

2013

Sun and Planets

Date	SUN					Mercury					Venus													
	GHA o	'	d	Dec o	'	vis mag	GHA o	'	dd	Dec o	'	dd	vis mag	GHA o	'	Dec o	'							
Jan 1	179	8.6	-7.0	-23	0.2	5.2	sr	-0.6	190	6.7	-42.7	0.2	-24	15.0	-5.1	-0.6	sr	-3.9	201	53.5	-21.7	-22	20.7	-7.9
2	179	1.6	-6.9	-22	55.0	5.6	sr	-0.7	189	24.0	-43.2	0.2	-24	20.1	-3.8	-0.6	sr	-3.9	201	31.8	-21.9	-22	28.6	-7.2
3	178	54.6	-6.9	-22	49.4	6.1	sr	-0.7	188	40.8	-43.6	0.2	-24	23.9	-2.5	-0.7	sr	-3.9	201	9.9	-22.0	-22	35.8	-6.5
4	178	47.8	-6.8	-22	43.3	6.5	sr	-0.7	187	57.2	-44.0	0.2	-24	26.4	-1.2	-0.7	sr	-3.9	200	47.9	-22.1	-22	42.3	-5.8
5	178	41.0	-6.7	-22	36.8	6.9	sr	-0.7	187	13.2	-44.4	0.2	-24	27.6	0.2	-0.7	sr	-3.9	200	25.7	-22.3	-22	48.1	-5.1
6	178	34.4	-6.5	-22	29.9	7.4	sr	-0.8	186	28.8	-44.8	0.2	-24	27.4	1.5	-0.7	sr	-3.9	200	3.5	-22.4	-22	53.2	-4.5
7	178	27.8	-6.4	-22	22.5	7.9		-0.8	185	43.9	-45.2	0.2	-24	25.9	2.9	-0.7	sr	-3.9	199	41.1	-22.5	-22	57.7	-3.7
8	178	21.4	-6.3	-22	14.6	8.3		-0.8	184	58.8	-45.5	0.2	-24	23.0	4.3	-0.7	sr	-3.9	199	18.6	-22.5	-23	1.4	-3.1
9	178	15.1	-6.2	-22	6.3	8.7		-0.9	184	13.3	-45.8	0.1	-24	18.7	5.8	-0.8	sr	-3.9	198	56.1	-22.6	-23	4.5	-2.3
10	178	8.9	-6.0	-21	57.6	9.1		-0.9	183	27.5	-46.0	0.1	-24	12.9	7.1	-0.7	sr	-3.9	198	33.5	-22.7	-23	6.8	-1.7
11	178	2.9	-5.9	-21	48.5	9.6		-1.0	182	41.5	-46.3	0.1	-24	5.8	8.7	-0.8	sr	-3.9	198	10.8	-22.7	-23	8.5	-0.9
12	177	57.0	-5.7	-21	38.9	10.0		-1.0	181	55.2	-46.5	0.1	-23	57.1	10.0	-0.7	sr	-3.9	197	48.2	-22.7	-23	9.4	-0.2
13	177	51.3	-5.6	-21	28.9	10.4		-1.1	181	8.8	-46.7	0.1	-23	47.1	11.6	-0.8	sr	-3.9	197	25.5	-22.7	-23	9.6	0.5
14	177	45.7	-5.4	-21	18.5	10.8		-1.1	180	22.1	-46.8	0.1	-23	35.5	13.0	-0.7	sr	-3.9	197	2.8	-22.7	-23	9.1	1.2
15	177	40.3	-5.2	-21	7.7	11.2		-1.2	179	35.3	-46.9	0.1	-23	22.5	14.5	-0.8	sr	-3.9	196	40.1	-22.6	-23	7.9	1.9
16	177	35.0	-5.1	-20	56.5	11.6		-1.2	178	48.4	-47.0	0.0	-23	8.0	16.0	-0.8	sr	-3.9	196	17.5	-22.6	-23	6.0	2.6
17	177	30.0	-4.9	-20	44.9	12.0		-1.2	178	1.3	-47.1	0.0	-22	52.0	17.5	-0.8	sr	-3.9	195	54.9	-22.5	-23	3.4	3.4
18	177	25.1	-4.7	-20	32.9	12.4		-1.3	177	14.2	-47.1	0.0	-22	34.5	19.1	-0.8	sr	-3.9	195	32.3	-22.5	-23	0.0	4.0
19	177	20.4	-4.5	-20	20.5	12.8		-1.3	176	27.1	-47.1	0.0	-22	15.4	20.6	-0.8	sr	-3.9	195	9.9	-22.4	-22	56.0	4.6
20	177	15.9	-4.3	-20	7.7	13.2		-1.3	175	40.0	-47.1	0.0	-21	54.8	22.1	-0.7	sr	-3.9	194	47.5	-22.3	-22	51.2	5.4
21	177	11.6	-4.1	-19	54.5	13.5		-1.3	174	52.9	-47.0	0.0	-21	32.7	23.6	-0.8	sr	-3.9	194	25.3	-22.1	-22	45.8	6.2
22	177	7.5	-3.9	-19	41.0	13.9		-1.3	174	5.8	-46.9	-0.1	-21	9.1	25.2	-0.8	sr	-3.9	194	3.1	-22.0	-22	39.6	6.8
23	177	3.5	-3.7	-19	27.1	14.2		-1.3	173	18.9	-46.8	-0.1	-20	43.9	26.7	-0.8	sr	-3.9	193	41.1	-21.9	-22	32.8	7.6
24	176	59.8	-3.5	-19	12.9	14.6		-1.3	172	32.1	-46.6	-0.1	-20	17.2	28.2	-0.8	sr	-3.9	193	19.3	-21.7	-22	25.2	8.2
25	176	56.3	-3.3	-18	58.3	15.0		-1.2	171	45.5	-46.3	-0.1	-19	49.0	29.8	-0.8	sr	-3.9	192	57.6	-21.5	-22	17.0	8.9
26	176	52.9	-3.1	-18	43.3	15.3		-1.2	170	59.2	-46.0	-0.2	-19	19.2	31.3	-0.8	sr	-3.9	192	36.0	-21.4	-22	8.1	9.5
27	176	49.8	-2.9	-18	28.0	15.6		-1.2	170	13.1	-45.7	-0.2	-18	47.9	32.7	-0.7	sr	-3.9	192	14.7	-21.2	-21	58.6	10.3
28	176	46.9	-2.7	-18	12.4	15.9		-1.2	169	27.4	-45.2	-0.2	-18	15.2	34.3	-0.8	sr	-3.9	191	53.5	-21.0	-21	48.3	10.9
29	176	44.2	-2.5	-17	56.5	16.3	ss	-1.2	168	42.2	-44.7	-0.3	-17	40.9	35.6	-0.7	sr	-3.9	191	32.6	-20.7	-21	37.4	11.5
30	176	41.6	-2.3	-17	40.2	16.6	ss	-1.2	167	57.5	-44.1	-0.3	-17	5.3	37.1	-0.7	sr	-3.9	191	11.8	-20.5	-21	25.9	12.2
Jan 31	176	39.3	-2.1	-17	23.6	16.9	ss	-1.2	167	13.4	-43.3	-0.4	-16	28.2	38.5	-0.7	sr	-3.9	190	51.3	-20.3	-21	13.7	12.8
Feb 1	176	37.2	-1.9	-17	6.7	17.2	ss	-1.2	166	30.1	-42.5	-0.4	-15	49.7	39.7	-0.6	sr	-3.9	190	31.0	-20.1	-21	0.9	13.5
2	176	35.3	-1.7	-16	49.5	17.5	ss	-1.1	165	47.6	-41.4	-0.5	-15	10.0	41.0	-0.6	sr	-3.9	190	10.9	-19.8	-20	47.4	14.0
3	176	33.6	-1.5	-16	32.0	17.8	ss	-1.1	165	6.2	-40.2	-0.6	-14	29.0	42.0	-0.5	sr	-3.9	189	51.1	-19.6	-20	33.4	14.7
4	176	32.0	-1.3	-16	14.2	18.0	ss	-1.1	164	25.9	-38.8	-0.7	-13	47.0	43.2	-0.6	sr	-3.9	189	31.6	-19.3	-20	18.7	15.3
5	176	30.7	-1.1	-15	56.2	18.4	ss	-1.1	163	47.1	-37.2	-0.8	-13	3.8	44.0	-0.4	sr	-3.9	189	12.3	-19.0	-20	3.4	15.9
6	176	29.6	-0.9	-15	37.8	18.6	ss	-1.1	163	9.9	-35.3	-1.0	-12	19.8	44.8	-0.4	sr	-3.9	188	53.2	-18.8	-19	47.5	16.5
7	176	28.6	-0.7	-15	19.2	18.9	ss	-1.1	162	34.6	-33.1	-1.1	-11	35.0	45.4	-0.3	sr	-3.9	188	34.5	-18.5	-19	31.0	17.0
8	176	27.9	-0.5	-15	0.3	19.1	ss	-1.0	162	1.6	-30.5	-1.3	-10	49.6	45.7	-0.1	sr	-3.9	188	16.0	-18.2	-19	14.0	17.6
9	176	27.4	-0.3	-14	41.2	19.4	ss	-1.0	161	31.1	-27.5	-1.5	-10	3.9	46.0	-0.1	sr	-3.9	187	57.8	-17.9	-18	56.4	18.1
10	176	27.0	-0.2	-14	21.8	19.6	ss	-1.0	161	3.6	-24.1	-1.7	-9	17.9	45.8	0.1	sr	-3.9	187	39.9	-17.6	-18	38.3	18.7
11	176	26.9	0.0	-14	2.2	19.8	ss	-0.9	160	39.4	-20.3	-1.9	-8	32.1	45.5	0.1	sr	-3.9	187	22.3	-17.3	-18	19.6	19.2
12	176	26.9	0.2	-13	42.4	20.1	ss	-0.9	160	19.2	-15.9	-2.2	-7	46.6	44.7	0.4	sr	-3.9	187	5.0	-17.0	-18	0.4	19.7
13	176	27.1	0.4	-13	22.3	20.3	ss	-0.8	160	3.3	-11.0	-2.5	-7	1.9	43.7	0.5	sr	-3.9	186	47.9	-16.7	-17	40.7	20.2
14	176	27.6	0.6	-13	2.0	20.5	ss	-0.8	159	52.3	-5.5	-2.7	-6	18.2	42.3	0.7	sr	-3.9	186	31.2	-16.4	-17	20.5	20.7
15	176	28.2	0.8	-12	41.5	20.7	ss	-0.7	159	46.8	0.5	-3.0	-5	35.9	40.4	1.0	sr	-3.9	186	14.8	-16.1	-16	59.8	21.2
16	176	29.0	1.0	-12	20.8	20.9	ss	-0.6	159	47.3	7.2	-3.3	-4	55.5	38.2	1.1	sr	-3.9	185	58.7	-15.8	-16	38.6	21.6
17	176	29.9	1.2	-11	59.9	21.0	ss	-0.5	159	54.5	14.3	-3.6	-4	17.3	35.6	1.3	sr	-3.9	185	42.8	-15.5	-16	17.0	22.1
18	176	31.1	1.3	-11	38.9	21.3	ss	-0.3	160	8.8	22.0	-3.8	-3	41.7	32.6	1.5	sr	-3.9	185	27.3	-15.2	-15	54.9	22.6
19	176	32.4	1.5	-11	17.6	21.4	ss	-0.1	160	30.9	30.2	-4.1	-3	9.1	29.1	1.8	sr	-3.9	185	12.1	-14.9	-15	32.3	23.0
20	176	33.9	1.7	-10	56.2	21.7	ss	0.1	161	1.1	38.7	-4.3	-2	40.0	25.3	1.9	sr	-3.9	184	57.1	-14.7	-15	9.3	23.4
21	176	35.6	1.8	-10	34.5	21.7	ss	0.3	161	39.8	47.5	-4.4	-2	14.7	21.1	2.1	sr	-3.9	184	42.5	-14.4	-14	45.9	23.6
22	176	37.4	2.0	-10	12.8	22.0	ss	0.6	162	27.2	56.4	-4.5	-1	53.6	16.7	2.2	sr	-3.9	184	28.1	-14.1	-14	22.1	24.1
23	176	39.4	2.1	-9	50.8	22.0	ss	0.8	163	23.6	65.3	-4.4	-1	36.9	11.9	2.4	sr	-3.9	184	14.0	-13.8	-13	58.0	24.6
24	176	41.5	2.3	-9	28.8	22.3	ss	1.1	164	28.9	74.0	-4.3	-1	25.0	7.1	2.4	sr	-3.9	184	0.2	-13.5	-13	33.4	25.0
25	176	43.8	2.4	-9	6.5	22.3	ss	1.3	165	42.9	82.3	-4.2	-1	17.9	2.2	2.4	sr	-3.9	183	46.6	-13.3	-13	8.4	25.3
26	176	46.3	2.6	-8	44.2	22.5	ss	1.6	167	5.1	90.0	-3.9	-1	15.7	-2.8	2.5	sr	-3.9	183	33.4	-13.0	-12	43.1	25.6
27	176	48.9	2.7	-8	21.7	22.6	ss	1.9	168	35.1	97.0	-3.5	-1	18.5	-7.6	2.4	sr	-3.9	183	20.4	-12.8	-12	17.5	26.0
Feb 28	176	51.6	2.9	-7	59.1	22.7		2.1	170	12.1	103.0	-3.0	-1	26.1	-12.1	2.3	sr	-3.9	183	7.6	-12.5	-11	51.5	

2013

Sun and Planets

Date	Mars					Jupiter					Saturn					
	vis	mag	GHA	d	Dec	vis	mag	GHA	d	Dec	vis	mag	GHA	d	Dec	
Jan 1	y	1.2	153	29.9	10.5	-20	12.5	11.6	y	-2.7	34	41.8	65.1	20	54.3	-0.7
2	y	1.2	153	40.4	10.6	-20	0.9	11.8	y	-2.7	35	46.9	64.9	20	53.6	-0.6
3	y	1.2	153	50.9	10.7	-19	49.1	12.0	y	-2.7	36	51.8	64.7	20	53.0	-0.7
4	y	1.2	154	1.6	10.8	-19	37.1	12.3	y	-2.7	37	56.5	64.6	20	52.3	-0.6
5	y	1.2	154	12.4	10.9	-19	24.8	12.4	y	-2.7	39	1.1	64.4	20	51.7	-0.6
6	y	1.2	154	23.3	11.0	-19	12.4	12.7	y	-2.7	40	5.5	64.2	20	51.1	-0.5
7	y	1.2	154	34.2	11.1	-18	59.7	12.9	y	-2.7	41	9.7	64.0	20	50.6	-0.5
8	y	1.2	154	45.3	11.2	-18	46.8	13.0	y	-2.7	42	13.7	63.8	20	50.1	-0.5
9	y	1.2	154	56.5	11.3	-18	33.8	13.3	y	-2.7	43	17.5	63.6	20	49.6	-0.5
10	y	1.2	155	7.7	11.4	-18	20.5	13.5	y	-2.7	44	21.1	63.4	20	49.1	-0.5
11	y	1.2	155	19.1	11.5	-18	7.0	13.7	y	-2.7	45	24.5	63.2	20	48.6	-0.4
12	y	1.2	155	30.6	11.6	-17	53.3	13.8	y	-2.7	46	27.7	63.0	20	48.2	-0.3
13	y	1.2	155	42.2	11.7	-17	39.5	14.1	y	-2.7	47	30.7	62.8	20	47.9	-0.4
14	y	1.2	155	53.9	11.8	-17	25.4	14.2	y	-2.6	48	33.5	62.6	20	47.5	-0.3
15	y	1.2	156	5.7	11.9	-17	11.2	14.4	y	-2.6	49	36.1	62.4	20	47.2	-0.3
16	y	1.2	156	17.6	12.0	-16	56.8	14.6	y	-2.6	50	38.5	62.2	20	46.9	-0.2
17	y	1.2	156	29.7	12.1	-16	42.2	14.8	y	-2.6	51	40.7	62.0	20	46.7	-0.3
18	y	1.2	156	41.8	12.3	-16	27.4	14.9	y	-2.6	52	42.6	61.8	20	46.4	-0.1
19	y	1.2	156	54.1	12.4	-16	12.5	15.1	y	-2.6	53	44.4	61.5	20	46.3	-0.2
20	y	1.2	157	6.4	12.5	-15	57.4	15.2	y	-2.6	54	45.9	61.3	20	46.1	-0.1
21	y	1.2	157	18.9	12.6	-15	42.2	15.5	y	-2.6	55	47.3	61.1	20	46.0	-0.1
22	y	1.2	157	31.5	12.7	-15	26.7	15.6	y	-2.6	56	48.4	60.9	20	45.9	0.0
23	y	1.2	157	44.2	12.8	-15	11.1	15.7	y	-2.6	57	49.3	60.7	20	45.9	0.0
24	y	1.2	157	57.0	12.9	-14	55.4	15.9	y	-2.6	58	50.0	60.5	20	45.9	0.0
25	y	1.2	158	9.9	13.0	-14	39.5	16.0	y	-2.6	59	50.4	60.3	20	45.9	0.0
26	y	1.2	158	23.0	13.1	-14	23.5	16.2	y	-2.6	60	50.7	60.0	20	45.9	0.1
27	y	1.2	158	36.1	13.2	-14	7.3	16.3	y	-2.6	61	50.7	59.8	20	46.0	0.2
28	y	1.2	158	49.4	13.4	-13	51.0	16.4	y	-2.5	62	50.6	59.6	20	46.2	0.1
29	y	1.2	159	2.7	13.5	-13	34.6	16.6	y	-2.5	63	50.2	59.4	20	46.3	0.2
30	y	1.2	159	16.2	13.6	-13	18.0	16.7	y	-2.5	64	49.6	59.2	20	46.5	0.2
Jan 31	y	1.2	159	29.7	13.7	-13	1.3	16.9	y	-2.5	65	48.7	59.0	20	46.7	0.3
Feb 1	y	1.2	159	43.4	13.8	-12	44.4	16.9	y	-2.5	66	47.7	58.7	20	47.0	0.3
2	y	1.2	159	57.2	13.9	-12	27.5	17.1	y	-2.5	67	46.5	58.5	20	47.3	0.3
3	y	1.2	160	11.1	14.0	-12	10.4	17.2	y	-2.5	68	45.0	58.3	20	47.6	0.4
4	y	1.2	160	25.0	14.1	-11	53.2	17.3	y	-2.5	69	43.3	58.1	20	48.0	0.4
5	y	1.2	160	39.1	14.2	-11	35.9	17.4	y	-2.5	70	41.4	57.9	20	48.4	0.4
6	y	1.2	160	53.3	14.3	-11	18.5	17.6	y	-2.5	71	39.3	57.7	20	48.8	0.5
7	y	1.2	161	7.5	14.4	-11	0.9	17.6	y	-2.5	72	37.0	57.5	20	49.3	0.5
8	y	1.2	161	21.9	14.4	-10	43.3	17.7	y	-2.5	73	34.4	57.3	20	49.8	0.5
9	y	1.2	161	36.3	14.5	-10	25.6	17.8	y	-2.5	74	31.7	57.0	20	50.3	0.6
10	y	1.2	161	50.8	14.6	-10	7.8	17.9	y	-2.4	75	28.7	56.8	20	50.9	0.6
11	y	1.2	162	5.5	14.7	-9	49.9	18.0	y	-2.4	76	25.6	56.6	20	51.5	0.6
12	y	1.2	162	20.2	14.8	-9	31.9	18.1	y	-2.4	77	22.2	56.4	20	52.1	0.7
13	y	1.2	162	35.0	14.9	-9	13.8	18.2	y	-2.4	78	18.6	56.2	20	52.8	0.7
14	y	1.2	162	49.9	15.0	-8	55.6	18.2	y	-2.4	79	14.8	56.0	20	53.5	0.7
15	y	1.2	163	4.9	15.1	-8	37.4	18.3	y	-2.4	80	10.8	55.8	20	54.2	0.8
16	y	1.2	163	19.9	15.1	-8	19.1	18.4	y	-2.4	81	6.6	55.6	20	55.0	0.8
17	y	1.2	163	35.1	15.2	-8	0.7	18.4	y	-2.4	82	2.2	55.4	20	55.8	0.8
18	y	1.2	163	50.3	15.3	-7	42.3	18.6	y	-2.4	82	57.6	55.2	20	56.6	0.8
19	y	1.2	164	5.6	15.4	-7	23.7	18.5	y	-2.4	83	52.8	55.0	20	57.4	0.9
20	y	1.2	164	21.0	15.5	-7	5.2	18.6	y	-2.4	84	47.8	54.8	20	58.3	0.9
21	y	1.2	164	36.5	15.5	-6	46.6	18.7	y	-2.4	85	42.6	54.6	20	59.2	0.9
22	y	1.2	164	52.0	15.6	-6	27.9	18.7	y	-2.4	86	37.2	54.4	21	0.1	1.0
23	y	1.2	165	7.6	15.7	-6	9.2	18.8	y	-2.4	87	31.7	54.2	21	1.1	0.9
24	y	1.2	165	23.3	15.8	-5	50.4	18.8	y	-2.3	88	25.9	54.1	21	2.0	1.0
25	y	1.2	165	39.0	15.8	-5	31.6	18.8	y	-2.3	89	20.0	53.9	21	3.0	1.1
26	y	1.2	165	54.9	15.9	-5	12.8	18.9	y	-2.3	90	13.8	53.7	21	4.1	1.0
27	y	1.2	166	10.7	15.9	-4	53.9	18.9	y	-2.3	91	7.5	53.5	21	5.1	1.1
Feb 28	y	1.2	166	26.7	16.0	-4	35.0	19.0	y	-2.3	92	1.0	53.3	21	6.2	1.1
Mar 1	y	1.2	166	42.7	16.1	-4	16.0	18.9	y	-2.3	92	54.3	53.1	21	7.3	1.1
2	y	1.2	166	58.7	16.1	-3	57.1	19.0	y	-2.3	93	47.5	53.0	21	8.4	1.1
3	y	1.2	167	14.9	16.2	-3	38.1	19.1	y	-2.3	94	40.4	52.8	21	9.5	1.2
4	y	1.2	167	31.0	16.2	-3	19.0	19.0	y	-2.3	95	33.2	52.6	21	10.7	1.2
5	y	1.2	167	47.2	16.3	-3	0.0	19.0	y	-2.3	96	25.8	52.4	21	11.9	1.2
Mar 6	y	1.2	168	3.5	16.3	-2	41.0	19.1	y	-2.3	97	18.3	52.3	21	13.1	1.2

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Sun and Planets

Date	SUN					Mercury						Venus										
	GHA O	d	Dec O	d		vis mag	GHA O	d	dd	Dec O	d	dd	vis mag	GHA O	d	Dec O	d					
Mar 7	177	14.0	3.6	-5	17.9	23.4	2.5	183	10.6	110.3	1.3	-4	1.0	-29.8	0.3	-3.9	181	44.8	-11.0	-8	41.5	28.2
8	177	17.6	3.7	-4	54.5	23.4	sr 2.4	185	0.9	106.7	1.8	-4	30.8	-29.9	0.1	-3.9	181	33.8	-10.8	-8	13.3	28.4
9	177	21.3	3.8	-4	31.1	23.5	sr 2.2	186	47.6	102.2	2.2	-5	0.7	-29.4	-0.2	-3.9	181	23.0	-10.6	-7	44.9	28.6
10	177	25.1	3.9	-4	7.6	23.6	sr 2.1	188	29.8	97.1	2.6	-5	30.1	-28.4	-0.5	-3.9	181	12.4	-10.5	-7	16.3	28.8
11	177	28.9	3.9	-3	44.0	23.5	sr 2.0	190	6.9	91.5	2.8	-5	58.5	-27.1	-0.6	-3.9	181	2.0	-10.3	-6	47.5	29.0
12	177	32.9	4.0	-3	20.5	23.7	sr 1.9	191	38.4	85.6	2.9	-6	25.6	-25.4	-0.9	-3.9	180	51.7	-10.1	-6	18.5	29.1
13	177	36.9	4.1	-2	56.8	23.6	sr 1.8	193	4.0	79.5	3.0	-6	51.0	-23.5	-0.9	-3.9	180	41.5	-10.0	-5	49.4	29.3
14	177	41.0	4.2	-2	33.2	23.7	sr 1.6	194	23.5	73.4	3.1	-7	14.5	-21.3	-1.1	-3.9	180	31.5	-9.9	-5	20.1	29.5
15	177	45.1	4.2	-2	9.5	23.7	sr 1.5	195	37.0	67.4	3.0	-7	35.8	-19.1	-1.1	-3.9	180	21.7	-9.7	-4	50.6	29.5
16	177	49.4	4.3	-1	45.8	23.7	sr 1.4	196	44.3	61.4	3.0	-7	54.9	-16.7	-1.2	-3.9	180	11.9	-9.6	-4	21.1	29.7
17	177	53.6	4.3	-1	22.1	23.8	sr 1.3	197	45.7	55.6	2.9	-8	11.6	-14.4	-1.2	-3.9	180	2.3	-9.5	-3	51.4	29.8
18	177	57.9	4.4	-0	58.3	23.7	sr 1.2	198	41.4	50.1	2.8	-8	26.0	-12.0	-1.2	-3.9	179	52.8	-9.4	-3	21.6	29.9
19	178	2.3	4.4	-0	34.6	23.7	sr 1.0	199	31.5	44.8	2.6	-8	38.0	-9.6	-1.2	-3.9	179	43.4	-9.3	-2	51.7	30.0
20	178	6.7	4.4	-0	10.9	23.7	sr 0.9	200	16.3	39.8	2.5	-8	47.6	-7.3	-1.1	-3.9	179	34.0	-9.3	-2	21.7	30.1
21	178	11.2	4.5	0	12.8	23.7	sr 0.8	200	56.1	35.1	2.4	-8	54.9	-4.9	-1.2	-3.9	179	24.8	-9.2	-1	51.6	30.1
22	178	15.7	4.5	0	36.5	23.7	sr 0.8	201	31.1	30.6	2.2	-8	59.8	-2.7	-1.1	-3.9	179	15.5	-9.1	-1	21.5	30.1
23	178	20.2	4.5	1	0.2	23.6	sr 0.7	202	1.7	26.4	2.1	-9	2.5	-0.5	-1.1	-3.9	179	6.4	-9.1	0	51.4	30.2
24	178	24.7	4.5	1	23.8	23.6	sr 0.6	202	28.1	22.5	2.0	-9	3.0	1.6	-1.0	-3.9	178	57.3	-9.1	0	21.2	30.2
25	178	29.3	4.6	1	47.4	23.5	sr 0.6	202	50.7	18.9	1.8	-9	1.4	3.7	-1.0	-3.9	178	48.2	-9.0	0	9.0	30.2
26	178	33.8	4.6	2	10.9	23.6	sr 0.5	203	9.5	15.4	1.7	-8	57.7	5.8	-1.1	-3.9	178	39.2	-9.0	0	39.2	30.3
27	178	38.4	4.6	2	34.5	23.4	sr 0.5	203	24.9	12.2	1.6	-8	51.9	7.6	-0.9	-3.9	178	30.1	-9.0	1	9.5	30.2
28	178	42.9	4.6	2	57.9	23.4	sr 0.4	203	37.2	9.3	1.5	-8	44.3	9.6	-1.0	-3.9	178	21.1	-9.1	1	39.7	30.2
29	178	47.5	4.5	3	21.3	23.3	sr 0.4	203	46.5	6.5	1.4	-8	34.7	11.4	-0.9	-3.9	178	12.1	-9.1	2	9.9	30.1
30	178	52.0	4.5	3	44.6	23.3	sr 0.4	203	52.9	3.9	1.3	-8	23.3	13.1	-0.8	-3.9	178	3.0	-9.1	2	40.0	30.1
Mar 31	178	56.5	4.5	4	7.9	23.2	sr 0.3	203	56.8	1.4	1.2	-8	10.2	14.9	-0.9	-3.9	177	53.9	-9.2	3	10.1	30.0
Apr 1	179	1.0	4.5	4	31.1	23.1	sr 0.3	203	58.3	-0.8	1.1	-7	55.3	16.6	-0.9	-3.9	177	44.7	-9.2	3	40.1	30.0
2	179	5.5	4.4	4	54.2	23.1	sr 0.3	203	57.4	-3.0	1.1	-7	38.7	18.1	-0.7	-3.9	177	35.5	-9.3	4	10.1	29.9
3	179	9.9	4.4	5	17.3	22.9	sr 0.3	203	54.4	-5.0	1.0	-7	20.6	19.8	-0.9	-3.9	177	26.2	-9.4	4	40.0	29.8
4	179	14.3	4.3	5	40.2	22.8	sr 0.2	203	49.4	-6.9	1.0	-7	0.8	21.2	-0.7	-3.9	177	16.9	-9.4	5	9.8	29.6
5	179	18.6	4.3	6	3.0	22.8	sr 0.2	203	42.5	-8.7	0.9	-6	39.6	22.8	-0.8	-3.9	177	7.4	-9.5	5	39.4	29.6
6	179	22.9	4.2	6	25.8	22.6	sr 0.2	203	33.7	-10.5	0.9	-6	16.8	24.2	-0.7	-3.9	176	57.9	-9.6	6	9.0	29.4
7	179	27.2	4.2	6	48.4	22.5	sr 0.2	203	23.3	-12.1	0.8	-5	52.6	25.5	-0.6	-3.9	176	48.3	-9.8	6	38.4	29.3
8	179	31.3	4.1	7	10.9	22.4	sr 0.1	203	11.2	-13.7	0.8	-5	27.1	27.0	-0.8	-3.9	176	38.5	-9.9	7	7.7	29.1
9	179	35.5	4.1	7	33.3	22.3	sr 0.1	202	57.5	-15.2	0.8	-5	0.1	28.3	-0.6	-3.9	176	28.6	-10.0	7	36.8	28.9
10	179	39.5	4.0	7	55.6	22.1	sr 0.1	202	42.3	-16.7	0.7	-4	31.8	29.6	-0.7	-3.9	176	18.6	-10.2	8	5.7	28.8
11	179	43.5	3.9	8	17.7	22.0	sr 0.1	202	25.6	-18.1	0.7	-4	2.2	30.8	-0.6	-3.9	176	8.5	-10.3	8	34.5	28.5
12	179	47.4	3.8	8	39.7	21.8	sr 0.0	202	7.5	-19.5	0.7	-3	31.4	32.1	-0.7	-3.9	175	58.2	-10.5	9	3.0	28.4
13	179	51.2	3.8	9	1.5	21.7	sr 0.0	201	48.0	-20.9	0.7	-2	59.3	33.2	-0.6	-3.9	175	47.7	-10.6	9	31.4	28.1
14	179	55.0	3.7	9	23.2	21.6	sr 0.0	201	27.1	-22.3	0.7	-2	26.1	34.5	-0.7	-3.9	175	37.1	-10.8	9	59.5	27.9
15	179	58.7	3.6	9	44.8	21.3	sr -0.1	201	4.9	-23.6	0.7	-1	51.6	35.5	-0.5	-3.9	175	26.2	-11.0	10	27.4	27.7
16	180	2.2	3.5	10	6.1	21.2	sr -0.1	200	41.2	-25.0	0.7	-1	16.1	36.7	-0.6	-3.9	175	15.2	-11.2	10	55.1	27.4
17	180	5.7	3.4	10	27.3	21.1	sr -0.2	200	16.3	-26.4	0.7	0	39.4	37.7	-0.5	-3.9	175	4.1	-11.4	11	22.5	27.1
18	180	9.2	3.3	10	48.4	20.8	sr -0.2	199	49.9	-27.7	0.7	0	1.7	38.8	-0.6	-3.9	174	52.7	-11.6	11	49.6	26.9
19	180	12.5	3.2	11	9.2	20.7	sr -0.2	199	22.2	-29.1	0.7	0	37.1	39.7	-0.4	-3.9	174	41.1	-11.8	12	16.5	26.5
20	180	15.7	3.1	11	29.9	20.5	sr -0.3	198	53.0	-30.6	0.7	1	16.8	40.8	-0.5	-3.9	174	29.2	-12.0	12	43.0	26.3
21	180	18.8	3.0	11	50.4	20.2	sr -0.3	198	22.4	-32.0	0.7	1	57.6	41.7	-0.5	-3.9	174	17.2	-12.3	13	9.3	25.9
22	180	21.8	2.9	12	10.6	20.1	sr -0.4	197	50.4	-33.6	0.8	2	39.3	42.6	-0.4	-3.9	174	5.0	-12.5	13	35.2	25.6
23	180	24.7	2.8	12	30.7	19.9	sr -0.4	197	16.8	-35.1	0.8	3	21.9	43.4	-0.4	-3.9	173	52.5	-12.7	14	0.8	25.3
24	180	27.5	2.7	12	50.6	19.7	sr -0.5	196	41.7	-36.7	0.8	4	5.3	44.3	-0.4	-3.9	173	39.7	-13.0	14	26.1	24.9
25	180	30.2	2.6	13	10.3	19.4	sr -0.5	196	5.0	-38.4	0.8	4	49.6	45.0	-0.4	-3.9	173	26.7	-13.2	14	51.0	24.5
26	180	32.8	2.4	13	29.7	19.2	sr -0.6	195	26.7	-40.1	0.9	5	34.6	45.8	-0.4	-3.9	173	13.5	-13.5	15	15.5	24.1
27	180	35.2	2.3	13	48.9	19.0	sr -0.7	194	46.6	-41.8	0.9	6	20.4	46.4	-0.3	ss -3.9	172	60.0	-13.8	15	39.6	23.8
28	180	37.5	2.2	14	7.9	18.8	sr -0.7	194	4.8	-43.7	0.9	7	6.8	47.1	-0.3	ss -3.9	172	46.2	-14.0	16	3.4	23.3
29	180	39.7	2.0	14	26.7	18.5	sr -0.8	193	21.1	-45.6	0.9	7	53.9	47.6	-0.3	ss -3.9	172	32.2	-14.3	16	26.7	22.9
Apr 30	180	41.7	1.9	14	45.2	18.3	sr -0.9	192	35.5	-47.5	1.0	8	41.5	48.0	-0.2	ss -3.9	172	17.9	-14.6	16	49.6	22.5
May 1	180	43.6	1.8	15	3.5	18.1	sr -1.0	191	48.0	-49.5	1.0	9	29.5	48.4	-0.2	ss -3.9	172	3.3	-14.9	17	12.1	22.1
2	180	45.4	1.6	15	21.6	17.7	sr -1.1	190	58.5	-51.6	1.0	10	17.9	48.7	-0.1	ss -3.9	171	48.5	-15.1	17	34.2	21.6
3	180	47.0	1.5	15	39.3	17.6	sr -1.2	190	6.9	-53.7	1.1	11	6.6	48.9	-0.1	ss -3.9	171	33.3	-15.4	17	55.8	21.1
4	180	48.5	1.3	15	56.9	17.2	sr -1.3	189	13.2	-55.8	1.1	11	55.5	48.9	0.0	ss -3.9	171	17.9	-15.7	18	16.9	20.7
5	180	49.8	1.2	16	14.1	17.0	-1.4	188	17.3	-58.0	1.1	12	44.4	48.8	0.0	ss -3.9	171	2.2	-16.0	18	37.6	20.2
6	180	51.0	1.1	16	31.1	16.7	-1.5	187	19.4	-60.1	1.1	13	33.2	48.6	0.1	ss -3.9	170	46.3	-16.3	18	57.8	19.6
7	180	52.1	0.9	16	47.8	16.5	-1.6	186	19.2	-62.3	1.1	14	21.8	48.2	0.2	ss -3.9	170	30.0	-16.5	19	17.4	19.2
8	180	53.0																				

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Sun and Planets

Date	Mars					Jupiter					Saturn				
	vis	GHA	d	Dec	d'	vis	GHA	d	Dec	d'	vis	GHA	d	Dec	d'
Mar 7	y	1.2 168 19.8	16.3	-2 21.9	19.0	y	-2.3 98 10.5	52.1	21 14.3	1.2	y	1.1 305 11.4	60.7	-12 45.6	0.8
	y	1.2 168 36.1	16.4	-2 2.9	19.1	y	-2.3 99 2.6	51.9	21 15.5	1.3	y	1.1 306 12.1	60.8	-12 44.8	0.7
8	y	1.2 168 52.5	16.4	-1 43.8	19.1	y	-2.3 99 54.6	51.8	21 16.8	1.3	y	1.1 307 12.9	60.9	-12 44.1	0.8
9	y	1.2 169 8.9	16.5	-1 24.7	19.0	y	-2.2 100 46.4	51.6	21 18.1	1.3	y	1.1 308 13.8	61.0	-12 43.3	0.8
10	y	1.2 169 25.4	16.5	-1 5.7	19.1	y	-2.2 101 38.0	51.4	21 19.4	1.3	y	1.1 309 14.8	61.1	-12 42.5	0.8
11	y	1.2 169 41.9	16.5	-0 46.6	19.0	y	-2.2 102 29.4	51.3	21 20.7	1.3	y	1.1 310 15.9	61.2	-12 41.7	0.9
12	y	1.2 169 58.4	16.6	-0 27.6	19.0	y	-2.2 103 20.7	51.1	21 22.0	1.3	y	1.1 311 17.1	61.3	-12 40.8	0.9
13	y	1.2 170 15.0	16.6	-0 8.6	19.0	y	-2.2 104 11.8	51.0	21 23.3	1.4	y	1.1 312 18.4	61.4	-12 39.9	0.9
14	y	1.2 170 31.6	16.6	0 10.4	19.0	y	-2.2 105 2.8	50.8	21 24.7	1.3	y	1.1 313 19.8	61.5	-12 39.0	0.9
15	y	1.2 170 48.2	16.7	0 29.4	19.0	y	-2.2 105 53.6	50.7	21 26.0	1.4	y	1.1 314 21.2	61.5	-12 38.1	1.0
16	y	1.2 171 4.9	16.7	0 48.4	18.9	y	-2.2 106 44.3	50.5	21 27.4	1.4	y	1.1 315 22.8	61.6	-12 37.1	0.9
17	y	1.2 171 21.5	16.7	1 7.3	19.0	y	-2.2 107 34.8	50.4	21 28.8	1.4	y	1.0 316 24.4	61.7	-12 36.2	1.0
18	y	1.2 171 38.2	16.7	1 26.3	18.8	y	-2.2 108 25.2	50.2	21 30.2	1.4	y	1.0 317 26.1	61.8	-12 35.2	1.1
19	y	1.2 171 55.0	16.7	1 45.1	18.9	y	-2.2 109 15.4	50.1	21 31.6	1.4	y	1.0 318 27.9	61.9	-12 34.1	1.0
20	y	1.2 172 11.7	16.8	2 4.0	18.8	y	-2.2 110 5.5	49.9	21 33.0	1.5	y	1.0 319 29.8	61.9	-12 33.1	1.1
21	y	1.2 172 28.5	16.8	2 22.8	18.8	y	-2.2 110 55.4	49.8	21 34.5	1.4	y	1.0 320 31.7	62.0	-12 32.0	1.1
22	y	1.2 172 45.3	16.8	2 41.6	18.7	y	-2.2 111 45.3	49.7	21 35.9	1.4	y	1.0 321 33.7	62.1	-12 30.9	1.1
23	y	1.2 173 2.0	16.8	3 0.3	18.7	y	-2.2 112 34.9	49.5	21 37.3	1.5	y	1.0 322 35.8	62.2	-12 29.8	1.1
24	y	1.2 173 18.9	16.8	3 19.0	18.6	y	-2.2 113 24.5	49.4	21 38.8	1.4	y	1.0 323 38.0	62.2	-12 28.7	1.2
25	y	1.2 173 35.7	16.8	3 37.6	18.6	y	-2.1 114 13.9	49.3	21 40.2	1.5	y	1.0 324 40.3	62.3	-12 27.5	1.1
26	y	1.2 173 52.5	16.8	3 56.2	18.5	y	-2.1 115 3.2	49.1	21 41.7	1.5	y	1.0 325 42.6	62.4	-12 26.4	1.2
27	y	1.2 174 9.3	16.8	4 14.7	18.4	y	-2.1 115 52.3	49.0	21 43.2	1.4	y	1.0 326 45.0	62.5	-12 25.2	1.2
28	y	1.2 174 26.1	16.8	4 33.1	18.5	y	-2.1 116 41.3	48.9	21 44.6	1.5	y	1.0 327 47.4	62.5	-12 24.0	1.2
29	y	1.2 174 43.0	16.8	4 51.6	18.3	y	-2.1 117 30.2	48.8	21 46.1	1.5	y	1.0 328 50.0	62.6	-12 22.8	1.3
30	y	1.2 174 59.8	16.8	5 9.9	18.3	y	-2.1 118 19.0	48.7	21 47.6	1.5	y	1.0 329 52.5	62.6	-12 21.5	1.2
Mar 31	y	1.2 175 16.6	16.8	5 28.2	18.2	y	-2.1 119 7.6	48.5	21 49.1	1.5	y	1.0 330 55.2	62.7	-12 20.3	1.3
Apr 1	y	1.2 175 33.4	16.8	5 46.4	18.1	y	-2.1 119 56.2	48.4	21 50.6	1.4	y	1.0 331 57.9	62.8	-12 19.0	1.3
2	y	1.2 175 50.2	16.8	6 4.5	18.1	y	-2.1 120 44.6	48.3	21 52.0	1.5	y	1.0 333 0.7	62.8	-12 17.7	1.3
3	y	1.2 176 7.0	16.8	6 22.6	18.0	y	-2.1 121 32.9	48.2	21 53.5	1.5	y	0.9 334 3.5	62.9	-12 16.4	1.3
4	y	1.2 176 23.8	16.8	6 40.6	17.9	y	-2.1 122 21.1	48.1	21 55.0	1.5	y	0.9 335 6.4	62.9	-12 15.1	1.4
5	y	1.2 176 40.6	16.8	6 58.5	17.8	y	-2.1 123 9.1	48.0	21 56.5	1.5	y	0.9 336 9.3	63.0	-12 13.7	1.3
6	y	1.2 176 57.3	16.7	7 16.3	17.7	y	-2.1 123 57.1	47.8	21 58.0	1.5	y	0.9 337 12.3	63.0	-12 12.4	1.4
7	y	1.2 177 14.1	16.7	7 34.0	17.7	y	-2.1 124 44.9	47.7	21 59.5	1.4	y	0.9 338 15.3	63.1	-12 11.0	1.3
8	y	1.2 177 30.8	16.7	7 51.7	17.5	y	-2.1 125 32.7	47.6	22 0.9	1.5	y	0.9 339 18.4	63.1	-12 9.7	1.4
9	y	1.2 177 47.5	16.7	8 9.2	17.5	y	-2.1 126 20.3	47.5	22 2.4	1.5	y	0.9 340 21.5	63.2	-12 8.3	1.4
10	y	1.2 178 4.2	16.7	8 26.7	17.3	y	-2.1 127 7.8	47.4	22 3.9	1.5	y	0.9 341 24.7	63.2	-12 6.9	1.4
11	y	1.2 178 20.8	16.6	8 44.0	17.3	y	-2.1 127 55.3	47.3	22 5.4	1.4	y	0.9 342 27.9	63.3	-12 5.5	1.4
12	y	1.2 178 37.5	16.6	9 1.3	17.2	y	-2.1 128 42.6	47.2	22 6.8	1.5	y	0.9 343 31.2	63.3	-12 4.1	1.4
13	y	1.2 178 54.1	16.6	9 18.5	17.0	y	-2.1 129 29.8	47.1	22 8.3	1.4	y	0.9 344 34.4	63.3	-12 2.7	1.4
14	y	1.2 179 10.7	16.6	9 35.5	17.0	y	-2.0 130 16.9	47.0	22 9.7	1.5	y	0.9 345 37.8	63.4	-12 1.3	1.4
15	y	1.2 179 27.2	16.5	9 52.5	16.8	y	-2.0 131 4.0	46.9	22 11.2	1.4	y	0.9 346 41.1	63.4	-11 59.9	1.5
16	y	1.2 179 43.8	16.5	10 9.3	16.8	y	-2.0 131 50.9	46.8	22 12.6	1.5	y	0.9 347 44.5	63.4	-11 58.4	1.4
17	y	1.2 180 0.3	16.5	10 26.1	16.6	y	-2.0 132 37.7	46.8	22 14.1	1.4	y	0.9 348 47.9	63.4	-11 57.0	1.4
18	y	1.2 180 16.8	16.5	10 42.7	16.5	y	-2.0 133 24.5	46.7	22 15.5	1.4	y	0.9 349 51.3	63.5	-11 55.6	1.5
19	y	1.2 180 33.2	16.4	10 59.2	16.4	y	-2.0 134 11.2	46.6	22 16.9	1.4	y	0.9 350 54.8	63.5	-11 54.1	1.4
20	y	1.2 180 49.6	16.4	11 15.6	16.3	y	-2.0 134 57.8	46.5	22 18.3	1.4	y	0.9 351 58.3	63.5	-11 52.7	1.5
21	y	1.2 181 6.0	16.4	11 31.9	16.1	y	-2.0 135 44.3	46.4	22 19.7	1.4	y	0.8 353 1.7	63.5	-11 51.2	1.4
22	y	1.2 181 22.4	16.3	11 48.0	16.0	y	-2.0 136 30.7	46.3	22 21.1	1.4	y	0.8 354 5.3	63.5	-11 49.8	1.5
23	y	1.2 181 38.7	16.3	12 4.0	15.9	y	-2.0 137 17.0	46.3	22 22.5	1.3	y	0.8 355 8.8	63.5	-11 48.3	1.4
24	y	1.2 181 55.0	16.2	12 19.9	15.7	y	-2.0 138 3.3	46.2	22 23.8	1.4	y	0.8 356 12.3	63.5	-11 46.9	1.4
25	y	1.2 182 11.2	16.2	12 35.6	15.7	y	-2.0 138 49.5	46.1	22 25.2	1.3	y	0.8 357 15.8	63.5	-11 45.5	1.5
26	y	1.2 182 27.4	16.2	12 51.3	15.4	y	-2.0 139 35.6	46.0	22 26.5	1.4	y	0.8 358 19.4	63.5	-11 44.0	1.4
27	y	1.2 182 43.6	16.1	13 6.7	15.4	y	-2.0 140 21.6	46.0	22 27.9	1.3	y	0.8 359 22.9	63.5	-11 42.6	1.5
28	y	1.2 182 59.7	16.1	13 22.1	15.2	y	-2.0 141 7.6	45.9	22 29.2	1.3	y	0.8 0 26.5	63.5	-11 41.1	1.4
29	y	1.3 183 15.7	16.0	13 37.3	15.1	y	-2.0 141 53.5	45.8	22 30.5	1.3	y	0.8 1 30.0	63.5	-11 39.7	1.4
Apr 30	y	1.3 183 31.8	16.0	13 52.4	14.9	y	-2.0 142 39.3	45.7	22 31.8	1.3	y	0.8 2 33.6	63.5	-11 38.3	1.4
May 1	y	1.3 183 47.7	15.9	14 7.3	14.8	y	-2.0 143 25.0	45.7	22 33.1	1.2	y	0.8 3 37.1	63.5	-11 36.9	1.4
2	y	1.3 184 3.7	15.9	14 22.1	14.6	y	-2.0 144 10.7	45.6	22 34.3	1.3	y	0.8 4 40.6	63.5	-11 35.5	1.4
3	y	1.3 184 19.6	15.8	14 36.7	14.5	y	-2.0 144 56.3	45.6	22 35.6	1.2	y	0.8 5 44.2	63.5	-11 34.1	1.4
4	y	1.3 184 35.4	15.8	14 51.2	14.3	y	-2.0 145 41.9	45.5	22 36.8	1.2	y	0.8 6 47.7	63.5	-11 32.7	1.4
5	y	1.3 184 51.2	15.7	15 5.5	14.2	y	-2.0 146 27.4	45.4	22 38.0	1.2	y	0.9 7 51.2	63.5	-11 31.3	1.4
6	y	1.3 185 7.0	15.7	15 19.7	14.0	y	-2.0 147 12.8	45.4	22 39.2	1.2	y	0.9 8 54.7	63.5	-11 29.9	1.4
7	y	1.3 185 22.6	15.7	15 33.7	13.9	y	-2.0 147 58.2	45.3	22 40.4	1.2	y	0.9 9 58.2	63.4	-11 28.5	1.3
8	y	1.3 185 38.3	15.6	15 47.6	13.6	y	-2.0 148 43.5	45.2	22 41.6	1.1	y	0.9 11 1.6	63.4	-11 27.2	1.4
May 9	y	1.3 185 53.9	15.6	16 1.2	13.6	y	-2.0 149 28.7	45.2	22 42.7	1.2	y	0.9 12 5.0	63.4	-11 25.8	1.3
May 10	y	1.3 185 53.9	15.6	16 1.2	13.6	y	-2.0 149 28.7	45.2	22 42.7	1.2	y	0.9 12 5.0	63.4	-11 25.8	1.3

2013

Sun and Planets

Date	SUN				Mercury						Venus					
	GHA O	d	Dec O	d	vis mag	GHA O	d	dd	Dec O	d	dd	vis mag	GHA O	d	Dec O	d
May 11	180 54.8	0.3	17 51.9	15.2	-2.2	181 58.1	-69.9	0.9	17 30.5	44.8	0.5	SS -3.9	169 22.2	-17.6	20 30.8	17.0
12	180 55.2	0.2	18 7.1	15.0	-2.4	180 48.1	-71.5	0.8	18 15.3	43.5	0.6	SS -3.9	169 4.5	-17.9	20 47.8	16.4
13	180 55.3	0.0	18 22.1	14.7	-2.2	179 36.7	-72.8	0.7	18 58.8	41.9	0.8	SS -3.9	168 46.6	-18.2	21 4.2	15.9
14	180 55.4	-0.1	18 36.8	14.3	-2.1	178 23.9	-73.9	0.5	19 40.7	40.2	0.9	SS -3.9	168 28.5	-18.4	21 20.1	15.2
15	180 55.3	-0.2	18 51.1	14.0	-2.0	177 10.0	-74.7	0.4	20 20.9	38.2	1.0	SS -3.9	168 10.1	-18.7	21 35.3	14.7
16	180 55.1	-0.4	19 5.1	13.7	-1.8	175 55.3	-75.1	0.2	20 59.1	36.1	1.0	SS -3.9	167 51.4	-18.9	21 50.0	14.0
17	180 54.7	-0.5	19 18.8	13.4	-1.7	174 40.2	-75.3	0.1	21 35.2	33.8	1.2	SS -3.9	167 32.5	-19.1	22 4.0	13.4
18	180 54.2	-0.6	19 32.2	13.0	-1.6	173 24.9	-75.1	-0.1	22 9.0	31.4	1.2	SS -3.9	167 13.4	-19.3	22 17.4	12.8
19	180 53.6	-0.8	19 45.2	12.7	SS -1.5	172 9.8	-74.6	-0.3	22 40.4	29.0	1.2	SS -3.9	166 54.1	-19.6	22 30.2	12.1
20	180 52.8	-0.9	19 57.9	12.4	SS -1.4	170 55.2	-73.7	-0.4	23 9.4	26.3	1.3	SS -3.9	166 34.5	-19.8	22 42.3	11.6
21	180 51.9	-1.0	20 10.3	12.0	SS -1.3	169 41.5	-72.6	-0.6	23 35.7	23.7	1.3	SS -3.9	166 14.8	-20.0	22 53.9	10.8
22	180 50.9	-1.2	20 22.3	11.7	SS -1.2	168 28.9	-71.1	-0.7	23 59.4	21.0	1.3	SS -3.9	165 54.8	-20.1	23 4.7	10.2
23	180 49.7	-1.3	20 34.0	11.3	SS -1.1	167 17.8	-69.3	-0.9	24 20.4	18.4	1.3	SS -3.9	165 34.7	-20.3	23 14.9	9.5
24	180 48.5	-1.4	20 45.3	10.9	SS -1.0	166 8.5	-67.3	-1.0	24 38.8	15.7	1.3	SS -3.9	165 14.4	-20.5	23 24.4	8.9
25	180 47.1	-1.5	20 56.2	10.6	SS -0.9	165 1.2	-65.0	-1.1	24 54.5	13.2	1.3	SS -3.9	164 53.9	-20.6	23 33.3	8.1
26	180 45.5	-1.7	21 6.8	10.2	SS -0.8	163 56.2	-62.6	-1.2	25 7.7	10.7	1.3	SS -3.9	164 33.3	-20.8	23 41.4	7.5
27	180 43.9	-1.8	21 17.0	9.9	SS -0.8	162 53.7	-59.9	-1.3	25 18.4	8.2	1.3	SS -3.9	164 12.5	-20.9	23 48.9	6.8
28	180 42.1	-1.9	21 26.9	9.5	SS -0.7	161 53.8	-57.1	-1.4	25 26.6	5.9	1.1	SS -3.9	163 51.6	-21.0	23 55.7	6.1
29	180 40.2	-2.0	21 36.4	9.1	SS -0.6	160 56.7	-54.1	-1.5	25 32.5	3.6	1.2	SS -3.9	163 30.6	-21.1	24 1.8	5.4
30	180 38.2	-2.1	21 45.5	8.7	SS -0.5	160 2.6	-51.0	-1.6	25 36.1	1.5	1.0	SS -3.9	163 9.5	-21.2	24 7.2	4.7
May 31	180 36.1	-2.2	21 54.2	8.4	SS -0.4	159 11.6	-47.8	-1.6	25 37.6	-0.6	1.0	SS -3.9	162 48.4	-21.3	24 11.9	4.0
Jun 1	180 33.9	-2.3	22 2.6	8.0	SS -0.3	158 23.9	-44.5	-1.7	25 37.0	-2.5	1.0	SS -3.9	162 27.1	-21.3	24 15.9	3.2
2	180 31.6	-2.4	22 10.6	7.6	SS -0.3	157 39.4	-41.1	-1.7	25 34.5	-4.3	0.9	SS -3.9	162 5.8	-21.4	24 19.1	2.6
3	180 29.1	-2.5	22 18.2	7.2	SS -0.2	156 58.3	-37.6	-1.7	25 30.2	-6.1	0.9	SS -3.9	161 44.4	-21.4	24 21.7	1.8
4	180 26.6	-2.6	22 25.4	6.8	SS -0.1	156 20.8	-34.0	-1.8	25 24.1	-7.6	0.8	SS -3.9	161 23.0	-21.4	24 23.5	1.1
5	180 24.0	-2.7	22 32.2	6.4	SS 0.0	155 46.8	-30.4	-1.8	25 16.5	-9.1	0.8	SS -3.9	161 1.6	-21.4	24 24.6	0.4
6	180 21.3	-2.8	22 38.6	6.0	SS 0.1	155 16.4	-26.7	-1.9	25 7.4	-10.4	0.7	SS -3.9	160 40.3	-21.4	24 25.0	-0.3
7	180 18.5	-2.9	22 44.6	5.6	SS 0.1	154 49.8	-22.9	-1.9	24 57.0	-11.7	0.7	SS -3.9	160 18.9	-21.3	24 24.7	-1.0
8	180 15.7	-2.9	22 50.2	5.2	SS 0.2	154 26.9	-19.0	-2.0	24 45.3	-12.9	0.6	SS -3.9	159 57.5	-21.3	24 23.7	-1.8
9	180 12.7	-3.0	22 55.4	4.8	SS 0.3	154 7.8	-15.1	-2.0	24 32.4	-13.9	0.5	SS -3.9	159 36.2	-21.2	24 21.9	-2.5
10	180 9.8	-3.0	23 0.2	4.4	SS 0.4	153 52.7	-11.2	-2.0	24 18.5	-14.8	0.4	SS -3.9	159 15.0	-21.1	24 19.4	-3.2
11	180 6.7	-3.1	23 4.6	4.0	SS 0.4	153 41.5	-7.1	-2.0	24 3.7	-15.7	0.5	SS -3.9	158 53.9	-21.0	24 16.2	-3.9
12	180 3.6	-3.1	23 8.6	3.6	SS 0.5	153 34.4	-3.0	-2.1	23 48.0	-16.3	0.3	SS -3.9	158 32.8	-20.9	24 12.3	-4.6
13	180 0.5	-3.2	23 12.2	3.2	SS 0.6	153 31.4	1.2	-2.1	23 31.7	-17.0	0.4	SS -3.9	158 11.9	-20.8	24 7.7	-5.3
14	179 57.3	-3.2	23 15.4	2.8	SS 0.7	153 32.6	5.4	-2.1	23 14.7	-17.5	0.3	SS -3.9	157 51.1	-20.7	24 2.4	-6.0
15	179 54.1	-3.2	23 18.2	2.3	SS 0.8	153 38.0	9.8	-2.2	22 57.2	-17.9	0.2	SS -3.9	157 30.5	-20.5	23 56.4	-6.8
16	179 50.9	-3.2	23 20.5	2.0	SS 0.9	153 47.8	14.2	-2.2	22 39.3	-18.3	0.2	SS -3.9	157 10.0	-20.3	23 49.6	-7.4
17	179 47.7	-3.2	23 22.5	1.5	SS 0.9	154 2.0	18.7	-2.3	22 21.0	-18.4	0.1	SS -3.9	156 49.7	-20.1	23 42.2	-8.1
18	179 44.4	-3.3	23 24.0	1.1	SS 1.0	154 20.7	23.3	-2.3	22 2.6	-18.6	0.1	SS -3.9	156 29.5	-19.9	23 34.1	-8.8
19	179 41.2	-3.3	23 25.1	0.7	SS 1.1	154 44.0	28.0	-2.3	21 44.0	-18.5	0.0	SS -3.9	156 9.6	-19.7	23 25.3	-9.5
20	179 37.9	-3.3	23 25.8	0.3	SS 1.2	155 12.0	32.7	-2.4	21 25.5	-18.5	0.0	SS -3.9	155 49.9	-19.5	23 15.8	-10.1
21	179 34.7	-3.2	23 26.1	-0.1	SS 1.3	155 44.7	37.5	-2.4	21 7.0	-18.3	-0.1	SS -3.9	155 30.4	-19.3	23 5.7	-10.8
22	179 31.4	-3.2	23 26.0	-0.5	SS 1.4	156 22.2	42.3	-2.4	20 48.7	-18.0	-0.1	SS -3.9	155 11.1	-19.0	22 54.9	-11.4
23	179 28.2	-3.2	23 25.5	-1.0	SS 1.5	157 4.5	47.2	-2.4	20 30.7	-17.6	-0.2	SS -3.9	154 52.1	-18.8	22 43.5	-12.1
24	179 25.0	-3.2	23 24.5	-1.3	SS 1.6	157 51.6	52.0	-2.4	20 13.1	-17.2	-0.2	SS -3.9	154 33.3	-18.5	22 31.4	-12.8
25	179 21.8	-3.2	23 23.2	-1.8	SS 1.7	158 43.7	56.9	-2.4	19 55.9	-16.6	-0.3	SS -3.9	154 14.8	-18.2	22 18.6	-13.4
26	179 18.7	-3.1	23 21.4	-2.2	SS 1.8	159 40.6	61.7	-2.4	19 39.3	-15.9	-0.4	SS -3.9	153 56.6	-17.9	22 5.2	-14.0
27	179 15.5	-3.1	23 19.2	-2.6	SS 1.9	160 42.3	66.5	-2.4	19 23.4	-15.1	-0.4	SS -3.9	153 38.6	-17.7	21 51.2	-14.6
28	179 12.5	-3.0	23 16.6	-3.0	SS 2.0	161 48.8	71.1	-2.3	19 8.3	-14.3	-0.4	SS -3.9	153 21.0	-17.4	21 36.6	-15.2
29	179 9.4	-3.0	23 13.6	-3.4	SS 2.1	162 59.9	75.6	-2.2	18 54.0	-13.4	-0.4	SS -3.9	153 3.6	-17.1	21 21.4	-15.8
Jun 30	179 6.4	-2.9	23 10.2	-3.8	SS 2.2	164 15.5	79.8	-2.1	18 40.6	-12.3	-0.6	SS -3.9	152 46.5	-16.8	21 5.6	-16.4
Jul 1	179 3.5	-2.9	23 6.4	-4.2	SS 2.3	165 35.3	83.8	-2.0	18 28.3	-11.3	-0.5	SS -3.9	152 29.8	-16.5	20 49.2	-17.0
2	179 0.6	-2.8	23 2.2	-4.6	SS 2.4	166 59.2	87.5	-1.8	18 17.0	-10.1	-0.6	SS -3.9	152 13.3	-16.1	20 32.2	-17.5
3	178 57.8	-2.7	22 57.6	-5.0	SS 2.5	168 26.6	90.7	-1.6	18 6.9	-8.9	-0.6	SS -3.9	151 57.2	-15.8	20 14.7	-18.1
4	178 55.0	-2.7	22 52.6	-5.4	SS 2.6	169 57.4	93.6	-1.4	17 58.0	-7.6	-0.7	SS -3.9	151 41.3	-15.5	19 56.6	-18.6
5	178 52.4	-2.6	22 47.2	-5.9	2.7	171 30.9	95.9	-1.2	17 50.4	-6.3	-0.6	SS -3.9	151 25.8	-15.2	19 38.0	-19.2
6	178 49.8	-2.5	22 41.3	-6.2	2.8	173 6.8	97.7	-0.9	17 44.1	-5.0	-0.7	SS -3.9	151 10.7	-14.9	19 18.8	-19.7
7	178 47.3	-2.4	22 35.1	-6.6	2.9	174 44.5	98.8	-0.6	17 39.1	-3.5	-0.8	SS -3.9	150 55.8	-14.5	18 59.1	-20.2
8	178 44.9	-2.3	22 28.5	-7.0	3.0	176 23.3	99.4	-0.3	17 35.6	-2.3	-0.6	SS -3.9	150 41.3	-14.2	18 38.9	-20.6
9	178 42.6	-2.2	22 21.5	-7.3	3.1	178 2.6	99.2	0.1	17 33.3	-0.8	-0.8	SS -3.9	150 27.1	-13.9	18 18.3	-21.2
10	178 40.4	-2.1	22 14.2	-7.8	3.2	179 41.9	98.4	0.4	17 32.5	0.5	-0.7	SS -3.9	150 13.2	-13.5	17 57.1	-21.7
11	178 38.3	-2.0	22 6.4	-8.1	3.3	181 20.3	97.0	0.7	17 33.0	1.8	-0.7	SS -3.9	149 59.7	-13.2	17 35.4	-22.1
12	178 36.3	-1.9	21 58.3	-8.5	3.5	182 57.3	94.9	1.1	17 34.8	3.1	-0.7	SS -3.9	149 46.5	-12.9	17 13.3	-22.6
13	178 34.4	-1.7	21 49.8	-8.9	3.3	184 32.2	92.2	1.4	17 37.9	4.4	-0.6	SS -3.9	149 33.6	-12.5	16 50.7	-23.0
Jul 14	178 32.7	-1.6	21 40.9	-9.3	sr 3.1	186 4.4	88.9	1.7	17 42.3	5.5	-0.5	SS -3.9	149 21.1	-12.2	16 27.7	-23.4

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Sun and Planets

Date	Mars					Jupiter					Saturn													
	vis	GHA	d		Dec	vis	GHA	d		Dec	vis	GHA	d		Dec									
	mag	o	'	"	o	'	"	'	"	o	'	"	'	"	o	'	"							
May 11	y	1.3	186	9.5	15.5	16	14.8	13.3	y	-2.0	150	13.9	45.1	22	43.9	1.1	y	0.9	13	8.4	63.4	-11	24.5	1.3
12		1.3	186	25.0	15.5	16	28.1	13.2	y	-2.0	150	59.1	45.1	22	45.0	1.1	y	0.9	14	11.8	63.3	-11	23.2	1.4
13		1.3	186	40.4	15.4	16	41.3	13.1	y	-2.0	151	44.2	45.0	22	46.1	1.1	y	0.9	15	15.1	63.3	-11	21.8	1.2
14		1.3	186	55.8	15.4	16	54.4	12.8	y	-2.0	152	29.2	45.0	22	47.2	1.0	y	0.9	16	18.4	63.3	-11	20.6	1.3
15		1.3	187	11.2	15.3	17	7.2	12.7	y	-1.9	153	14.2	44.9	22	48.2	1.1	y	0.9	17	21.7	63.2	-11	19.3	1.3
16		1.3	187	26.5	15.3	17	19.9	12.5	y	-1.9	153	59.1	44.9	22	49.3	1.0	y	0.9	18	25.0	63.2	-11	18.0	1.2
17		1.3	187	41.8	15.2	17	32.4	12.4	y	-1.9	154	44.0	44.9	22	50.3	1.0	y	0.9	19	28.2	63.2	-11	16.8	1.3
18		1.3	187	57.0	15.2	17	44.8	12.1	y	-1.9	155	28.9	44.8	22	51.3	1.0	y	0.9	20	31.3	63.1	-11	15.5	1.2
19		1.3	188	12.2	15.1	17	56.9	12.0	y	-1.9	156	13.7	44.8	22	52.3	0.9	y	0.9	21	34.4	63.1	-11	14.3	1.1
20	y	1.4	188	27.4	15.1	18	8.9	11.8	y	-1.9	156	58.5	44.7	22	53.2	1.0	y	0.9	22	37.5	63.0	-11	13.2	1.2
21	y	1.4	188	42.5	15.1	18	20.7	11.6	y	-1.9	157	43.2	44.7	22	54.2	0.9	y	0.9	23	40.5	63.0	-11	12.0	1.2
22	y	1.4	188	57.5	15.0	18	32.3	11.4	y	-1.9	158	27.9	44.7	22	55.1	0.9	y	0.9	24	43.5	62.9	-11	10.8	1.1
23	y	1.4	189	12.5	15.0	18	43.7	11.3	y	-1.9	159	12.6	44.6	22	56.0	0.9	y	0.9	25	46.5	62.9	-11	9.7	1.1
24	y	1.4	189	27.5	14.9	18	55.0	11.0	y	-1.9	159	57.2	44.6	22	56.9	0.9	y	1.0	26	49.3	62.8	-11	8.6	1.1
25	y	1.4	189	42.4	14.9	19	6.0	10.9	y	-1.9	160	41.8	44.6	22	57.8	0.8	y	1.0	27	52.2	62.8	-11	7.5	1.1
26	y	1.4	189	57.3	14.8	19	16.9	10.7	y	-1.9	161	26.3	44.5	22	58.6	0.8	y	1.0	28	54.9	62.7	-11	6.4	1.0
27	y	1.4	190	12.1	14.8	19	27.6	10.5	y	-1.9	162	10.8	44.5	22	59.4	0.8	y	1.0	29	57.6	62.7	-11	5.4	1.0
28	y	1.4	190	26.9	14.8	19	38.1	10.3	y	-1.9	162	55.3	44.5	23	0.2	0.8	y	1.0	31	0.3	62.6	-11	4.4	1.0
29	y	1.4	190	41.7	14.7	19	48.4	10.1	y	-1.9	163	39.8	44.4	23	1.0	0.7	y	1.0	32	2.9	62.5	-11	3.4	1.0
30	y	1.4	190	56.4	14.7	19	58.5	9.9	y	-1.9	164	24.2	44.4	23	1.7	0.8	y	1.0	33	5.4	62.5	-11	2.4	0.9
May 31	y	1.4	191	11.1	14.6	20	8.4	9.7	y	-1.9	165	8.6	44.4	23	2.5	0.7	y	1.0	34	7.9	62.4	-11	1.5	1.0
Jun 1	y	1.4	191	25.7	14.6	20	18.1	9.5	y	-1.9	165	53.0	44.4	23	3.2	0.6	y	1.0	35	10.3	62.3	-11	0.5	0.8
2	y	1.4	191	40.3	14.6	20	27.6	9.3	y	-1.9	166	37.4	44.3	23	3.8	0.7	y	1.0	36	12.7	62.3	-10	59.7	0.9
3	y	1.4	191	54.8	14.5	20	36.9	9.1	y	-1.9	167	21.7	44.3	23	4.5	0.6	y	1.0	37	14.9	62.2	-10	58.8	0.9
4	y	1.4	192	9.4	14.5	20	46.0	8.9	y	-1.9	168	6.0	44.3	23	5.1	0.6	y	1.0	38	17.2	62.1	-10	57.9	0.8
5	y	1.4	192	23.8	14.5	20	54.9	8.7	y	-1.9	168	50.3	44.3	23	5.7	0.6	y	1.0	39	19.3	62.1	-10	57.1	0.8
6	y	1.4	192	38.3	14.4	21	3.6	8.5	y	-1.9	169	34.6	44.3	23	6.3	0.6	y	1.0	40	21.4	62.0	-10	56.3	0.7
7	y	1.4	192	52.7	14.4	21	12.1	8.3	y	-1.9	170	18.8	44.2	23	6.9	0.5	y	1.0	41	23.4	61.9	-10	55.6	0.8
8	y	1.4	193	7.1	14.4	21	20.4	8.1	y	-1.9	171	3.1	44.2	23	7.4	0.5	y	1.0	42	25.3	61.8	-10	54.8	0.7
9	y	1.4	193	21.5	14.3	21	28.5	7.9	y	-1.9	171	47.3	44.2	23	7.9	0.5	y	1.1	43	27.1	61.8	-10	54.1	0.6
10	y	1.4	193	35.8	14.3	21	36.4	7.6	y	-1.9	172	31.5	44.2	23	8.4	0.5	y	1.1	44	28.9	61.7	-10	53.5	0.7
11	y	1.5	193	50.1	14.3	21	44.0	7.5	y	-1.9	173	15.7	44.2	23	8.9	0.5	y	1.1	45	30.6	61.6	-10	52.8	0.6
12	y	1.5	194	4.4	14.3	21	51.5	7.2	y	-1.9	173	59.9	44.2	23	9.4	0.4	y	1.1	46	32.2	61.5	-10	52.2	0.6
13	y	1.5	194	18.7	14.3	21	58.7	7.1	y	-1.9	174	44.1	44.2	23	9.8	0.4	y	1.1	47	33.7	61.4	-10	51.6	0.5
14	y	1.5	194	32.9	14.2	22	5.8	6.8	y	-1.9	175	28.2	44.2	23	10.2	0.4	y	1.1	48	35.1	61.4	-10	51.1	0.5
15	y	1.5	194	47.2	14.2	22	12.6	6.6	y	-1.9	176	12.4	44.2	23	10.6	0.3	y	1.1	49	36.5	61.3	-10	50.6	0.5
16	y	1.5	195	1.4	14.2	22	19.2	6.4	y	-1.9	176	56.6	44.2	23	10.9	0.3	y	1.1	50	37.8	61.2	-10	50.1	0.5
17	y	1.5	195	15.6	14.2	22	25.6	6.2	y	-1.9	177	40.7	44.2	23	11.2	0.3	y	1.1	51	39.0	61.1	-10	49.6	0.4
18	y	1.5	195	29.8	14.2	22	31.8	6.0	y	-1.9	178	24.9	44.2	23	11.5	0.3	y	1.1	52	40.1	61.0	-10	49.2	0.4
19	y	1.5	195	44.0	14.2	22	37.8	5.8	y	-1.9	179	9.0	44.2	23	11.8	0.2	y	1.1	53	41.1	60.9	-10	48.8	0.4
20	y	1.5	195	58.2	14.2	22	43.6	5.5	y	-1.9	179	53.2	44.2	23	12.0	0.3	y	1.1	54	42.1	60.9	-10	48.4	0.3
21	y	1.5	196	12.4	14.2	22	49.1	5.4	y	-1.9	180	37.4	44.2	23	12.3	0.2	y	1.1	55	42.9	60.8	-10	48.1	0.3
22	y	1.5	196	26.6	14.2	22	54.5	5.1	y	-1.9	181	21.5	44.2	23	12.5	0.2	y	1.1	56	43.7	60.7	-10	47.8	0.3
23	y	1.5	196	40.8	14.2	22	59.6	4.9	y	-1.9	182	5.7	44.2	23	12.7	0.1	y	1.1	57	44.4	60.6	-10	47.5	0.2
24	y	1.5	196	55.0	14.2	23	4.5	4.7	y	-1.9	182	49.9	44.2	23	12.8	0.2	y	1.1	58	44.9	60.5	-10	47.3	0.2
25	y	1.5	197	9.2	14.2	23	9.2	4.5	y	-1.9	183	34.1	44.2	23	13.0	0.1	y	1.1	59	45.4	60.4	-10	47.1	0.2
26	y	1.5	197	23.4	14.2	23	13.7	4.2	y	-1.9	184	18.2	44.2	23	13.1	0.0	y	1.2	60	45.9	60.3	-10	46.9	0.1
27	y	1.5	197	37.6	14.2	23	17.9	4.1	y	-1.9	185	2.4	44.2	23	13.1	0.1	y	1.2	61	46.2	60.2	-10	46.8	0.1
28	y	1.5	197	51.8	14.2	23	22.0	3.8	y	-1.9	185	46.6	44.2	23	13.2	0.0	y	1.2	62	46.4	60.1	-10	46.7	0.1
29	y	1.5	198	6.0	14.2	23	25.8	3.6	y	-1.9	186	30.9	44.2	23	13.2	0.0	y	1.2	63	46.5	60.0	-10	46.6	0.0
Jun 30	y	1.5	198	20.2	14.2	23	29.4	3.4	y	-1.9	187	15.1	44.2	23	13.2	0.0	y	1.2	64	46.6	60.0	-10	46.6	0.0
Jul 1	y	1.5	198	34.4	14.3	23	32.8	3.2	y	-1.9	187	59.3	44.3	23	13.2	0.0	y	1.2	65	46.5	59.9	-10	46.6	0.0
2	y	1.5	198	48.7	14.3	23	36.0	3.0	y	-1.9	188	43.6	44.3	23	13.2	-0.1	y	1.2	66	46.4	59.8	-10	46.6	0.0
3	y	1.5	199	3.0	14.3	23	39.0	2.7	y	-1.9	189	27.9	44.3	23	13.1	-0.1	y	1.2	67	46.2	59.7	-10	46.6	-0.1
4	y	1.5	199	17.3	14.3	23	41.7	2.5	y	-1.9	190	12.2	44.3	23	13.0	-0.1	y	1.2	68	45.8	59.6	-10	46.7	-0.2
5	y	1.5	199	31.6	14.3	23	44.2	2.4	y	-1.9	190	56.5	44.3	23	12.9	-0.1	y	1.2	69	45.4	59.5	-10	46.9	-0.1
6	y	1.5	199	45.9	14.4	23	46.6	2.1	y	-1.9	191	40.8	44.4	23	12.8	-0.1	y	1.2	70	44.9	59.4	-10	47.0	-0.2
7	y	1.6	200	0.3	14.4	23	48.7	1.9	y	-1.9	192	25.2	44.4	23	12.7	-0.2	y	1.2	71	44.3	59.3	-10	47.2	-0.3
8	y	1.6	200	14.7	14.4	23	50.6	1.7	y	-1.9	193	9.6	44.4	23	12.5	-0.2	y	1.2	72	43.6	59.2	-10	47.5	-0.2
9	y	1.6	200	29.2	14.5	23	52.3	1.4	y	-1.9	193	54.0	44.4	23	12.3	-0.2	y	1.2	73	42.8	59.1	-10	47.7	-0.3
10	y	1.6	200	43.6	14.																			

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Sun and Planets

Date	SUN				Mercury						Venus					
	GHA O	d	Dec O	d	vis mag	GHA O	d	dd	Dec O	d	dd	vis mag	GHA O	d	Dec O	d
Jul 15	178 31.1	-1.5	21 31.6	-9.6	sr 2.9	187 33.3	85.0	1.9	17 47.8	6.6	-0.5	ss -3.9	149 8.9	-11.9	16 4.3	-23.8
Jul 16	178 29.6	-1.3	21 22.0	-10.0	sr 2.8	188 58.3	80.7	2.2	17 54.4	7.6	-0.5	ss -3.9	148 57.0	-11.6	15 40.5	-24.3
Jul 17	178 28.2	-1.2	21 12.0	-10.3	sr 2.6	190 19.0	75.9	2.4	18 2.0	8.5	-0.5	ss -3.9	148 45.4	-11.2	15 16.2	-24.6
Jul 18	178 27.0	-1.1	21 1.7	-10.7	sr 2.4	191 34.9	70.8	2.6	18 10.5	9.3	-0.4	ss -3.9	148 34.2	-10.9	14 51.6	-25.0
Jul 19	178 26.0	-0.9	20 51.0	-11.1	sr 2.2	192 45.7	65.3	2.7	18 19.8	9.9	-0.3	ss -3.9	148 23.2	-10.6	14 26.6	-25.4
Jul 20	178 25.0	-0.8	20 39.9	-11.3	sr 2.0	193 51.0	59.6	2.9	18 29.7	10.6	-0.3	ss -3.9	148 12.6	-10.3	14 1.2	-25.8
Jul 21	178 24.2	-0.6	20 28.6	-11.8	sr 1.9	194 50.6	53.7	3.0	18 40.3	10.9	-0.2	ss -3.9	148 2.3	-10.0	13 35.4	-26.0
Jul 22	178 23.6	-0.5	20 16.8	-12.1	sr 1.7	195 44.3	47.5	3.1	18 51.2	11.3	-0.2	ss -3.9	147 52.3	-9.7	13 9.4	-26.4
Jul 23	178 23.1	-0.4	20 4.7	-12.4	sr 1.5	196 31.8	41.3	3.1	19 2.5	11.3	0.0	ss -3.9	147 42.6	-9.4	12 43.0	-26.8
Jul 24	178 22.7	-0.2	19 52.3	-12.7	sr 1.3	197 13.1	35.0	3.2	19 13.8	11.4	0.0	ss -3.9	147 33.2	-9.1	12 16.2	-27.0
Jul 25	178 22.5	-0.1	19 39.6	-13.1	sr 1.1	197 48.1	28.6	3.2	19 25.2	11.2	0.1	ss -3.9	147 24.0	-8.9	11 49.2	-27.3
Jul 26	178 22.5	0.1	19 26.5	-13.4	sr 1.0	198 16.7	22.3	3.2	19 36.4	10.9	0.2	ss -3.9	147 15.1	-8.6	11 21.9	-27.6
Jul 27	178 22.5	0.2	19 13.1	-13.7	sr 0.8	198 39.0	15.9	3.2	19 47.3	10.4	0.2	ss -3.9	147 6.5	-8.4	10 54.3	-27.9
Jul 28	178 22.8	0.4	18 59.4	-14.0	sr 0.6	198 54.9	9.6	3.2	19 57.7	9.7	0.4	ss -3.9	146 58.2	-8.1	10 26.4	-28.2
Jul 29	178 23.1	0.5	18 45.4	-14.3	sr 0.4	199 4.4	3.3	3.1	20 7.4	8.8	0.5	ss -3.9	146 50.1	-7.9	9 58.2	-28.4
Jul 30	178 23.7	0.7	18 31.1	-14.7	sr 0.3	199 7.7	-2.9	3.1	20 16.2	7.9	0.5	ss -3.9	146 42.2	-7.6	9 29.8	-28.6
Jul 31	178 24.3	0.8	18 16.4	-14.9	sr 0.1	199 4.8	-8.9	3.0	20 24.1	6.5	0.7	ss -3.9	146 34.6	-7.4	9 1.2	-28.9
Aug 1	178 25.2	1.0	18 1.5	-15.2	sr 0.0	198 55.9	-14.8	3.0	20 30.6	5.2	0.7	ss -4.0	146 27.2	-7.2	8 32.3	-29.0
Aug 2	178 26.1	1.1	17 46.3	-15.6	sr -0.2	198 41.1	-20.6	2.9	20 35.8	3.6	0.8	ss -4.0	146 20.0	-7.0	8 3.3	-29.3
Aug 3	178 27.2	1.3	17 30.7	-15.8	sr -0.3	198 20.5	-26.1	2.8	20 39.4	1.8	0.9	ss -4.0	146 13.0	-6.8	7 34.0	-29.5
Aug 4	178 28.5	1.4	17 14.9	-16.1	sr -0.4	197 54.5	-31.3	2.6	20 41.2	-0.2	1.0	ss -4.0	146 6.3	-6.6	7 4.5	-29.6
Aug 5	178 29.9	1.6	16 58.8	-16.3	sr -0.5	197 23.1	-36.3	2.5	20 41.0	-2.2	1.0	ss -4.0	145 59.7	-6.4	6 34.9	-29.8
Aug 6	178 31.4	1.7	16 42.5	-16.7	sr -0.6	196 46.9	-40.9	2.3	20 38.8	-4.6	1.2	ss -4.0	145 53.3	-6.2	6 5.1	-30.0
Aug 7	178 33.2	1.9	16 25.8	-16.9	sr -0.7	196 5.9	-45.2	2.1	20 34.2	-7.0	1.2	ss -4.0	145 47.1	-6.1	5 35.1	-30.1
Aug 8	178 35.0	2.0	16 8.9	-17.1	sr -0.8	195 20.7	-49.1	1.9	20 27.2	-9.5	1.3	ss -4.0	145 41.0	-5.9	5 5.0	-30.2
Aug 9	178 37.0	2.1	15 51.8	-17.4	sr -0.9	194 31.7	-52.5	1.7	20 17.7	-12.1	1.3	ss -4.0	145 35.1	-5.7	4 34.8	-30.4
Aug 10	178 39.2	2.3	15 34.4	-17.7	sr -1.0	193 39.2	-55.4	1.5	20 5.6	-14.8	1.3	ss -4.0	145 29.4	-5.6	4 4.4	-30.5
Aug 11	178 41.5	2.4	15 16.7	-17.9	sr -1.1	192 43.8	-57.9	1.2	19 50.8	-17.4	1.3	ss -4.0	145 23.8	-5.5	3 33.9	-30.5
Aug 12	178 43.9	2.6	14 58.8	-18.1	sr -1.2	191 45.8	-59.9	1.0	19 33.4	-20.1	1.4	ss -4.0	145 18.3	-5.3	3 3.4	-30.7
Aug 13	178 46.5	2.7	14 40.7	-18.4	sr -1.2	190 45.9	-61.4	0.7	19 13.3	-22.8	1.3	ss -4.0	145 12.9	-5.2	2 32.7	-30.7
Aug 14	178 49.2	2.9	14 22.3	-18.6	sr -1.3	189 44.5	-62.4	0.5	18 50.5	-25.3	1.3	ss -4.0	145 7.7	-5.1	2 2.0	-30.8
Aug 15	178 52.1	3.0	14 3.7	-18.8	sr -1.4	188 42.1	-63.0	0.3	18 25.2	-27.7	1.2	ss -4.0	145 2.6	-5.0	1 31.2	-30.9
Aug 16	178 55.1	3.1	13 44.9	-19.0	sr -1.4	187 39.1	-63.1	0.1	17 57.5	-30.1	1.2	ss -4.0	144 57.5	-4.9	1 0.3	-30.9
Aug 17	178 58.2	3.3	13 25.9	-19.3	sr -1.5	186 36.0	-62.9	-0.1	17 27.4	-32.3	1.1	ss -4.0	144 52.6	-4.8	0 29.4	-30.9
Aug 18	179 1.5	3.4	13 6.6	-19.4	sr -1.6	185 33.1	-62.3	-0.3	16 55.1	-34.3	1.0	ss -4.0	144 47.7	-4.8	-0 1.5	-30.9
Aug 19	179 4.9	3.5	12 47.2	-19.7	sr -1.6	184 30.8	-61.5	-0.4	16 20.8	-36.1	0.9	ss -4.0	144 42.9	-4.7	-0 32.4	-31.0
Aug 20	179 8.4	3.6	12 27.5	-19.8	sr -1.7	183 29.3	-60.4	-0.6	15 44.7	-37.9	0.9	ss -4.0	144 38.2	-4.7	-1 3.4	-30.9
Aug 21	179 12.0	3.8	12 7.7	-20.1	sr -1.7	182 28.9	-59.1	-0.7	15 6.8	-39.3	0.7	ss -4.0	144 33.5	-4.6	-1 34.3	-31.0
Aug 22	179 15.8	3.9	11 47.6	-20.2	sr -1.8	181 29.9	-57.6	-0.7	14 27.5	-40.8	0.8	ss -4.0	144 28.9	-4.6	-2 5.3	-30.9
Aug 23	179 19.7	4.0	11 27.4	-20.4	sr -1.8	180 32.3	-56.0	-0.8	13 46.7	-41.9	0.6	ss -4.0	144 24.2	-4.6	-2 36.2	-30.8
Aug 24	179 23.7	4.1	11 7.0	-20.6	sr -1.9	179 36.2	-54.4	-0.8	13 4.8	-43.0	0.5	ss -4.0	144 19.7	-4.6	-3 7.0	-30.9
Aug 25	179 27.8	4.2	10 46.4	-20.8	sr -1.8	178 41.9	-52.6	-0.9	12 21.8	-43.8	0.4	ss -4.0	144 15.1	-4.6	-3 37.9	-30.7
Aug 26	179 31.9	4.3	10 25.6	-20.9	sr -1.8	177 49.2	-50.9	-0.9	11 38.0	-44.7	0.5	ss -4.0	144 10.5	-4.6	-4 8.6	-30.7
Aug 27	179 36.2	4.4	10 4.7	-21.1	sr -1.7	176 58.3	-49.1	-0.9	10 53.3	-45.2	0.3	ss -4.0	144 5.9	-4.6	-4 39.3	-30.7
Aug 28	179 40.6	4.5	9 43.6	-21.2	sr -1.6	176 9.2	-47.4	-0.9	10 8.1	-45.8	0.3	ss -4.0	144 1.3	-4.6	-5 10.0	-30.5
Aug 29	179 45.0	4.5	9 22.4	-21.4	sr -1.5	175 21.8	-45.7	-0.9	9 22.3	-46.2	0.2	ss -4.0	143 56.6	-4.7	-5 40.5	-30.4
Aug 30	179 49.6	4.6	9 1.0	-21.6	sr -1.4	174 36.1	-44.0	-0.8	8 36.1	-46.5	0.1	ss -4.0	143 52.0	-4.7	-6 10.9	-30.4
Aug 31	179 54.2	4.7	8 39.4	-21.7	sr -1.3	173 52.2	-42.3	-0.8	7 49.6	-46.8	0.1	ss -4.0	143 47.2	-4.8	-6 41.3	-30.2
Sep 1	179 58.9	4.8	8 17.7	-21.8	sr -1.2	173 9.8	-40.7	-0.8	7 2.8	-46.9	0.1	ss -4.0	143 42.4	-4.8	-7 11.5	-30.1
Sep 2	180 3.7	4.8	7 55.9	-21.9	ss -1.1	172 29.1	-39.2	-0.8	6 15.9	-47.0	0.0	ss -4.0	143 37.6	-4.9	-7 41.6	-29.9
Sep 3	180 8.5	4.9	7 34.0	-22.1	ss -1.0	171 49.9	-37.7	-0.7	5 28.9	-47.0	0.0	ss -4.0	143 32.7	-5.0	-8 11.5	-29.8
Sep 4	180 13.4	5.0	7 11.9	-22.2	ss -0.9	171 12.2	-36.3	-0.7	4 41.9	-47.0	0.0	ss -4.0	143 27.7	-5.1	-8 41.3	-29.6
Sep 5	180 18.3	5.0	6 49.7	-22.3	ss -0.8	170 35.9	-34.9	-0.7	3 54.9	-46.8	-0.1	ss -4.0	143 22.6	-5.2	-9 10.9	-29.4
Sep 6	180 23.4	5.1	6 27.4	-22.4	ss -0.8	170 1.0	-33.6	-0.7	3 8.1	-46.7	-0.1	ss -4.1	143 17.4	-5.3	-9 40.3	-29.3
Sep 7	180 28.4	5.1	6 5.0	-22.5	ss -0.7	169 27.4	-32.3	-0.6	2 21.4	-46.5	-0.1	ss -4.1	143 12.1	-5.4	-10 9.6	-29.0
Sep 8	180 33.6	5.2	5 42.5	-22.5	ss -0.7	168 55.1	-31.1	-0.6	1 34.9	-46.2	-0.2	ss -4.1	143 6.8	-5.5	-10 38.6	-28.8
Sep 9	180 38.7	5.2	5 20.0	-22.7	ss -0.6	168 24.0	-30.0	-0.6	0 48.7	-46.0	-0.1	ss -4.1	143 1.3	-5.6	-11 7.4	-28.6
Sep 10	180 43.9	5.2	4 57.3	-22.8	ss -0.6	167 54.0	-28.9	-0.5	0 2.7	-45.7	-0.2	ss -4.1	142 55.6	-5.7	-11 36.0	-28.4
Sep 11	180 49.2	5.3	4 34.5	-22.8	ss -0.5	167 25.1	-27.8	-0.5	-0 43.0	-45.2	-0.3	ss -4.1	142 49.9	-5.9	-12 4.4	-28.1
Sep 12	180 54.4	5.3	4 11.7	-23.0	ss -0.5	166 57.3	-26.8	-0.5	-1 28.2	-44.9	-0.2	ss -4.1	142 44.0	-6.0	-12 32.5	-27.9
Sep 13	180 59.7	5.3	3 48.7	-22.9	ss -0.4	166 30.5	-25.9	-0.5	-2 13.1	-44.5	-0.2	ss -4.1	142 38.0	-6.1	-13 0.4	-27.6
Sep 14	181 5.1	5.3	3 25.8	-23.1	ss -0.4	166 4.7	-24.9	-0.5	-2 57.6	-44.1	-0.2	ss -4.1	142 31.9	-6.3	-13 28.0	-27.4
Sep 15	181 10.4	5.4	3 2.7	-23.1	ss -0.3	165 39.7	-24.0	-0.4	-3 41.7	-43.5	-0.3	ss -4.1	142 25.6	-6.4	-13 55.4	-27.0
Sep 16	181 15.8	5.4	2 39.6	-23.1	ss -0.3	165 15.7	-23.2	-0.4	-4 25.2	-43.1	-0.2	ss -4.1	142 19.1	-6.6	-14 22.4	-26.7
Sep 17	181 21.2	5.4	2 16.5	-23.2	ss -0.3	164 52.5	-22.3	-0.4	-5 8.3	-42.5	-0.3	ss -4.1	142 12.5	-6.7	-14 49.1	-26.5

2013

Sun and Planets

Date	Mars					Jupiter					Saturn				
	vis	GHA	d	Dec	d'	vis	GHA	d	Dec	d'	vis	GHA	d	Dec	d'
Jul 15	y	1.6 201 56.7	14.8	23 57.9	0.2	y	-1.9 198 21.0	44.6	23 10.6	-0.3	y	1.3 79 36.0	58.5	-10 50.0	-0.5
16	y	1.6 202 11.5	14.8	23 58.1	0.0	y	-1.9 199 5.7	44.7	23 10.3	-0.4	y	1.3 80 34.6	58.4	-10 50.5	-0.5
17	y	1.6 202 26.3	14.9	23 58.1	-0.2	y	-1.9 199 50.3	44.7	23 9.9	-0.4	y	1.3 81 33.0	58.4	-10 51.0	-0.6
18	y	1.6 202 41.2	14.9	23 57.9	-0.5	y	-1.9 200 35.0	44.7	23 9.5	-0.4	y	1.3 82 31.4	58.3	-10 51.6	-0.6
19	y	1.6 202 56.1	15.0	23 57.4	-0.6	y	-1.9 201 19.7	44.8	23 9.1	-0.5	y	1.3 83 29.6	58.2	-10 52.2	-0.6
20	y	1.6 203 11.1	15.1	23 56.8	-0.8	y	-1.9 202 4.5	44.8	23 8.6	-0.4	y	1.3 84 27.8	58.1	-10 52.8	-0.6
21	y	1.6 203 26.2	15.1	23 56.0	-1.0	y	-1.9 202 49.3	44.9	23 8.2	-0.5	y	1.3 85 25.9	58.0	-10 53.4	-0.7
22	y	1.6 203 41.3	15.2	23 55.0	-1.3	y	-1.9 203 34.2	44.9	23 7.7	-0.5	y	1.3 86 23.8	57.9	-10 54.1	-0.7
23	y	1.6 203 56.5	15.3	23 53.7	-1.4	y	-1.9 204 19.1	45.0	23 7.2	-0.5	y	1.3 87 21.7	57.8	-10 54.8	-0.8
24	y	1.6 204 11.8	15.3	23 52.3	-1.7	y	-1.9 205 4.1	45.0	23 6.7	-0.6	y	1.3 88 19.5	57.7	-10 55.6	-0.8
25	y	1.6 204 27.1	15.4	23 50.6	-1.8	y	-1.9 205 49.1	45.0	23 6.1	-0.5	y	1.3 89 17.2	57.6	-10 56.4	-0.8
26	y	1.6 204 42.5	15.5	23 48.8	-2.0	y	-1.9 206 34.1	45.1	23 5.6	-0.6	y	1.3 90 14.8	57.5	-10 57.2	-0.8
27	y	1.6 204 58.0	15.5	23 46.8	-2.3	y	-1.9 207 19.2	45.1	23 5.0	-0.6	y	1.3 91 12.4	57.4	-10 58.0	-0.9
28	y	1.6 205 13.5	15.6	23 44.5	-2.4	y	-1.9 208 4.4	45.2	23 4.4	-0.6	y	1.3 92 9.8	57.3	-10 58.9	-0.9
29	y	1.6 205 29.1	15.7	23 42.1	-2.6	y	-1.9 208 49.6	45.3	23 3.8	-0.7	y	1.3 93 7.1	57.2	-10 59.8	-0.9
30	y	1.6 205 44.8	15.8	23 39.5	-2.8	y	-1.9 209 34.8	45.3	23 3.1	-0.6	y	1.3 94 4.4	57.2	-11 0.7	-1.0
Jul 31	y	1.6 206 0.6	15.9	23 36.7	-3.0	y	-1.9 210 20.1	45.4	23 2.5	-0.7	y	1.3 95 1.5	57.1	-11 1.7	-1.0
Aug 1	y	1.6 206 16.5	15.9	23 33.7	-3.2	y	-1.9 211 5.5	45.4	23 1.8	-0.7	y	1.3 95 58.6	57.0	-11 2.7	-1.0
2	y	1.6 206 32.4	16.0	23 30.5	-3.4	y	-1.9 211 50.9	45.5	23 1.1	-0.7	y	1.3 96 55.6	56.9	-11 3.7	-1.0
3	y	1.6 206 48.5	16.1	23 27.1	-3.6	y	-1.9 212 36.4	45.5	23 0.4	-0.7	y	1.3 97 52.5	56.8	-11 4.7	-1.1
4	y	1.6 207 4.6	16.2	23 23.5	-3.8	y	-1.9 213 21.9	45.6	22 59.7	-0.7	y	1.3 98 49.3	56.7	-11 5.8	-1.1
5	y	1.6 207 20.8	16.3	23 19.7	-3.9	y	-1.9 214 7.5	45.7	22 59.0	-0.8	y	1.3 99 46.0	56.6	-11 6.9	-1.1
6	y	1.6 207 37.1	16.4	23 15.8	-4.1	y	-2.0 214 53.2	45.7	22 58.2	-0.7	y	1.3 100 42.6	56.5	-11 8.0	-1.2
7	y	1.6 207 53.5	16.5	23 11.7	-4.4	y	-2.0 215 38.9	45.8	22 57.5	-0.8	y	1.3 101 39.1	56.5	-11 9.2	-1.2
8	y	1.6 208 10.0	16.6	23 7.3	-4.4	y	-2.0 216 24.7	45.9	22 56.7	-0.8	y	1.3 102 35.6	56.4	-11 10.4	-1.2
9	y	1.6 208 26.6	16.7	23 2.9	-4.7	y	-2.0 217 10.6	45.9	22 55.9	-0.8	y	1.3 103 32.0	56.3	-11 11.6	-1.2
10	y	1.6 208 43.3	16.8	22 58.2	-4.8	y	-2.0 217 56.5	46.0	22 55.1	-0.8	y	1.3 104 28.2	56.2	-11 12.8	-1.3
11	y	1.6 209 0.1	16.9	22 53.4	-5.1	y	-2.0 218 42.6	46.1	22 54.3	-0.8	y	1.3 105 24.4	56.1	-11 14.1	-1.3
12	y	1.6 209 17.1	17.0	22 48.3	-5.1	y	-2.0 219 28.6	46.2	22 53.5	-0.9	y	1.4 106 20.6	56.0	-11 15.4	-1.3
13	y	1.6 209 34.1	17.1	22 43.2	-5.4	y	-2.0 220 14.8	46.2	22 52.6	-0.8	y	1.4 107 16.6	55.9	-11 16.7	-1.4
14	y	1.6 209 51.2	17.2	22 37.8	-5.5	y	-2.0 221 1.0	46.3	22 51.8	-0.9	y	1.4 108 12.5	55.9	-11 18.1	-1.3
15	y	1.6 210 8.4	17.3	22 32.3	-5.7	y	-2.0 221 47.4	46.4	22 50.9	-0.9	y	1.4 109 8.4	55.8	-11 19.4	-1.4
16	y	1.6 210 25.8	17.4	22 26.6	-5.9	y	-2.0 222 33.8	46.5	22 50.0	-0.9	y	1.4 110 4.2	55.7	-11 20.8	-1.5
17	y	1.6 210 43.2	17.6	22 20.7	-6.0	y	-2.0 223 20.2	46.6	22 49.1	-0.9	y	1.4 110 59.9	55.6	-11 22.3	-1.4
18	y	1.6 211 0.8	17.7	22 14.7	-6.2	y	-2.0 224 6.8	46.6	22 48.2	-0.9	y	1.4 111 55.5	55.5	-11 23.7	-1.5
19	y	1.6 211 18.4	17.8	22 8.5	-6.3	y	-2.0 224 53.5	46.7	22 47.3	-0.9	y	1.4 112 51.0	55.5	-11 25.2	-1.5
20	y	1.6 211 36.2	17.9	22 2.2	-6.5	y	-2.0 225 40.2	46.8	22 46.4	-0.9	y	1.4 113 46.5	55.4	-11 26.7	-1.5
21	y	1.6 211 54.1	18.0	21 55.7	-6.7	y	-2.0 226 27.0	46.9	22 45.5	-1.0	y	1.4 114 41.9	55.3	-11 28.2	-1.5
22	y	1.6 212 12.1	18.1	21 49.0	-6.8	y	-2.0 227 13.9	47.0	22 44.5	-0.9	y	1.4 115 37.2	55.2	-11 29.7	-1.6
23	y	1.6 212 30.2	18.2	21 42.2	-7.0	y	-2.0 228 0.9	47.1	22 43.6	-1.0	y	1.4 116 32.4	55.2	-11 31.3	-1.6
24	y	1.6 212 48.5	18.3	21 35.2	-7.1	y	-2.0 228 48.0	47.2	22 42.6	-0.9	y	1.4 117 27.6	55.1	-11 32.9	-1.6
25	y	1.6 213 6.8	18.5	21 28.1	-7.3	y	-2.0 229 35.2	47.3	22 41.7	-1.0	y	1.4 118 22.7	55.0	-11 34.5	-1.6
26	y	1.6 213 25.3	18.6	21 20.8	-7.4	y	-2.0 230 22.5	47.4	22 40.7	-1.0	y	1.4 119 17.7	54.9	-11 36.1	-1.6
27	y	1.6 213 43.8	18.7	21 13.4	-7.6	y	-2.0 231 9.8	47.5	22 39.7	-0.9	y	1.4 120 12.6	54.9	-11 37.7	-1.7
28	y	1.7 214 2.5	18.8	21 5.8	-7.7	y	-2.0 231 57.3	47.6	22 38.8	-1.0	y	1.4 121 7.5	54.8	-11 39.4	-1.7
29	y	1.7 214 21.3	18.9	20 58.1	-7.8	y	-2.0 232 44.9	47.7	22 37.8	-1.0	y	1.4 122 2.3	54.7	-11 41.1	-1.7
30	y	1.7 214 40.3	19.0	20 50.3	-8.0	y	-2.0 233 32.6	47.8	22 36.8	-1.0	y	1.4 122 57.0	54.7	-11 42.8	-1.7
Aug 31	y	1.7 214 59.3	19.2	20 42.3	-8.1	y	-2.0 234 20.3	47.9	22 35.8	-1.0	y	1.4 123 51.7	54.6	-11 44.5	-1.8
Sep 1	y	1.7 215 18.5	19.3	20 34.2	-8.3	y	-2.0 235 8.2	48.0	22 34.8	-1.0	y	1.4 124 46.3	54.5	-11 46.3	-1.7
2	y	1.7 215 37.7	19.4	20 25.9	-8.4	y	-2.0 235 56.2	48.1	22 33.8	-1.0	y	1.4 125 40.8	54.4	-11 48.0	-1.8
3	y	1.7 215 57.1	19.5	20 17.5	-8.5	y	-2.0 236 44.3	48.2	22 32.8	-1.0	y	1.4 126 35.2	54.4	-11 49.8	-1.8
4	y	1.7 216 16.7	19.6	20 9.0	-8.6	y	-2.0 237 32.5	48.3	22 31.8	-1.0	y	1.4 127 29.6	54.3	-11 51.6	-1.8
5	y	1.6 216 36.3	19.8	20 0.4	-8.8	y	-2.1 238 20.8	48.4	22 30.8	-1.0	y	1.4 128 23.9	54.3	-11 53.4	-1.9
6	y	1.6 216 56.1	19.9	19 51.6	-8.9	y	-2.1 239 9.3	48.6	22 29.8	-1.0	y	1.4 129 18.2	54.2	-11 55.3	-1.8
7	y	1.6 217 16.0	20.0	19 42.7	-9.0	y	-2.1 239 57.8	48.7	22 28.8	-1.0	y	1.4 130 12.4	54.1	-11 57.1	-1.9
8	y	1.6 217 36.0	20.1	19 33.7	-9.2	y	-2.1 240 46.5	48.8	22 27.8	-1.0	y	1.4 131 6.5	54.1	-11 59.0	-1.9
9	y	1.6 217 56.1	20.3	19 24.5	-9.2	y	-2.1 241 35.3	48.9	22 26.8	-1.0	y	1.4 132 0.5	54.0	-12 0.9	-1.9
10	y	1.6 218 16.4	20.4	19 15.3	-9.4	y	-2.1 242 24.2	49.0	22 25.8	-1.0	y	1.4 132 54.5	53.9	-12 2.8	-1.9
11	y	1.6 218 36.8	20.5	19 5.9	-9.5	y	-2.1 243 13.2	49.2	22 24.8	-1.0	y	1.4 133 48.5	53.9	-12 4.7	-1.9
12	y	1.6 218 57.3	20.6	18 56.4	-9.6	y	-2.1 244 2.4	49.3	22 23.8	-1.0	y	1.4 134 42.3	53.8	-12 6.6	-2.0
13	y	1.6 219 17.9	20.8	18 46.8	-9.7	y	-2.1 244 51.7	49.4	22 22.8	-0.9	y	1.4 135 36.2	53.8	-12 8.6	-1.9
14	y	1.6 219 38.7	20.9	18 37.1	-9.8	y	-2.1 245 41.1	49.6	22 21.9	-1.0	y	1.4 136 29.9	53.7	-12 10.5	-2.0
15	y	1.6 219 59.6	21.0	18 27.3	-9.9	y	-2.1 246 30.7	49.7	22 20.9	-1.0	y	1.4 137 23.6	53.6	-12 12.5	-2.0
16	y	1.6 220 20.6	21.1	18 17.4	-10.1	y	-2.1 247 20.4	49.8	22 19.9	-0.9	y	1.4 138 17.2	53.6	-12 14.5	-2.0
Sep 17	y	1.6 220 41.7	21.3	18 7.3	-10.1	y	-2.1 248 10.2	50.0	22 19.0	-1.0	y	1.4 139 10.8	53.5	-12 16.5	-2.0

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Sun and Planets

Date	SUN					Mercury						Venus										
	GHA O	d	Dec O	d	d'	vis mag	GHA O	d	dd	Dec O	d	dd	vis mag	GHA O	d	Dec O	d					
Sep 18	181	26.5	5.4	1	53.3	-23.3	SS -0.3	164	30.2	-21.5	-0.4	-5	50.8	-42.0	-0.3	SS -4.1	142	5.8	-6.9	-15	15.6	-26.1
19	181	31.9	5.4	1	30.0	-23.2	SS -0.2	164	8.6	-20.7	-0.4	-6	32.8	-41.4	-0.3	SS -4.1	141	58.9	-7.1	-15	41.7	-25.7
20	181	37.3	5.3	1	6.8	-23.3	SS -0.2	163	47.9	-20.0	-0.4	-7	14.2	-40.8	-0.3	SS -4.1	141	51.8	-7.2	-16	7.4	-25.4
21	181	42.6	5.3	0	43.5	-23.3	SS -0.2	163	27.9	-19.2	-0.4	-7	55.0	-40.1	-0.4	SS -4.1	141	44.6	-7.4	-16	32.8	-25.1
22	181	47.9	5.3	0	20.2	-23.4	SS -0.2	163	8.7	-18.5	-0.4	-8	35.1	-39.5	-0.3	SS -4.1	141	37.2	-7.6	-16	57.9	-24.7
23	181	53.2	5.3	-0	3.2	-23.3	SS -0.1	162	50.3	-17.7	-0.4	-9	14.6	-38.8	-0.4	SS -4.1	141	29.6	-7.7	-17	22.6	-24.3
24	181	58.5	5.2	-0	26.5	-23.4	SS -0.1	162	32.6	-16.9	-0.4	-9	53.4	-38.1	-0.4	SS -4.1	141	21.9	-7.9	-17	46.9	-23.9
25	182	3.7	5.2	-0	49.9	-23.4	SS -0.1	162	15.6	-16.1	-0.4	-10	31.5	-37.4	-0.4	SS -4.1	141	14.0	-8.1	-18	10.8	-23.6
26	182	8.9	5.1	-1	13.3	-23.3	SS -0.1	161	59.5	-15.3	-0.4	-11	8.9	-36.6	-0.4	SS -4.1	141	5.9	-8.3	-18	34.4	-23.1
27	182	14.0	5.1	-1	36.6	-23.4	SS -0.1	161	44.2	-14.5	-0.4	-11	45.5	-35.8	-0.4	SS -4.2	140	57.6	-8.4	-18	57.5	-22.7
28	182	19.1	5.0	-2	0.0	-23.3	SS -0.1	161	29.7	-13.6	-0.4	-12	21.3	-35.0	-0.4	SS -4.2	140	49.2	-8.6	-19	20.2	-22.3
29	182	24.1	4.9	-2	23.3	-23.3	SS -0.1	161	16.1	-12.7	-0.5	-12	56.3	-34.1	-0.5	SS -4.2	140	40.5	-8.8	-19	42.5	-21.8
Sep 30	182	29.1	4.9	-2	46.6	-23.3	SS -0.1	161	3.4	-11.7	-0.5	-13	30.4	-33.2	-0.4	SS -4.2	140	31.8	-9.0	-20	4.3	-21.4
Oct 1	182	33.9	4.8	-3	9.9	-23.3	SS -0.1	160	51.7	-10.6	-0.5	-14	3.6	-32.3	-0.5	SS -4.2	140	22.8	-9.1	-20	25.7	-20.9
2	182	38.7	4.7	-3	33.2	-23.2	SS 0.0	160	41.0	-9.5	-0.6	-14	35.9	-31.2	-0.5	SS -4.2	140	13.7	-9.3	-20	46.6	-20.4
3	182	43.5	4.6	-3	56.4	-23.2	SS 0.0	160	31.5	-8.3	-0.6	-15	7.1	-30.3	-0.5	SS -4.2	140	4.4	-9.4	-21	7.0	-20.0
4	182	48.1	4.6	-4	19.6	-23.1	SS 0.0	160	23.2	-6.9	-0.7	-15	37.4	-29.1	-0.6	SS -4.2	139	54.9	-9.6	-21	27.0	-19.5
5	182	52.6	4.5	-4	42.7	-23.0	SS 0.0	160	16.3	-5.4	-0.7	-16	6.5	-28.1	-0.5	SS -4.2	139	45.4	-9.7	-21	46.5	-19.0
6	182	57.1	4.4	-5	5.7	-23.0	SS 0.0	160	10.9	-3.8	-0.8	-16	34.6	-26.8	-0.6	SS -4.2	139	35.6	-9.9	-22	5.5	-18.4
7	183	1.5	4.3	-5	28.7	-23.0	SS 0.0	160	7.1	-2.0	-0.9	-17	1.4	-25.6	-0.6	SS -4.2	139	25.8	-10.0	-22	23.9	-18.0
8	183	5.7	4.2	-5	51.7	-22.8	SS 0.0	160	5.2	0.0	-1.0	-17	27.0	-24.2	-0.7	SS -4.2	139	15.8	-10.1	-22	41.9	-17.4
9	183	9.9	4.0	-6	14.5	-22.8	SS 0.0	160	5.2	2.3	-1.1	-17	51.2	-22.8	-0.7	SS -4.2	139	5.7	-10.2	-22	59.3	-16.9
10	183	13.9	3.9	-6	37.3	-22.7	SS 0.0	160	7.5	4.8	-1.2	-18	14.0	-21.3	-0.8	SS -4.2	138	55.4	-10.3	-23	16.2	-16.3
11	183	17.9	3.8	-7	0.0	-22.5	SS 0.0	160	12.3	7.5	-1.4	-18	35.3	-19.7	-0.8	SS -4.2	138	45.2	-10.4	-23	32.5	-15.8
12	183	21.7	3.7	-7	22.5	-22.5	SS 0.1	160	19.8	10.6	-1.5	-18	55.0	-18.1	-0.8	SS -4.3	138	34.8	-10.4	-23	48.3	-15.3
13	183	25.4	3.6	-7	45.0	-22.4	SS 0.1	160	30.5	14.1	-1.7	-19	13.1	-16.1	-1.0	SS -4.3	138	24.3	-10.5	-24	3.6	-14.6
14	183	29.0	3.4	-8	7.4	-22.2	SS 0.1	160	44.5	17.9	-1.9	-19	29.2	-14.3	-0.9	SS -4.3	138	13.9	-10.5	-24	18.2	-14.1
15	183	32.4	3.3	-8	29.6	-22.2	SS 0.1	161	2.5	22.2	-2.1	-19	43.5	-12.1	-1.1	SS -4.3	138	3.3	-10.5	-24	32.3	-13.5
16	183	35.7	3.2	-8	51.8	-22.0	SS 0.2	161	24.6	26.9	-2.4	-19	55.6	-9.8	-1.1	SS -4.3	137	52.8	-10.5	-24	45.8	-13.0
17	183	38.9	3.0	-9	13.8	-21.9	SS 0.2	161	51.5	32.1	-2.6	-20	5.4	-7.4	-1.2	SS -4.3	137	42.3	-10.5	-24	58.8	-12.3
18	183	41.9	2.9	-9	35.7	-21.7	SS 0.3	162	23.6	37.8	-2.9	-20	12.8	-4.7	-1.3	SS -4.3	137	31.7	-10.5	-25	11.1	-11.8
19	183	44.8	2.7	-9	57.4	-21.6	SS 0.4	163	1.4	44.1	-3.1	-20	17.5	-1.8	-1.5	SS -4.3	137	21.2	-10.4	-25	22.9	-11.1
20	183	47.5	2.6	-10	19.0	-21.4	SS 0.5	163	45.5	50.9	-3.4	-20	19.3	1.3	-1.5	SS -4.3	137	10.8	-10.4	-25	34.0	-10.5
21	183	50.1	2.4	-10	40.4	-21.3	SS 0.6	164	36.4	58.2	-3.7	-20	18.0	4.7	-1.7	SS -4.3	137	0.4	-10.3	-25	44.5	-10.0
22	183	52.5	2.2	-11	1.7	-21.1	SS 0.7	165	34.6	66.1	-3.9	-20	13.3	8.4	-1.8	SS -4.3	136	50.1	-10.2	-25	54.5	-9.3
23	183	54.7	2.0	-11	22.8	-21.0	SS 0.9	166	40.7	74.3	-4.1	-20	4.9	12.2	-1.9	SS -4.3	136	39.9	-10.1	-26	3.8	-8.7
24	183	56.7	1.9	-11	43.8	-20.7	SS 1.1	167	55.0	82.8	-4.3	-19	52.7	16.3	-2.0	SS -4.3	136	29.9	-9.9	-26	12.5	-8.1
25	183	58.6	1.7	-12	4.5	-20.6	SS 1.3	169	17.8	91.4	-4.3	-19	36.4	20.6	-2.2	SS -4.4	136	19.9	-9.8	-26	20.6	-7.4
26	184	0.3	1.5	-12	25.1	-20.4	SS 1.5	170	49.2	99.9	-4.2	-19	15.8	25.0	-2.2	SS -4.4	136	10.2	-9.6	-26	28.0	-6.9
27	184	1.8	1.3	-12	45.5	-20.2	SS 1.6	172	29.1	107.9	-4.0	-18	50.8	29.4	-2.2	SS -4.4	136	0.6	-9.3	-26	34.9	-6.2
28	184	3.1	1.1	-13	5.7	-20.0	SS 1.8	174	17.0	115.1	-3.6	-18	21.4	33.5	-2.1	SS -4.4	135	51.3	-9.1	-26	41.1	-5.6
29	184	4.2	0.9	-13	25.7	-19.8	SS 2.0	176	12.2	121.2	-3.0	-17	47.9	37.3	-1.9	SS -4.4	135	42.2	-8.8	-26	46.7	-5.0
30	184	5.1	0.7	-13	45.5	-19.6	2.2	178	13.4	125.7	-2.3	-17	10.6	40.4	-1.5	SS -4.4	135	33.3	-8.6	-26	51.7	-4.4
Oct 31	184	5.8	0.5	-14	5.1	-19.3	2.4	180	19.1	128.4	-1.3	-16	30.2	42.8	-1.2	SS -4.4	135	24.8	-8.2	-26	56.1	-3.7
Nov 1	184	6.4	0.3	-14	24.4	-19.2	2.5	182	27.5	129.0	-0.3	-15	47.4	44.1	-0.6	SS -4.4	135	16.5	-7.9	-26	59.8	-3.2
2	184	6.7	0.1	-14	43.6	-18.8	2.7	184	36.5	127.4	0.8	-15	3.3	44.2	0.0	SS -4.4	135	8.7	-7.5	-27	3.0	-2.5
3	184	6.8	-0.1	-15	2.4	-18.7	2.8	186	43.9	123.5	1.9	-14	19.1	43.1	0.5	SS -4.4	135	1.1	-7.1	-27	5.5	-1.9
4	184	6.7	-0.3	-15	21.1	-18.3	2.5	188	47.5	117.7	2.9	-13	36.0	40.7	1.2	SS -4.4	134	54.0	-6.7	-27	7.4	-1.3
5	184	6.4	-0.5	-15	39.4	-18.2	2.2	190	45.2	110.1	3.8	-12	55.3	37.2	1.8	SS -4.4	134	47.3	-6.2	-27	8.7	-0.7
6	184	5.9	-0.7	-15	57.6	-17.8	Sr 1.9	192	35.3	101.2	4.5	-12	18.1	32.8	2.2	SS -4.5	134	41.1	-5.7	-27	9.4	-0.2
7	184	5.2	-0.9	-16	15.4	-17.6	Sr 1.6	194	16.4	91.3	4.9	-11	45.3	27.6	2.6	SS -4.5	134	35.3	-5.2	-27	9.6	0.5
8	184	4.3	-1.1	-16	33.0	-17.3	Sr 1.3	195	47.7	80.9	5.2	-11	17.7	22.1	2.8	SS -4.5	134	30.1	-4.6	-27	9.1	1.1
9	184	3.1	-1.3	-16	50.3	-17.0	Sr 1.0	197	8.6	70.3	5.3	-10	55.6	16.4	2.9	SS -4.5	134	25.5	-4.0	-27	8.0	1.6
10	184	1.8	-1.5	-17	7.3	-16.7	Sr 0.7	198	19.0	59.9	5.2	-10	39.2	10.6	2.9	SS -4.5	134	21.5	-3.4	-27	6.4	2.2
11	184	0.3	-1.7	-17	24.0	-16.5	Sr 0.4	199	18.9	49.9	5.0	-10	28.6	5.1	2.8	SS -4.5	134	18.1	-2.7	-27	4.2	2.7
12	183	58.5	-1.9	-17	40.5	-16.1	Sr 0.2	200	8.8	40.5	4.7	-10	23.5	-0.1	2.6	SS -4.5	134	15.3	-2.0	-27	1.5	3.3
13	183	56.6	-2.2	-17	56.6	-15.8	Sr 0.0	200	49.4	31.8	4.4	-10	23.6	-5.0	2.4	SS -4.5	134	13.3	-1.3	-26	58.2	3.8
14	183	54.4	-2.4	-18	12.4	-15.5	Sr -0.2	201	21.2	23.9	4.0	-10	28.6	-9.2	2.1	SS -4.5	134	12.0	-0.5	-26	54.4	4.4
15	183	52.1	-2.6	-18	27.9	-15.1	Sr -0.3	201	45.1	16.7	3.6	-10	37.8	-13.1	2.0	SS -4.5	134	11.5	0.3	-26	50.0	4.8
16	183	49.5	-2.8	-18	43.0	-14.8	Sr -0.4	202	1.8	10.3	3.2	-10	50.9	-16.5	1.7	SS -4.5	134	11.8	1.2	-26	45.2	5.4
17	183	46.7	-3.0	-18	57.8	-14.5	Sr -0.5	202	12.0	4.6	2.9	-11	7.4	-19.4	1.4	SS -4.5	134	13.0	2.0	-26	39.8	5.9
18	183	43.7	-3.2	-19	12.3	-14.2	Sr -0.5	202	16.6	-0.5</												

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Sun and Planets

Date	Mars					Jupiter					Saturn					
	vis	GHA		d	Dec	vis	GHA		d	Dec	vis	GHA		d	Dec	
	mag	o		'	o	mag	o		'	o	mag	o		'	o	
Sep 18	y	1.6	221	3.0	21.4	17	57.2	-10.2	y	-2.1	249	0.1	50.1	22	18.0	-1.0
19	y	1.6	221	24.3	21.5	17	47.0	-10.3	y	-2.1	249	50.2	50.2	22	17.0	-0.9
20	y	1.6	221	45.8	21.6	17	36.7	-10.5	y	-2.1	250	40.5	50.4	22	16.1	-0.9
21	y	1.6	222	7.5	21.7	17	26.2	-10.5	y	-2.1	251	30.8	50.5	22	15.2	-1.0
22	y	1.6	222	29.2	21.9	17	15.7	-10.6	y	-2.1	252	21.4	50.7	22	14.2	-0.9
23	y	1.6	222	51.1	22.0	17	5.1	-10.7	y	-2.1	253	12.0	50.8	22	13.3	-0.9
24	y	1.6	223	13.0	22.1	16	54.4	-10.8	y	-2.1	254	2.8	51.0	22	12.4	-0.9
25	y	1.6	223	35.1	22.2	16	43.6	-10.9	y	-2.2	254	53.8	51.1	22	11.5	-0.9
26	y	1.6	223	57.3	22.3	16	32.7	-10.9	y	-2.2	255	44.9	51.3	22	10.6	-0.8
27	y	1.6	224	19.7	22.4	16	21.8	-11.1	y	-2.2	256	36.1	51.4	22	9.8	-0.9
28	y	1.6	224	42.1	22.6	16	10.7	-11.1	y	-2.2	257	27.5	51.6	22	8.9	-0.8
29	y	1.6	225	4.7	22.7	15	59.6	-11.2	y	-2.2	258	19.1	51.7	22	8.1	-0.9
Sep 30	y	1.6	225	27.4	22.8	15	48.4	-11.3	y	-2.2	259	10.8	51.9	22	7.2	-0.8
Oct 1	y	1.6	225	50.2	22.9	15	37.1	-11.3	y	-2.2	260	2.7	52.0	22	6.4	-0.8
2	y	1.6	226	13.1	23.0	15	25.8	-11.4	y	-2.2	260	54.7	52.2	22	5.6	-0.7
3	y	1.6	226	36.1	23.2	15	14.4	-11.5	y	-2.2	261	47.0	52.4	22	4.9	-0.8
4	y	1.6	226	59.3	23.3	15	2.9	-11.5	y	-2.2	262	39.3	52.5	22	4.1	-0.7
5	y	1.6	227	22.6	23.4	14	51.4	-11.7	y	-2.2	263	31.9	52.7	22	3.4	-0.8
6	y	1.6	227	46.0	23.5	14	39.7	-11.6	y	-2.2	264	24.6	52.9	22	2.6	-0.7
7	y	1.6	228	9.5	23.6	14	28.1	-11.8	y	-2.2	265	17.5	53.1	22	1.9	-0.7
8	y	1.6	228	33.2	23.8	14	16.3	-11.8	y	-2.2	266	10.6	53.2	22	1.2	-0.6
9	y	1.6	228	56.9	23.9	14	4.5	-11.8	y	-2.2	267	3.8	53.4	22	0.6	-0.7
10	y	1.6	229	20.8	24.0	13	52.7	-11.9	y	-2.2	267	57.2	53.6	21	59.9	-0.6
11	y	1.6	229	44.8	24.1	13	40.8	-12.0	y	-2.3	268	50.8	53.8	21	59.3	-0.6
12	y	1.6	230	8.9	24.2	13	28.8	-12.0	y	-2.3	269	44.6	54.0	21	58.7	-0.6
13	y	1.6	230	33.1	24.3	13	16.8	-12.0	y	-2.3	270	38.5	54.1	21	58.1	-0.6
14	y	1.6	230	57.4	24.5	13	4.8	-12.1	y	-2.3	271	32.7	54.3	21	57.5	-0.5
15	y	1.6	231	21.9	24.6	12	52.7	-12.2	y	-2.3	272	27.0	54.5	21	57.0	-0.5
16	y	1.6	231	46.5	24.7	12	40.5	-12.2	y	-2.3	273	21.5	54.7	21	56.5	-0.5
17	y	1.6	232	11.2	24.8	12	28.3	-12.2	y	-2.3	274	16.2	54.9	21	56.0	-0.5
18	y	1.6	232	35.9	24.9	12	16.1	-12.3	y	-2.3	275	11.1	55.1	21	55.5	-0.4
19	y	1.6	233	0.9	25.0	12	3.8	-12.3	y	-2.3	276	6.2	55.3	21	55.1	-0.5
20	y	1.5	233	25.9	25.1	11	51.5	-12.3	y	-2.3	277	1.5	55.5	21	54.6	-0.3
21	y	1.5	233	51.0	25.2	11	39.2	-12.4	y	-2.3	277	56.9	55.7	21	54.3	-0.4
22	y	1.5	234	16.2	25.3	11	26.8	-12.4	y	-2.3	278	52.6	55.9	21	53.9	-0.4
23	y	1.5	234	41.6	25.4	11	14.4	-12.5	y	-2.3	279	48.5	56.1	21	53.5	-0.3
24	y	1.5	235	7.0	25.6	11	1.9	-12.4	y	-2.3	280	44.5	56.3	21	53.2	-0.3
25	y	1.5	235	32.6	25.7	10	49.5	-12.5	y	-2.3	281	40.8	56.5	21	52.9	-0.2
26	y	1.5	235	58.2	25.8	10	37.0	-12.5	y	-2.4	282	37.2	56.7	21	52.7	-0.2
27	y	1.5	236	24.0	25.9	10	24.5	-12.6	y	-2.4	283	33.9	56.9	21	52.5	-0.2
28	y	1.5	236	49.9	26.0	10	11.9	-12.5	y	-2.4	284	30.7	57.1	21	52.3	-0.2
29	y	1.5	237	15.8	26.1	9	59.4	-12.6	y	-2.4	285	27.8	57.3	21	52.1	-0.1
30	y	1.5	237	41.9	26.2	9	46.8	-12.6	y	-2.4	286	25.1	57.5	21	52.0	-0.2
Oct 31	y	1.5	238	8.1	26.3	9	34.2	-12.6	y	-2.4	287	22.6	57.7	21	51.8	0.0
Nov 1	y	1.5	238	34.5	26.4	9	21.6	-12.6	y	-2.4	288	20.3	57.9	21	51.8	-0.1
2	y	1.5	239	0.9	26.5	9	9.0	-12.6	y	-2.4	289	18.2	58.1	21	51.7	0.0
3	y	1.5	239	27.4	26.6	8	56.4	-12.6	y	-2.4	290	16.3	58.3	21	51.7	0.0
4	y	1.5	239	54.0	26.7	8	43.8	-12.7	y	-2.4	291	14.6	58.5	21	51.7	0.0
5	y	1.5	240	20.8	26.9	8	31.1	-12.6	y	-2.4	292	13.2	58.8	21	51.7	0.1
6	y	1.5	240	47.7	27.0	8	18.5	-12.6	y	-2.4	293	11.9	59.0	21	51.8	0.1
7	y	1.4	241	14.6	27.1	8	5.9	-12.7	y	-2.4	294	10.9	59.2	21	51.9	0.2
8	y	1.4	241	41.7	27.2	7	53.2	-12.6	y	-2.4	295	10.1	59.4	21	52.1	0.1
9	y	1.4	242	8.9	27.3	7	40.6	-12.6	y	-2.4	296	9.5	59.6	21	52.2	0.2
10	y	1.4	242	36.2	27.4	7	28.0	-12.6	y	-2.5	297	9.1	59.8	21	52.4	0.2
11	y	1.4	243	3.6	27.5	7	15.4	-12.6	y	-2.5	298	8.9	60.0	21	52.6	0.3
12	y	1.4	243	31.1	27.6	7	2.8	-12.6	y	-2.5	299	9.0	60.2	21	52.9	0.3
13	y	1.4	243	58.7	27.7	6	50.2	-12.6	y	-2.5	300	9.2	60.5	21	53.2	0.3
14	y	1.4	244	26.5	27.8	6	37.6	-12.6	y	-2.5	301	9.7	60.7	21	53.5	0.3
15	y	1.4	244	54.3	27.9	6	25.0	-12.6	y	-2.5	302	10.3	60.9	21	53.8	0.4
16	y	1.4	245	22.3	28.1	6	12.4	-12.5	y	-2.5	303	11.2	61.1	21	54.2	0.4
17	y	1.4	245	50.3	28.2	5	59.9	-12.5	y	-2.5	304	12.3	61.3	21	54.6	0.5
18	y	1.4	246	18.5	28.3	5	47.4	-12.5	y	-2.5	305	13.6	61.5	21	55.1	0.4
19	y	1.4	246	46.8	28.4	5	34.9	-12.5	y	-2.5	306	15.1	61.7	21	55.5	0.5
20	y	1.3	247	15.1	28.5	5	22.4	-12.5	y	-2.5	307	16.8	61.9	21	56.0	0.6
Nov 21	y	1.3	247	43.6	28.6	5	9.9	-12.4	y	-2.5	308	18.8	62.1	21	56.6	0.5

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Sun and Planets

Date	SUN				Mercury						Venus													
	GHA o	d	Dec o	d	vis	mag	GHA o	d	dd	Dec o	d	dd	vis	mag	GHA o	d	Dec o	d						
Nov 22	183	29.7	-4.0	-20	6.8	-12.7	sr	-0.6	201	50.0	-15.3	1.5	-13	5.1	-27.9	0.4	ss	-4.6	134	32.9	7.1	-26	5.7	8.1
23	183	25.7	-4.2	-20	19.5	-12.3	sr	-0.6	201	34.7	-18.0	1.3	-13	33.0	-28.8	0.5	ss	-4.6	134	39.9	8.2	-25	57.6	8.6
24	183	21.5	-4.4	-20	31.8	-12.0	sr	-0.7	201	16.7	-20.3	1.2	-14	1.8	-29.4	0.3	ss	-4.6	134	48.1	9.3	-25	49.0	9.0
25	183	17.1	-4.6	-20	43.8	-11.6	sr	-0.7	200	56.4	-22.4	1.0	-14	31.2	-29.7	0.1	ss	-4.6	134	57.4	10.5	-25	40.0	9.3
26	183	12.5	-4.8	-20	55.4	-11.2	sr	-0.7	200	34.0	-24.2	0.9	-15	0.9	-29.8	0.1	ss	-4.6	135	8.0	11.8	-25	30.7	9.7
27	183	7.7	-5.0	-21	6.6	-10.7	sr	-0.7	200	9.8	-25.9	0.8	-15	30.7	-29.9	0.0	ss	-4.6	135	19.8	13.1	-25	21.0	10.1
28	183	2.7	-5.2	-21	17.3	-10.4	sr	-0.7	199	43.9	-27.3	0.7	-16	0.6	-29.8	-0.1	ss	-4.6	135	32.9	14.4	-25	10.9	10.4
29	182	57.5	-5.3	-21	27.7	-10.0	sr	-0.7	199	16.6	-28.6	0.7	-16	30.4	-29.5	-0.1	ss	-4.6	135	47.3	15.8	-25	0.5	10.7
Nov 30	182	52.2	-5.5	-21	37.7	-9.6	sr	-0.7	198	47.9	-29.8	0.6	-16	59.9	-29.1	-0.2	ss	-4.6	136	3.1	17.3	-24	49.8	11.1
Dec 1	182	46.7	-5.7	-21	47.3	-9.1	sr	-0.7	198	18.1	-30.9	0.5	-17	29.0	-28.7	-0.2	ss	-4.6	136	20.4	18.7	-24	38.7	11.3
2	182	41.0	-5.8	-21	56.4	-8.7	sr	-0.7	197	47.1	-32.0	0.5	-17	57.7	-28.1	-0.3	ss	-4.7	136	39.1	20.3	-24	27.4	11.6
3	182	35.2	-6.0	-22	5.1	-8.3	sr	-0.7	197	15.2	-32.9	0.5	-18	25.8	-27.5	-0.3	ss	-4.7	136	59.4	21.9	-24	15.8	11.8
4	182	29.2	-6.1	-22	13.4	-7.9	sr	-0.7	196	42.3	-33.7	0.4	-18	53.3	-26.9	-0.3	ss	-4.7	137	21.3	23.5	-24	4.0	12.0
5	182	23.1	-6.3	-22	21.3	-7.4	sr	-0.7	196	8.6	-34.6	0.4	-19	20.2	-26.1	-0.4	ss	-4.7	137	44.8	25.3	-23	52.0	12.3
6	182	16.8	-6.4	-22	28.7	-7.0	sr	-0.7	195	34.0	-35.3	0.4	-19	46.3	-25.3	-0.4	ss	-4.7	138	10.1	27.0	-23	39.7	12.4
7	182	10.4	-6.5	-22	35.7	-6.6	sr	-0.7	194	58.7	-36.1	0.4	-20	11.6	-24.4	-0.4	ss	-4.7	138	37.1	28.9	-23	27.3	12.6
8	182	3.9	-6.6	-22	42.3	-6.1	sr	-0.7	194	22.6	-36.7	0.3	-20	36.0	-23.6	-0.4	ss	-4.7	139	6.0	30.8	-23	14.7	12.6
9	181	57.3	-6.7	-22	48.4	-5.7	sr	-0.7	193	45.9	-37.4	0.3	-20	59.6	-22.6	-0.5	ss	-4.7	139	36.8	32.7	-23	1.9	12.8
10	181	50.6	-6.8	-22	54.1	-5.2	sr	-0.7	193	8.4	-38.1	0.3	-21	22.2	-21.6	-0.5	ss	-4.7	140	9.5	34.8	-22	49.1	13.0
11	181	43.7	-6.9	-22	59.3	-4.7	sr	-0.7	192	30.4	-38.7	0.3	-21	43.8	-20.7	-0.5	ss	-4.7	140	44.3	36.9	-22	36.1	13.1
12	181	36.8	-7.0	-23	4.0	-4.3	sr	-0.7	191	51.7	-39.3	0.3	-22	4.5	-19.6	-0.6	ss	-4.7	141	21.2	39.0	-22	23.0	13.1
13	181	29.8	-7.1	-23	8.3	-3.9	sr	-0.7	191	12.4	-39.9	0.3	-22	24.1	-18.5	-0.5	ss	-4.7	142	0.2	41.3	-22	9.9	13.2
14	181	22.7	-7.2	-23	12.2	-3.3	sr	-0.8	190	32.6	-40.4	0.3	-22	42.6	-17.4	-0.5	ss	-4.7	142	41.5	43.5	-21	56.7	13.2
15	181	15.6	-7.2	-23	15.5	-3.0	sr	-0.8	189	52.2	-41.0	0.3	-23	0.0	-16.3	-0.6	ss	-4.7	143	25.0	45.9	-21	43.5	13.2
16	181	8.4	-7.3	-23	18.5	-2.4	sr	-0.8	189	11.2	-41.5	0.3	-23	16.3	-15.1	-0.6	ss	-4.7	144	10.9	48.3	-21	30.3	13.2
17	181	1.1	-7.3	-23	20.9	-2.0	sr	-0.8	188	29.7	-42.0	0.3	-23	31.4	-14.0	-0.6	ss	-4.7	144	59.1	50.7	-21	17.1	13.1
18	180	53.8	-7.4	-23	22.9	-1.5	sr	-0.8	187	47.7	-42.5	0.3	-23	45.4	-12.8	-0.6	ss	-4.6	145	49.8	53.2	-21	4.0	13.1
19	180	46.4	-7.4	-23	24.4	-1.0	sr	-0.9	187	5.2	-43.0	0.2	-23	58.2	-11.5	-0.6	ss	-4.6	146	43.0	55.7	-20	50.9	13.1
20	180	39.0	-7.4	-23	25.4	-0.6	sr	-0.9	186	22.2	-43.5	0.2	-24	9.7	-10.2	-0.6	ss	-4.6	147	38.8	58.3	-20	37.8	12.9
21	180	31.6	-7.4	-23	26.0	-0.1	sr	-0.9	185	38.7	-43.9	0.2	-24	19.9	-9.0	-0.6	ss	-4.6	148	37.1	60.9	-20	24.9	12.9
22	180	24.2	-7.4	-23	26.1	0.4	sr	-1.0	184	54.8	-44.4	0.2	-24	28.9	-7.7	-0.7	ss	-4.6	149	38.0	63.5	-20	12.0	12.7
23	180	16.7	-7.4	-23	25.7	0.8	sr	-1.0	184	10.4	-44.8	0.2	-24	36.6	-6.4	-0.6	ss	-4.6	150	41.6	66.2	-19	59.3	12.6
24	180	9.3	-7.4	-23	24.9	1.3	sr	-1.0	183	25.7	-45.2	0.2	-24	43.0	-5.0	-0.7	ss	-4.6	151	47.8	68.8	-19	46.7	12.4
25	180	1.8	-7.4	-23	23.6	1.8	sr	-1.1	182	40.5	-45.5	0.2	-24	48.0	-3.7	-0.7	ss	-4.5	152	56.6	71.5	-19	34.3	12.3
26	179	54.4	-7.4	-23	21.8	2.2	sr	-1.1	181	55.0	-45.9	0.2	-24	51.7	-2.3	-0.7	ss	-4.5	154	8.1	74.1	-19	22.0	12.0
27	179	47.0	-7.4	-23	19.6	2.8	sr	-1.1	181	9.1	-46.2	0.2	-24	54.0	-0.9	-0.7	ss	-4.5	155	22.1	76.7	-19	10.0	11.9
28	179	39.6	-7.3	-23	16.8	3.2	sr	-1.2	180	22.9	-46.5	0.1	-24	54.9	0.5	-0.7	ss	-4.5	156	38.8	79.2	-18	58.1	11.7
29	179	32.3	-7.3	-23	13.6	3.6	sr	-1.2	179	36.4	-46.8	0.1	-24	54.4	2.0	-0.8	ss	-4.5	157	58.0	81.6	-18	46.4	11.4
30	179	25.0	-7.2	-23	10.0	4.1	sr	-1.2	178	49.6	-47.0	0.1	-24	52.4	3.4	-0.7	ss	-4.4	159	19.6	84.0	-18	35.0	11.1
Dec 31	179	17.7	-7.2	-23	5.9	4.6	sr	-1.2	178	2.6	-47.2	0.1	-24	49.0	4.8	-0.7	ss	-4.4	160	43.6	86.2	-18	23.9	11.0
Jan 1	179	10.6	-7.2	-23	1.3	5.1	sr	-1.2	177	15.4	-47.2	0.1	-24	44.2	6.2	-0.7	ss	-4.4	162	9.8	86.2	-18	12.9	10.9

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Date	Mars					Jupiter					Saturn													
	GHA		d	Dec		GHA		d	Dec		GHA		d	Dec										
	vis	mag		o	'	o	'		o	'	o	'		o	'	o	'							
Nov 22	y	1.3	248	12.2	28.7	4	57.5	-12.4	y	-2.5	309	20.9	62.3	21	57.1	0.6	y	1.3	196	53.8	52.1	-14	37.3	-1.9
23	y	1.3	248	40.9	28.8	4	45.1	-12.4	y	-2.5	310	23.2	62.5	21	57.7	0.6	y	1.3	197	46.0	52.2	-14	39.2	-2.0
24	y	1.3	249	9.7	28.9	4	32.7	-12.4	y	-2.5	311	25.8	62.8	21	58.3	0.6	y	1.3	198	38.1	52.2	-14	41.2	-2.0
25	y	1.3	249	38.7	29.0	4	20.3	-12.3	y	-2.5	312	28.5	63.0	21	58.9	0.7	y	1.3	199	30.3	52.2	-14	43.2	-1.9
26	y	1.3	250	7.7	29.2	4	8.0	-12.2	y	-2.6	313	31.5	63.2	21	59.6	0.7	y	1.3	200	22.5	52.2	-14	45.1	-2.0
27	y	1.3	250	36.9	29.3	3	55.8	-12.3	y	-2.6	314	34.6	63.4	22	0.3	0.7	y	1.3	201	14.7	52.2	-14	47.1	-1.9
28	y	1.3	251	6.1	29.4	3	43.5	-12.2	y	-2.6	315	38.0	63.5	22	1.0	0.7	y	1.3	202	6.9	52.3	-14	49.0	-1.9
29	y	1.3	251	35.5	29.5	3	31.3	-12.1	y	-2.6	316	41.5	63.7	22	1.7	0.8	y	1.3	202	59.2	52.3	-14	50.9	-1.9
Nov 30	y	1.3	252	5.0	29.6	3	19.2	-12.1	y	-2.6	317	45.3	63.9	22	2.5	0.8	y	1.4	203	51.5	52.3	-14	52.8	-1.9
Dec 1	y	1.2	252	34.6	29.7	3	7.1	-12.1	y	-2.6	318	49.2	64.1	22	3.3	0.8	y	1.4	204	43.8	52.3	-14	54.7	-1.8
2	y	1.2	253	4.4	29.9	2	55.0	-12.0	y	-2.6	319	53.3	64.3	22	4.1	0.8	y	1.4	205	36.1	52.3	-14	56.5	-1.9
3	y	1.2	253	34.3	30.0	2	43.0	-12.0	y	-2.6	320	57.6	64.5	22	4.9	0.9	y	1.4	206	28.4	52.4	-14	58.4	-1.8
4	y	1.2	254	4.2	30.1	2	31.0	-11.9	y	-2.6	322	2.1	64.7	22	5.8	0.9	y	1.4	207	20.8	52.4	-15	0.2	-1.8
5	y	1.2	254	34.4	30.2	2	19.1	-11.8	y	-2.6	323	6.8	64.8	22	6.7	0.9	y	1.4	208	13.2	52.4	-15	2.0	-1.8
6	y	1.2	255	4.6	30.4	2	7.3	-11.8	y	-2.6	324	11.6	65.0	22	7.6	0.9	y	1.4	209	5.6	52.5	-15	3.8	-1.8
7	y	1.2	255	35.0	30.5	1	55.5	-11.8	y	-2.6	325	16.7	65.2	22	8.5	0.9	y	1.4	209	58.1	52.5	-15	5.6	-1.8
8	y	1.2	256	5.5	30.6	1	43.7	-11.7	y	-2.6	326	21.8	65.3	22	9.4	1.0	y	1.4	210	50.6	52.5	-15	7.4	-1.8
9	y	1.2	256	36.1	30.8	1	32.0	-11.6	y	-2.6	327	27.2	65.5	22	10.4	1.0	y	1.4	211	43.1	52.6	-15	9.2	-1.7
10	y	1.1	257	6.9	30.9	1	20.4	-11.5	y	-2.6	328	32.7	65.7	22	11.4	0.9	y	1.4	212	35.7	52.6	-15	10.9	-1.7
11	y	1.1	257	37.8	31.0	1	8.9	-11.5	y	-2.6	329	38.4	65.8	22	12.3	1.0	y	1.4	213	28.3	52.6	-15	12.6	-1.7
12	y	1.1	258	8.9	31.2	0	57.4	-11.5	y	-2.6	330	44.2	66.0	22	13.3	1.1	y	1.4	214	21.0	52.7	-15	14.3	-1.7
13	y	1.1	258	40.0	31.3	0	45.9	-11.3	y	-2.6	331	50.1	66.1	22	14.4	1.0	y	1.4	215	13.6	52.7	-15	16.0	-1.7
14	y	1.1	259	11.3	31.4	0	34.6	-11.3	y	-2.6	332	56.2	66.2	22	15.4	1.0	y	1.4	216	6.4	52.8	-15	17.7	-1.6
15	y	1.1	259	42.8	31.6	0	23.3	-11.2	y	-2.7	334	2.5	66.4	22	16.4	1.1	y	1.4	216	59.1	52.8	-15	19.3	-1.7
16	y	1.1	260	14.4	31.7	0	12.1	-11.2	y	-2.7	335	8.9	66.5	22	17.5	1.0	y	1.4	217	51.9	52.8	-15	21.0	-1.6
17	y	1.1	260	46.1	31.9	0	0.9	-11.1	y	-2.7	336	15.4	66.6	22	18.5	1.1	y	1.4	218	44.8	52.9	-15	22.6	-1.6
18	y	1.0	261	18.0	32.0	-0	10.2	-11.0	y	-2.7	337	22.0	66.7	22	19.6	1.1	y	1.4	219	37.6	52.9	-15	24.2	-1.6
19	y	1.0	261	50.0	32.2	-0	21.2	-10.9	y	-2.7	338	28.7	66.9	22	20.7	1.1	y	1.4	220	30.6	53.0	-15	25.8	-1.5
20	y	1.0	262	22.2	32.3	-0	32.1	-10.8	y	-2.7	339	35.6	67.0	22	21.8	1.1	y	1.4	221	23.6	53.0	-15	27.3	-1.6
21	y	1.0	262	54.5	32.5	-0	42.9	-10.8	y	-2.7	340	42.5	67.1	22	22.9	1.1	y	1.4	222	16.6	53.1	-15	28.9	-1.5
22	y	1.0	263	27.0	32.6	-0	53.7	-10.7	y	-2.7	341	49.6	67.2	22	24.0	1.1	y	1.4	223	9.7	53.1	-15	30.4	-1.5
23	y	1.0	263	59.6	32.8	-1	4.4	-10.5	y	-2.7	342	56.8	67.3	22	25.1	1.1	y	1.4	224	2.8	53.2	-15	31.9	-1.5
24	y	1.0	264	32.4	33.0	-1	14.9	-10.5	y	-2.7	344	4.0	67.3	22	26.2	1.1	y	1.4	224	56.0	53.2	-15	33.4	-1.4
25	y	1.0	265	5.4	33.1	-1	25.4	-10.4	y	-2.7	345	11.4	67.4	22	27.3	1.1	y	1.4	225	49.2	53.3	-15	34.8	-1.5
26	y	0.9	265	38.5	33.3	-1	35.8	-10.4	y	-2.7	346	18.8	67.5	22	28.4	1.2	y	1.4	226	42.5	53.3	-15	36.3	-1.4
27	y	0.9	266	11.8	33.5	-1	46.2	-10.2	y	-2.7	347	26.3	67.6	22	29.6	1.1	y	1.4	227	35.8	53.4	-15	37.7	-1.4
28	y	0.9	266	45.3	33.7	-1	56.4	-10.1	y	-2.7	348	33.8	67.6	22	30.7	1.1	y	1.4	228	29.2	53.4	-15	39.1	-1.4
29	y	0.9	267	19.0	33.8	-2	6.5	-10.0	y	-2.7	349	41.5	67.7	22	31.8	1.1	y	1.4	229	22.6	53.5	-15	40.5	-1.3
30	y	0.9	267	52.8	34.0	-2	16.5	-9.9	y	-2.7	350	49.1	67.7	22	32.9	1.1	y	1.4	230	16.1	53.6	-15	41.8	-1.4
Dec 31	y	0.9	268	26.8	34.2	-2	26.4	-9.8	y	-2.7	351	56.8	67.8	22	34.0	1.1	y	1.4	231	9.7	53.6	-15	43.2	-1.3
Jan 1	y	0.8	269	1.1	34.2	-2	36.2	-9.7	y	-2.7	353	4.6	67.8	22	35.1	1.1	y	1.4	232	3.3	53.6	-15	44.5	-1.2