.8	5.22	2.37	1	3	1	124.39	0.27	6.07	91.3	0.94
4	18.8	5.84	3.71	1	3	1	136.53	0.23	11.19	96.5	0.88
5	19.8	6.22	4.89	1	3	1	148.67	0.20	15.73	101.7	0.80
6	20.8	6.32	5.83	1	3	1	160.82	0.16	19.38	106.4	0.71
7	21.8	-6.13	-6.48	+1	+3	+1	172.97	+0.13	21.92	110.3	0.61
8	22.8	5.62	6.79	1	3	1	185.13	0.10	23.23	113.1	0.50
9	23.8	4.79	6.70	1	3	1	197.30	0.06	23.27	114.7	0.39
10	24.8	3.66	6.20	1	3	1	209.47	+0.03	22.06	115.0	0.28
11	25.8	2.28	5.30	1	3	2	221.65	0.00	19.62	114.0	0.18
12	26.8	-0.73	-4.03	+1	+3	+2	233.83	-0.03	15.99	111.4	0.10
13	27.8	+0.90	2.49	1	3	2	246.02	0.07	11.25	107.2	0.04
14	28.8	2.50	-0.78	1	3	2	258.21	0.10	5.62	101.0	0.01
15	0.3	3.95	+0.97	1	3	2	270.41	0.13	359.44	280.4	0.00
16	1.3	5.14	2.63	1	3	2	282.60	0.15	353.27	270.9	0.02
17	2.3	+6.00	+4.08	+1	+3	+2	294.79	-0.18	347.67	264.1	0.07
18	3.3	6.48	5.27	1	3	2	306.97	0.21	343.09	258.3	0.14
19	4.3	6.55	6.13	1	3	2	319.15	0.23	339.75	253.6	0.22
20	5.3	6.25	6.66	1	3	2	331.33	0.25	337.66	250.1	0.31
21	6.3	5.61	6.85	1	3	2	343.50	0.27	336.72	247.8	0.40
22	7.3	+4.68	+6.73	+1	+3	+2	355.66	-0.30	336.81	246.5	0.50
23	8.3	3.53	6.31	1	3	2	7.82	0.32	337.80	246.2	0.60
24	9.3	2.25	5.63	1	3	1	19.97	0.34	339.61	246.9	0.69
25	10.3	+0.90	4.71	1	3	1	32.12	0.36	342.17	248.7	0.77
26	11.3	-0.44	3.59	1	3	1	44.26	0.39	345.46	251.5	0.84
27	12.3	-1.70	+2.31	+1	+3	+1	56.39	-0.41	349.45	255.5	0.91
28	13.3	2.83	+0.91	0	3	1	68.53	0.44	354.07	261.0	0.96
29	14.3	3.77	-0.55	0	3	1	80.66	0.47	359.19	269.5	0.99
30	15.3	4.49	2.00	0	3	1	92.78	0.50	4.56	315.9	1.00
31	16.3	4.98	3.38	0	3	1	104.91	0.53	9.84	84.0	0.99
32	17.3	-5.21	-4.61	0	+3	+1	117.04	-0.56	14.64	94.7	0.96

DISCO ILUMINADO

0 HORA TEMPO UNIVERSAL

DATA	FASE	ANG. FASE	ANG. L.I.	BRILH	MAG.	DATA	FASE	ANG. FASE	ANG. L.I.	BRILH	MAG.
		G	G					G	G		
JAN. 0	0.986	13	78	25.0	-0.8	JUL. 3	0.012	168	36	2.0	+4.8
5	.995	8	60	25.4	1.0	8	.053	153	67	8.5	3.4
10	.999	4	4	27.1	1.2	13	.134	137	77	19.5	2.1
15	.995	8	296	30.1	1.1	18	.248	120	83	31.9	1.1
20	.981	16	275	35.1	1.1	23	.390	103	88	44.7	+0.3
25	0.950	26	264	42.6	-1.0	28	0.556	84	94	57.3	-0.3
30	.886	39	257	52.9	1.0	AGO. 2	.730	63	100	67.1	0.8
FEV. 4	.771	57	252	64.3	0.9	7	.879	41	108	69.6	1.2
9	.589	80	247	69.8	-0.6	12	.969	20	121	63.5	1.6
14	.357	107	242	58.1	+0.1	17	.998	6	179	53.3	1.8
19	0.141	136	235	28.8	+1.6	22	0.987	13	271	44.0	-1.4
24	.020	164	207	4.4	4.1	27	.958	24	284	37.1	0.9
29	.027	161	99	5.5	3.9	SET. 1	.922	32	289	32.5	0.6
MAR. 5	.123	139	79	20.1	2.1	6	.883	40	292	29.8	0.3
10	.246	121	74	30.6	1.2	11	.842	47	294	28.5	-0.2
15	0.361	106	70	34.2	+0.7	16	0.797	54	295	28.4	+0.0
20	.458	95	68	34.2	0.4	21	.747	60	296	29.4	0.0
25	.540	85	66	33.2	0.3	26	.687	68	296	31.4	0.1
30	.609	77	64	32.3	0.2	OUT. 1	.612	77	296	34.4	0.1
ABR. 4	.672	70	62	32.1	+0.1	6	.515	88	296	37.8	0.2
9	0.732	62	61	33.0	-0.1	11	0.390	103	296	39.4	+0.5
14	.791	54	60	35.2	0.3	16	.234	122	298	33.7	1.1
19	.852	45	60	39.1	0.5	21	.075	148	302	15.0	2.7
24	.913	34	60	45.2	0.9	26	.001	177	52	0.2	5.6
29	.968	21	61	53.6	1.4	31	.101	143	115	22.5	2.1
MAIO 4	0.999	3	58	62.9	-2.1	NOV. 5	0.329	110	117	54.5	+0.3
9	.980	16	249	68.9	1.8	10	.560	83	117	62.6	-0.4
14	.898	37	252	67.6	1.3	15	.730	63	116	55.2	0.6
19	.774	57	256	60.2	0.8	20	.840	47	114	45.1	0.7
24	.641	74	261	51.3	-0.4	25	.908	35	111	37.0	0.7
29	0.516	88	265	43.5	+0.1	30	0.949	26	107	31.3	-0.7
JUN. 3	.405	101	269	37.0	0.5	DEZ. 5	.974	19	101	27.7	0.7
8	.304	113	272	31.2	0.9	10	.989	12	92	25.6	0.8
13	.210	125	276	24.8	1.5	15	.997	6	75	24.7	1.0
18	.126	138	280	17.1	2.3	20	.999	3	4	24.9	1.1
23	0.056	153	288	8.7	+3.3	25	0.996	7	300	26.3	-1.0
28	0.014	166	314	2.4	+4.7	30	0.986	14	283	29.1	-0.9
JUL. 3	0.012	168	36	2.0	+4.8	35	0.965	22	274	33.6	-0.9

DISCO ILUMINADO

0 HORA TEMPO UNIVERSAL

DATA	FASE	ANG. FASE	ANG. L.I.	BRILH	MAG.	DATA	FASE	ANG. FASE	ANG. L.I.	BRILH	MAG.
		G	G					G	G		
JAN. 0	0.824	50.6	256.0	65.9	-3.9	JUL. 3	0.205	126.1	74.4	168.2	-4.4
5	.812	51.5	254.2	68.0	3.9	8	.250	121.0	75.5	174.6	4.4
10	.799	53.3	253.5	70.3	3.9	13	.293	114.5	77.8	174.6	4.4
15	.785	55.2	251.1	72.7	3.9	18	.332	110.6	78.3	170.4	4.3
20	.771	57.2	250.9	75.3	3.9	23	.369	105.1	80.0	164.0	4.3
25	0.756	59.2	249.9	78.1	-4.0	28	0.404	101.1	82.9	156.6	-4.3
30	.741	61.2	248.0	81.2	4.0	AGO. 2	.436	97.3	85.0	148.7	4.3
FEV. 4	.725	63.3	247.4	84.5	4.0	7	.467	94.8	86.1	140.9	4.2
9	.708	65.4	247.0	88.1	4.0	12	.495	91.5	88.4	133.4	4.2
14	.690	68.7	247.8	92.0	4.0	17	.522	87.5	91.8	126.3	4.2
19	0.671	70.9	247.8	96.2	-4.1	22	0.548	85.5	93.2	119.8	-4.1
24	.652	72.3	248.0	100.8	4.1	27	.572	82.7	96.6	113.7	4.1
29	.631	75.8	247.3	105.7	4.1	SET. 1	.595	79.0	98.1	108.2	4.1
MAR. 5	.610	77.3	248.9	111.1	4.1	6	.618	76.4	100.4	103.1	4.1
10	.587	80.9	249.5	117.0	4.2	11	.639	74.9	103.7	98.5	4.0
15	0.563	83.7	249.4	123.3	-4.2	16	0.659	71.4	105.9	94.2	-4.0
20	.538	86.6	250.4	130.1	4.2	21	.679	69.0	107.9	90.3	4.0
25	.511	89.7	251.4	137.4	4.3	26	.698	67.7	109.8	86.7	4.0
30	.483	92.9	253.6	145.1	4.3	OUT. 1	.716	64.4	110.5	83.4	4.0
ABR. 4	.453	95.4	254.8	153.2	4.3	6	.733	62.2	112.9	80.4	4.0
9	0.421	99.1	255.0	161.3	-4.3	11	0.750	61.0	113.2	77.6	-3.9
14	.386	103.2	256.2	169.2	4.4	16	.766	58.8	114.2	75.0	3.9
19	.349	108.6	257.3	176.0	4.4	21	.782	56.7	116.0	72.6	3.9
24	.310	112.4	258.2	180.8	4.4	26	.797	54.6	115.5	70.4	3.9
29	.267	118.8	259.8	182.0	4.4	31	.811	52.5	116.7	68.3	3.9
MAIO 4	0.222	124.8	259.2	177.2	-4.4	NOV. 5	0.825	49.5	116.7	66.3	-3.9
9	.175	131.6	259.1	163.6	4.4	10	.838	47.5	115.3	64.5	3.9
14	.127	138.3	259.6	138.6	4.3	15	.851	45.5	115.8	62.8	3.9
19	.081	147.9	258.6	101.9	4.2	20	.862	44.5	114.9	61.2	3.9
24	.041	157.6	256.9	58.2	4.1	25	.874	42.6	113.7	59.7	3.9
29	0.013	167.1	253.2	19.2	-3.9	30	0.885	40.7	111.3	58.3	-3.9
JUN. 3	.000	178.1	234.8	0.4	3.6	DEZ. 5	.895	38.9	110.6	57.0	3.9
8	.007	171.6	78.6	10.5	3.8	10	.904	36.0	108.6	55.8	3.8
13	.031	160.9	75.6	44.1	4.0	15	.914	34.2	105.3	54.6	3.8
18	.067	151.0	74.6	86.8	4.1	20	.922	32.4	103.8	53.6	3.8
23	0.111	141.0	73.4	125.0	-4.3	25	0.930	31.6	100.0	52.6	-3.8
28	0.158	133.1	74.7	152.4	-4.3	30	0.938	29.9	97.1	51.6	-3.8
JUL. 3	0.205	126.1	74.4	168.2	-4.4	35	0.945	27.2	94.0	50.7	-3.8

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIAM.	TERRA ALFA+PI DELTA		AS-AT	SOL DELTA LONG.	
	M		"	G	G	G	G	G
JAN. 0	18.23	+1.6	4.27	334.40	+10.60	-23.30	+19.18	128.38
2	18.11	1.6	4.30	335.66	10.07	23.58	18.91	129.34
4	17.99	1.6	4.33	336.91	9.53	23.86	18.64	130.30
6	17.87	1.5	4.36	338.16	8.99	24.14	18.36	131.26
8	17.74	1.5	4.39	339.41	8.44	24.41	18.08	132.23
10	17.62	+1.5	4.42	340.65	+ 7.89	-24.69	+17.79	133.20
12	17.49	1.5	4.45	341.89	7.34	24.96	17.49	134.17
14	17.37	1.5	4.48	343.14	6.78	25.23	17.19	135.15
16	17.24	1.5	4.51	344.38	6.21	25.50	16.89	136.12
18	17.12	1.5	4.55	345.62	5.65	25.76	16.57	137.11
20	16.99	+1.5	4.58	346.85	+ 5.08	-26.03	+16.26	138.09
22	16.86	1.4	4.62	348.09	4.51	26.30	15.93	139.08
24	16.73	1.4	4.65	349.33	3.93	26.56	15.61	140.07
26	16.60	1.4	4.69	350.56	3.36	26.83	15.27	141.06
28	16.47	1.4	4.73	351.80	2.78	27.09	14.93	142.06
30	16.34	+1.4	4.77	353.04	+ 2.20	-27.36	+14.59	143.06
FEV. 1	16.20	1.4	4.80	354.27	1.62	27.62	14.24	144.06
3	16.07	1.3	4.84	355.51	1.04	27.89	13.89	145.07
5	15.94	1.3	4.88	356.75	+ 0.46	28.16	13.53	146.08
7	15.80	1.3	4.93	357.98	- 0.13	28.42	13.16	147.09
9	15.67	+1.3	4.97	359.22	- 0.71	-28.69	+12.79	148.10
11	15.53	1.3	5.01	0.47	1.29	28.96	12.42	149.12
13	15.40	1.3	5.06	1.71	1.87	29.23	12.04	150.15
15	15.26	1.3	5.10	2.96	2.45	29.51	11.66	151.17
17	15.13	1.2	5.15	4.20	3.03	29.78	11.27	152.20
19	14.99	+1.2	5.19	5.45	- 3.61	-30.06	+10.88	153.23
21	14.86	1.2	5.24	6.71	4.19	30.34	10.48	154.27
23	14.72	1.2	5.29	7.97	4.76	30.62	10.08	155.31
25	14.58	1.2	5.34	9.23	5.33	30.90	9.68	156.36
27	14.45	1.1	5.39	10.49	5.90	31.19	9.27	157.40
29	14.31	+1.1	5.44	11.76	- 6.47	-31.48	+ 8.85	158.45
MAR. 2	14.17	1.1	5.49	13.03	7.03	31.77	8.44	159.51
4	14.04	1.1	5.55	14.30	7.59	32.06	8.02	160.57
6	13.90	1.1	5.60	15.58	8.14	32.36	7.59	161.63
8	13.77	1.0	5.66	16.86	8.69	32.66	7.16	162.69
10	13.63	+1.0	5.71	18.15	- 9.24	-32.96	+ 6.73	163.76
12	13.49	+1.0	5.77	19.45	- 9.78	-33.27	+ 6.29	164.84
14	13.36	+1.0	5.83	20.75	-10.32	-33.58	+ 5.86	165.91

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

		ANG.	DEF.	ÂNGULO	POSICAO	MERID.CENTRAL		TRANS.MERID.ZERO					
DATA	FASE	FASE	ILUM	DEFEITO	EIXO	DATA	DIA	SEG	DATA	DIA	SEG		
		G	"	G	G	G	G		H	M	H	M	
JAN.	0	0.957	24.07	0.19	283.43	37.05	54.01	44.29	20	57.9	21	38.0	
	2	.955	24.45	.19	282.93	36.81	34.57	24.85	22	17.8	22	57.9	
	4	.954	24.84	.20	282.42	36.55	15.13	5.41	23	37.8	--	----	
	6	.952	25.22	.21	281.90	36.28	355.69	345.98	00	17.8	00	57.7	
	8	.951	25.60	.22	281.38	35.98	336.26	326.54	01	37.6	02	17.5	
	10	0.949	25.98	0.22	280.84	35.65	316.83	307.11	02	57.5	03	37.5	
	12	.948	26.36	.23	280.30	35.31	297.40	287.69	04	17.3	04	57.4	
	14	.947	26.74	.24	279.76	34.95	277.97	268.26	05	37.2	06	17.1	
	16	.945	27.12	.25	279.20	34.57	258.55	248.83	06	57.1	07	37.0	
	18	.944	27.49	.26	278.64	34.17	239.12	229.41	08	17.0	08	56.9	
	20	0.942	27.87	0.27	278.08	33.75	219.70	209.99	09	36.8	10	16.8	
	22	.940	28.24	.27	277.50	33.30	200.28	190.57	10	56.6	11	36.5	
	24	.939	28.61	.28	276.93	32.84	180.86	171.15	12	16.5	12	56.4	
	26	.937	28.98	.29	276.34	32.36	161.44	151.73	13	36.3	14	16.3	
	28	.936	29.35	.30	275.76	31.87	142.02	132.31	14	56.1	15	36.0	
	FEV.	30	0.934	29.71	0.31	275.16	31.35	122.60	112.89	16	15.9	16	55.9
		1	.933	30.07	.32	274.57	30.82	103.18	93.47	17	35.8	18	15.7
		3	.931	30.43	.33	273.97	30.27	83.76	74.05	18	55.6	19	35.5
5		.930	30.79	.35	273.37	29.70	64.33	54.62	20	15.4	20	55.4	
7		.928	31.15	.36	272.76	29.12	44.91	35.20	21	35.3	22	15.2	
9		0.926	31.50	0.37	272.15	28.52	25.49	15.78	22	55.1	23	35.1	
11		.925	31.85	.38	271.55	27.90	6.06	356.35	--	----	00	15.0	
13		.923	32.20	.39	270.93	27.27	346.64	336.92	00	54.9	01	35.0	
15		.921	32.55	.40	270.32	26.62	327.21	317.49	02	14.8	02	54.7	
17		.920	32.90	.41	269.71	25.96	307.78	298.06	03	34.7	04	14.6	
19		0.918	33.24	0.42	269.10	25.28	288.34	278.63	04	54.6	05	34.5	
21		.917	33.58	.44	268.49	24.60	268.91	259.19	06	14.5	06	54.4	
23		.915	33.92	.45	267.87	23.89	249.47	239.75	07	34.5	08	14.4	
25		.913	34.25	.46	267.26	23.18	230.02	220.30	08	54.4	09	34.3	
27		.912	34.59	.48	266.66	22.45	210.58	200.85	10	14.3	10	54.4	
MAR.		29	0.910	34.92	0.49	266.05	21.71	191.13	181.40	11	34.2	12	14.2
		2	.908	35.24	.50	265.45	20.96	171.67	161.95	12	54.2	13	34.2
		4	.907	35.57	.52	264.85	20.20	152.22	142.49	14	14.2	14	54.2
	6	.905	35.89	.53	264.25	19.43	132.75	123.02	15	34.2	16	14.3	
	8	.903	36.21	.55	263.66	18.65	113.29	103.55	16	54.4	17	34.3	
	10	0.902	36.52	0.56	263.08	17.86	93.82	84.08	18	14.3	18	54.4	
	12	0.900	36.84	0.58	262.50	17.06	74.34	64.60	19	34.5	20	14.5	
	14	0.899	37.15	0.59	261.92	16.25	54.86	45.11	20	54.5	21	34.6	

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIAM.	TERRA		AS-AT	SOL	
				ALFA+PI	DELTA		DELTA	LONG.
	M		"	G	G	G	G	G
MAR. 14	13.36	+1.0	5.83	20.75	-10.32	-33.58	+ 5.86	165.91
16	13.22	1.0	5.89	22.05	10.85	33.90	5.41	166.99
18	13.09	0.9	5.95	23.36	11.37	34.22	4.97	168.08
20	12.95	0.9	6.01	24.68	11.89	34.54	4.52	169.17
22	12.82	0.9	6.07	26.00	12.40	34.86	4.07	170.26
24	12.68	+0.9	6.14	27.33	-12.90	-35.19	+ 3.61	171.35
26	12.55	0.9	6.20	28.66	13.40	35.52	3.16	172.45
28	12.41	0.8	6.27	30.00	13.88	35.86	2.70	173.56
30	12.28	0.8	6.34	31.35	14.36	36.20	2.23	174.66
ABR. 1	12.15	0.8	6.41	32.70	14.83	36.54	1.77	175.77
3	12.02	+0.8	6.48	34.06	-15.30	-36.88	+ 1.30	176.89
5	11.88	0.7	6.55	35.42	15.75	37.23	0.84	178.01
7	11.75	0.7	6.62	36.79	16.19	37.58	+ 0.37	179.13
9	11.62	0.7	6.70	38.17	16.63	37.94	- 0.11	180.25
11	11.49	0.7	6.77	39.55	17.05	38.30	0.58	181.38
13	11.36	+0.6	6.85	40.94	-17.46	-38.66	- 1.05	182.52
15	11.23	0.6	6.93	42.34	17.86	39.02	1.53	183.66
17	11.10	0.6	7.01	43.74	18.25	39.39	2.01	184.80
19	10.98	0.6	7.09	45.15	18.63	39.75	2.49	185.94
21	10.85	0.5	7.18	46.57	19.00	40.12	2.97	187.09
23	10.72	+0.5	7.26	47.99	-19.35	-40.49	- 3.44	188.24
25	10.60	0.5	7.35	49.41	19.70	40.86	3.92	189.40
27	10.47	0.5	7.44	50.84	20.02	41.23	4.40	190.56
29	10.35	0.4	7.52	52.27	20.34	41.60	4.88	191.72
MAIO 1	10.22	0.4	7.62	53.71	20.64	41.97	5.36	192.89
3	10.10	+0.4	7.71	55.15	-20.93	-42.34	- 5.84	194.06
5	9.98	0.4	7.80	56.60	21.21	42.71	6.32	195.23
7	9.85	0.3	7.90	58.05	21.47	43.08	6.80	196.41
9	9.73	0.3	8.00	59.50	21.71	43.44	7.28	197.59
11	9.61	0.3	8.10	60.96	21.95	43.80	7.75	198.78
13	9.49	+0.3	8.20	62.42	-22.16	-44.16	- 8.23	199.97
15	9.37	0.2	8.30	63.88	22.37	44.51	8.70	201.16
17	9.26	0.2	8.41	65.34	22.55	44.86	9.17	202.35
19	9.14	0.2	8.52	66.80	22.73	45.21	9.64	203.55
21	9.02	0.1	8.63	68.26	22.88	45.54	10.11	204.75
23	8.91	+0.1	8.74	69.72	-23.03	-45.87	-10.57	205.96
25	8.79	+0.1	8.85	71.18	-23.15	-46.19	-11.03	207.17
27	8.68	+0.1	8.97	72.63	-23.26	-46.51	-11.49	208.38

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

		ANG.	DEF.	ÂNGULO	POSICAO	MERID.CENTRAL		TRANS.MERID.ZERO				
DATA	FASE	FASE	ILUM	DEFEITO	EIXO	DATA	DIA	SEG	DATA	DIA	SEG	
		G	"	G	G	G	G		H	M	H	M
MAR.14	0.899	37.15	0.59	261.92	16.25	54.86	45.11		20	54.5	21	34.6
16	.897	37.45	.61	261.35	15.43	35.37	25.62		22	14.7	22	54.7
18	.895	37.76	.62	260.79	14.61	15.87	6.13		23	34.8	--	----
20	.894	38.06	.64	260.23	13.77	356.38	346.62		00	14.9	00	55.0
22	.892	38.36	.66	259.68	12.94	336.87	327.11		01	35.1	02	15.2
24	0.890	38.65	0.67	259.14	12.09	317.36	307.60		02	55.4	03	35.5
26	.889	38.94	.69	258.61	11.24	297.84	288.08		04	15.6	04	55.7
28	.887	39.23	.71	258.08	10.38	278.32	268.55		05	35.8	06	16.0
30	.886	39.51	.72	257.57	9.52	258.79	249.02		06	56.1	07	36.3
ABR. 1	.884	39.79	.74	257.06	8.65	239.25	229.48		08	16.5	08	56.6
3	0.883	40.06	0.76	256.57	7.78	219.71	209.94		09	36.8	10	17.0
5	.881	40.34	.78	256.08	6.91	200.16	190.39		10	57.2	11	37.5
7	.880	40.60	.80	255.60	6.03	180.61	170.83		12	17.6	12	57.9
9	.878	40.87	.82	255.14	5.15	161.05	151.26		13	38.0	14	18.3
11	.877	41.13	.84	254.68	4.26	141.48	131.69		14	58.5	15	38.7
13	0.875	41.38	0.86	254.24	3.38	121.90	112.11		16	19.0	16	59.4
15	.874	41.63	.88	253.81	2.49	102.32	92.53		17	39.5	18	19.8
17	.872	41.88	.90	253.39	1.60	82.74	72.94		19	00.1	19	40.5
19	.871	42.12	.92	252.98	0.71	63.14	53.34		20	20.8	21	00.9
21	.869	42.36	.94	252.58	359.82	43.54	33.74		21	41.3	22	21.6
23	0.868	42.60	0.96	252.20	358.93	23.94	14.13		23	02.0	23	42.2
25	.867	42.82	0.98	251.83	358.04	4.33	354.52		--	----	00	22.5
27	.865	43.05	1.00	251.47	357.16	344.71	334.90		01	03.0	01	43.2
29	.864	43.27	.02	251.12	356.27	325.09	315.28		02	23.5	03	03.9
MAIO 1	.863	43.48	.04	250.79	355.39	305.47	295.66		03	44.2	04	24.6
3	0.862	43.69	1.07	250.46	354.51	285.84	276.03		05	04.9	05	45.3
5	.860	43.89	.09	250.16	353.63	266.21	256.39		06	25.7	07	06.1
7	.859	44.08	.11	249.86	352.76	246.57	236.75		07	46.5	08	26.8
9	.858	44.27	.14	249.58	351.89	226.93	217.11		09	07.2	09	47.6
11	.857	44.46	.16	249.31	351.02	207.29	197.47		10	28.0	11	08.4
13	0.856	44.64	1.18	249.06	350.16	187.65	177.82		11	48.8	12	29.1
15	.855	44.81	.21	248.82	349.31	168.00	158.18		13	09.5	13	50.0
17	.854	44.98	.23	248.59	348.46	148.35	138.53		14	30.3	15	10.7
19	.853	45.14	.25	248.38	347.62	128.70	118.88		15	51.1	16	31.5
21	.852	45.29	.28	248.18	346.79	109.05	99.23		17	11.9	17	52.4
23	0.851	45.44	1.30	247.99	345.97	89.41	79.58		18	32.7	19	13.1
25	0.850	45.58	1.33	247.82	345.15	69.76	59.94		19	53.5	20	34.0
27	0.849	45.71	1.35	247.66	344.35	50.12	40.30		21	14.3	21	54.7

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIAM.	TERRA		AS-AT	SOL	
				ALFA+PI	DELTA		DELTA	LONG.
	M		"	G	G	G	G	G
MAIO 27	8.68	+0.1	8.97	72.63	-23.26	-46.51	-11.49	208.38
29	8.56	0.0	9.09	74.09	23.36	46.81	11.94	209.59
31	8.45	0.0	9.21	75.53	23.44	47.10	12.40	210.81
JUN. 2	8.34	+0.0	9.33	76.98	23.50	47.38	12.84	212.03
4	8.23	-0.1	9.46	78.42	23.56	47.65	13.29	213.25
6	8.12	-0.1	9.59	79.85	-23.59	-47.91	-13.73	214.48
8	8.01	0.1	9.72	81.28	23.61	48.16	14.16	215.71
10	7.90	0.2	9.85	82.71	23.62	48.39	14.59	216.94
12	7.79	0.2	9.99	84.12	23.61	48.60	15.01	218.17
14	7.69	0.2	10.13	85.53	23.58	48.80	15.43	219.41
16	7.58	-0.2	10.27	86.92	-23.55	-48.98	-15.84	220.65
18	7.47	0.3	10.42	88.31	23.50	49.15	16.25	221.89
20	7.37	0.3	10.57	89.68	23.43	49.30	16.65	223.13
22	7.26	0.3	10.72	91.04	23.35	49.42	17.04	224.38
24	7.16	0.4	10.87	92.39	23.26	49.53	17.43	225.63
26	7.06	-0.4	11.03	93.72	-23.16	-49.61	-17.81	226.87
28	6.96	0.4	11.19	95.04	23.05	49.68	18.18	228.13
30	6.85	0.5	11.36	96.35	22.92	49.72	18.55	229.38
JUL. 2	6.75	0.5	11.53	97.63	22.79	49.73	18.91	230.63
4	6.65	0.6	11.70	98.90	22.64	49.73	19.26	231.89
6	6.56	-0.6	11.87	100.16	-22.48	-49.69	-19.60	233.15
8	6.46	0.6	12.06	101.39	22.32	49.64	19.93	234.41
10	6.36	0.7	12.24	102.60	22.15	49.55	20.25	235.67
12	6.26	0.7	12.43	103.80	21.96	49.44	20.56	236.93
14	6.17	0.7	12.62	104.97	21.78	49.30	20.87	238.20
16	6.07	-0.8	12.82	106.12	-21.58	-49.13	-21.16	239.46
18	5.98	0.8	13.02	107.25	21.38	48.94	21.44	240.73
20	5.88	0.8	13.23	108.35	21.18	48.71	21.72	241.99
22	5.79	0.9	13.44	109.42	20.97	48.44	21.98	243.26
24	5.70	0.9	13.66	110.47	20.75	48.15	22.23	244.53
26	5.61	-1.0	13.88	111.49	-20.54	-47.82	-22.47	245.80
28	5.52	1.0	14.11	112.48	20.32	47.46	22.71	247.07
30	5.43	1.0	14.34	113.44	20.10	47.07	22.92	248.34
AGO. 1	5.34	1.1	14.58	114.37	19.89	46.63	23.13	249.61
3	5.25	1.1	14.82	115.26	19.67	46.17	23.33	250.87
5	5.17	-1.2	15.07	116.13	-19.46	-45.66	-23.51	252.14
7	5.08	-1.2	15.32	116.96	-19.25	-45.12	-23.68	253.41
9	5.00	-1.3	15.58	117.75	-19.04	-44.54	-23.84	254.68

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

		ANG.	DEF.	ÂNGULO POSICAO		MERID.CENTRAL		TRANS.MERID.ZERO				
DATA	FASE	FASE	ILUM	DEFEITO	EIXO	DATA	DIA SEG	DATA	DIA SEG			
		G	"	G	G	G	G	H	M	H	M	
MAIO	27	0.849	45.71	1.35	247.66	344.35	50.12	40.30	21	14.3	21	54.7
	29	.848	45.83	.38	247.51	343.55	30.48	20.66	22	35.1	23	15.4
	31	.848	45.94	.40	247.38	342.77	10.84	1.02	23	55.9	--	----
JUN.	2	.847	46.05	.43	247.26	342.00	351.20	341.39	00	36.2	01	16.5
	4	.846	46.15	.45	247.16	341.24	331.57	321.76	01	56.9	02	37.2
	6	0.846	46.24	1.48	247.06	340.49	311.95	302.14	03	17.6	03	57.9
	8	.845	46.32	.50	246.98	339.75	292.33	282.53	04	38.3	05	18.6
	10	.845	46.39	.53	246.92	339.03	272.72	262.92	05	58.9	06	39.2
	12	.845	46.45	.55	246.87	338.32	253.12	243.32	07	19.5	07	59.9
	14	.844	46.50	.58	246.83	337.63	233.52	223.73	08	40.1	09	20.3
	16	0.844	46.54	1.60	246.80	336.95	213.93	204.15	10	00.6	10	40.8
	18	.844	46.57	.63	246.78	336.29	194.36	184.58	11	21.1	12	01.3
	20	.844	46.59	.65	246.78	335.64	174.79	165.02	12	41.5	13	21.8
	22	.844	46.59	.68	246.79	335.01	155.24	145.47	14	02.0	14	42.1
	24	.844	46.59	.70	246.82	334.40	135.70	125.94	15	22.3	16	02.3
	26	0.844	46.57	1.72	246.85	333.81	116.18	106.42	16	42.5	17	22.6
	28	.844	46.54	.75	246.90	333.23	96.67	86.92	18	02.6	18	42.7
	30	.844	46.49	.77	246.96	332.67	77.17	67.43	19	22.8	20	02.8
JUL.	2	.845	46.43	.79	247.03	332.12	57.70	47.96	20	42.8	21	22.8
	4	.845	46.35	.81	247.11	331.60	38.23	28.51	22	02.8	22	42.8
	6	0.846	46.26	1.83	247.20	331.09	18.79	9.07	23	22.8	--	----
	8	.846	46.16	.85	247.30	330.61	359.36	349.66	00	02.6	00	42.5
	10	.847	46.03	.87	247.41	330.14	339.96	330.26	01	22.5	02	02.3
	12	.848	45.89	.89	247.53	329.69	320.57	310.88	02	42.1	03	22.0
	14	.849	45.74	.91	247.67	329.26	301.20	291.53	04	01.7	04	41.5
	16	0.850	45.56	1.92	247.81	328.84	281.86	272.20	05	21.3	06	00.9
	18	.851	45.36	.94	247.96	328.45	262.54	252.89	06	40.6	07	20.3
	20	.853	45.14	.95	248.12	328.08	243.25	233.61	07	59.9	08	39.5
	22	.854	44.90	.96	248.28	327.72	223.98	214.36	09	19.0	09	58.6
	24	.856	44.64	.97	248.46	327.38	204.74	195.13	10	38.1	11	17.6
	26	0.858	44.35	1.98	248.64	327.06	185.53	175.93	11	57.0	12	36.5
	28	.859	44.03	.98	248.83	326.76	166.35	156.76	13	15.8	13	55.2
	30	.862	43.69	.99	249.03	326.48	147.19	137.62	14	34.5	15	13.8
AGO.	1	.864	43.33	.99	249.23	326.21	128.07	118.52	15	53.0	16	32.3
	3	.866	42.93	.98	249.44	325.96	108.97	99.44	17	11.4	17	50.6
	5	0.869	42.51	1.98	249.65	325.72	89.91	80.40	18	29.7	19	08.8
	7	0.871	42.06	1.97	249.87	325.51	70.89	61.39	19	47.8	20	26.8
	9	0.874	41.57	1.96	250.10	325.30	51.90	42.41	21	05.8	21	44.7

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIAM.	TERRA ALFA+PI DELTA		AS-AT	SOL DELTA LONG.	
	M		"	G	G	G	G	G
AGO. 9	5.00	-1.3	15.58	117.75	-19.04	-44.54	-23.84	254.68
11	4.91	1.3	15.85	118.51	18.84	43.92	23.99	255.95
13	4.83	1.3	16.12	119.23	18.64	43.26	24.13	257.22
15	4.75	1.4	16.39	119.91	18.46	42.55	24.25	258.49
17	4.67	1.4	16.67	120.55	18.28	41.80	24.36	259.76
19	4.59	-1.5	16.96	121.14	-18.11	-41.01	-24.46	261.02
21	4.51	1.5	17.24	121.69	17.95	40.17	24.54	262.29
23	4.44	1.6	17.54	122.19	17.80	39.28	24.61	263.55
25	4.37	1.6	17.83	122.65	17.67	38.35	24.67	264.82
27	4.29	1.7	18.13	123.05	17.55	37.37	24.72	266.08
29	4.22	-1.7	18.43	123.41	-17.45	-36.33	-24.75	267.34
31	4.16	1.8	18.73	123.71	17.36	35.25	24.77	268.60
SET. 2	4.09	1.8	19.04	123.97	17.29	34.12	24.78	269.86
4	4.03	1.9	19.34	124.17	17.23	32.93	24.77	271.12
6	3.96	1.9	19.64	124.31	17.20	31.69	24.76	272.38
8	3.91	-2.0	19.93	124.40	-17.18	-30.40	-24.73	273.63
10	3.85	2.0	20.22	124.43	17.19	29.06	24.68	274.88
12	3.80	2.1	20.51	124.41	17.21	27.66	24.63	276.13
14	3.75	2.1	20.78	124.32	17.26	26.20	24.56	277.38
16	3.70	2.2	21.05	124.18	17.33	24.69	24.48	278.63
18	3.66	-2.2	21.30	123.98	-17.42	-23.13	-24.39	279.87
20	3.62	2.3	21.53	123.73	17.53	21.52	24.28	281.11
22	3.58	2.3	21.75	123.42	17.66	19.85	24.17	282.35
24	3.55	2.4	21.94	123.06	17.81	18.15	24.04	283.59
26	3.52	2.4	22.11	122.65	17.98	16.40	23.90	284.83
28	3.50	-2.4	22.26	122.20	-18.17	-14.61	-23.75	286.06
30	3.48	2.5	22.38	121.71	18.38	12.78	23.59	287.29
OUT. 2	3.46	2.5	22.47	121.18	18.60	10.93	23.42	288.51
4	3.46	2.5	22.53	120.62	18.83	9.05	23.23	289.74
6	3.45	2.6	22.56	120.03	19.07	7.15	23.04	290.96
8	3.45	-2.6	22.55	119.42	-19.32	- 5.24	-22.84	292.18
10	3.46	2.6	22.51	118.80	19.58	3.32	22.62	293.39
12	3.47	2.6	22.43	118.17	19.85	- 1.40	22.40	294.61
14	3.49	2.6	22.32	117.54	20.11	+ 0.51	22.17	295.82
16	3.51	2.6	22.18	116.91	20.38	2.41	21.92	297.02
18	3.54	-2.5	22.01	116.30	-20.64	+ 4.29	-21.67	298.22
20	3.57	-2.5	21.80	115.70	-20.90	+ 6.15	-21.41	299.42
22	3.61	-2.4	21.57	115.14	-21.16	+ 7.97	-21.14	300.62

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

		ANG.	DEF.	ÂNGULO POSICAO		MERID.CENTRAL		TRANS.MERID.ZERO				
DATA	FASE	FASE	ILUM	DEFEITO	EIXO	DATA	DIA SEG	DATA	DIA SEG			
		G	"	G	G	G	G	H	M	H	M	
AGO.	9	0.874	41.57	1.96	250.10	325.30	51.90	42.41	21	05.8	21	44.7
	11	.877	41.05	.95	250.33	325.12	32.94	23.48	22	23.5	23	02.5
	13	.880	40.50	.93	250.56	324.95	14.03	4.58	23	41.2	--	----
	15	.884	39.90	.91	250.80	324.79	355.15	345.73	00	20.0	00	58.6
	17	.887	39.27	.88	251.04	324.65	336.32	326.92	01	37.3	02	15.9
	19	0.891	38.60	1.85	251.28	324.52	317.53	308.15	02	54.4	03	33.0
	21	.895	37.88	.82	251.53	324.40	298.78	289.43	04	11.4	04	49.8
	23	.899	37.12	.78	251.78	324.29	280.08	270.75	05	28.2	06	06.5
	25	.903	36.32	.73	252.04	324.20	261.43	252.12	06	44.7	07	23.0
	27	.907	35.47	.68	252.29	324.12	242.83	233.54	08	01.1	08	39.2
	29	0.912	34.57	1.63	252.56	324.05	224.27	215.01	09	17.3	09	55.4
	31	.916	33.62	.57	252.82	323.99	205.77	196.53	10	33.2	11	11.1
SET.	2	.921	32.62	.50	253.10	323.95	187.31	178.11	11	49.0	12	26.7
	4	.926	31.57	.43	253.37	323.91	168.91	159.73	13	04.4	13	42.0
	6	.931	30.47	.36	253.66	323.88	150.57	141.41	14	19.6	14	57.2
	8	0.936	29.31	1.28	253.96	323.87	132.28	123.15	15	34.6	16	12.0
	10	.941	28.09	.19	254.27	323.86	114.04	104.95	16	49.3	17	26.7
	12	.946	26.82	.10	254.60	323.86	95.86	86.80	18	03.9	18	41.0
	14	.951	25.49	1.01	254.96	323.88	77.75	68.71	19	18.1	19	55.2
	16	.956	24.11	0.92	255.34	323.90	59.68	50.67	20	32.1	21	09.1
	18	0.961	22.67	0.82	255.76	323.93	41.68	32.69	21	46.0	22	22.8
	20	.966	21.17	.73	256.23	323.98	23.72	14.77	22	59.4	23	36.2
	22	.971	19.63	.63	256.76	324.04	5.83	356.90	--	----	00	12.7
	24	.975	18.04	.54	257.38	324.10	347.98	339.07	00	49.3	01	25.8
	26	.980	16.40	.45	258.12	324.18	330.18	321.29	02	02.3	02	38.8
	28	0.984	14.73	0.37	259.02	324.27	312.42	303.55	03	15.1	03	51.5
	30	.987	13.02	.29	260.16	324.37	294.70	285.85	04	27.8	05	04.1
OUT.	2	.990	11.28	.22	261.65	324.48	277.01	268.18	05	40.3	06	16.5
	4	.993	9.53	.16	263.71	324.60	259.36	250.54	06	52.7	07	28.8
	6	.995	7.77	.11	266.70	324.72	241.73	232.93	08	04.9	08	41.0
	8	0.997	6.02	0.06	271.47	324.86	224.12	215.33	09	17.1	09	53.2
	10	.999	4.34	.03	280.04	325.00	206.53	197.73	10	29.3	11	05.3
	12	0.999	2.87	.02	298.28	325.15	188.94	180.15	11	41.5	12	17.5
	14	1.000	2.11	.02	338.32	325.31	171.35	162.56	12	53.5	13	29.6
	16	0.999	2.73	.02	20.58	325.47	153.76	144.95	14	05.6	14	41.7
	18	0.999	4.13	0.03	40.45	325.62	136.15	127.34	15	18.0	15	54.0
	20	0.997	5.75	0.05	49.62	325.78	118.52	109.69	16	30.2	17	06.4
	22	0.996	7.43	0.09	54.63	325.93	100.86	92.02	17	42.7	18	19.0

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIAM.	TERRA ALFA+PI DELTA		AS-AT	SOL DELTA LONG.	
	M		"	G	G	G	G	G
OUT. 22	3.61	-2.4	21.57	115.14	-21.16	+ 7.97	-21.14	300.62
24	3.65	2.4	21.31	114.60	21.41	9.74	20.86	301.81
26	3.70	2.3	21.02	114.10	21.65	11.48	20.58	303.00
28	3.76	2.3	20.72	113.65	21.88	13.16	20.28	304.19
30	3.82	2.2	20.39	113.24	22.09	14.79	19.98	305.37
NOV. 1	3.88	-2.1	20.06	112.88	-22.30	+16.36	-19.67	306.55
3	3.95	2.1	19.71	112.56	22.50	17.87	19.36	307.73
5	4.02	2.0	19.34	112.31	22.68	19.32	19.04	308.90
7	4.10	1.9	18.98	112.10	22.85	20.71	18.71	310.07
9	4.18	1.9	18.60	111.96	23.01	22.03	18.37	311.23
11	4.27	-1.8	18.22	111.86	-23.15	+23.29	-18.03	312.39
13	4.36	1.7	17.85	111.83	23.28	24.49	17.68	313.55
15	4.46	1.7	17.47	111.85	23.40	25.62	17.33	314.71
17	4.56	1.6	17.09	111.93	23.50	26.68	16.97	315.86
19	4.66	1.5	16.72	112.07	23.59	27.68	16.61	317.00
21	4.76	-1.5	16.35	112.25	-23.66	+28.62	-16.24	318.15
23	4.87	1.4	15.98	112.50	23.72	29.50	15.87	319.28
25	4.98	1.3	15.62	112.79	23.77	30.32	15.49	320.42
27	5.10	1.3	15.27	113.13	23.81	31.08	15.11	321.55
29	5.22	1.2	14.93	113.52	23.83	31.79	14.72	322.68
DEZ. 1	5.34	-1.1	14.59	113.96	-23.84	+32.44	-14.33	323.80
3	5.46	1.1	14.26	114.43	23.83	33.04	13.94	324.92
5	5.58	1.0	13.94	114.95	23.81	33.60	13.54	326.04
7	5.71	0.9	13.63	115.51	23.78	34.11	13.14	327.15
9	5.84	0.9	13.33	116.11	23.74	34.57	12.74	328.26
11	5.97	-0.8	13.03	116.74	-23.68	+35.00	-12.33	329.36
13	6.11	0.8	12.74	117.40	23.61	35.38	11.92	330.46
15	6.25	0.7	12.47	118.10	23.53	35.72	11.51	331.56
17	6.38	0.6	12.19	118.82	23.44	36.02	11.10	332.65
19	6.52	0.6	11.93	119.58	23.33	36.29	10.69	333.74
21	6.67	-0.5	11.68	120.36	-23.21	+36.53	-10.27	334.83
23	6.81	0.5	11.43	121.17	23.07	36.73	9.85	335.91
25	6.95	0.4	11.19	122.00	22.93	36.91	9.43	336.99
27	7.10	0.4	10.96	122.86	22.77	37.06	9.01	338.06
29	7.25	0.3	10.74	123.73	22.60	37.18	8.59	339.13
31	7.40	-0.3	10.52	124.62	-22.41	+37.28	- 8.16	340.20
33	7.55	-0.2	10.31	125.53	-22.22	+37.35	- 7.74	341.26

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

		ANG.	DEF.	ÂNGULO POSICAO		MERID.CENTRAL		TRANS.MERID.ZERO				
DATA	FASE	FASE	ILUM	DEFEITO	EIXO	DATA	DIA	SEG	DATA	DIA	SEG	
		G	"	G	G	G	G		H	M	H	M
OUT. 22	0.996	7.43	0.09	54.63	325.93	100.86	92.02		17	42.7	18	19.0
24	.994	9.10	.13	57.73	326.08	83.17	74.31		18	55.4	19	31.6
26	.991	10.76	.18	59.82	326.21	65.44	56.56		20	08.1	20	44.5
28	.988	12.38	.24	61.32	326.34	47.66	38.76		21	21.0	21	57.6
30	.985	13.95	.30	62.44	326.46	29.84	20.91		22	34.2	23	10.8
NOV. 1	0.982	15.49	0.36	63.30	326.56	11.97	3.02		23	47.6	--	----
3	.978	16.97	.43	63.99	326.65	354.05	345.07		00	24.5	01	01.3
5	.974	18.40	.49	64.55	326.72	336.07	327.07		01	38.2	02	15.1
7	.970	19.78	.56	65.01	326.78	318.04	309.00		02	52.2	03	29.2
9	.966	21.10	.62	65.40	326.82	299.95	290.89		04	06.4	04	43.6
11	0.962	22.37	0.69	65.72	326.85	281.81	272.71		05	21.0	05	58.2
13	.958	23.58	.74	66.00	326.85	263.60	254.48		06	35.6	07	13.1
15	.954	24.73	.80	66.25	326.84	245.34	236.19		07	50.6	08	28.2
17	.950	25.83	.85	66.46	326.81	227.02	217.84		09	05.8	09	43.5
19	.946	26.87	.90	66.65	326.76	208.65	199.44		10	21.3	10	59.1
21	0.942	27.85	0.95	66.81	326.69	190.22	180.98		11	37.0	12	14.9
23	.938	28.78	0.99	66.96	326.61	171.73	162.47		12	53.0	13	31.0
25	.934	29.66	1.02	67.10	326.51	153.20	143.91		14	09.1	14	47.3
27	.931	30.49	.06	67.23	326.40	134.61	125.30		15	25.5	16	03.7
29	.927	31.27	.08	67.34	326.27	115.98	106.64		16	42.1	17	20.5
DEZ. 1	0.924	32.01	1.11	67.46	326.14	97.30	87.94		17	58.9	18	37.3
3	.921	32.70	.13	67.56	325.99	78.57	69.19		19	15.8	19	54.4
5	.918	33.35	.15	67.66	325.83	59.81	50.41		20	33.0	21	11.6
7	.915	33.95	.16	67.76	325.66	41.00	31.59		21	50.3	22	29.0
9	.912	34.52	.17	67.86	325.48	22.16	12.72		23	07.7	23	46.5
11	0.909	35.05	1.18	67.96	325.30	3.28	353.83		--	----	00	25.5
13	.907	35.54	.19	68.06	325.11	344.37	334.90		01	04.2	01	43.1
15	.905	35.99	.19	68.15	324.91	325.42	315.94		02	22.1	03	01.0
17	.902	36.41	.19	68.26	324.72	306.44	296.94		03	40.0	04	19.1
19	.900	36.80	.19	68.36	324.51	287.44	277.92		04	58.1	05	37.2
21	0.898	37.16	1.19	68.47	324.31	268.40	258.88		06	16.3	06	55.5
23	.897	37.49	.18	68.58	324.11	249.34	239.81		07	34.7	08	13.9
25	.895	37.79	.17	68.70	323.91	230.26	220.71		08	53.1	09	32.3
27	.894	38.06	.17	68.82	323.71	211.16	201.60		10	11.6	10	51.0
29	.892	38.31	.16	68.94	323.52	192.03	182.46		11	30.2	12	09.6
31	0.891	38.53	1.15	69.07	323.32	172.89	163.31		12	49.0	13	28.3
33	0.890	38.73	1.13	69.21	323.14	153.72	144.14		14	07.7	14	47.1

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIÂMETRO EQUAT. POLAR		TERRA ALFA+PI DELTA		SOL ALFA+PI DELTA	
	M		"	"	G	G	G	G
JAN. 0	51.65	-1.7	31.70	29.65	139.33	-2.00	138.86	-2.02
4	51.60	1.7	31.73	29.68	140.26	1.97	139.19	2.01
8	51.52	1.7	31.78	29.72	141.18	1.95	139.52	1.99
12	51.41	1.7	31.85	29.79	142.09	1.93	139.85	1.98
16	51.27	1.7	31.94	29.87	143.00	1.90	140.18	1.97
20	51.11	-1.7	32.04	29.96	143.91	-1.88	140.51	-1.95
24	50.92	1.7	32.16	30.07	144.80	1.85	140.84	1.94
28	50.70	1.7	32.30	30.20	145.69	1.83	141.17	1.93
FEV. 1	50.45	1.7	32.45	30.35	146.56	1.80	141.50	1.91
5	50.18	1.7	32.63	30.51	147.43	1.78	141.83	1.90
9	49.89	-1.7	32.82	30.69	148.28	-1.75	142.16	-1.88
13	49.57	1.8	33.03	30.89	149.11	1.73	142.49	1.87
17	49.23	1.8	33.26	31.11	149.93	1.70	142.82	1.86
21	48.86	1.8	33.51	31.34	150.72	1.67	143.15	1.84
25	48.47	1.8	33.78	31.59	151.50	1.65	143.48	1.83
29	48.07	-1.8	34.06	31.86	152.25	-1.62	143.82	-1.81
MAR. 4	47.64	1.8	34.37	32.14	152.99	1.60	144.15	1.80
8	47.20	1.9	34.69	32.44	153.69	1.57	144.48	1.79
12	46.74	1.9	35.03	32.76	154.37	1.55	144.81	1.77
16	46.27	1.9	35.39	33.10	155.02	1.52	145.14	1.76
20	45.78	-1.9	35.77	33.45	155.64	-1.50	145.48	-1.74
24	45.28	1.9	36.16	33.82	156.22	1.48	145.81	1.73
28	44.77	2.0	36.57	34.20	156.77	1.45	146.14	1.71
ABR. 1	44.25	2.0	37.00	34.60	157.29	1.43	146.47	1.70
5	43.73	2.0	37.44	35.02	157.77	1.41	146.81	1.68
9	43.20	-2.0	37.90	35.45	158.21	-1.39	147.14	-1.67
13	42.67	2.1	38.38	35.89	158.60	1.37	147.47	1.65
17	42.13	2.1	38.86	36.34	158.96	1.35	147.81	1.64
21	41.60	2.1	39.36	36.81	159.27	1.33	148.14	1.62
25	41.07	2.2	39.87	37.28	159.53	1.32	148.47	1.61
29	40.55	-2.2	40.38	37.77	159.75	-1.30	148.81	-1.59
MAIO 3	40.03	-2.2	40.90	38.25	159.92	-1.29	149.14	-1.58

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	ANG. FASE	DEF. ILUM	ÂNGULO DEFEITO	POSIÇÃO EIXO	MERID. SIST.I	CENTRAL SIST.II	CORR. FASE
	G	"	G	G	G	G	G
JAN. 0	0.48	0.00	269.23	356.19	81.03	131.84	+0.00
4	1.07	.00	267.66	355.76	351.74	12.03	.02
8	1.66	.02	266.93	355.34	262.47	252.24	.02
12	2.25	.02	266.38	354.92	173.22	132.47	.02
16	2.83	.02	265.89	354.50	83.99	12.72	.03
20	3.40	0.03	265.45	354.09	354.79	253.00	+0.05
24	3.97	.04	265.03	353.69	265.61	133.30	.08
28	4.53	.05	264.62	353.28	176.45	13.62	.09
FEV. 1	5.07	.06	264.23	352.89	87.33	253.97	.11
5	5.60	.08	263.85	352.51	358.23	134.36	.15
9	6.12	0.09	263.48	352.13	269.16	14.77	+0.16
13	6.62	.11	263.13	351.76	180.12	255.21	.19
17	7.11	.13	262.78	351.40	91.12	135.68	.22
21	7.58	.15	262.45	351.06	2.14	16.18	.25
25	8.02	.18	262.13	350.72	273.20	256.72	.28
29	8.44	0.18	261.82	350.39	184.29	137.29	+0.31
MAR. 4	8.84	.20	261.52	350.08	95.42	17.89	.35
8	9.22	.22	261.24	349.78	6.59	258.54	.37
12	9.56	.24	260.97	349.49	277.79	139.22	.40
16	9.88	.26	260.71	349.22	189.03	19.93	.42
20	10.16	0.28	260.47	348.96	100.31	260.69	+0.45
24	10.42	.30	260.24	348.72	11.62	141.48	.47
28	10.64	.31	260.03	348.49	282.98	22.32	.49
ABR. 1	10.82	.33	259.83	348.28	194.38	263.20	.51
5	10.96	.35	259.65	348.08	105.83	144.12	.52
9	11.07	0.35	259.49	347.90	17.31	25.08	+0.53
13	11.13	.36	259.34	347.74	288.84	266.08	.54
17	11.15	.37	259.21	347.60	200.41	147.13	.54
21	11.13	.37	259.10	347.47	112.02	28.22	.54
25	11.06	.37	259.01	347.37	23.68	269.36	.53
29	10.94	0.37	258.94	347.28	295.38	150.54	+0.52
MAIO 3	10.78	0.36	258.89	347.21	207.13	31.76	+0.51

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIÂMETRO EQUAT. POLAR		TERRA ALFA+PI DELTA		SOL ALFA+PI DELTA	
	M		"	"	G	G	G	G
MAIO 3	40.03	-2.2	40.90	38.25	159.92	-1.29	149.14	-1.58
7	39.52	2.2	41.43	38.75	160.04	1.27	149.48	1.56
11	39.03	2.3	41.96	39.24	160.11	1.26	149.81	1.55
15	38.54	2.3	42.48	39.73	160.13	1.25	150.15	1.53
19	38.08	2.3	43.00	40.21	160.10	1.24	150.48	1.51
23	37.63	-2.4	43.51	40.69	160.02	-1.23	150.82	-1.50
27	37.21	2.4	44.01	41.16	159.88	1.22	151.15	1.48
31	36.80	2.4	44.49	41.61	159.70	1.22	151.49	1.47
JUN. 4	36.42	2.4	44.95	42.04	159.48	1.21	151.83	1.45
8	36.07	2.5	45.39	42.45	159.20	1.21	152.16	1.44
12	35.75	-2.5	45.80	42.83	158.89	-1.21	152.50	-1.42
16	35.46	2.5	46.17	43.18	158.53	1.21	152.83	1.40
20	35.20	2.5	46.51	43.50	158.14	1.21	153.17	1.39
24	34.98	2.5	46.81	43.77	157.71	1.21	153.51	1.37
28	34.80	2.6	47.06	44.01	157.26	1.21	153.84	1.35
JUL. 2	34.65	-2.6	47.26	44.20	156.78	-1.21	154.18	-1.34
6	34.54	2.6	47.41	44.34	156.29	1.22	154.52	1.32
10	34.46	2.6	47.51	44.43	155.78	1.22	154.86	1.31
14	34.43	2.6	47.56	44.48	155.26	1.22	155.19	1.29
18	34.43	2.6	47.55	44.47	154.75	1.23	155.53	1.27
22	34.48	-2.6	47.49	44.41	154.24	-1.23	155.87	-1.26
26	34.56	2.6	47.37	44.30	153.74	1.24	156.21	1.24
30	34.69	2.6	47.21	44.15	153.26	1.24	156.55	1.22
AGO. 3	34.85	2.6	46.99	43.94	152.80	1.24	156.89	1.21
7	35.04	2.5	46.73	43.70	152.36	1.25	157.22	1.19
11	35.27	-2.5	46.42	43.41	151.96	-1.25	157.56	-1.17
15	35.54	2.5	46.08	43.09	151.60	1.26	157.90	1.16
19	35.83	2.5	45.69	42.73	151.27	1.26	158.24	1.14
23	36.16	2.5	45.28	42.35	150.99	1.26	158.58	1.12
27	36.51	2.4	44.84	41.94	150.75	1.26	158.92	1.11
31	36.89	-2.4	44.38	41.51	150.56	-1.26	159.26	-1.09
SET. 4	37.30	-2.4	43.90	41.06	150.42	-1.26	159.60	-1.07

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	ANG. FASE	DEF. ILUM	ÂNGULO DEFEITO	POSIÇÃO EIXO	MERID. SIST.I	CENTRAL SIST.II	CORR. FASE
	G	"	G	G	G	G	G
MAIO 3	10.78	0.36	258.89	347.21	207.13	31.76	+0.51
7	10.56	.35	258.85	347.16	118.92	273.03	.49
11	10.30	.35	258.84	347.14	30.75	154.34	.46
15	9.98	.32	258.85	347.13	302.63	35.69	.43
19	9.62	.30	258.88	347.14	214.54	277.08	.40
23	9.20	0.28	258.94	347.17	126.49	158.51	+0.37
27	8.73	.26	259.02	347.22	38.49	39.98	.33
31	8.22	.23	259.12	347.29	310.51	281.49	.29
JUN. 4	7.65	.20	259.24	347.38	222.57	163.02	.26
8	7.04	.18	259.40	347.49	134.66	44.59	.22
12	6.39	0.15	259.58	347.61	46.77	286.18	+0.18
16	5.70	.11	259.79	347.76	318.90	167.79	.15
20	4.97	.09	260.05	347.92	231.05	49.42	.11
24	4.21	.06	260.35	348.09	143.21	291.06	.08
28	3.41	.04	260.74	348.27	55.38	172.71	.05
JUL. 2	2.60	0.02	261.28	348.47	327.55	54.35	+0.03
6	1.77	.02	262.15	348.67	239.71	295.99	.02
10	0.92	.00	264.28	348.88	151.86	177.63	.00
14	0.10	.00	303.09	349.09	64.00	59.24	.00
18	0.79	.00	75.98	349.31	336.11	300.83	+ .00
22	1.63	0.02	78.65	349.52	248.19	182.40	-0.02
26	2.47	.02	79.63	349.73	160.24	63.92	.03
30	3.29	.04	80.21	349.94	72.25	305.41	.05
AGO. 3	4.09	.06	80.63	350.13	344.21	186.86	.08
7	4.86	.08	80.96	350.32	256.13	68.25	.11
11	5.60	0.11	81.24	350.49	167.99	309.59	-0.15
15	6.31	.15	81.48	350.65	79.79	190.88	.18
19	6.97	.18	81.69	350.79	351.54	72.11	.21
23	7.60	.20	81.87	350.91	263.22	313.27	.25
27	8.17	.23	82.02	351.02	174.84	194.38	.29
31	8.70	0.26	82.14	351.10	86.40	75.42	-0.33
SET. 4	9.18	0.28	82.24	351.16	357.90	316.39	-0.37

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIÂMETRO EQUAT. POLAR		TERRA ALFA+PI DELTA		SOL ALFA+PI DELTA	
	M		"	"	G	G	G	G
SET. 4	37.30	-2.4	43.90	41.06	150.42	-1.26	159.60	-1.07
8	37.72	2.4	43.41	40.60	150.33	1.26	159.94	1.05
12	38.16	2.3	42.91	40.13	150.29	1.26	160.28	1.04
16	38.62	2.3	42.40	39.65	150.30	1.25	160.62	1.02
20	39.10	2.3	41.88	39.17	150.36	1.25	160.96	1.00
24	39.58	-2.3	41.37	38.69	150.48	-1.24	161.30	-0.99
28	40.08	2.2	40.86	38.21	150.65	1.24	161.65	0.97
OUT. 2	40.58	2.2	40.35	37.74	150.86	1.23	161.99	0.95
6	41.09	2.2	39.85	37.27	151.13	1.22	162.33	0.93
10	41.60	2.1	39.36	36.81	151.44	1.21	162.67	0.92
14	42.11	-2.1	38.88	36.36	151.79	-1.20	163.01	-0.90
18	42.62	2.1	38.42	35.93	152.19	1.19	163.35	0.88
22	43.13	2.1	37.96	35.50	152.64	1.17	163.70	0.86
26	43.63	2.1	37.53	35.09	153.12	1.16	164.04	0.85
30	44.13	2.0	37.11	34.70	153.65	1.15	164.38	0.83
NOV. 3	44.62	-2.0	36.70	34.32	154.21	-1.13	164.73	-0.81
7	45.09	2.0	36.31	33.96	154.80	1.11	165.07	0.79
11	45.56	2.0	35.94	33.61	155.43	1.09	165.41	0.77
15	46.01	1.9	35.59	33.28	156.09	1.07	165.75	0.76
19	46.44	1.9	35.26	32.97	156.78	1.05	166.10	0.74
23	46.86	-1.9	34.94	32.68	157.51	-1.03	166.44	-0.72
27	47.27	1.9	34.64	32.40	158.25	1.01	166.79	0.70
DEZ. 1	47.65	1.9	34.37	32.14	159.02	0.98	167.13	0.68
5	48.01	1.9	34.11	31.90	159.82	0.96	167.47	0.67
9	48.35	1.9	33.87	31.67	160.63	0.93	167.82	0.65
13	48.67	-1.8	33.64	31.46	161.47	-0.90	168.16	-0.63
17	48.97	1.8	33.44	31.27	162.32	0.88	168.51	0.61
21	49.24	1.8	33.26	31.10	163.19	0.85	168.85	0.59
25	49.48	1.8	33.09	30.95	164.08	0.82	169.20	0.58
29	49.70	1.8	32.94	30.81	164.97	0.79	169.54	0.56
33	49.90	-1.8	32.82	30.69	165.88	-0.75	169.89	-0.54

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	ANG. FASE	DEF. ILUM	ÂNGULO DEFEITO	POSIÇÃO EIXO	MERID. SIST.I	CENTRAL SIST.II	CORR. FASE
	G	"	G	G	G	G	G
SET. 4	9.18	0.28	82.24	351.16	357.90	316.39	-0.37
8	9.61	.30	82.32	351.20	269.33	197.31	.40
12	9.99	.33	82.37	351.22	180.70	78.16	.43
16	10.32	.35	82.40	351.21	92.01	318.95	.46
20	10.60	.36	82.40	351.18	3.25	199.68	.49
24	10.82	0.37	82.39	351.13	274.44	80.35	-0.51
28	11.00	.38	82.35	351.06	185.57	320.96	.53
OUT. 2	11.12	.38	82.29	350.96	96.65	201.53	.54
6	11.20	.38	82.21	350.85	7.68	82.03	.55
10	11.23	.38	82.11	350.72	278.65	322.50	.55
14	11.22	0.37	81.99	350.56	189.59	202.91	-0.55
18	11.16	.36	81.86	350.39	100.47	83.28	.54
22	11.06	.35	81.71	350.20	11.32	323.61	.53
26	10.92	.35	81.55	349.99	282.13	203.90	.52
30	10.74	.32	81.37	349.77	192.90	84.16	.50
NOV. 3	10.52	0.31	81.17	349.53	103.65	324.38	-0.48
7	10.27	.29	80.97	349.28	14.36	204.58	.46
11	9.98	.27	80.76	349.01	285.05	84.75	.43
15	9.66	.25	80.54	348.74	195.71	324.89	.41
19	9.31	.23	80.31	348.45	106.35	205.02	.38
23	8.94	0.21	80.07	348.16	16.98	85.12	-0.35
27	8.53	.19	79.83	347.85	287.58	325.21	.32
DEZ. 1	8.11	.18	79.59	347.54	198.18	205.29	.29
5	7.66	.15	79.34	347.22	108.76	85.36	.26
9	7.18	.13	79.10	346.90	19.34	325.42	.22
13	6.69	0.11	78.87	346.57	289.91	205.47	-0.20
17	6.18	.11	78.64	346.24	200.48	85.52	.18
21	5.66	.08	78.43	345.91	111.04	325.56	.15
25	5.12	.08	78.23	345.57	21.61	205.61	.11
29	4.57	.05	78.06	345.24	292.18	85.66	.09
33	4.00	0.04	77.94	344.90	202.75	325.71	-0.08

JÚPITER, SISTEMA I, 2020
LONGITUDE DO MERIDIANO CENTRAL DO DISCO ILUMINADO
O HORA TEMPO UNIVERSAL

DIA	JAN.	FEB.	MAR.	ABR.	MAIO	JUN.	JUL.	AGO.	SET.	OUT.	NOV.	DEZ.
	G	G	G	G	G	G	G	G	G	G	G	G
1	238.7	87.4	342.5	194.9	251.8	108.8	169.5	28.2	243.9	298.3	147.8	197.9
2	36.5	245.2	140.2	352.8	49.7	266.8	327.6	186.2	41.8	96.1	305.5	355.5
3	194.1	43.0	298.0	150.6	207.6	64.8	125.6	344.1	199.7	253.9	103.2	153.2
4	351.8	200.6	95.8	308.5	5.6	222.8	283.8	142.1	357.5	51.6	261.0	311.0
5	149.4	358.5	253.6	106.3	163.5	20.8	81.7	300.1	155.4	209.4	58.5	108.5
6	307.1	156.1	51.4	264.3	321.5	178.8	239.7	98.1	313.3	7.1	216.2	266.3
7	104.8	313.8	209.2	62.1	119.4	337.0	37.8	256.0	111.1	164.9	13.9	63.9
8	262.5	111.6	7.0	220.0	277.5	134.9	195.8	54.0	269.0	322.6	171.6	221.5
9	60.2	269.3	164.8	17.8	75.3	293.0	353.8	211.9	66.8	120.4	329.3	19.1
10	217.9	67.1	322.6	175.7	233.3	90.9	151.9	9.9	224.6	278.1	126.9	176.8
11	15.5	224.8	120.4	333.6	31.2	248.9	310.0	167.8	22.5	75.8	284.6	334.5
12	173.2	22.6	278.3	131.5	189.2	47.0	107.9	325.8	180.3	233.6	82.3	132.1
13	331.0	180.3	76.0	289.5	347.1	205.0	266.0	123.7	338.1	31.3	240.0	289.8
14	128.6	338.1	233.8	87.3	145.1	3.0	64.0	281.8	135.9	189.0	37.6	87.4
15	286.3	135.8	31.6	245.2	303.1	161.0	222.0	79.6	293.8	346.8	195.3	245.0
16	84.0	293.6	189.5	43.1	101.0	319.0	20.1	237.6	91.5	144.5	353.0	42.7
17	241.7	91.3	347.3	200.9	259.0	117.1	178.1	35.5	249.4	302.3	150.6	200.3
18	39.5	249.1	145.1	358.8	57.0	275.1	336.1	193.4	47.2	99.9	308.3	358.0
19	197.1	47.0	303.0	156.7	214.9	73.1	134.1	351.3	205.0	257.6	106.0	155.6
20	354.8	204.6	100.8	314.8	12.9	231.2	292.1	149.2	2.8	55.4	263.6	313.3
21	152.5	2.5	258.6	112.6	170.9	29.2	90.2	307.3	160.6	213.1	61.4	110.9
22	310.3	160.2	56.4	270.5	329.0	187.2	248.2	105.1	318.5	10.8	219.0	268.6
23	108.0	318.0	214.3	68.4	126.9	345.3	46.2	263.0	116.1	168.5	16.6	66.2
24	265.8	115.7	12.1	226.3	284.8	143.3	204.2	60.9	274.0	326.3	174.3	223.8
25	63.4	273.5	169.9	24.3	82.8	301.3	2.2	218.8	71.7	123.9	332.0	21.5
26	221.1	71.3	327.8	182.1	240.8	99.4	160.2	16.8	229.5	281.6	129.6	179.1
27	18.8	229.0	125.6	340.1	38.8	257.5	318.3	174.6	27.3	79.3	287.3	336.8
28	176.5	26.8	283.5	138.0	196.8	55.4	116.2	332.5	185.0	237.0	84.9	134.4
29	334.3	184.6	81.3	296.0	354.8	213.5	274.3	130.3	342.8	34.7	242.6	292.1
30	132.0		239.2	93.8	152.8	11.5	72.2	288.3	140.6	192.4	40.2	89.7
31	289.8		37.0		310.8		230.2	86.1		350.1		247.4

MOVIMENTO DO MERIDIANO CENTRAL

	MIN.	0H.	1H.	2H.	3H.	4H.	5H.	6H.	7H.	8H.	9H.	10H.	11H.
		G	G	G	G	G	G	G	G	G	G	G	G
0	0.0	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4	
10	6.1	42.7	79.3	115.8	152.4	189.0	225.6	262.2	298.7	335.3	11.9	48.5	
20	12.2	48.8	85.4	121.9	158.5	195.1	231.7	268.2	304.8	341.4	18.0	54.6	
30	18.3	54.9	91.4	128.0	164.6	201.2	237.8	274.3	310.9	347.5	24.1	60.7	
40	24.4	61.0	97.5	134.1	170.7	207.3	243.9	280.4	317.0	353.6	30.2	66.8	
50	30.5	67.1	103.6	140.2	176.8	213.4	250.0	286.5	323.1	359.7	36.3	72.9	
60	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4	79.0	

JÚPITER, SISTEMA II 2020
LONGITUDE DO MERIDIANO CENTRAL DO DISCO ILUMINADO
O HORA TEMPO UNIVERSAL

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DIA	JAN.	FEB.	MAR.	ABR.	MAIO	JUN.	JUL.	AGO.	SET.	OUT.	NOV.	DEZ.
	G	G	G	G	G	G	G	G	G	G	G	G
1	282.0	254.1	287.8	263.8	91.7	72.2	264.0	246.1	225.3	51.0	23.8	205.0
2	71.9	44.2	77.9	53.9	242.0	222.5	54.4	36.5	15.6	201.0	173.8	355.0
3	222.0	194.3	228.1	204.2	32.3	12.9	204.8	186.8	165.8	351.1	324.0	145.1
4	12.0	344.5	18.3	354.5	182.6	163.3	355.3	337.1	316.0	141.2	114.0	295.1
5	162.1	134.5	168.4	144.6	333.0	313.8	145.6	127.5	106.3	291.5	264.0	85.1
6	312.1	284.6	318.6	295.0	123.2	104.0	296.0	277.8	256.5	81.5	54.1	235.1
7	102.2	74.7	108.7	85.1	273.5	254.4	86.4	68.1	46.7	231.6	204.1	25.1
8	252.3	224.8	259.0	235.4	63.9	44.8	236.8	218.5	196.9	21.8	354.3	175.2
9	42.3	14.9	49.1	25.6	214.2	195.2	27.2	8.8	347.1	171.8	144.2	325.3
10	192.4	165.0	199.3	175.9	4.5	345.6	177.6	159.1	137.3	322.0	294.3	115.2
11	342.5	315.3	349.5	326.1	154.8	136.0	328.0	309.5	287.5	112.1	84.3	265.3
12	132.5	105.3	139.6	116.4	305.1	286.5	118.4	99.8	77.7	262.3	234.4	55.4
13	282.6	255.4	289.8	266.6	95.5	76.7	268.8	250.1	227.9	52.4	24.5	205.3
14	72.6	45.5	80.0	56.9	245.8	227.1	59.2	40.5	18.1	202.4	174.4	355.3
15	222.7	195.6	230.2	207.1	36.1	17.5	209.6	190.7	168.3	352.5	324.5	145.3
16	12.8	345.8	20.5	357.5	186.5	167.9	.0	341.0	318.5	142.6	114.5	295.3
17	162.8	135.9	170.5	147.7	336.8	318.3	150.4	131.3	108.7	292.6	264.6	85.4
18	313.0	286.0	320.8	298.0	127.1	108.7	300.8	281.6	258.8	82.7	54.6	235.4
19	103.0	76.2	110.9	88.2	277.5	259.1	91.2	71.9	49.0	232.8	204.6	25.5
20	253.0	226.3	261.1	238.5	67.8	49.5	241.6	222.2	199.2	23.0	354.8	175.4
21	43.1	16.5	51.4	28.8	218.2	199.9	32.0	12.5	349.5	173.0	144.7	325.5
22	193.2	166.6	201.5	179.0	8.5	350.3	182.4	162.7	139.5	323.1	294.8	115.4
23	343.3	316.8	351.8	329.3	158.9	140.7	332.8	313.0	289.8	113.2	84.8	265.5
24	133.4	106.9	142.0	119.6	309.3	291.1	123.1	103.3	79.8	263.3	234.8	55.5
25	283.5	257.0	292.3	270.0	99.6	81.5	273.5	253.6	230.0	53.4	24.8	205.5
26	73.5	47.1	82.4	60.2	250.0	231.9	63.9	43.8	20.1	203.4	174.9	355.5
27	223.6	197.3	232.6	210.5	40.3	22.5	214.3	194.1	170.3	353.5	325.0	145.5
28	13.7	347.5	22.8	.8	190.7	172.8	4.6	344.3	320.5	143.5	114.9	295.5
29	163.8	137.6	173.0	151.1	341.0	323.3	155.0	134.6	110.6	293.6	265.0	85.6
30	314.0		323.3	301.5	131.4	113.6	305.5	284.8	260.8	83.7	55.0	235.6
31	104.0		113.5		281.8		95.7	75.1		233.7		25.6

MOVIMENTO DO MERIDIANO CENTRAL

MIN.	0H.	1H.	2H.	3H.	4H.	5H.	6H.	7H.	8H.	9H.	10H.	11H.
	G	G	G	G	G	G	G	G	G	G	G	G
0	0.0	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9
10	6.0	42.3	78.6	114.8	151.1	187.3	223.6	259.9	296.1	332.4	8.7	44.9
20	12.1	48.3	84.6	120.9	157.1	193.4	229.7	265.9	302.2	338.4	14.7	51.0
30	18.1	54.4	90.7	126.9	163.2	199.4	235.7	272.0	308.2	344.5	20.7	57.0
40	24.2	60.4	96.7	133.0	169.2	205.5	241.7	278.0	314.3	350.5	26.8	63.0
50	30.2	66.5	102.7	139.0	175.3	211.5	247.8	284.0	320.3	356.6	32.8	69.1
60	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9	75.1

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIÂMETRO EQUAT. POLAR		ANG. FASE	DEF. ILUM	ANG. POS. DEFEITO
	M		"	"	G	"	G
JAN. 1	91.43	+0.7	15.05	13.43	1.20	0.00	80.82
4	91.53	0.7	15.03	13.41	0.85	.00	80.56
8	91.60	0.7	15.02	13.41	0.50	.00	80.20
12	91.63	0.7	15.02	13.40	0.14	.00	79.00
16	91.62	0.7	15.02	13.40	0.21	.00	261.24
20	91.58	+0.7	15.03	13.41	0.56	0.00	260.43
24	91.51	0.8	15.04	13.42	0.91	.00	260.11
28	91.40	0.8	15.06	13.43	1.26	.00	259.87
FEV. 1	91.26	0.8	15.08	13.46	1.60	.00	259.65
5	91.08	0.8	15.11	13.48	1.94	.00	259.46
9	90.87	+0.8	15.14	13.51	2.27	0.02	259.27
13	90.63	0.8	15.18	13.55	2.59	.02	259.09
17	90.36	0.8	15.23	13.59	2.90	.02	258.92
21	90.06	0.8	15.28	13.63	3.21	.02	258.76
25	89.73	0.9	15.34	13.68	3.50	.02	258.60
29	89.37	+0.9	15.40	13.74	3.77	0.02	258.45
MAR. 4	88.99	0.9	15.46	13.80	4.04	.02	258.31
8	88.58	0.9	15.54	13.86	4.29	.02	258.17
12	88.15	0.9	15.61	13.93	4.52	.02	258.04
16	87.69	0.9	15.69	14.00	4.74	.03	257.92
20	87.22	+0.9	15.78	14.08	4.93	0.03	257.80
24	86.73	0.9	15.87	14.16	5.11	.03	257.69
28	86.22	0.9	15.96	14.24	5.27	.03	257.59
ABR. 1	85.71	0.9	16.06	14.33	5.41	.04	257.50
5	85.17	0.9	16.16	14.42	5.53	.04	257.42
9	84.63	+0.9	16.26	14.51	5.62	0.04	257.35
13	84.09	0.8	16.37	14.60	5.69	.04	257.29
17	83.53	0.8	16.47	14.70	5.73	.04	257.23
21	82.98	0.8	16.58	14.80	5.75	.04	257.19
25	82.42	0.8	16.70	14.90	5.75	.04	257.15
29	81.87	+0.8	16.81	15.00	5.72	0.04	257.12
MAIO 3	81.32	+0.8	16.92	15.10	5.66	0.04	257.11

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

0 HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIÂMETRO EQUAT. POLAR		ANG. FASE	DEF. ILUM	ANG. POS. DEFEITO
	M		"	"	G	"	G
MAIO 3	81.32	+0.8	16.92	15.10	5.66	0.04	257.11
7	80.78	0.8	17.04	15.20	5.58	.04	257.10
11	80.25	0.7	17.15	15.30	5.47	.04	257.11
15	79.73	0.7	17.26	15.40	5.34	.04	257.12
19	79.23	0.7	17.37	15.50	5.18	.04	257.15
23	78.74	+0.7	17.48	15.59	5.00	0.03	257.19
27	78.27	0.6	17.58	15.69	4.79	.03	257.24
31	77.82	0.6	17.68	15.78	4.55	.03	257.30
JUN. 4	77.40	0.6	17.78	15.86	4.29	.02	257.37
8	77.00	0.6	17.87	15.95	4.01	.02	257.45
12	76.63	+0.5	17.96	16.02	3.71	0.02	257.55
16	76.29	0.5	18.04	16.10	3.39	.02	257.66
20	75.98	0.5	18.11	16.16	3.05	.02	257.79
24	75.71	0.5	18.18	16.22	2.69	.02	257.94
28	75.47	0.4	18.23	16.27	2.32	.02	258.11
JUL. 2	75.26	+0.4	18.28	16.31	1.93	0.02	258.33
6	75.10	0.4	18.32	16.35	1.54	.00	258.62
10	74.97	0.4	18.36	16.38	1.13	.00	259.04
14	74.88	0.3	18.38	16.40	0.72	.00	259.83
18	74.83	0.3	18.39	16.41	0.31	.00	262.47
22	74.81	+0.3	18.39	16.41	0.11	0.00	66.22
26	74.84	0.3	18.39	16.41	0.53	.00	75.76
30	74.91	0.3	18.37	16.39	0.94	.00	77.00
AGO. 3	75.02	0.4	18.34	16.37	1.35	.00	77.54
7	75.17	0.4	18.31	16.34	1.75	.00	77.89
11	75.35	+0.4	18.26	16.30	2.14	0.02	78.14
15	75.57	0.4	18.21	16.25	2.52	.02	78.34
19	75.83	0.4	18.15	16.19	2.88	.02	78.51
23	76.12	0.5	18.08	16.13	3.23	.02	78.66
27	76.44	0.5	18.00	16.06	3.56	.02	78.78
31	76.79	+0.5	17.92	15.99	3.87	0.02	78.90
SET. 4	77.18	+0.5	17.83	15.91	4.16	0.02	79.00

EFEMÉRIDES PARA OBSERVAÇÕES FÍSICAS

O HORA TEMPO UNIVERSAL

DATA	TEMPO LUZ	MAG.	DIÂMETRO EQUAT. POLAR		ANG. FASE	DEF. ILUM	ANG. POS. DEFEITO
	M		"	"	G	"	G
SET. 4	77.18	+0.5	17.83	15.91	4.16	0.02	79.00
8	77.59	0.6	17.74	15.83	4.43	.03	79.09
12	78.02	0.6	17.64	15.74	4.67	.03	79.16
16	78.48	0.6	17.53	15.65	4.89	.03	79.23
20	78.96	0.6	17.43	15.55	5.09	.03	79.28
24	79.45	+0.6	17.32	15.45	5.26	0.04	79.32
28	79.96	0.7	17.21	15.36	5.40	.04	79.35
OUT. 2	80.49	0.7	17.10	15.26	5.52	.04	79.37
6	81.02	0.7	16.98	15.15	5.61	.04	79.38
10	81.57	0.7	16.87	15.05	5.67	.04	79.38
14	82.12	+0.7	16.76	14.95	5.71	0.04	79.37
18	82.67	0.7	16.65	14.85	5.72	.04	79.35
22	83.22	0.8	16.54	14.76	5.70	.04	79.32
26	83.77	0.8	16.43	14.66	5.66	.04	79.28
30	84.31	0.8	16.32	14.56	5.60	.04	79.24
NOV. 3	84.85	+0.8	16.22	14.47	5.51	0.04	79.18
7	85.38	0.8	16.12	14.38	5.40	.04	79.12
11	85.90	0.8	16.02	14.30	5.26	.03	79.05
15	86.40	0.8	15.93	14.21	5.10	.03	78.98
19	86.89	0.8	15.84	14.13	4.93	.03	78.89
23	87.36	+0.8	15.75	14.06	4.73	0.03	78.81
27	87.81	0.8	15.67	13.98	4.51	.02	78.72
DEZ. 1	88.24	0.8	15.60	13.92	4.28	.02	78.63
5	88.64	0.8	15.52	13.85	4.03	.02	78.54
9	89.02	0.8	15.46	13.79	3.77	.02	78.45
13	89.38	+0.8	15.40	13.74	3.49	0.02	78.37
17	89.70	0.8	15.34	13.69	3.20	.02	78.29
21	90.00	0.8	15.29	13.64	2.89	.02	78.23
25	90.27	0.8	15.24	13.60	2.58	.02	78.18
29	90.50	0.8	15.21	13.57	2.26	.02	78.17
33	90.71	+0.8	15.17	13.54	1.92	0.00	78.20