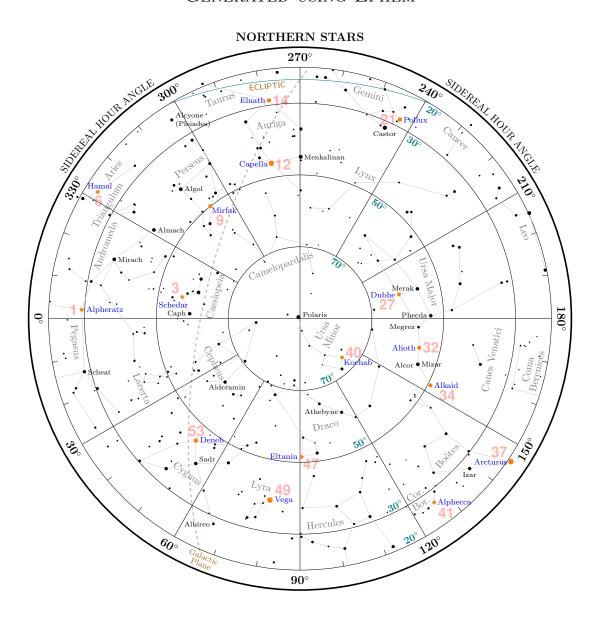
## GENERATED USING EPHEM



## THE NAUTICAL ALMANAC

## 29.05.2010

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May 29, 30, 31 (Sat., Sun., Mon.)

	Aries	Venus		Mars		Jupiter		Saturn	
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	246°25.0	144°38.1	<b>N</b> 24°48.2	98°21.5	<b>N</b> 14°28.5	247°03.9	<b>S</b> 01°31.3	67°26.0	<b>N</b> 03°05.8
1	261°27.5	159°37.3	48.0	113°22.8	28.0	262°06.0	31.2	82°28.5	05.8
2	276°30.0	174°36.5	47.8	128°24.1	27.5	277°08.1	31.0	97°31.0	05.8
3	291°32.4	189°35.7	• • 47.6	143°25.3	• • 27.1	292°10.2	• • 30.9	112°33.4	• • 05.8
4	306°34.9	204°34.9	47.4	158° 26.6	26.6	307°12.3	30.7	127°35.9	05.8
5	321°37.4	219°34.1	47.2	173°27.9	26.1	322°14.4	30.6	142°38.4	05.8
6	336°39.8	234°33.3	<b>N</b> 24°47.1	188°29.1	<b>N</b> 14°25.7	337° 16.5	<b>S</b> 01°30.4	157°40.9	<b>N</b> 03°05.8
7	351°42.3	249°32.5	46.9	203°30.4	25.2	352° 18.7	30.3	172°43.3	05.8
8	6°44.8	264°31.7	46.7	218°31.7	24.7	7°20.8	30.1	187°45.8	05.8
9	21°47.2	279°30.9	• • 46.5	233°32.9	• • 24.3	22°22.9	• • 30.0	202°48.3	• • 05.8
10	36°49.7	294°30.1	46.3	248°34.2	23.8	37°25.0	29.9	217°50.8	05.7
11	51°52.2	309°29.3	46.1	263°35.5	23.3	52°27.1	29.7	232°53.2	05.7
12	66°54.6	324°28.5	N24°45.9	278°36.7	<b>N</b> 14°22.9	67°29.2	<b>S</b> 01°29.6	247°55.7	N03°05.7
13	81°57.1	339°27.7	45.7	293°38.0	22.4	82°31.3	29.4	262°58.2	05.7
14	96°59.5	354°26.9	45.5	308°39.3	21.9	97°33.4	29.3	278°00.7	05.7
15	112°02.0	9°26.1	• • 45.3	323°40.5	• • 21.5	112°35.5	• • 29.1	293°03.1	•• 05.7
16	127°04.5	24°25.3	45.1	338°41.8	21.0	127°37.6	29.0	308°05.6	05.7
17	142°06.9	39°24.5	44.9	353°43.1	20.5	142°39.7	28.9	323°08.1	05.7
18	157°09.4	54°23.7	<b>N</b> 24°44.7	8°44.3	$N14^{\circ}20.1$	157°41.9	<b>S</b> 01°28.7	338° 10.5	<b>N</b> 03°05.7
19	172°11.9	69°22.9	44.5	23°45.6	19.6	172°44.0	28.6	353°13.0	05.7
20	187°14.3	84°22.1	44.3	38°46.9	19.1	187°46.1	28.4	8° 15.5	05.7
21	202°16.8	99°21.3	• • 44.1	53°48.1	• • 18.7	202°48.2	• • 28.3	23°18.0	•• 05.7
22	217°19.3	114°20.5	43.8	68°49.4	18.2	217°50.3	28.1	38° 20.4	05.7
23	232°21.7	129°19.7	43.6	83°50.7	17.7	232°52.4	28.0	53°22.9	05.7
Mer.p	ass. 07:33	ν -0.8′ d -	0.2′ m -3.9	ν 1.3′ d -0	0.5 <sup>'</sup> m 1.1	ν 2.1′ d 0	.1′ m -2.1	ν 2.5′ d -0.0′ m 1.0	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	247°24.2	144°18.9	<b>N</b> 24°43.4	98°51.9	<b>N</b> 14°17.2	247°54.5	<b>S</b> 01°27.9	68° 25.4	<b>N</b> 03°05.7
1	262°26.7	159°18.1	43.2	113°53.2	16.8	262°56.6	27.7	83°27.8	05.6
2	277°29.1	174°17.3	43.0	128°54.5	16.3	277°58.8	27.6	98°30.3	05.6
3	292°31.6	189°16.5	• • 42.8	143°55.7	• • 15.8	293°00.9	• • 27.4	113°32.8	• • 05.6
4	307°34.0	204°15.7	42.6	158° 57.0	15.4	308°03.0	27.3	128°35.2	05.6
5	322°36.5	219°14.9	42.3	173°58.2	14.9	323°05.1	27.2	143°37.7	05.6
6	337°39.0	234°14.1	N24°42.1	188° 59.5	$N14^{\circ}14.4$	338° 07.2	<b>S</b> 01°27.0	158° 40.2	<b>N</b> 03°05.6
7	352°41.4	249°13.3	41.9	204°00.8	14.0	353°09.3	26.9	173°42.7	05.6
8	7°43.9	264°12.6	41.7	219°02.0	13.5	8°11.4	26.7	188°45.1	05.6
9	22°46.4	279°11.8	• • 41.4	234°03.3	• • 13.0	23° 13.5	• • 26.6	203°47.6	• • 05.6
10	37°48.8	294°11.0	41.2	249°04.6	12.5	38° 15.7	26.4	218°50.1	05.6
11	52°51.3	309°10.2	41.0	264°05.8	12.1	53° 17.8	26.3	233°52.5	05.6
12	67°53.8	324°09.4	<b>N</b> 24°40.8	279°07.1	$N14^{\circ}11.6$	68° 19.9	<b>S</b> 01°26.2	248°55.0	<b>N</b> 03°05.6
13	82°56.2	339°08.6	40.5	294°08.4	11.1	83°22.0	26.0	263°57.5	05.6
14	97°58.7	354°07.8	40.3	309°09.6	10.7	98°24.1	25.9	278°59.9	05.6
15	113°01.2	9°07.0	• • 40.1	324°10.9	• • 10.2	113°26.2	• • 25.7	294°02.4	• • 05.5
16	128°03.6	24°06.2	39.8	339°12.1	09.7	128°28.4	25.6	309°04.9	05.5
17	143°06.1	39°05.4	39.6	354°13.4	09.2	143°30.5	25.5	324°07.3	05.5
18	158°08.5	54°04.6	N24°39.4	9°14.7	<b>N</b> 14°08.8	158°32.6	<b>S</b> 01°25.3	339°09.8	<b>N</b> 03°05.5
19	173°11.0	69°03.8	39.1	24°15.9	08.3	173°34.7	25.2	354°12.3	05.5
20	188°13.5	84°03.1	38.9	39° 17.2	07.8	188°36.8	25.0	9°14.7	05.5
21	203°15.9	99°02.3	• • 38.7	54°18.4	• • 07.3	203°38.9	• • 24.9	24°17.2	• • 05.5
22	218°18.4	114°01.5	38.4	69° 19.7	06.9	218°41.0	24.8	39° 19.7	05.5
23	233°20.9	129°00.7	38.2	84°21.0	06.4	233°43.2	24.6	54°22.1	05.5
Mer.p	bass. 07:29	ν -0.8′ d -	0.2′ m -3.9	ν 1.3′ d -	0.5′ m 1.1	ν 2.1′ d 0	.1′ m -2.1	ν 2.5′ d -	0.0′ m 1.0

Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	248°23.3	143°59.9	<b>N</b> 24°38.0	99°22.2	<b>N</b> 14°05.9	248° 45.3	<b>S</b> 01°24.5	69°24.6	N03°05.5
1	263°25.8	158°59.1	37.7	114°23.5	05.5	263°47.4	24.3	84°27.1	05.5
2	278°28.3	173°58.3	37.5	129°24.7	05.0	278°49.5	24.2	99°29.6	05.5
3	293°30.7	188°57.5	• • 37.2	144°26.0	• • 04.5	293°51.6	• • 24.1	114°32.0	• • 05.4
4	308°33.2	203°56.8	37.0	159°27.3	04.0	308°53.7	23.9	129°34.5	05.4
5	323°35.6	218°56.0	36.7	174°28.5	03.6	323°55.9	23.8	144°36.9	05.4
6	338°38.1	233°55.2	<b>N</b> 24°36.5	189°29.8	$N14^{\circ}03.1$	338°58.0	<b>S</b> 01°23.6	159°39.4	N03°05.4
7	353°40.6	248°54.4	36.2	204°31.0	02.6	354°00.1	23.5	174°41.9	05.4
8	8°43.0	263°53.6	36.0	219°32.3	02.1	9°02.2	23.4	189°44.3	05.4
9	23°45.5	278°52.8	• • 35.7	234°33.6	• • 01.7	24°04.3	• • 23.2	204°46.8	• • 05.4
10	38°48.0	293°52.0	35.5	249°34.8	01.2	39°06.5	23.1	219°49.3	05.4
11	53°50.4	308°51.3	35.2	264°36.1	00.7	54°08.6	22.9	234°51.7	05.4
12	68°52.9	323°50.5	<b>N</b> 24°35.0	279°37.3	$N14^{\circ}00.2$	69°10.7	<b>S</b> 01°22.8	249°54.2	N03°05.4
13	83°55.4	338°49.7	34.7	294°38.6	13°59.8	84°12.8	22.7	264°56.7	05.4
14	98°57.8	353°48.9	34.4	309°39.8	59.3	99°14.9	22.5	279°59.1	05.3
15	114°00.3	8°48.1	• • 34.2	324°41.1	• • 58.8	114° 17.1	• • 22.4	295°01.6	• • 05.3
16	129°02.8	23°47.3	33.9	339°42.4	58.3	129° 19.2	22.3	310°04.1	05.3
17	144°05.2	38°46.6	33.7	354°43.6	57.8	144°21.3	22.1	325°06.5	05.3
18	159°07.7	53°45.8	N24°33.4	9°44.9	N13°57.4	159°23.4	<b>S</b> 01°22.0	340°09.0	N03°05.3
19	174°10.1	68°45.0	33.1	24°46.1	56.9	174°25.5	21.8	355°11.5	05.3
20	189°12.6	83°44.2	32.9	39°47.4	56.4	189°27.7	21.7	10°13.9	05.3
21	204°15.1	98°43.4	• • 32.6	54°48.6	• • 55.9	204°29.8	• • 21.6	25°16.4	• • 05.3
22	219°17.5	113°42.7	32.3	69°49.9	55.5	219°31.9	21.4	40°18.8	05.3
23	234°20.0	128°41.9	32.1	84°51.2	55.0	234°34.0	21.3	55°21.3	05.3
Mer.p	ass. 07:25	$\nu$ -0.8' $d$ -0	0.2′ m -3.9	$\nu$ 1.3 $^{\prime}$ $d$ -0	0.5' m 1.1	ν 2.1' d 0	.1′ m -2.1	$\nu$ 2.5 $^{\prime}$ $d$ -0	0.0' m 1.0

	Stars	
	SHA	Dec
Alpheratz	357°46.0	29°08.8
Ankaa	353°18.0	-42°14.7
Schedar	349°43.5 348°58.3	56°35.5 -17°55.6
Diphda Achernar	348 58.3 335°28.7	-17°55.6 -57°10.8
Hamal	328°03.6	23°30.6
Polaris	319°17.0	89°18.5
Acamar Menkar	315°20.4 314°17.7	-40°15.7 4°07.8
Mirfak	308°44.1	49°53.8
Aldebaran	290°52.3	16°31.8
Rigel Capella	281°14.5 280°38.2	-8°11.4 46°00.5
Bellatrix	278°34.7	6°21.5
Elnath	278°15.8	28°37.0
Alnilam Betelgeuse	275°49.0 271°04.0	-1°11.8 7°24.5
Canopus	263°57.6	-52°42.2
Sirius	258°36.0	-16°44.0
Adhara	255°14.6	-28°59.3 5°11.8
Procyon Pollux	245°02.3 243°30.7	28°00.1
Avior	234°19.4	-59°32.9
Suhail	222°54.3	-43°28.8
Miaplacidus Alphard	221°40.7 217°58.4	-69°46.0 -8°42.4
Regulus	207°45.9	11°54.9
Dubhe	193°54.1	61°41.9
Denebola	182°35.8 175°54.5	14°30.8 -17°36.2
Gienah Acrux	173 54.5 173°11.7	-17 30.2 -63°09.8
Gacrux	172°03.2	-57°10.7
Alioth	166°22.1	55°54.3
Spica Alkaid	158°33.4 153°00.1	-11°13.1 49°15.7
Hadar	148°50.7	-60°25.7
Menkent	148°09.9	-36°25.5
Arcturus Rigil Kent.	145°57.4 139°54.2	19°07.6 -60°52.9
Kochab	139° 34.2 137° 18.6	74°06.8
Zuben'ubi	$137^{\circ}07.6$	-16°05.3
Alphecca	126°12.5 112°28.6	26°40.7 -26°27.4
Antares Atria	112 28.6 107°31.9	-20 27.4 -69°02.8
Sabik	102°14.7	-15°44.3
Shaula	96°24.5	-37°06.7
Rasalhague Eltanin	96°08.2 90°46.7	12°33.1 51°29.1
Kaus Aust.	83°46.4	-34°22.7
Vega	80°40.1	38°47.5
Nunki Altair	76°00.7 62°10.2	-26°16.9 8°53.7
Peacock	53°22.3	-56°41.8
Deneb	49°32.8	45°18.9
Enif	33°49.2	9°55.3
Al Na'ir Fomalhaut	27°46.4 15°26.4	-46°54.3 -29°33.8
Scheat	13°55.6	28°08.3
Markab	13°40.6	15°15.6
May 29 Sat	SHA	Mer.pass
Venus	258°13.0 211°56.5	14:22 17:25
Mars Jupiter	0°38.8	07:31
Saturn	181°01.0	19:27
May 30 Sun	SHA	Mer.pass
Venus Mars	256°54.7 211°27.7	14:24 17:23
Jupiter	0°30.3	07:27
Saturn	181°01.2	19:23
May 31 Mon	SHA	Mer.pass
Venus	255°36.6	14:25
Mars Jupiter	210°58.9 0°22.0	17:21 07:24

h	Su	n		Moon				
Sat	GHA	Dec	GHA	ν	Dec	d	HP	
0	180°40.3	<b>N</b> 21°34.0	347°24.6	7.9'	<b>S</b> 25°01.4	0.3'	56.4'	
1	195°40.2	34.4	1°51.5	7.9'	$25^{\circ}01.1$	0.5'	56.3'	
2	210°40.1	34.8	16°18.4	7.9'	25°00.7	0.6'	56.3'	
3	225°40.0	• • 35.2	30°45.3	8.0'	25°00.0	0.7'	56.3'	
4	240°39.9	35.6	45°12.3	8.0'	24°59.3	0.9'	56.3'	
5	255°39.9	36.0	59°39.4	8.1'	24°58.4	1.0'	56.2'	
6	270°39.8	<b>N</b> 21°36.4	74°06.4	8.1'	<b>S</b> 24°57.4	1.2'	56.2'	
7	285°39.7	36.8	88°33.5	8.2'	24°56.2	1.3'	56.2'	
8	300°39.6	37.2	103°00.7	8.2'	24°54.9	1.4'	56.2'	
9	315°39.5	• • 37.5	117°27.9	8.2'	24°53.5	1.6'	56.1'	
10	330°39.5	37.9	131°55.1	8.3'	24°51.9	1.7'	56.1'	
11	345°39.4	38.3	146°22.4	8.3'	24°50.2	1.8'	56.1'	
12	0°39.3	<b>N</b> 21°38.7	160°49.8	8.4'	<b>S</b> 24°48.3	2.0'	56.1'	
13	15°39.2	39.1	175°17.2	8.4'	24°46.4	2.1'	56.0'	
14	30°39.1	39.5	189°44.6	8.5'	24°44.2	2.3'	56.0'	
15	45°39.0	• • 39.8	204°12.1	8.5'	24°42.0	2.4'	56.0'	
16	60°39.0	40.2	218°39.7	8.6'	24°39.6	2.5'	56.0'	
17	75°38.9	40.6	233°07.3	8.7'	24°37.1	2.6'	56.0'	
18	90°38.8	<b>N</b> 21°41.0	247°34.9	8.7'	<b>S</b> 24°34.4	2.8'	55.9'	
19	105°38.7	41.4	262°02.6	8.8'	24°31.7	2.9'	55.9'	
20	120°38.6	41.7	276°30.4	8.8'	24°28.7	3.0'	55.9'	
21	135°38.5	• • 42.1	290°58.2	8.9'	24°25.7	3.2'	55.9'	
22	150°38.5	42.5	305°26.1	9.0'	24°22.5	3.3'	55.8'	
23	165°38.4	42.9	319°54.1	9.0'	24°19.2	3.4'	55.8'	
	SD = 15.8'	d = 0.4'		SI	D = 15.4'			
Sun	GHA	Dec	GHA	ν	Dec	d	HP	
0	180°38.3	N21°43.3	334°22.1	9.1'	<b>S</b> 24°15.8	3.5'	55.8'	
1	195°38.2	43.6	348°50.2	9.1'	24°12.3	3.7'	55.8'	
2	210°38.1	44.0	3°18.3	9.2'	24°08.6	3.8'	55.7'	
3	225°38.0	• • 44.4	17°46.5	9.3'	24°04.8	3.9'	55.7'	
4	240°38.0	44.8	32°14.8	9.3'	24°00.9	4.0'	55.7'	
5	255°37.9	45.1	46°43.1	9.4'	23°56.8	4.2'	55.7'	
6	270°37.8	N21°45.5	61°11.5	9.5'	<b>S</b> 23°52.7	4.3'	55.6'	
7	285°37.7	45.9	75°40.0	9.5'	23°48.4	4.4'	55.6'	
8	300°37.6	46.2	90°08.5	9.6'	23°44.0	4.5'	55.6'	
9	315°37.5	• • 46.6	104°37.1	9.7'	23°39.4	4.6'	55.6'	
10	330°37.4	47.0	119°05.8	9.7'	23°34.8	4.8'	55.6'	
11	345°37.4	47.4	133°34.5	9.8'	23°30.0	4.9'	55.5'	
12	0°37.3	N21°47.7	148°03.3	9.9'	<b>S</b> 23°25.1	5.0'	55.5'	
13	15°37.2	48.1	162°32.2	10.0'	23°20.2	5.1'	55.5'	
14	30°37.1	48.5	177°01.2	10.0'	23°15.0	5.2'	55.5'	
15	45°37.0	• • 48.8	191°30.2	10.1'	23°09.8	5.3'	55.4'	
16	60°36.9	49.2	205°59.3	10.2'	23°04.5	5.5'	55.4'	
17	75°36.8	49.6	220°28.5	10.2'	22°59.0	5.6'	55.4'	
18	90°36.7	N21°49.9	234°57.7	10.3'	<b>S</b> 22°53.5	5.7'	55.4'	
19	105°36.7	50.3	249°27.1	10.4	22°47.8	5.8'	55.4	
20	120°36.6	50.7	263°56.5	10.5'	22°42.0	5.9'	55.3'	
21	135°36.5	51.0	278°25.9	10.5'	22°36.1	6.0'	55.3'	
22	150°36.4	51.4	292°55.5	10.6'	22°30.1	6.1'	55.3'	
23	165°36.3	51.7	307°25.1	10.7'	22°24.0	6.2'	55.3'	
	SD = 15.8'	d = 0.4'			D = 15.2'			
Mon	GHA	Dec	GHA	ν	Dec	d	HP	
0						6.3'	55.3'	
U	180°36.2	<b>N</b> 21°52.1	321°54.8	10.8'	<b>S</b> 22°17.8			
1	195°36.1	52.5	336°24.6	10.8'	22°11.5	6.4'	55.2'	
1 2	195°36.1 210°36.0	52.5 52.8	336°24.6 350°54.4	10.8' 10.9'	22°11.5 22°05.1	6.5'	55.2'	
1 2 3	195°36.1 210°36.0 225°36.0	52.5 52.8 · · · 53.2	336°24.6 350°54.4 5°24.3	10.8' 10.9' 11.0'	22°11.5 22°05.1 21°58.6	6.5' 6.6'	55.2' 55.2'	
1 2 3 4	195°36.1 210°36.0 225°36.0 240°35.9	52.5 52.8 •• 53.2 53.5	336°24.6 350°54.4 5°24.3 19°54.3	10.8' 10.9' 11.0' 11.1'	22°11.5 22°05.1 21°58.6 21°51.9	6.5' 6.6' 6.7'	55.2' 55.2' 55.2'	
1 2 3	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8	52.5 52.8 •• 53.2 53.5 53.9	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4	10.8' 10.9' 11.0' 11.1' 11.2'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2	6.5' 6.6' 6.7' 6.8'	55.2' 55.2' 55.2' 55.2'	
1 2 3 4	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7	52.5 52.8 •• 53.2 53.5	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6	10.8' 10.9' 11.0' 11.1'	22°11.5 22°05.1 21°58.6 21°51.9	6.5' 6.6' 6.7'	55.2' 55.2' 55.2'	
1 2 3 4 5	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6	52.5 52.8 •• 53.2 53.5 53.9	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5	6.5' 6.6' 6.7' 6.8' 6.9' 7.0'	55.2' 55.2' 55.2' 55.2' 55.1' 55.1'	
1 2 3 4 5	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5	52.5 52.8 •• 53.2 53.5 53.9 <b>N</b> 21°54.2	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1	10.8' 10.9' 11.0' 11.1' 11.2' 11.2'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4	6.5' 6.6' 6.7' 6.8' 6.9'	55.2' 55.2' 55.2' 55.2' 55.1'	
1 2 3 4 5 6 7	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4	52.5 52.8 •• 53.2 53.5 53.9 N21° 54.2 54.6 55.0 •• 55.3	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°24.5 21°17.4	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2'	55.2' 55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1'	
1 2 3 4 5 6 7 8	195° 36.1 210° 36.0 225° 36.0 240° 35.9 255° 35.8 270° 35.7 285° 35.6 300° 35.5 315° 35.4	52.5 52.8 • 53.2 53.5 53.9 <b>N</b> 21°54.2 54.6 55.0 • 55.3 55.7	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0	10.8' 10.9' 11.0' 11.1' 11.2' 11.3' 11.4' 11.5' 11.5'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°24.5 21°17.4 21°10.1	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.1'	
1 2 3 4 5 6 7 8 9	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4	52.5 52.8 •• 53.2 53.5 53.9 N21° 54.2 54.6 55.0 •• 55.3	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°24.5 21°17.4	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2'	55.2' 55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1'	
1 2 3 4 5 6 7 8 9	195° 36.1 210° 36.0 225° 36.0 240° 35.9 255° 35.8 270° 35.7 285° 35.6 300° 35.5 315° 35.4	52.5 52.8 • 53.2 53.5 53.9 <b>N</b> 21°54.2 54.6 55.0 • 55.3 55.7	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0	10.8' 10.9' 11.0' 11.1' 11.2' 11.3' 11.4' 11.5' 11.5'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°24.5 21°17.4 21°10.1	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.1'	
1 2 3 4 5 6 7 8 9 10 11	195° 36.1 210° 36.0 225° 36.0 240° 35.9 255° 35.8 270° 35.7 285° 35.6 300° 35.5 315° 35.4 330° 35.3 345° 35.2	52.5 52.8 • 53.2 53.5 53.9 N21°54.2 54.6 55.0 • 55.3 55.7 56.0	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5' 11.5' 11.6'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S2</b> 1°38.4 21°31.5 21°24.5 21°17.4 21°10.1 21°02.8	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3' 7.4'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.1' 55.0'	
1 2 3 4 5 6 7 8 9 10 11	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4 330°35.3 345°35.2 0°35.1 15°35.1 30°35.0	52.5 52.8 • 53.2 53.5 53.9 N21°54.2 54.6 55.0 • 55.3 55.7 56.0 N21°56.4	336°24.6 350°54.4 5°24.3 119°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5' 11.5' 11.6' 11.7'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S21</b> °38.4 21°31.5 21°24.5 21°17.4 21°02.8 <b>S20</b> °55.4 20°48.0 20°40.4	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7'	55.2' 55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0'	
1 2 3 4 5 6 7 8 9 10 11 12 13	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.3 345°35.2 0°35.1 15°35.1 15°35.1 45°34.9	52.5 52.8 53.2 53.5 53.9 N21° 54.2 54.6 55.0 55.3 55.7 56.0 N21° 56.4 56.7	336° 24.6 350° 54.4 5° 24.3 19° 54.3 34° 24.4 48° 54.6 63° 24.8 77° 55.1 92° 25.5 106° 56.0 121° 26.5 135° 57.1 150° 27.8	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°17.4 21°10.1 21°02.8 <b>S</b> 20°55.4 20°48.0 20°32.7	6.5' 6.6' 6.7' 6.8' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4 330°35.3 345°35.2 0°35.1 15°35.1 30°35.0 45°34.9 60°34.8	52.5 52.8 53.2 53.5 53.9 N21°54.2 54.6 55.0 55.3 55.7 56.0 N21°56.4 56.7 57.1	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.8'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S21</b> °38.4 21°31.5 21°24.5 21°10.1 21°02.8 <b>S20</b> °55.4 20°40.4 20°40.4 20°24.9	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9'	55.2' 55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 55.0'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.3 345°35.2 0°35.1 15°35.1 15°35.1 45°34.9	52.5 52.8 53.2 53.5 53.9 N21° 54.2 54.6 55.0 55.7 56.0 N21° 56.4 56.7 57.1 57.1	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5	10.8' 10.9' 11.0' 11.1' 11.2' 11.3' 11.4' 11.5' 11.6' 11.6' 11.7' 11.8' 11.8' 11.9'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°17.4 21°10.1 21°02.8 <b>S</b> 20°55.4 20°48.0 20°32.7	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8'	55.2' 55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 55.0'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4 330°35.3 345°35.2 0°35.1 15°35.1 30°35.0 45°34.9 60°34.8	52.5 52.8 53.2 53.9 N21°54.2 54.6 55.0 55.3 55.7 56.0 N21°56.4 56.7 57.1 57.4 57.8	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4	10.8' 10.9' 11.0' 11.1' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.8' 11.9' 12.0'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S21</b> °38.4 21°31.5 21°24.5 21°10.1 21°02.8 <b>S20</b> °55.4 20°40.4 20°40.4 20°24.9	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4 330°35.3 345°35.2 0°35.1 15°35.1 30°35.0 45°34.9 60°34.8 75°34.7	52.5 52.8 53.9 53.9 54.6 55.0 55.3 55.7 56.0  N21°56.4 56.7 57.1 57.4 57.8 58.1	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4 208°31.4	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.9' 12.0' 12.1'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°24.5 21°17.4 21°10.1 21°02.8 <b>S</b> 20°55.4 20°48.0 20°40.4 20°32.7 20°24.9 20°17.1	6.5' 6.6' 6.7' 6.8' 6.9' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0' 55.0'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4 330°35.3 345°35.2 0°35.1 15°35.1 30°35.0 45°34.9 60°34.8 75°34.7 90°34.6	52.5 52.8 53.9 53.5 53.9  N21° 54.2 54.6 55.0 55.7 56.0  N21° 56.4 56.7 57.1 57.4 57.8 58.1  N21° 58.5	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4 208°31.4 223°02.5	10.8' 10.9' 11.0' 11.1' 11.2' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.8' 11.9' 12.0' 12.1' 12.2'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°24.5 21°17.4 21°10.1 21°02.8 <b>S</b> 20°55.4 20°48.0 20°40.4 20°32.7 20°24.9 20°17.1 <b>S</b> 20°09.2	6.5' 6.6' 6.7' 6.8' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9' 7.9'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 55.0' 54.9' 54.9'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.3 345°35.2 0°35.1 15°35.1 30°35.0 45°34.9 60°34.8 75°34.7 90°34.6 105°34.5	52.5 52.8 53.9 53.5 53.9  N21° 54.2 54.6 55.0 55.3 56.0 N21° 56.4 56.7 57.1 57.4 57.8 58.1  N21° 58.5 58.8	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4 208°31.4 223°02.5 237°33.6 252°04.9 266°36.2	10.8' 10.9' 11.0' 11.12' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.9' 12.0' 12.1' 12.2' 12.2'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S21</b> °38.4 21°31.5 21°24.5 21°17.4 21°10.1 21°02.8 <b>S2</b> 0°55.4 20°40.4 20°32.7 20°24.9 20°17.1 <b>S2</b> 0°09.2 20°01.1	6.5' 6.6' 6.7' 6.8' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9' 7.9' 8.0' 8.1'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 54.9' 54.9' 54.9'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.5 315°35.4 330°35.3 345°35.2 0°35.1 15°35.1 30°35.0 45°34.9 60°34.8 75°34.7 90°34.6 105°34.5 120°34.4 135°34.3 150°34.2	52.5 52.8 53.2 53.5 53.9 N21° 54.2 54.6 55.0 55.7 56.0 N21° 56.4 56.7 57.1 57.4 57.8 58.1 N21° 58.5 58.8 59.2	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4 208°31.4 223°02.5 237°33.6 252°04.9 266°36.2 281°07.5	10.8' 10.9' 11.0' 11.1' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.9' 12.0' 12.1' 12.2' 12.2' 12.3'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°17.4 21°10.1 21°02.8 <b>S</b> 20°55.4 20°48.0 20°40.4 20°32.7 20°24.9 20°17.1 <b>S</b> 20°09.2 20°01.1 19°53.0	6.5' 6.6' 6.7' 6.8' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9' 8.0' 8.1' 8.2'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 54.9' 54.9' 54.9' 54.9'	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	195°36.1 210°36.0 225°36.0 240°35.9 255°35.8 270°35.7 285°35.6 300°35.3 345°35.2 0°35.1 15°35.1 30°35.3 45°34.9 60°34.8 75°34.7 90°34.6 105°34.5 120°34.4 135°34.3	52.5 52.8 53.9 N21°54.2 54.6 55.0 55.3 55.7 56.0 N21°56.4 56.7 57.1 57.4 57.8 58.1 N21°58.5 58.8 59.2 59.5	336°24.6 350°54.4 5°24.3 19°54.3 34°24.4 48°54.6 63°24.8 77°55.1 92°25.5 106°56.0 121°26.5 135°57.1 150°27.8 164°58.6 179°29.5 194°00.4 208°31.4 223°02.5 237°33.6 252°04.9 266°36.2	10.8' 10.9' 11.0' 11.1' 11.2' 11.3' 11.4' 11.5' 11.6' 11.7' 11.8' 11.9' 12.0' 12.1' 12.2' 12.2' 12.2' 12.3'	22°11.5 22°05.1 21°58.6 21°51.9 21°45.2 <b>S</b> 21°38.4 21°31.5 21°14.5 21°10.1 21°02.8 <b>S</b> 20°55.4 20°40.4 20°32.7 20°24.9 20°17.1 <b>S</b> 20°09.2 20°01.1 19°53.0 19°44.8	6.5' 6.6' 6.7' 6.8' 7.0' 7.1' 7.2' 7.3' 7.4' 7.5' 7.6' 7.7' 7.8' 7.9' 8.0' 8.1' 8.2' 8.3'	55.2' 55.2' 55.2' 55.1' 55.1' 55.1' 55.1' 55.0' 55.0' 55.0' 55.0' 55.0' 54.9' 54.9' 54.9' 54.9' 54.9' 54.9'	

d=0.4'

 $\mathsf{SD} = \mathsf{15.8'}$ 

			2	2010 Ma	ay 29 to	May.	
Lat.	Twi Naut.	<b>light</b> Civil	Sunrise	Sunset	<b>Tw</b> Civil	ilight Naut.	
N 72°							
<b>N</b> 70° 68°							
66°	-:-	-:-	01:22	22:37	-:-	-:-	
64°	-:-	-:-	02:03	21:54	-:-	-:-	
62°	-:-	00:32	02:31	21:25	23:34	-:-	
60°	-:-	01:32	02:53	21:04	22:25	-:-	
<b>N</b> 58°	-:-	02:05	03:10	20:46	21:52	-:-	
56°	00:28	02:28	03:24	20:31	21:29	23:36	
54°	01:24	02:46	03:37	20:19	21:10	22:33	
52°	01:54	03:02	03:48	20:08	20:54	22:03	
50°	02:16	03:15	03:58	19:58	20:41	21:40	
45°	02:55	03:42	04:18	19:38	20:14	21:01	
N 40°	03:22	04:02	04:34	19:21	19:53	20:33	
35°	03:43	04:19	04:48	19:07	19:36	20:12	
30°	04:00	04:33	05:00	18:55	19:22	19:55	
20° N 10°	04:27 04:48	04:56 05:15	05:20 05:38	18:35	18:59	19:28 19:07	
0°	05:06	05:32	05:54	18:17 18:01	18:40 18:23	18:49	
<b>S</b> 10°	05:21	05:47	06:10	17:45	18:08	18:34	
20°	05:21	06:03	06:10	17:45	17:52	18:34	
20°	05:50	06:03	06:27	17:28	17:32	18:04	
35°	05:59	06:30	06:58	16:57	17:25	17:56	
40°	06:07	06:41	07:11	16:44	17:14	17:48	
45°	06:16	06:53	07:26	16:29	17:02	17:38	
<b>S</b> 50°	06:27	07:08	07:45	16:10	16:47	17:28	
52°	06:31	07:14	07:54	16:01	16:41	17:23	
54°	06:36	07:21	08:04	15:51	16:33	17:18	
56°	06:42	07:30	08:15	15:40	16:25	17:13	
58°	06:48	07:39	08:28	15:27	16:16	17:07	
<b>S</b> 60°	06:54	07:49	08:43	15:12	16:06	17:01	
Lat.	Sat	Moonrise Sun	e Mon	Sat	<b>Moonset</b> Sun Mon		
N 72°	Jat	Juli	IVIOII	Jat	Juli	IVIOII	
N 70°							
68°							
66°			01:03			04:22	
64°	· · · · ·	00:16	00:23	01:58	03:22	05:01	
62°	23:36	23:56		02:49	04:02	05:28	
60°	23:08	23:34	23:50	03:21	04:29	05:49	
N 58°	22:47	23:17	23:37	03:44	04:50	06:06	
56°	22:29	23:02	23:25	04:03	05:08	06:20	
54°	22:14	22:49	23:15	04:19	05:22	06:33	
52°	22:01	22:38	23:06	04:33	05:35	06:43	
50°	21.50	22.28	22.58	04.45	05.46	06.53	

Lat.		Moonrise	;	Moonset			
Lat.	Sat	Sun	Mon	Sat	Sun	Mon	
N 72°							
N 70°							
68°							
66°			01:03			04:22	
64°		00:16	00:23	01:58	03:22	05:01	
62°	23:36	23:56		02:49	04:02	05:28	
60°	23:08	23:34	23:50	03:21	04:29	05:49	
N 58°	22:47	23:17	23:37	03:44	04:50	06:06	
56°	22:29	23:02	23:25	04:03	05:08	06:20	
54°	22:14	22:49	23:15	04:19	05:22	06:33	
52°	22:01	22:38	23:06	04:33	05:35	06:43	
50°	21:50	22:28	22:58	04:45	05:46	06:53	
45°	21:26	22:07	22:40	05:10	06:10	07:13	
N 40°	21:07	21:50	22:26	05:30	06:29	07:30	
35°	20:51	21:36	22:14	05:46	06:44	07:43	
30°	20:37	21:23	22:04	06:01	06:58	07:55	
20°	20:13	21:02	21:45	06:25	07:21	08:16	
N 10° 0°	19:53	20:43	21:29	06:46	07:40	08:33	
1	19:34	20:26	21:14	07:05	07:59	08:50	
<b>S</b> 10°	19:14	20:08	20:59	07:25	08:17	09:06	
20° 30°	18:54	19:49	20:43	07:46	08:37	09:23	
35°	18:30 18:16	19:28 19:15	20:25 20:14	08:10 08:24	09:00 09:13	09:43 09:55	
40°	18:00	19:15	20:14	08:24	09:13	10:08	
45°	17:41	18:43	19:47	09:00	09:26	10:03	
1							
<b>S</b> 50° 52°	17:17 17:05	18:21 18:11	19:29 19:20	09:24 09:36	10:08 10:19	10:42 10:51	
54°	16:52	18:11 17:59	19:20	09:36	10:19	11:01	
56°	16:32	17:59	19:11	10:05	10:31	11:01	
58°	16:18	17:30	18:47	10:03	11:01	11:26	
<b>S</b> 60°	15:56	17:11	18:33	10:46	11:20	11:41	

		Sun		Moon			
Day	Eqn.of	f Time	Mer.	Mer.Pass.			
Day	00 <sup>h</sup>	12 <sup>h</sup>	Pass	Upper	Lower	Age	
	mm:ss	mm:ss	hh:mm	hh:mm	hh:mm		
29	02:41	02:37	11:57	00:52	13:20	15(99%)	
30	02:33	02:29	11:58	01:46	14:12	16(96%)	
31	02:25	02:21	11:58	02:38	15:02	17(91%)	

 $\mathsf{SD} = \mathsf{15.1'}$