

Formulae

$$\text{Dip} = 0.971 \times \text{Ht}^{1/2}$$

Ht in feet

or

$$\text{Dip} = 1.758 \times \text{Ht}^{1/2}$$

Ht in meters

$$\text{Refraction} = 0.96 / \tan(\text{Alt})$$

Altitude > 11°

$$\text{Parallax} = \text{HP} \times \cos(\text{Alt})$$

$$\cos(\text{Zenith Distance}) = \sin(\text{Lat}) \times \sin(\text{Dec}) + \cos(\text{Lat}) \times \cos(\text{Dec}) \times \cos(\text{LHA})$$

$$\tan(\text{Azimuth}) = \sin(\text{LHA}) / [\cos(\text{Lat}) \times \tan(\text{Dec}) - \sin(\text{Lat}) \times \cos(\text{LHA})]$$

ABC Tables

$$A = \cos(\text{Lat}) \times \tan(\text{Dec})$$

$$B = \sin(\text{Lat}) \times \cos(\text{LHA})$$

$$C = \sin(\text{LHA}) / \tan(\text{Azimuth})$$

or

$$\text{Azimuth} = \text{Atan}[C / \sin(\text{LHA})]$$

Increments

$$\text{Sun} = 15'' \text{ hour}$$

$$\text{Moon} = 15''.041666' \text{ hour}$$

$$\text{Aries} = 14''.316666' \text{ hour}$$

Sailings

$$d\text{Lat} = \text{Dist} \times \cos(\text{Course})$$

$$d\text{Long} = \tan(\text{Course}) \times \text{DMP}$$

or

$$\text{Departure} = \text{Dist} \times \sin(\text{Course})$$

$$d\text{Long} = \text{Departure} / \cos(\text{Mean Lat})$$

Horizontal Parallaxes and Semi-Diameters for 2009

	Sun SD	Venus		Mars		Jupiter SD	Saturn SD
		HP	SD	HP	SD		
Jan 1	16'.3	0'.19	0'.18	0'.06	0'.03	0'.26	0'.14
Jan	16'.3	0'.22	0'.21	0'.06	0'.03	0'.25	0'.14
Feb	16'.2	0'.32	0'.31	0'.06	0'.03	0'.26	0'.15
Mar	16'.1	0'.49	0'.46	0'.07	0'.03	0'.27	0'.15
Apr	15'.9	0'.44	0'.42	0'.07	0'.04	0'.29	0'.14
May	15'.8	0'.28	0'.26	0'.07	0'.04	0'.31	0'.14
Jun	15'.7	0'.19	0'.18	0'.08	0'.04	0'.34	0'.13
Jul	15'.7	0'.14	0'.14	0'.08	0'.04	0'.37	0'.12
Aug	15'.8	0'.12	0'.11	0'.09	0'.05	0'.38	0'.12
Sep	15'.9	0'.10	0'.10	0'.10	0'.05	0'.37	0'.12
Oct	16'.0	0'.09	0'.09	0'.11	0'.06	0'.34	0'.12
Nov	16'.2	0'.09	0'.09	0'.14	0'.07	0'.31	0'.12
Dec	16'.2	0'.09	0'.08	0'.17	0'.09	0'.29	0'.13
Dec 31	16'.3	0'.09	0'.08	0'.20	0'.11	0'.28	0'.13

15th day of each month unless stated

$$\text{Sun's HP} = 0'.15$$

$$\text{HP for Jupiter and Saturn} < 0'.05$$

GMT		ARIES		VENUS		-3.9		MARS		0.0		JUPITER		-2.3		SATURN		+1.1		STARS			SUN		MOON					Lat		Twilight		Civil		Sunrise		27		Moonrise		28		29										
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name			SHA		Dec		GHA		v		Dec		d		HP		N 72°		07:43		09:37		•		12:24		11:52		10:58					
Fri day	00	66°02'6		194°22'1		17°50:7 S		286°25'2		18°08:4 N		102°58:1		15°37:9 S		242°44:1		0°53:5 N		Acamar			315°19'8		40°15'9 S		183°07'2		21°06'5 S		68°26'4		15:2		3°39:7 N		13:5		55:6		N 70°		07:28		09:01		-		12:33		12:11		11:38	
	01	81°05:1		209°21'4		51:6		301°27:0		08:3		118°00:3		37:8		257°46:4		57°11:3 S		Achernar			335°28:1		57°11'3 S		198°07'0		06:9		84°00:6		15:2		53:2		13:4		55:7		68°		07:15		08:36		10:20		12:40		12:25		12:06	
	02	96°07:5		224°20:7		52:4		316°28:8		08:2		133°02:4		37:7		272°48:7		53:4		Acruv			173°12:9		63°09:0 S		213°06:8		07:4		98°34:8		15:2		4°06:6 N		13:5		66°		07:05		08:16		09:37		12:46		12:38		12:28			
	03	111°10:0		239°20:0		53:3		331°30:6		08:1		148°04:5		37:6		287°50:9		53:3		Adhara			255°14:3		28°59:0 S		228°06:6		07:8		113°09:0		15:1		20:1		13:4		64°		06:56		08:00		09:08		12:51		12:48		12:45			
	04	126°12:5		254°19:2		54:1		346°32:4		08:0		163°06:7		37:5		302°53:2		53:2		Aldebaran			290°52:0		16°31:8 N		243°06:4		08:3		127°43:1		15:1		33:5		13:5		55:8		62°		06:48		07:47		08:46		12:56		12:57		12:59	
	05	141°14:9		269°18:5		55:0		1°34:2		07:9		178°08:8		37:3		317°55:5		53:2					258°06:1		08:7		142°17:2		15:0		47:0		13:4		60°		06:41		07:36		08:29		13:00		13:04		13:11							
	06	156°17:4		284°17:8		55:8		16°36:0		07:8		193°10:9		37:2		332°57:8		53:1		Alioth			166°23:1		55°54:1 N		273°05:9		09:2		156°51:2		15:0		5°00:4 N		13:5		N 58°		06:35		07:26		08:14		13:03		13:11		13:22			
	07	171°19:9		299°17:1		56:7		31°37:7		07:6		208°13:1		37:1		348°00:1		53:0		Alkaid			153°01:2		49°15:6 N		288°05:7		09:7		171°25:2		14:9		13:9		13:4		55:9		56°		06:29		07:17		08:02		13:06		13:17		13:31	
	08	186°22:3		314°16:4		57:5		46°39:5		07:5		223°15:2		37:0		3°02:3		53:0		Alnair			27°46:9		46°54:9 S		303°05:5		10:1		185°59:1		14:8		27:3		13:4		54°		06:24		07:09		07:51		13:09		13:23		13:39			
	09	201°24:8		329°15:7		58:4		61°39:3		07:4		238°17:3		36:9		18°04:6		52:9		Alnilam			275°48:7		1°11:7 S		318°05:3		10:6		200°32:9		14:8		40:7		13:4		52°		06:20		07:02		07:41		13:12		13:27		13:47			
	10	216°27:3		344°14:9		59:2		76°43:1		07:3		253°19:5		36:8		33°06:9		52:8		Alphard			217°58:6		8°42:1 S		333°05:1		11:0		215°06:7		14:8		54:1		13:4		50°		06:15		06:56		07:33		13:14		13:32		13:53			
	11	231°29:7		359°14:2		18°00:1 S		91°44:9		07:2		268°21:6		37:2		48°09:2		52:8					348°04:9		11:5		229°40:5		14:7		6°07:5 N		13:4		56:0		45°		06:05		06:42		07:14		13:19		13:41		14:08					
	12	246°32:2		14°13:5		18°00:9 S		106°46:7		18°07:1 N		283°23:7		15°36:6 S		63°11:5		0°52:7 N		Alphecca			126°13:6		26°40:8 N		3°04:7		21°11:9 S		244°14:2		14:6		6°20:9 N		13:4		56:0		N 40°		05:56		06:30		07:00		13:24		13:50		14:19	
	13	261°34:7		29°12:8		01:8		121°48:5		07:0		298°25:9		36:5		78°13:8		52:6		Alpheratz			357°46:1		29°09:0 N		18°04:5		12:4		258°47:8		14:5		34:3		13:4		35°		05:48		06:19		06:47		13:27		13:56		14:30			
	14	276°37:1		44°12:1		02:6		136°50:3		06:9		313°28:0		36:3		93°16:0		52:6		Altair			62°11:0		8°53:8 N		33°04:3		12:8		273°21:3		14:5		47:7		13:3		56:1		30°		05:41		06:36		13:31		14:03		14:39			
	15	291°39:6		59°11:4		03:4		151°52:1		06:8		328°30:1		36:2		108°18:3		52:5		Ankaa			353°18:0		42°15:2 S		48°04:1		13:3		287°54:8		14:5		7°01:0 N		13:4		20°		05:26		05:53		06:17		13:37		14:13		14:54			
16	306°42:0		74°10:6		04:3		166°53:9		06:7		343°32:9		36:1		123°20:6		52:4		Antares			112°29:9		26°27:2 S		43°04:9		13:7		302°28:3		14:4		14:4		13:3		N 10°		05:12		05:38		06:00		13:42		14:23		15:08				
17	321°44:5		89°09:9		05:1		181°55:7		06:6		358°34:4		36:0		138°22:9		52:4					78°03:7		14:1		317°01:7		14:3		27:7		13:3		56:2		0°		04:56		05:22		05:44		13:47		14:32		15:21						
18	336°47:0		104°09:2		06:0		196°57:5		06:5		13°36:5		35:9		153°25:2		52:3		Arcturus			145°58:4		19°07:7 N		93°03:5		14:6		331°35:0		14:2		41:0		13:3		S 10°		04:39		05:06		05:28		13:52		14:41		15:34				
19	351°49:4		119°08:5		06:8		211°58:6		06:4		28°38:6		35:8		168°27:4		52:2		Atria			107°34:7		69°02:8 S		108°03:3		15:0		346°08:2		14:2		54:3		13:3		20°		04:19		04:47		05:11		13:57		14:50		15:48				
20	6°51:9		134°07:8		07:6		227°01:1		06:3		43°40:8		35:7		183°29:7		52:1		Avior			234°18:9		59°32:2 S		123°03:0		15:5		0°41:4		14:1		8°07:6 N		13:3		56:3		30°		03:52		04:25		04:52		14:03		15:02		16:04		
21	21°54:4		149°07:0		08:5		242°02:9		06:2		58°42:9		35:5		198°32:0		52:1		Bellatrix			278°34:5		6°21:6 N		138°02:8		15:9		15°14:5		14:1		20:9		13:2		35°		03:36		04:11		04:40		14:07		15:08		16:13				
22	36°56:8		164°06:3		09:3		257°04:8		06:1		73°45:0		35:4		213°34:3		52:0		Betelgeuse			271°03:8		7°24:6 N		153°02:6		16:4		29°47:6		13:9		34:1		13:3		40°		03:15		03:55		04:26		14:11		15:16		16:24				
23	51°59:3		179°05:6		10:2		272°06:6		05:9		88°47:2		35:3		228°36:6		51:9					168°02:4		16:8		44°20:5		13:9		47:4		13:2		56:4		45°		02:48		03:35		04:10		14:15		15:24		16:37						
Sat day	00	67°01'8		194°04:9		18°11:0 S		287°08:4		18°05:8 N		103°49:3		15°35:2 S		243°38:9		0°51:9 N		Canopus			263°56:8		52°40:1 S		183°02:2		21°17:3 S		58°53:4		13:9		9°00:6 N		13:1		56:4		S 50°		02:11		03:09		03:51		14:21		15:35		16:52	
	01	82°04:2		209°04:1		11:8		302°10:2		05:7		118°51:4		35:1		258°41:1		51:8		Capella			280°37:9		46°00:5 N		198°02:0		17:7		73°26:3		13:7		13:7		13:2		52°		01:50		02:56		03:41		14:24		15:40		16:59			
	02	97°06:7		224°03:4		12:7		317°12:0		05:6		133°53:5		35:0		273°43:4		51:7		Deneb			49°33:6		45°19:2 N		213°01:8		18:1		87°59:0		13:7		26:9		13:1		56:5		54°		01:22		02:41		03:31		14:26		15:45		17:08	
	03	112°09:1		239°02:7		13:5		332°13:8		05:5		148°55:7		34:9		288°45:7		51:7		Denebola			182°36:4		14°30:9 N		102°01:6		18:6		102°31:7		13:6		40:0		13:1		56°		00:37		02:23		03:19		14:30		15:51		17:17			
	04	127°11:6		254°02:0		14:3		347°15:6		05:4		163°57:8		34:8		303°48:0		51:6		Diphda			348°58:3		17°55:9 S		243°01:4		19:0		117°04:3		13:5		53:1		13:1		58°		-		02:01		03:05		14:33		15:58		17:27			
	05	142°14:1		269°01:2		15:2		2°17:4		05:3		178°59:9		34:6		318°50:3		51:5					258°01:2		19:5		131°36:8		13:5		10°06:2 N		13:0		56:6		S 60°		-		01:31		02:48		14:37		16:06		17:39					
	06	157°16:5		284°00:5		16:0		17°19:2		05:2		194°02:0		34:5		333°52:6		51:5		Dubhe			193°54:8		61°41:5 N		273°00:9		19:9		146°09:3		13:3		19:2		13:0		S 62°		-		00:42		02:28		14:42		16:14		17:54			
	07	172°19:0		298°59:8		16:8		32°21:1		05:1		209°04:2		34:4		348°54:8		51:4		Eltanin			278°15:6		28°37:0 N		288°00:7		20:3		160°41:6		13:3		32:2		13:0																	
	08	187°21:5		313°59:0		17:6		47°22:9		05:0		224°06:3		34:3		3°57:1		51:3		Enif			90°47:9		51°29:4 N		303°00:5		20:8		175°13:9		13:2		45:2		13:0		56:7															
	09	202°23:9		328°58:3		18:5		62°24:7		04:9		239°08:4		34:2		18°59:4		51:3		Enif			33°49:8		9°55:4 N		318°00:3		21:2		189°46:1		13:1		58:2		12:9																	
	10	217°26:4		343°57:6		19:3		77°26:5		04:8		254°10:5		34:1		34°01:7		51:2		Fomalhaut			15°																															

GMT		ARIES		VENUS		-3.9		MARS		-0.1		JUPITER		-2.3		SATURN		+1.1		STARS			SUN		MOON					Lat		Twilight		Civil		Sunrise		30		Moonrise		1		2												
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name			SHA		Dec		GHA		v		Dec		d		HP		N 72°		07:51		09:51		•		•		•		•							
30	S u n d a y	69°00'0		193°29'5		18°50'1 S		288°36'3		18°01'2 N		105°31'1		15°29'7 S		245°28'6		0°48'7 N		Acamar			315°19'8		40°15'9 S		182°51'8		21°37'6 S		35°27'2		9'1		18°43'9 N		10'5		58'1		N 70°		07:35		09:11		•		•		•		•			
		84°02'5		208°28'7		50'9		303°38'2		01'1		120°33'2		29'6		260°30'9		48'6		Achernar			335°28'1		57°11'3 S		197°51'6		38'0		49°55'3		9'0		54'4		10'5		68°		07:22		08:44		10:37		11:32		•		•		•			
		99°05'0		223°28'0		51'7		318°40'0		01'0		135°35'4		29'4		275°33'2		48'6		Acnux			173°12'8		63°09'0 S		212°51'3		38'4		64°23'3		8'9		19°04'9 N		10'3		66°		07:11		08:23		09:47		12:14		11:38		•		•		•	
		114°07'4		238°27'2		52'4		333°41'9		00'9		150°37'5		29'3		290°35'5		48'5		Adhara			255°14'3		28°59'0 S		227°51'1		38'8		78°51'2		8'8		15'2		10'3		58'2		64°		07:01		08:07		09:16		12:43		12:42		12:52			
		129°09'9		253°26'5		53'2		348°43'7		00'9		165°39'6		29'2		305°37'8		48'4		Aldebaran			290°52'0		16°31'8 N		242°50'9		39'3		93°19'0		8'7		25'5		10'1		62°		06:53		07:53		08:53		13:05		13:18		13:49					
		144°12'4		268°25'7		54'0		3°45'6		00'8		180°41'7		29'1		320°40'1		48'4								257°50'7		39'7		107°46'7		8'6		35'6		10'1		60°		06:46		07:41		08:35		13:23		13:43		14:22						
		159°14'8		283°25'0		54'8		18°47'4		00'7		195°43'8		29'0		335°42'3		48'3		Alioth			166°23'1		55°54'0 N		272°50'4		40'1		122°14'3		8'4		45'7		9'9		58'3		N 58°		06:39		07:31		08:20		13:38		14:04		14:47			
		174°17'3		298°24'2		55'6		33°49'3		00'6		210°45'9		28'8		350°44'6		48'2		Alkaid			153°01'2		49°15'6 N		287°50'2		40'5		136°41'7		8'3		55'6		9'9		56°		06:34		07:21		08:07		13:51		14:20		15:06					
		189°19'7		313°23'5		56'4		48°51'2		00'5		225°48'0		28'7		5°46'9		48'2		Alnair			27°47'0		46°54'9 S		302°50'0		40'9		151°09'0		8'2		20°05'5 N		9'7		54°		06:28		07:13		07:56		14:02		14:35		15:23					
		204°22'2		328°22'7		57'2		63°53'0		00'4		240°50'2		28'6		20°49'2		48'1		Alnilam			275°48'7		1°11'7 S		317°49'8		41'3		165°36'2		8'1		15'2		9'6		58'4		52°		06:23		07:06		07:46		14:12		14:47		15:37			
		219°24'7		343°22'0		58'0		78°54'9		00'3		255°52'3		28'5		35°51'5		48'1		Alphard			217°58'6		8°42'1 S		332°49'5		41'7		180°03'3		8'0		24'8		9'6		50°		06:19		06:59		07:37		14:21		14:59		15:50					
		234°27'1		358°21'2		58'7		358°21'2		00'3		270°54'4		28'4		50°53'8		48'0								347°49'3		42'1		194°30'3		7'9		34'4		9'4		45°		06:08		06:45		07:18		14:40		15:22		16:15						
		249°29'6		13°20'5		18°59'5 S		108°58'6		18°00'2 N		285°56'5		15°28'3 S		65°56'1		0°47'9 N		Alphecca			126°13'5		26°40'8 N		2°49'1		21°42'5 S		208°57'2		7'7		20°43'8 N		9'3		58'5		N 40°		05:59		06:33		07:03		14:56		15:40		16:36			
		264°32'1		28°19'7		19°00'3 S		124°00'5		00'1		300°58'6		28'1		80°58'4		47'9		Alpheratz			357°46'1		29°09'0 N		17°48'8		42'9		223°23'9		7'7		53'1		9'2		35°		05:51		06:22		06:50		15:09		15:56		16:53					
		279°34'5		43°19'0		01'1		139°02'4		00'0		316°00'7		28'0		96°00'7		47'8		Altair			62°11'0		8°53'8 N		32°48'6		43'3		237°50'6		7'5		21°02'3 N		9'1		30°		05:43		06:12		06:38		15:20		16:10		17:08					
294°37'0		53°18'2		01'9		154°04'2		17°59'9 N		331°02'8		27'9		111°03'0		47'7		Ankaa			353°18'0		42°15'2 S		47°48'4		43'7		252°17'1		7'4		11'4		8'9		58'6		20°		05:28		05:55		06:19		15:40		16:33		17:33					
309°39'5		78°17'4		02'6		169°06'1		59'8		346°04'9		27'8		126°05'3		47'7		Antares			112°29'9		26°27'2 S		62°48'2		44'1		266°43'5		7'2		20'3		8'9		58'8		N 10°		05:13		05:39		06:02		15:58		16:54		17:55					
324°41'9		88°16'7		03'4		184°08'0		59'7		1°07'1		27'7		141°07'5		47'6								77°47'9		44'5		281°09'7		7'2		29'2		8'7		0°		04:57		05:23		05:45		16:14		17:13		18:15								
339°44'4		103°15'9		04'2		199°09'8		59'7		16°09'2		27'5		156°09'8		47'5		Arcturus			145°58'4		19°07'7 N		92°47'7		44'8		295°35'9		7'1		37'9		8'6		58'7		S 10°		04:40		05:06		05:29		16:31		17:32		18:35					
354°46'9		118°15'2		05'0		214°11'7		59'6		31°11'3		27'4		171°12'1		47'5		Atria			107°34'7		69°02'7 S		107°47'5		45'2		310°02'0		6'9		46'5		8'5		20°		04:19		04:47		05:12		16:48		17:52		18:57							
9°49'3		133°14'4		05'7		229°13'6		59'5		46°13'4		27'3		186°14'4		47'4		Avior			234°18'8		59°32'2 S		122°47'2		45'6		324°27'9		6'8		55'0		8'3		30°		03:52		04:24		04:51		17:09		18:16		19:23							
24°51'8		148°13'6		06'5		244°15'5		59'4		61°15'5		27'2		201°16'7		47'3		Bellatrix			278°34'5		6°21'6 N		317°47'0		46'0		303°53'7		6'7		22°03'3 N		8'2		58'8		35°		03:36		04:10		04:39		17:21		18:30		19:38					
22°39'54'2		163°12'9		07'3		259°17'3		59'3		76°17'6		27'1		216°19'0		47'3		Betelgeuse			271°03'8		7°24'6 N		152°46'8		46'4		353°19'4		6'6		11'5		8'1		40°		03:13		03:53		04:25		17:35		18:47		19:55							
54°56'7		178°12'1		08'1		274°19'2		59'2		91°19'7		26'9		231°21'3		47'2								167°46'6		46'8		7°45'0		6'5		19'6		8'0		45°		02:46		03:33		04:09		17:52		19:06		20:16								
1	M o n d a y	69°59'2		193°11'4		19°08'8 S		289°21'1		17°59'2 N		106°21'8		15°26'8 S		246°23'6		0°47'2 N		Canopus			263°56'8		52°41'9 S		182°46'3		21°47'2 S		22°10'5		6'4		22°27'6 N		7'8		58'9		S 50°		02:07		03:06		03:49		18:12		19:31		20:42			
		85°01'6		208°10'6		09'6		304°23'0		59'1		121°23'9		26'7		261°25'9		47'1		Capella			280°37'9		46°00'5 S		197°46'1		47'6		36°35'9		6'2		35'4		7'7		52°		01:44		02:53		03:39		18:22		19:43		20:55					
		100°04'1		223°09'8		10'4		319°24'8		59'0		136°26'1		26'6		276°28'2		47'0		Deneb			49°33'6		45°19'2 N		212°45'9		48'0		51°01'1		6'2		43'1		7'6		54°		01:14		02:37		03:28		18:33		19:56		21:10					
		115°06'6		238°09'1		11'2		334°26'7		58'9		151°28'2		26'5		291°30'5		47'0		Denebola			182°36'4		14°30'9 N		227°45'6		48'4		65°26'3		6'0		50'7		7'4		56°		00:16		02:19		03:15		18:46		20:12		21:27					
		130°09'0		253°08'3		11'9		349°28'6		58'8		166°30'3		26'4		306°32'8		46'9		Diphda			348°58'3		17°55'9 S		242°45'4		48'8		79°51'3		6'0		58'1		7'3		58'0		58°		-		01:55		03:01		19:00		20:31		21:48			
		145°11'5		268°07'5		12'7		4°30'5		58'7		181°32'4		26'2		321°35'1		46'8								257°45'1		49'1		94°16'3		5'8		23°05'4 N		7'1		S 60°		49°		-		01:23		02:43		19:18		20:54		22:14				
		160°14'0		263°06'8		13'5		19°32'4		58'7		196°34'5		26'1		336°37'3		46'8		Dubhe			193°54'7		61°41'5 N		272°44'9		49'5		108°41'1		5'7		12'5		7'0		59'1		S 62°		-		00:19		02:22		19:39		21:25		22:51			
		175°16'4		298°06'0		14'2		34°34'3		58'6		211°36'6		26'0		351°39'6		46'7		Elath			278°15'6		28°37'0 S		287°44'7		49'9		123°05'8		5'6		19'5		6'9		59'2		Lat		Sunset		Twilight		Civil		Moonset		1		2			
		190°18'9		313°05'3		15'0		49°38'7		58'5		226°38'7		25'9		6°41'9		46'7		Elnathan			90°47'9		51°29'3 N		137°30'4		50'3		137°30'4		5'6		28'4		6'7																			
		205°21'4		328°04'5		15'7		64°38'0		58'4		241°40'8		25'8		21°44'2		46'6		Enif			33°49'8		9°55'4 S		317°44'2		50'7		151°55'0		5'4		33'1		6'6																			
		220°23'8		343°03'7		16'5		79°39'9		58'4		256°42'9		25'6		36°46'5		46'5		Fomalhaut			15°26'8		29°34'2 S		332°44'0		51'1		166°19'4		5'3		39'7		6'4		58'2		N 72°		-		13:47		15									

2009 December 3, 4, 5 (Thu, Fri, Sat)

GMT		ARIES		VENUS		-3.9		MARS		-0.1		JUPITER		-2.2		SATURN		+1.1		STARS			SUN		MOON					Lat		Twilight		Sunrise		3		Moonrise		4		5											
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec		GHA		Dec		GHA		v		Dec		d		HP		N 72°		07:59		10:04		•		•		•		•	
3	00	71°57.5		192°34.2		19°44'.8 S		290°52.3		17°55'.6 N		108°02'.9		15°21'.0 S		248°13'.8		0°44'.2 N		Acamar		315°19'.8		40°15'.9 S		182°34'.9		22°05'.1 S		352°47'.9		2.8		25°46'.3 N		0°1		60'.0		N 70°		07:42		09:21		•		•		•		16:04	
		86°59.9		207°33.4		45.5		305°54.3		55.5		123°05.0		20.9		263°16.1		44.1		Achernar		335°28.1		57°11.3 S		17°34.7		05.4		7°09.7		2.9		46.2		0.4		68°		07:28		08:52		10:56		•		•		•		17:11	
		102°02.4		222°32.6		46.2		320°56.2		55.4		138°07.1		20.8		278°18.4		44.1		Acrux		173°12.8		63°09.0 S		212°34.4		05.8		21°31.6		2.8		45.8		0.5		60'.1		66°		07:16		08:30		09:58		-		15:11		17:47	
		117°04.8		237°31.9		47.0		335°58.1		55.4		153°09.2		20.6		293°20.7		44.0		Adhara		255°14.3		28°59.0 S		227°34.2		06.2		35°53.4		2.9		45.3		0.8		64°		07:06		08:13		09:24		14:02		16:07		18:12			
		132°07.3		252°31.1		47.7		351°00'.1		55.3		168°11'.3		20.5		308°23'.0		43.9		Aldebaran		290°52'.0		16°31'.8 N		242°34.0		06.5		50°15'.3		2.8		44.5		0.9		62°		06:58		07:58		09:00		14:57		16:39		18:32			
		147°09.8		267°30.3		48.4		6°02.0		55.2		183°13.4		20.4		323°25.3		43.9								257°33.7		06.9		64°37.1		2.8		43.6		1.1		60°		06:50		07:46		08:41		15:30		17:04		18:48			
		162°12.2		282°29.5		49.1		21°03'.9		55.2		198°15.5		20.3		338°27.6		43.8		Alioth		166°23.1		55°54'.0 N		272°33.5		07.2		78°58.9		2.8		42.5		1.3		N 58°		06:44		07:35		08:25		15:54		17:23		19:01			
		177°14.7		297°28.7		49.8		36°05.8		55.1		213°17.6		20.1		353°29.9		43.8		Alkaid		153°01.2		49°15.6 N		287°33.2		07.6		93°20.7		2.8		41.2		1.5		56°		06:38		07:26		08:12		16:14		17:39		19:13			
		192°17.2		312°27.9		50.6		51°07.8		55.1		228°19.7		20.0		8°32.2		43.7		Alnair		27°47.0		46°54.9 S		302°33.0		07.9		107°42.5		2.8		39.7		1.7		54°		06:32		07:17		08:00		16:30		17:53		19:23			
		207°19.6		327°27.1		51.3		66°09.7		55.0		243°21.8		19.9		23°34.5		43.6		Alnilam		275°48.7		1°11.7 S		317°32.7		08.3		122°04.3		2.8		38.0		1.8		52°		06:27		07:10		07:50		16:44		18:05		19:32			
		222°22.1		342°26.3		52.0		81°11.7		54.9		258°23.9		19.8		38°36.8		43.6		Alphard		217°58.5		8°42.1 S		332°32.5		08.6		136°26.1		2.8		36.2		2.1		60'.2		50°		06:22		07:03		07:41		16:56		18:15		19:40	
		237°24.6		357°25.5		52.7		96°13'.6		54.9		273°26.0		19.6		53°39.1		43.5								347°32.2		09.0		150°47.9		2.9		34.1		2.2		45°		06:11		06:48		07:21		17:21		18:37		19:57			
4	12	252°27.0		12°24.7		19°53.4 S		111°15.5		17°54.8 N		288°28.1		15°19.5 S		68°41.4		0°43.5 N		Alphecca		126°13.5		26°40.8 N		2°32.0		22°09.3 S		165°09.8		2.8		25°31.9 N		2.5		60'.2		N 40°		06:02		06:35		07:06		17:42		18:55		20:11	
		267°29.5		27°24.0		54.1		126°17.5		54.7		303°30.2		19.4		83°43.7		43.4		Alpheratz		357°46.1		29°09.0 N		17°31.7		09.6		179°31.6		2.9		29.4		2.6		35°		05:53		06:24		06:52		17:58		19:10		20:23			
		282°32.0		42°23.2		54.9		141°19.4		54.7		318°32.2		19.3		98°46.0		43.3		Altair		62°11.0		8°53.8 N		32°31.5		10.0		193°53.5		2.9		26.8		2.8		30°		05:45		06:14		06:41		18:13		19:22		20:30			
		297°34.4		57°22.4		55.6		156°21.3		54.6		333°34.3		19.1		113°48.3		43.3		Ankaa		353°18.0		42°15.2 S		47°31.2		10.3		208°15.4		2.9		24.0		3.0		20°		05:29		05:57		06:21		18:38		19:44		20:53			
		312°36.9		72°21.6		56.3		171°23.3		54.5		348°36.4		19.0		128°50.6		43.2		Antares		112°29.9		26°27.2 S		62°31.0		10.7		222°37.3		2.9		21.0		3.1		N 10°		05:14		05:40		06:03		18:59		20:03		21:06			
		327°39.3		87°20.8		57.0		186°25.2		54.5		3°38.5		18.9		143°52.9		43.2								77°30.7		11.0		236°58.2		2.9		17.9		3.4		0°		04:58		05:24		05:47		19:19		20:21		21:20			
		342°41.8		102°20.0		57.7		201°27.2		54.4		18°40.6		18.8		158°55.2		43.1		Arcturus		145°58.3		19°07.7 N		92°30.5		11.4		251°21.1		3.0		14.5		3.6		S 10°		04:40		05:07		05:30		19:38		20:39		21:34			
		357°44.3		117°19.2		58.4		216°29.1		54.4		33°42.7		18.6		173°57.5		43.0		Atria		107°34.7		69°02.7 S		107°30.2		11.7		265°43.1		3.0		10.9		3.7		20°		04:19		04:48		05:12		20:00		20:57		21:49			
		12°46.7		132°18.4		59.1		231°31.1		54.3		48°44.8		18.5		188°59.8		43.0		Avior		234°18.8		59°32.3 S		122°30.0		12.0		280°05.1		3.1		07.2		3.9		30°		03:51		04:24		04:51		20:24		21:19		22:06			
		27°49.2		147°17.6		59.8		246°33.0		54.2		63°46.9		18.4		204°02.1		42.9		Bellatrix		278°34.5		6°21.6 N		137°29.7		12.4		294°27.2		3.1		03.3		4.1		35°		03:34		04:10		04:39		20:39		21:32		22:16			
		42°51.7		162°16.8		20°00.5 S		261°35.0		54.2		78°49.0		18.3		219°04.4		42.9		Betelgeuse		271°03.8		7°24.6 N		152°29.5		12.7		308°49.3		3.1		24°59.2 N		4.3		40°		03:12		03:53		04:25		20:55		21:46		22:28			
		57°54.1		177°16.0		01.2		276°36.9		54.1		93°51.1		18.1		234°06.7		42.8								167°29.2		13.1		323°11.4		3.1		54.9		4.5		45°		02:44		03:31		04:08		21:15		22:03		22:41			
5	00	72°56.6		192°15.2		20°01.9 S		291°38.8		17°54.1 N		108°53.2		15°18.0 S		249°09.0		0°42.8 N		Canopus		263°56.8		52°41'.9 S		182°29.0		22°13.4 S		337°33.5		3.2		24°50.4 N		4.6		60'.3		S 50°		02:03		03:04		03:47		21:40		22:24		22:57	
		87°59.1		207°14.4		02.6		306°40.8		54.0		123°55.3		17.9		264°11.3		42.7		Capella		280°37.8		46°00.1 N		197°28.7		13.7		351°55.7		3.3		45.8		4.8		52°		01:40		02:50		03:37		21:52		22:34		23:04			
		103°01.5		222°13.6		03.3		321°42.7		53.9		138°57.4		17.8		279°13.6		42.6		Deneb		49°33.6		45°19.2 N		212°28.5		14.1		6°18.0		3.3		41.0		5.0		54°		01:07		02:34		03:26		22:06		22:46		23:13			
		118°04.0		237°12.8		04.0		336°44.7		53.9		153°59.5		17.6		294°15.9		42.6		Denebola		182°36.4		14°30.9 N		227°28.2		14.4		20°40.3		3.3		36.0		5.2		56°		-		02:14		03:13		22:22		22:58		23:22			
		133°06.5		252°12.0		04.7		351°46.7		53.8		169°01.6		17.5		309°18.2		42.5		Deneha		348°58.3		17°55.9 S		242°28.0		14.7		35°02.6		3.5		30.8		5.4		58°		-		01:50		02:57		22:41		23:23		23:33			
		148°08.9		267°11.2		05.4		6°48.6		53.8		184°03.7		17.4		324°20.5		42.5								257°27.7		15.1		49°25.1		3.4		25.4		5.5		S 60°		-		01:14		02:39		23:04		23:31		23:45			
		163°11.4		282°10.4		06.1		21°50.6		53.7		199°05.8		17.3		339°22.8		42.4		Dubhe		193°54.7		61°41.5 N		272°27.5		15.4		63°47.5		3.5		19.9		5.7		S 62°		-		-		02:17		23:35		23:52		23:59			
		178°13.8		297°09.6		06.8		36°52.5		53.7		214°07.9		17.1		354°25.1		42.3		Elmath		278°15.5		28°37.0 N		278°27.2		15.7		78°10.0		3.6		14.2		5.9																	
		193°16.3		312°08.8		07.5		51°54.5		53.6		229°09.9		17.0		9°27.4		42.3		Eltanin		90°47.9		51°29.3 N		302°27.0		16.1		92°32.6		3.6		08.3		6.1																	
		208°18.8		327°08.0		08.2		66°56.4		53.5		244°12.0		16.9		24°29.7		42.2		Enif		33°49.8		9°55.4 N		317°26.7		16.4		106°55.2		3.7		02.2		6.2																	
		223°21.2		342°07.2		08.9		81°58.4		53.5		259°14.1		16.8		39°32.0		42.2		Fomalhaut		15°28.8		29°34.2 S		332°26.5		16.7		121°17.9		3.8		23°56.0 N		6.4																	
		238°23.7		357°06.4		09.6		97°00.4		53.4		274°16.2		16.6		54°34.3		42.1								347°26.2		17.1		13																							

GMT		ARIES		VENUS		-3.9		MARS		-0.2		JUPITER		-2.2		SATURN		+1.1		STARS			SUN		MOON					Lat		Twilight		Civil		Sunrise		6		Moonrise		7		8						
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name	SHA	Dec	GHA		v		Dec		d	HP	N 72°		08:06		10:18		•		18:46		21:23		23:39							
Saturday	00	74°54.9		191°36.3		20°34'.5 S		293°13'.6		17°51'.6 N		110°33'.5		15°11'.9 S		250°59'.7		0°40'.0 N		Acamar	315°19'.8	40°15'.9 S	182°16'.7		22°28'.7 S		308°41'.3		7.2		18°06'.4 N		11'.8		60'.1		N 70°		07:48		09:30		•		19:16		21:35		23:41	
	01	89°57.3		206°35'.5		35.2		308°15'.6		51.6		125°35'.6		11'.8		266°02'.0		39.9		Achernar	335°28'.1	57°11'.3 S	197°16'.4		29.0		323°07'.5		7.2		17°54'.6 N		11'.8		68°		07:33		08:59		11:20		19:39		21:45		23:42			
	02	104°58.8		221°34'.7		35.8		323°17'.6		51.6		140°37'.6		11'.6		281°04'.3		39.9		Acrux	173°12'.7	63°09'.0 S	212°16'.2		29.3		337°33'.7		7.3		42.8		12'.0		66°		07:21		08:36		10:07		19:56		21:53		23:43			
	03	120°02.3		236°33'.9		36.8		358°19'.7		51.5		155°39'.7		11'.5		296°06'.6		39.8		Adhara	255°14'.2	28°59'.0 S	227°15'.9		29.6		352°00'.0		7.4		30.8		12'.0		64°		07:11		08:18		09:31		20:10		22:00		23:44			
	04	135°04.7		251°33'.0		37.1		353°21'.7		51.5		170°41'.8		11'.4		311°08'.9		39.8		Aldebaran	290°52'.0	16°31'.8 N	242°15'.7		29.9		6°26'.4		7.6		18.8		12'.2		62°		07:02		08:03		09:06		20:21		22:05		23:45			
	05	150°07.2		266°32'.2		37.8		8°23'.7		51.4		185°43'.9		11'.3		326°11'.2		39.7					257°15'.4		30'.2		20°53'.0		7.6		06.6		12'.2		60'.0		06:54		07:50		08:46		20:31		22:10		23:46			
	06	165°09.7		281°31'.4		38.4		23°25'.7		51.4		200°46'.0		11'.1		341°13'.5		39.7		Alioth	166°23'.0	55°54'.0 N	272°15'.1		30'.5		35°19'.6		7.7		16°54'.4 N		12'.4		58°		06:47		07:39		08:30		20:40		22:15		23:46			
	07	180°12.1		296°30'.6		39.1		38°27'.7		51.3		215°48'.1		11'.0		356°15'.8		39.6		Alkaid	153°01'.1	49°15'.5 N	287°14'.9		30'.8		49°46'.3		7.8		42.0		12'.4		56°		06:41		07:30		08:16		20:47		22:19		23:47			
	08	195°14.6		311°29'.7		39.7		33°29'.7		51.3		230°50'.1		10'.9		11°18'.1		39.6		Alnair	27°47'.0	46°54'.9 S	302°14'.6		31'.1		64°13'.1		7.9		29.6		12'.6		54°		06:35		07:21		08:04		20:54		22:22		23:47			
	09	210°17.1		326°28'.9		40.4		68°31'.7		51.3		245°52'.2		10'.7		26°20'.4		39.5		Alnilam	275°48'.7	1°11'.7 S	317°14'.3		31'.4		78°40'.0		8.0		17.0		12'.6		52°		06:30		07:13		07:54		21:00		22:25		23:48			
	10	225°19'.5		341°28'.1		41.0		83°33'.7		51.2		260°54'.3		10'.6		41°22'.7		39.4		Alphard	217°58'.5	8°42'.1 S	332°14'.1		31'.7		93°07'.0		8.1		04.4		12'.7		50°		06:25		07:06		07:44		21:05		22:28		23:48			
	11	240°22.0		356°27'.2		41.6		88°35'.7		51.2		275°56'.4		10'.5		56°25'.1		39.4					347°13'.8		32'.0		107°34'.1		8.2		15°51'.7 N		12'.8		45°		06:14		06:51		07:24		21:17		22:34		23:49			
	12	255°24.4		11°26'.4		20°42'.3 S		113°37.7		17°51'.2 N		290°58'.5		15°10'.3 S		71°27'.4		0°39'.3 N		Alphecca	126°13'.5	26°40'.8 N	2°13'.5		22°32'.3 S		122°01'.3		8.3		15°38'.9 N		12'.9		59'.9		N 40°		06:04		06:38		07:08		21:26		22:39		23:50	
	13	270°26.9		26°25'.6		42.9		128°39'.7		51.1		306°00'.5		10'.2		86°29'.7		39.3		Alpheratz	357°46'.1	29°09'.0 N	17°13'.3		32'.6		136°28'.6		8.4		26.0		13'.0		35°		05:55		06:27		06:55		21:35		22:44		23:51			
	14	285°29.4		41°24'.8		43.6		143°41'.8		51.1		321°02'.6		10'.1		101°32'.0		39.2		Altair	62°11'.0	8°53'.8 N	32°13'.2		32'.9		150°56'.0		8.4		13.0		13'.1		30°		05:47		06:17		06:43		21:42		22:48		23:51			
	15	300°31.8		56°23'.9		44.2		158°43'.8		51.0		336°04'.7		09.9		116°34'.3		39.2		Ankaa	353°18'.0	42°15'.2 S	47°12'.8		33'.2		165°23'.4		8.6		14°59'.9 N		13'.1		20°		05:31		05:59		06:22		21:54		22:54		23:52			
	16	315°34.3		71°23'.1		44.9		173°45'.8		51.0		351°06'.8		09.8		131°36'.6		39.1		Antares	112°29'.8	26																												

GMT	ARIES	VENUS	-3.9	MARS	-0.3	JUPITER	-2.2	SATURN	+1.1	STARS			SUN		MOON				Lat	Twilight		Sunrise	9	Moonrise		10	11
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	GHA	Dec	GHA	v	Dec	d	HP	N 72°	08:12	10:30	-	-	01:50	04:06	
Wednesday	00	77°52.3	190°35.9	21°18.9 S	295°40'5	17°49.5 N	113°03.0	15°02.4 S	253°46.2	0°36.1 N	Acamar	315°19.9	40°15.9 S	181°57.3	22°48.4 S	271°34.5	12.2	1°12.9 N	15.0	58.7	N 70°	07:53	09:38	-	-	01:42	03:46
	01	92°54.8	205°35.1	19.5	310°42.6	17°49.5 N	128°05.0	02.2	268°48.6	36.1	Achernar	335°28.2	57°11.3 S	196°57.0	50°57.9 N	286°05.7	12.2	0°57.9 N	15.1	68°	07°	07:38	09:05	-	-	01:35	03:30
	02	107°57.2	220°34.2	20.1	325°44.7	49.5	143°07.1	02.1	283°50.9	36.0	Acruis	173°12.7	63°09.0 S	211°56.7	48.9	300°36.9	12.3	42.8	15.1	66°	07:26	08:41	10:16	-	01:30	03:17	
	03	122°59.7	235°33.3	20.7	340°46.8	49.5	158°09.2	02.0	298°53.2	36.0	Adhara	255°14.2	28°59.0 S	226°56.4	49.2	315°08.2	12.3	27.7	15.0	58.6	64°	07:15	08:23	09:38	-	01:25	03:07
	04	138°02.2	250°32.5	21.3	355°48.8	49.5	173°11.2	01.8	313°55.5	35.9	Aldebaran	290°52.0	16°31.8 N	241°56.1	49.4	329°39.5	12.4	12.7	15.1	62°	07:06	08:07	09:11	-	01:22	02:58	
	05	153°04.6	265°31.6	21.8	10°50.9	49.5	188°13.3	01.7	328°57.8	35.9				256°55.9	49.7	344°10.9	12.4	0°02.4 S	15.0	60°	06:58	07:54	08:51	-	01:18	02:50	
	06	168°07.1	280°30.8	22.4	25°53.0	49.5	203°15.4	01.6	344°00.2	35.8	Alioth	166°23.0	55°54.0 N	271°55.6	49.9	358°42.3	12.3	17.4	15.0	N 58°	06:51	07:43	08:34	-	01:15	02:43	
	07	183°09.5	295°29.9	23.0	40°55.1	49.4	218°17.4	01.4	359°02.5	35.8	Alkaid	153°01.1	49°15.5 N	286°55.3	50.1	13°13.6	12.5	32.4	15.0	58.5	56°	06:44	07:33	08:20	-	01:13	02:38
	08	198°12.0	310°29.0	23.5	55°57.2	49.4	233°19.5	01.3	14°04.8	35.7	Alnair	27°47.0	46°54.9 S	301°55.0	50.4	27°45.1	12.4	47.4	15.0	54°	06:38	07:24	08:08	-	01:10	02:32	
	09	213°14.5	325°28.2	24.1	70°59.3	49.4	248°21.6	01.2	29°07.1	35.7	Alnilam	275°48.6	1°11.7 S	316°54.7	50.6	42°16.5	12.4	1°02.4 S	15.0	52°	06:33	07:16	07:57	-	01:08	02:28	
	10	228°16.9	340°27.3	24.7	86°01.4	49.4	263°23.6	01.0	44°09.4	35.6	Alphard	217°58.5	8°42.1 S	331°54.5	50.9	56°47.9	12.5	17.4	14.9	50°	06:28	07:09	07:47	-	01:06	02:23	
	11	243°19.4	355°26.5	25.2	101°03.5	49.4	278°25.7	00.9	59°11.8	35.6				346°54.2	51.1	71°19.4	12.5	32.3	14.9	58.4	45°	06:17	06:54	07:27	-	01:02	02:14
	12	258°21.9	10°25.6	21°25.8 S	116°05.6	17°49.4 N	293°27.8	15°00.8 S	74°14.1	0°35.5 N	Alphecca	126°13.5	26°40.8 N	1°53.9	22°51.3 S	85°50.9	12.5	1°47.2 S	14.9	58.4	N 40°	06:07	06:40	07:11	-	00:59	02:07
	13	273°24.3	25°24.7	26.4	131°07.7	49.4	308°29.8	00.6	89°16.4	35.5	Alpheratz	357°46.2	29°09.0 N	16°53.6	51.6	100°22.4	12.5	2°02.1 S	14.9	35°	05:57	06:29	06:57	-	00:56	02:00	
	14	288°26.8	40°23.9	26.9	146°09.7	49.4	323°31.9	00.5	104°18.7	35.4	Altair	62°11.0	8°53.8 N	31°53.3	51.8	114°53.9	12.6	17.0	14.9	30°	05:49	06:19	06:45	-	00:53	01:54	
	15	303°29.3	55°23.0	27.5	161°11.8	49.4	338°34.0	00.3	119°21.0	35.4	Ankaa	353°18.0	42°15.2 S	46°53.1	52.0	129°25.5	12.5	31.9	14.8	58.3	20°	05:33	06:00	06:24	-	00:49	01:45
16	318°31.7	70°22.2	28.1	176°13.9	49.3	353°36.0	00.2	134°23.4	35.3	Antares	112°29.8	26°27.2 S	61°52.8	52.3	143°57.0	12.6	46.7	14.8	N 10°	05:17	05:43	06:06	-	00:45	01:36		
17	333°34.2	85°21.3	28.6	191°16.0	49.3	8°38.1	00.1	149°25.7	35.3				76°52.5	52.5	158°28.6	12.6	3°01.5 S	14.8	0°	05:01	05:27	05:49	-	00:41	01:28		
18	348°36.6	100°20.4	29.2	206°18.1	49.3	23°40.2	14°59.9 S	164°28.0	35.2	Arcturus	145°58.3	19°07.7 N	91°52.2	52.7	173°00.2	12.6	16.3	14.8	S 10°	04:42	05:09	05:32	-	00:38	01:20		
19	3°39.1	115°19.6	29.8	221°20.2	49.8	38°42.2	59.8	179°30.3	35.2	Atria	107°34.6	69°02.7 S	106°51.9	53.0	187°31.8	12.5	31.1	14.7	58.2	20°	04:20	04:49	05:13	-	00:34	01:02	
20	18°41.6	130°18.7	30.3	236°22.3	49.3	53°44.3	59.7	194°32.7	35.1	Avior	234°18.7	59°32.3 S	121°51.7	53.2	202°03.3	12.6	49.8	14.7	30°	03:51	04:25	04:52	-	00:30	01:03		
21	33°44.0	145°17.8	30.9	251°24.4	49.3	68°46.3	59.5	209°35.0	35.1	Bellatrix	278°34.4	6°21.6 N	136°51.4	53.4	216°34.9	12.7	4°00.5 S	14.7	35°	03:33	04:10	04:39	-	00:27	00:57		
22	48°46.5	160°17.0	31.4	266°26.6	49.3	83°48.4	59.4	224°37.3	35.0	Betelgeuse	271°03.8	7°24.6 N	151°51.1	53.7	231°06.6	12.6	15.2	14.6	40°	03:11	03:52	04:25	-	00:25	00:51		
23	63°49.0	175°16.1	32.0	281°28.7	49.3	98°50.5	59.3	239°39.6	35.0				166°50.8	53.9	245°38.2	12.6	29.8	14.6	58.1	45°	02:41	03:30	04:07	-	00:21	00:44	
Thursday	00	78°51.4	190°15.2	21°32.5 S	296°30.8	17°49.3 N	113°52.5	14°59.1 S	254°41.9	0°34.9 N	Canopus	263°56.8	52°40.1 S	181°50.5	22°54.1 S	260°09.8	12.6	4°44.4 S	14.6	58.1	S 50°	01:58	03:01	03:45	00:00	00:18	00:36
	01	93°53.9	205°14.4	33.1	311°32.9	49.3	128°54.6	59.0	269°44.3	34.9	Capella	280°37.8	46°00.5 N	196°50.2	54.3	274°41.4	12.6	59.0	14.5	52°	01:32	02:47	03:35	00:01	00:16	00:32	
	02	108°56.4	220°13.5	33.6	326°35.0	49.3	143°56.7	58.8	284°46.6	34.8	Deneb	49°33.6	45°19.2 N	211°50.0	54.6	289°13.0	12.6	5°13.5 S	14.5	54°	00:53	02:30	03:23	00:01	00:14	00:28	
	03	123°58.8	235°12.6	34.2	341°37.1	49.3	158°58.7	58.7	299°48.9	34.8	Denebola	182°36.3	14°30.8 N	229°48.9	54.8	303°44.6	12.7	28.8	14.5	58.0	56°	-	02:08	03:09	00:02	00:12	00:23
	04	139°01.3	250°11.8	34.7	356°39.2	49.3	174°00.8	58.6	314°51.2	34.7	Diphda	348°58.3	17°55.9 S	241°49.4	55.0	318°16.3	12.6	42.5	14.4	58°	-	01:41	02:53	00:03	00:10	00:18	
	05	154°03.8	265°10.9	35.3	11°41.3	49.3	189°02.9	59.4	329°53.6	34.7				256°49.1	55.2	332°47.9	12.6	56.9	14.4	S 60°	-	-	00:59	02:34	00:03	00:07	00:12
	06	169°06.2	280°10.0	35.8	26°43.4	49.2	204°04.9	58.3	344°55.9	34.6	Dubhe	193°54.6	61°41.5 N	271°48.8	55.5	347°19.5	12.6	6°11.3 S	14.3	57.9	S 62°	-	-	02:09	00:04	00:05	00:06
	07	184°08.7	295°09.2	36.4	41°45.5	49.2	219°07.0	58.2	359°58.2	34.6	Elnath	278°15.5	28°37.0 N	286°48.5	55.7	1°51.1	12.6	25.6	14.3								
	08	199°11.1	310°08.3	36.9	56°47.7	49.2	234°09.0	58.0	15°00.5	34.5	Eltanin	90°47.9	51°29.3 S	301°48.3	55.9	16°22.7	12.6	39.9	14.2								
	09	214°13.6	325°07.4	37.5	71°49.8	49.2	249°11.1	57.9	30°02.8	34.5	Enif	33°49.8	9°55.4 N	316°48.0	56.1	30°54.3	12.6	54.1	14.3								
	10	229°16.1	340°06.6	38.0	86°51.9	49.2	264°13.2	57.7	45°05.2	34.4	Fomalhaut	15°26.8	29°34.2 S	331°47.7	56.4	45°25.9	12.6	7°08.4 S	14.1								
	11	244°18.5	355°05.7	38.5	101°54.0	49.2	279°15.2	57.6	60°07.5	34.4				346°47.4	56.6	59°57.5	12.6	22.5	14.1								
	12	259°21.0	10°04.8	21°39.1 S	116°56.1	17°49.2 N	294°17.3	14°57.5 S	75°09.8	0°34.3 N	Gacrux	172°04.2	57°09.9 S	1°47.1	22°56.8 S	74°29.1	12.5	7°36.6 S	14.1	57.8	N 72°	-	13:15	15:33	11:53	11:24	10:47
	13	274°23.5	25°03.9	39.6	131°58.3	49.2	309°19.3	57.3	90°12.1	34.3	Gienah	175°55.1	17°35.8 S	16°46.8	57.0	89°00.6	12.6	50.7	14.0		N 70°	-	14:08	15:52	11:55	11:35	11:10
	14	289°25.9	40°03.1	40.2	147°00.4	49.2	324°21.4	57.2	105°14.5	34.2	Hadar	148°52.2	60°25.1 S	31°46.6	57.2	103°32.2	12.6	8°04.7 S	14.0	66°	13:30	15:04	16:20	11:59	11:51	11:42	
	15	304°28.4	55°02.2	40.7	162°02.5	49.2	339°23.5	57.1	120°16.8	34.2	Hamal	328°03.5	23°30.8 N	46°46.3	57.4	118°03.8	12.5	18.7	13.9	64°	14:08	15:23	16:30	12:01	11:57	11:54	
16	319°30.6	70°01.3	41.2	177°04.6	49.2	354°25.5	56.9	135°19.1	34.1	Kaus Aust.	83°47.6	34°22.8 S	61°46.0	57.4	132°35.3	12.5	32.6	13.9	57.7	62°	14:34	15:38	16:39	12:02	12:03	12:04	
17	334°33.3	85°00.5	41.8	192°06.8	49.2	9°27.6	56.8	150°21.4	34.1				76°45.7	57.9	147°06.8	12.5	46.5	13.8	60°	14:55	15:51	16:47	12:03	12:07	12:13		
18	349°35.8	99°59.6	42.3	207°08.9	49.2	24°29.6	56.6	165°23.8	34.1	Kochab	137°20.6	74°06.6 N	91°45.4	58.1	161°38.3	12.5	9°00.3 S	13.8	N 58°	15:11	16:02	16:55	12:04	12:12	12:20		
19	4°38.3	114°58.7	42.8	222°11.0	49.2	39°31.7	56.5	180°26.1	34.0	Makrab	13°41.0	15°15.7 N	106°45.1	58.3	176°09.8	12.5	14.1	13.7	56°	15:25	16:12	17:01	12:05	12:15	12:27		
20	19°40.7	129°57.8	43.4	237°13.2	49.2	54°33.8	56.4	195°28.4	34.0	Menkar	314°17.5	4°07.8 N	121°44.8	58.5	190°41.3	12.4	27.8	13.6	57.6	54°	15:38	16:21	17:07	12:0			

GMT		ARIES		VENUS		-3.9		MARS		-0.3		JUPITER		-2.2		SATURN		+1.1		STARS			SUN		MOON					Lat		Twilight		Civil		Sunrise		12		Moonrise		13		14																																																							
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec		GHA		Dec		GHA		v		Dec		d		HP		N 72°		08:17		10:41		•		07:01		•		•																																															
F r i d a y	00	80°49'7		189°33'2		21°57'.8 S		298°13'3		17°49'.4 N		115°31'4		14°52'.5 S		256°33'6		0°32'.6 N		Acamar		315°19'9		40°15'9 S		181°36'8		23°04'.1 S		237°12'4		11'6		15°25'.2 S		11'6		57'.0		N 70°		07:58		09:44		•		06:05		•		•																																															
	01	95°52.2		204°32'3		58'3		313°15'5		49'4		130°33'4		52'3		271°35'9		32.6		Achernar		335°28'2		50°11'3 S		196°36'5		04'3		251°43'0		11'6		36.8		11'6		68°		07:42		09:10		•		05:32		08:02		•		•																																															
	02	110°54.6		219°31'4		58.8		328°17'6		49'5		145°35'5		52'2		286°38'2		32.5		Acruux		173°12'7		63°09'0 S		211°36'2		04'5		266°13'6		11'6		48.4		11'5		56'.9		66°		07:30		08:46		10:23		05:09		07:09		•		•																																													
	03	125°57.1		234°30'5		59.3		343°19'8		49'5		160°37'5		52'0		301°40'6		32.5		Adhara		255°14'2		28°59'.1 S		226°35'9		04'7		280°44'.2		11'5		59.9		11'5		64°		07:19		08:27		09:43		04:50		06:37		08:27		•		•																																													
	04	140°59'6		249°29'6		59.8		358°22'0		49'5		175°39'6		51'9		316°42'9		32.4		Aldebaran		290°52'0		16°31'.8 N		241°35'6		04'9		295°14'7		11'5		16°11'.4 S		11'3		62°		07:09		08:11		09:16		04:35		06:13		07:49		•		•																																													
	05	156°02'0		264°28'7		22°00'.3 S		13°24'.1		49'5		190°41'6		51'7		331°45'.2		32.4								256°35'3		05'0		309°45'.2		11'5		22.7		11'2		60°		07:01		07:58		08:55		04:22		05:54		07:23		•		•																																													
	06	171°04'5		279°27'8		00.8		28°26'3		49'5		205°43'7		51'6		346°47'6		32.4		Alioth		166°23'0		55°54'.0 N		321°35'0		05'2		374°15'7		11'4		33.9		11'2		N 58°		06:54		07:46		08:38		04:12		05:39		07:02		•		•																																													
	07	186°07'0		294°27'0		01.3		43°28'5		49'5		220°45'7		51'5		1°49'9		32.3		Alkaid		153°01'.1		49°15'.5 N		286°34'7		05'4		338°46'.1		11'4		45.1		11'1		56'.8		56°		06:47		07:36		08:23		04:02		05:26		06:45		•		•																																											
	08	201°09'4		309°26'.1		01.8		58°30'.7		49'5		235°47'8		51'3		16°52'.2		32.3		Alnair		27°47'0		46°54'.9 S		301°34'4		05'6		353°16'.5		11'3		56.2		10'9		54°		06:41		07:27		08:11		03:54		05:14		06:31		•		•																																													
	09	216°11'9		324°25'.2		02.2		73°32'.8		49'6		250°49'8		51'2		31°54'.6		32.2		Alnilam		275°48'6		1°11'.7 S		316°34'.1		05'8		7°46'.8		11'3		17°07'.1 S		10'9		52°		06:36		07:19		08:00		03:46		05:04		06:18		•		•																																													
	10	231°14'4		339°24'.3		02.7		88°35'0		49'6		265°51'9		51'0		46°56'9		32.2		Alphard		217°58'5		8°42'.1 S		331°33'8		06'0		22°17'.1		11'2		18.0		10'8		50°		06:30		07:12		07:50		03:40		04:55		06:07		•		•																																													
	11	246°16'8		354°23'4		03.2		103°37'.2		49'6		280°53'9		50'9		61°59'.2		32.1								346°33'5		06'1		36°47'.3		11'2		28.8		10'7		45°		06:19		06:56		07:30		03:26		04:36		05:44		•		•																																													
	12	261°19'3		9°22'.5		22°03'.7 S		118°39'4		17°49'.6 N		295°56'0		14°50'.8 S		77°01'.5		0°32'.1 N		Alphecca		126°13'.5		26°40'.7 N		1°33'.2		23°06'.3 S		51°17'.5		11'2		17°39'.5 S		10'6		56'.7		N 40°		06:09		06:43		07:13		03:14		04:21		05:26		•		•																																											
	13	276°21'7		24°21'6		04.2		133°41'.5		49'6		130°58'0		50'6		92°03'9		32.0		Alpheratz		357°46'.2		29°09'.0 N		16°33'.0		06'5		65°47'.7		11'1		50.1		10'5		35°		05:59		06:31		06:59		03:04		04:08		05:10		•		•																																													
	14	291°24'2		39°20'.7		04.7		148°43'7		49'7		326°00'1		50'5		107°06'.2		32.0		Altair		31°32'.7		8°53'.8 N		30°		06'51		80°17'.8		11'1		18°00'.6 S		10'4		30°		05:51		06:21		06:47		02:56		03:57		04:57		•		•																																													
15	306°26'7		54°19'8		05.2		163°45'9		49'7		341°02'.2		50'3		122°08'.5		31.9		Ankaa		353°18'0		42°15'.2 S		46°32'.4		06'9		94°47'9		11'0		11'0		10'3		20°		05:35		06:02		06:26		02:41		03:38		04:35		•		•																																														
16	321°29'1		69°18'9		05.6		178°48'.1		49'7		356°04'.2		50'2		137°10'9		31.9		Antares		112°29'8		26°27'.2 S		61°32'.1		07'0		108°17'9		11'0		21'3		10'2		56'.6		N 10°		05:19		05:45		06:08		02:28		03:21		04:15		•		•																																												
17	336°31'6		84°18'0		06.1		193°50'.3		49'7		11°06'.3		50'0		152°13'.2		31'9								76°31'8		07'2		123°47'9		11'0		31'5		10'1		S 10°		04:43		05:10		05:33		02:04		02:50		03:39		•		•																																														
18	351°34'.1		99°17'.1		06.6		208°52'.5		49'7		26°08'.3		49'9		167°15'.5		31'8		Arcturus		145°58'.3		19°07'.7 N		91°31'.5		07'4		138°17'9		10'9		41'6		10'0		S 10°		04:21		04:50		05:14		01:52		02:34		03:20		•		•																																														
19	6°36'.5		114°16'.3		07.1		223°54'.6		49'8		41°10'.4		49'8		182°17'9		31'8		Atria		107°34'.6		69°02'.7 S		106°31'.2		07'6		152°47'.8		10'9		51'6		9'9		30°		03:52		04:25		04:53		01:38		02:15		02:58		•		•																																														
20	21°39'0		129°15'.4		07.6		238°56'.8		49'8		56°12'.4		49'6		197°20'.2		31'7		Avior		234°18'7		59°32'.3 S		121°30'9		07'7		167°17'.7		10'8		19°01'.5 S		9'9		30°		03:52		04:25		04:53		01:38		02:15		02:45		•		•																																														
21	36°41'.5		144°14'.5		08.0		253°59'0		49'8		71°14'.5		49'5		212°22'.5		31'7		Bellatrix		278°34'.4		6°21'.6 N		136°30'6		07'9		181°47'.5		10'8		11'4		9'7		35°		03:34		04:10		04:40		01:29		02:05		02:45		•		•																																														
22	51°43'9		159°13'.6		08.5		269°01'.2		49'8		86°16'.5		49'8		227°24'.9		31'6		Betelgeuse		271°03'.7		7°24'.6 N		151°30'3		08'1		196°17'.3		10'7		21'1		9'6		40°		03:11		03:52		04:25		01:20		01:52		02:30		•		•																																														
23	66°46'.4		174°12'.7		09.0		284°03'.4		49'8		101°18'.6		49'2		242°27'.2		31'6								166°30'0		08'3		210°47'.0		10'7		30'7		9'5		45°		02:41		03:30		04:07		01:09		01:38		02:12		•		•																																														
S a t u r d a y	00	81°48'9		189°11'.8		22°09'.5 S		299°05'.6		17°49'.9 N		116°20'.6		14°49'.1 S		257°29'.5		0°31'.5 N		Canopus		263°56'.8		52°42'.0 S		181°29'7		23°08'.4 S		225°16'.7		10'7		19°40'.2 S		9'3		56'.5		S 50°		01:56		03:01		03:45		00:56		01:20		01:51		•		•																																											
	01	96°51'.3		204°10'9		09.9		314°07'8		49'9		131°22'.7		48'9		272°31'9		31'5		Capella		280°37'.8		46°00'.5 S		190°29'4		08'6		239°46'.4		10'6		49'.5		9'3		52°		01:30		02:46		03:34		00:50		01:12		01:40		•		•																																													
	02	111°53'.8		219°10'0		10.4		329°10'.0		49'9		146°24'.7		48'8		287°34'.2		31'4		Deneb		49°33'6		45°19'.2 N		211°29'.1		08'8		254°16'.0		10'5		58.8		9'2		56'.4		54°		00:47		02:28		03:22		00:43		01:03		01:29		•		•																																											
	03	126°56.2		234°09'1		10.9		344°12'.2		49'9		161°26'.8		48'6		302°36'.5		31'4		Denebola		182°36'.3		14°30'.8 N		226°28'8		08'9		260°45'.5		10'6		20°08'.0 S		9'1		56°		-		02:07		03:08		00:36		00:53		01:16		•		•																																													
	04	141°58'7		249°08'.2		11.3		359°14'.4		50'0		176°28'.8		48'5		317°38'9		31'4		Diphda		348°58'.3		17°55'.9 S		241°28'.5		09'1		283°15'.1		10'4		17'.1		8'9		58°		-		01:38		02:52		00:28		00:41		01:00		•		•																																													
	05	157°01'.2		264°07'.3		11.8		14°16'.6		50'0		191°30'.8		48'3		332°41'.2		31'3								256°28'.2		09'3		297°44'.5		10'5		26'.0		8'9		S 60°		-		00:52		02:32		00:18		00:27		00:42		•		•																																													
	06	172°03'.6		279°06'.4		12.3		29°18'.8		50'0		206°32'.9		48'2		347°43'.5		31'3		Dubhe		193°54'.5		61°41'.5 N		271°27'9		09'4		312°14'.0		10'4		34.9		8'7		56'.3		S 62°		-		-		02:06		00:07		00:11		00:20		•		•																																											
	07	187°06'.1		294°05'.5		12.7		44°21'.0		50'0		221°34'.9		48'0		2°45'.9		31'2		Eltanin		278°15'.5		28°37'.0 N		286°27'7		09'6		326°43'.4		10'3		43'.6		8'6																																																															

GMT		ARIES		VENUS		-3.9		MARS		-0.4		JUPITER		-2.2		SATURN		+1.1		STARS			SUN			MOON				Lat		Twilight		Civil		Sunrise		15		Moonrise		16		17									
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec		GHA		Dec		GHA		v		Dec		d		HP		N 72°		08:21		10:50		•		•		•			
Tuesday	00	83°47'1		188°28'3		22°30'.8 S		300°52'3		17°51'.4 N		117°58'8		14°42'.1 S		259°21'7		0°29'5 N		Acamar		315°19'9		40°15'9 S		181°15'4		23°15'7 S		200°18'2		9'1		24°58'3 S		3'6		55'5		N 70°		08:02		09:49		•		•		•			
	01	98°49'6		203°27'4		31'2		315°54'6		51'5		133°00'8		42'0		274°24'0		29'4		Achernar		335°28'2		57°11'3 S		196°15'1		15'8		214°46'3		9'1		25°01'9 S		3'3		68°		07:46		09:15		•		•		•					
	02	113°52'1		218°26'5		31'6		330°56'8		51'5		148°02'8		41'8		289°26'4		29'4		Acruz		173°12'6		63°09'0 S		211°14'8		15'9		229°14'4		9'1		05'2		3'3		66°		07:33		08:50		10:29		•		•		•			
	03	128°54'5		233°25'6		32'0		345°59'1		51'6		163°04'9		41'7		304°28'7		29'3		Adhara		255°14'2		28°59'1 S		226°14'5		16'1		243°42'5		9'1		08'5		3'1		64°		07:22		08:30		09:48		10:16		11:22		11:26			
	04	143°57'0		248°24'7		32'5		1°01'3		51'6		178°06'9		41'5		319°31'1		29'3		Aldebaran		290°52'0		16°31'8 N		241°14'2		16'2		258°10'6		9'1		11'6		3'0		62°		07:12		08:14		09:20		09:14		10:13		10:43			
	05	158°59'5		263°23'8		32'9		16°03'6		51'6		193°09'0		41'4		334°33'4		29'3								256°13'9		16'3		272°38'7		9'1		14'6		2'8		55'4		60°		07:04		08:01		08:58		08:40		09:38		10:14	
	06	174°01'9		278°22'9		33'3		31°05'9		51'7		208°11'0		41'2		349°35'7		29'2		Alioth		166°23'0		55°54'0 N		271°13'6		16'4		287°06'8		9'1		17'4		2'8		N 58°		06:57		07:49		08:41		08:15		09:12		09:51			
	07	189°04'4		293°21'9		33'7		46°08'1		51'7		223°13'0		41'1		4°38'1		29'2		Alkaid		153°01'1		49°15'5 N		286°13'3		16'6		301°34'9		9'0		20'2		2'5		56°		06:50		07:39		08:26		07:56		08:52		09:33			
	08	204°06'8		308°21'0		34'1		61°10'4		51'8		238°15'1		40'9		19°40'4		29'1		Alnair		27°47'0		46°54'9 S		301°13'0		16'7		316°02'9		9'1		22'7		2'5		54°		06:44		07:30		08:14		07:39		08:35		09:18			
	09	219°03'9		323°20'1		34'5		76°12'7		51'8		253°17'1		40'8		34°42'8		29'1		Alnilam		275°48'6		1°11'7 S		310°12'7		16'8		330°31'0		9'1		25'2		2'3		52°		06:38		07:22		08:03		07:25		08:21		09:05			
	10	234°11'8		338°19'2		34'9		91°14'9		51'9		268°19'1		40'6		49°45'1		29'1		Alphard		217°58'4		8°42'1 S		331°12'4		16'9		344°59'1		9'0		27'5		2'2		50°		06:33		07:14		07:53		07:12		08:08		08:53			
	11	249°14'2		353°18'3		35'3		106°17'2		51'9		283°21'2		40'5		64°47'4		29'0								346°12'1		17'1		359°27'1		9'1		29'7		2'0		55'3		45°		06:21		06:58		07:32		06:47		07:42		08:28	
	12	264°16'7		8°17'4		22°35'7 S		121°19'5		17°52'0 N		298°23'2		14°40'4 S		79°49'8		0°29'0 N		Alphecca		126°13'5		26°40'7 N		1°11'8		23°17'2 S		13°55'2		9'1		25°31'7 S		1'9		55'3		N 40°		06:11		06:45		07:15		06:27		07:22		08:09	
	13	279°19'2		23°16'4		36'1		136°21'7		52'0		313°25'3		40'2		94°52'1		28'9		Alpheratz		357°46'2		29°09'0 N		16°11'5		17'3		28°23'3		9'0		33'6		1'8		35°		06:01		06:33		07:01		06:10		07:04		07:53			
	14	294°21'6		38°15'5		36'5		151°24'0		52'1		328°27'3		40'1		109°54'5		28'9		Altair		62°11'0		8°53'8 N		31°11'2		17'4		42°51'3		9'1		36'3		1'6		30°		05:53		06:23		06:49		05:55		06:49		07:39			
	15	309°24'1		53°14'6		36'9		166°26'3		52'1		343°29'3		39'9		124°56'8		28'9		Ankaa		353°18'0		42°15'2 S		46°10'9		17'5		57°19'4		9'1		37'0		1'5		20°		05:36		06:04		06:28		05:31		06:24		07:15			
	16	324°26'6		68°13'7		37'3		181°28'5		52'2		358°31'4		39'8		139°59'2		28'8		Antares		112°29'8		26°27'2 S		61°10'6		17'7		71°47'5		9'1		38'5		1'4		55'2		N 10°		05:20		05:46		06:09		05:09		06:03		06:54	
	17	339°29'0		83°12'8		37'7		196°30'8		52'2		13°33'4		39'6		155°01'5		28'8								76°10'3		17'8		86°15'6		9'1		39'9		1'2		0°		05:03		05:29		05:52		04:50		05:42		06:34			
	18	354°31'5		98°11'8		38'1		211°33'1		52'3		28°35'4		39'5		170°03'8		28'7		Arcturus		145°58'3		19°07'7 N		91°10'0		17'9		100°43'7		9'1		41'1		1'1		S 10°		04:44		05:11		05:34		04:30		05:22		06:15			
	19	9°34'0		113°10'9		38'5		226°35'4		52'3		43°37'5		39'3		185°06'2		28'7		Atria		107°34'6		69°02'7 S		106°09'7		18'0		115°11'8		9'1		42'2		1'0		20°		04:22		04:51		05:16		04:09		05:00		05:54			
	20	24°36'4		128°10'0		38'9		241°37'6		52'4		58°39'5		39'2		200°08'5		28'7		Avior		234°18'7		59°32'3 S		121°09'4		18'1		129°39'9		9'1		43'2		0'8		30°		03:53		04:26		04:54		03:44		04:35		05:30			
	21	39°38'9		143°09'1		39'3		256°39'9		52'4		73°41'6		39'0		215°10'9		28'6		Bellatrix		278°34'4		6°21'6 N		136°09'1		18'2		144°08'0		9'1		44'0		0'7		35°		03:34		04:11		04:41		03:30		04:21		05:15			
	22	54°41'3		158°08'2		39'7		271°42'2		52'5		88°43'6		38'9		230°13'2		28'6		Betelgeuse		271°03'7		7°24'6 N		151°06'8		18'4		158°36'1		9'2		44'7		0'5		55'1		40°		03:11		03:53		04:26		03:13		04:04		04:59	
23	69°43'8		173°07'2		40'1		266°44'5		52'5		103°45'6		38'7		245°15'6		28'5								166°08'5		18'5		173°04'3		9'1		45'2		0'4		45°		02:41		03:30		04:08		02:54		03:43		04:39				
Wednesday	00	84°46'3		188°06'3		22°40'5 S		301°46'8		17°52'6 N		118°47'7		14°38'6 S		260°17'9		0°28'5 N		Canopus		263°56'7		52°42'0 S		181°08'1		23°18'6 S		187°32'4		9'2		25°45'6 S		0'3		55'1		S 50°		01:56		03:01		03:45		02:29		03:17		04:12	
	01	99°48'7		203°05'4		40'8		316°49'1		52'6		133°49'7		38'4		275°20'2		28'5		Capella		280°37'8		46°00'5 N		186°07'8		18'7		202°00'6		9'2		45'9		0'2		52°		01:28		02:46		03:34		02:17		03:05		04:04			
	02	114°51'2		218°04'5		41'2		331°51'3		52'7		148°51'7		38'3		290°22'6		28'4		Deneb		49°33'6		45°19'2 N		211°07'5		18'8		216°28'8		9'2		46'1		0'0		54°		00:43		02:28		03:22		02:04		02:50		03:49			
	03	129°53'7		233°03'5		41'6		346°53'6		52'7		163°53'8		38'1		305°24'9		28'4		Denebola		182°36'3		14°30'8 N		226°07'2		18'9		230°57'0		9'3		46'1		0'0		56°		-		02:06		03:08		01:48		02:34		03:33			
	04	144°56'1		248°02'6		42'0		1°55'9		52'8		178°55'8		38'0		320°27'3		28'3		Diphda		348°58'3		17°55'9 S		241°06'9		19'0		245°25'3		9'2		46'0		0'3		58°		-		01:36		02:51		01:30		02:14		03:14			
	05	159°58'6		263°01'7		42'4		16°58'2		52'8		193°57'8		37'8		335°29'6		28'3								256°06'6		19'1		259°53'5		9'3		45'7		0'4		55'0		S 60°		-		00:48		02:31		01:07		01:48		02:50	
	06	175°01'1		278°00'8		42'8		32°00'5		52'9		208°59'9		37'7		350°32'0		28'3		Dubhe		193°54'5		61°41'4 N		271°06'3		19'2		274°21'8		9'3		45'3		0'5		S 62°		-		-		02:05		00:37		01:14		02:19			
	07	190°03'5		292°59'9		43'1		47°02'8		53'0		224°01'9		37'5		5°34'3		28'2		Elath		278°15'5		28°37'0 N		286°06'0		19'4		288°50'1		9'3		44'8		0'6																	
	08	205°06'0		307°58'9		43'5		62°05'1		53'0		239°03'9		37'4		20°36'7		28'2		Eltanin		90°47'9		51°29'3 N		301°05'7		19'5		303°18'4		9'4		44'2		0'8																	
	09	220°08'4		322°58'0		43'9		77°07'4		53'1		254°06'0		37'2		35°39'0		28'1		Enif		33°49'8		9°55'4 N		316°05'4		19'6		317°46'8		9'4		43'4		0'9																	
	10	235°10'9		337°57'1		44'3		92°09'7		53'1		269°08'0		37'1		50°41'4		28'1		Fomalhaut		15°26'8		29°34'2 S		331°05'1		19'7		332°15'2		9'4		42'5		1'1																	

2009 December 21, 22, 23 (Mon, Tue, Wed)

	GMT	ARIES	VENUS	-3.9	MARS	-0.5	JUPITER	-2.1	SATURN	+1.0	STARS						SUN				MOON							Lat	Twilight		Sunrise	Moonrise		
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	GHA	Dec	GHA	v	Dec	d	HP	N 72°	Nautical	Civil		21	22	23							
Monday	21 00	89°42'0	186°13'7	23°18'.4 S	306°30'3	18°02'.1 N	122°50'7	14°20'.3 S	265°00'3	0°24'.2 N	Acamar	315°19'9	40°16'0 S	180°31'.2	23°26'.2 S	129°40'.5	15'.4	13°01'.8 S	11'.3	54'.1	N 70°	08:26	10:58	-	12:05	11:36	11:11							
	01	104°44'.4	201°12'.7	18'.6	321°32'.7	02'.2	137°52'.7	20'.1	280°02'.7	24'.2	Achernar	335°28'.2	57°11'.3 S	195°30'.9	26'.2	144°14'.9	15'.6	12°50'.5 S	11'.3		N 68°	07:50	09:20	-	11:35	11:21	11:08							
	02	119°46'.9	216°11'.7	18'.9	336°35'.2	02'.3	152°54'.7	20'.0	295°05'.0	24'.2	Achux	173°12'.5	63°09'.1 S	210°30'.5	26'.2	158°49'.5	15'.6	39'.2	11'.4		N 66°	07:37	08:54	10:35	11:23	11:15	11:08							
	03	134°49'.4	231°10'.8	19'.1	351°37'.6	02'.4	167°56'.7	19'.8	310°07'.4	24'.1	Adhara	255°14'.2	28°59'.1 S	225°30'.2	26'.2	173°24'.1	15'.6	27'.8	11'.5		N 64°	07:26	08:34	09:53	11:14	11:10	11:07							
	04	149°51'.8	246°09'.8	19'.3	6°40'.1	02'.5	182°58'.7	19'.7	325°09'.8	24'.1	Aldebaran	290°52'.0	16°31'.8 N	240°29'.9	26'.2	187°58'.7	15'.6	16'.3	11'.5		N 62°	07:16	08:18	09:24	11:06	11:06	11:07							
	05	164°54'.3	261°08'.9	19'.6	21°42'.5	02'.6	198°00'.7	19'.5	340°12'.1	24'.1				255°29'.6	26'.3	202°33'.3	15'.7	04'.8	11'.5		N 60°	07:08	08:05	09:03	10:59	11:02	11:06							
	06	179°56'.8	276°07'.9	19'.8	36°45'.0	02'.7	213°02'.8	19'.3	355°14'.5	24'.1	Alioth	166°22'.9	55°54'.0 N	270°29'.3	26'.3	217°08'.0	15'.7	11°53'.3 S	11'.6		N 58°	07:00	07:53	08:45	10:52	10:59	11:05							
	07	194°59'.2	291°07'.0	20'.1	51°47'.4	02'.8	228°04'.8	19'.2	360°16'.9	24'.0	Alkaid	153°01'.0	49°15'.5 N	285°29'.0	26'.3	231°42'.7	15'.8	41'.7	11'.6		N 56°	06:54	07:43	08:30	10:47	10:56	11:05							
	08	210°01'.7	306°06'.0	20'.3	66°49'.9	02'.9	243°06'.8	19'.0	25°19'.2	24'.0	Alnair	27°47'.0	46°54'.9 S	300°28'.7	26'.3	246°17'.5	15'.8	30'.1	11'.7		N 54°	06:47	07:34	08:18	10:42	10:54	11:04							
	09	225°04'.2	321°05'.1	20'.5	81°52'.3	03'.0	258°08'.8	18'.9	40°21'.6	24'.0	Alnilam	275°48'.6	1°11'.7 S	315°28'.4	26'.3	260°52'.3	15'.9	18'.4	11'.7		N 52°	06:42	07:25	08:06	10:37	10:51	11:04							
	10	240°08'.6	336°04'.1	20'.8	96°54'.8	03'.2	273°10'.8	18'.7	55°24'.0	23'.9	Alphard	217°58'.4	8°42'.1 S	330°28'.1	26'.3	275°27'.2	15'.8	06'.7	11'.7		N 50°	06:36	07:18	07:56	10:33	10:49	11:04							
	11	255°09'.1	351°03'.1	21'.0	111°57'.2	03'.3	288°12'.8	18'.6	70°26'.3	23'.9				345°27'.7	26'.3	290°02'.0	15'.9	10°55'.0 S	11'.8		N 45°	06:25	07:02	07:36	10:24	10:44	11:03							
	12	270°11'.5	6°02'.2	23°21'.2 S	126°59'.7	18°03'.4 N	303°14'.8	14°18'.4 S	85°28'.7	0°23'.9 N	Alphecca	126°13'.4	26°40'.7 N	0°27'.4	23°26'.3 S	304°36'.9	16'.0	10°43'.2 S	11'.9	54'.1	N 40°	06:14	06:48	07:19	10:17	10:40	11:02							
	13	285°14'.0	21°01'.2	21'.4	142°02'.2	03'.5																												

2009 December 24, 25, 26 (Thu, Fri, Sat)

GMT		ARIES		VENUS		-3.9		MARS		-0.6		JUPITER		-2.1		SATURN		+1.0		STARS				SUN				MOON				Lat		Twilight		Sunrise		Moonrise															
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec		GHA		Dec		GHA		v		Dec		HP		N 72°		Nautical		Civil		24		25		26					
Wednesday day	00	92°39'.4		185°04'.5		23°32'.6 S		309°29'.7		18°10'.8 N		125°15'.3		14°08'.8 S		267°50'.9		0°22'.2 N		Acamar		315°19'.9		40°16'.0 S		180°08'.8		23°25'.1 S		99°57'.7		16°2		1°57'.5 N		13°1		54'.9		N 72°		08:27		10:57		•		10:46		10:17		09:38	
	01	107°41'.9		200°03'.6		32.8		324°32'.3		11°10		140°17'.3		08.7		282°53'.3		22.2		Achamar		335°28'.3		57°11'.3 S		195°08'.4		25°1		114°32'.9		16°1		2°10'.6 N		13°2		68°		07:51		09:20		•		10:56		10:43		10:27			
	02	122°44'.3		215°02'.6		32.9		339°34'.8		11°11		155°19'.3		08.5		297°55'.6		22.1		Acrux		173°12'.5		63°09'.1 S		210°08'.1		25°10		129°08'.0		16°0		23.8		13°2		66°		07:38		08:55		10:35		11:00		10:52		10:43			
	03	137°46'.8		230°01'.6		33.1		354°37'.4		11°12		170°21'.3		08.3		312°58'.0		22.1		Adhara		255°14'.2		28°59'.1 S		225°07'.8		25°10		143°43'.0		16°1		37.0		13°1		55°10		64°		07:27		08:35		09:53		11:03		11:00		10:57	
	04	152°49'.2		245°00'.7		33.2		9°39'.9		11.4		185°23'.3		08.2		328°00'.4		22.1		Aldebaran		290°52'.0		16°31'.8 N		240°07'.5		24°9		158°18'.1		16°0		50.1		13°1		62°		07:17		08:19		09:25		11:06		11:07		11:08			
	05	167°51'.7		259°59'.7		33.4		24°42'.4		11°5		200°25'.3		08.0		343°02'.8		22.1																																			
	06	182°54'.2		274°58'.7		33.5		39°45'.0		11°7		215°27'.3		07.8		358°05'.1		22.0		Alioth		166°22'.8		55°53'.9 N		270°06'.9		24°8		187°28'.1		15°9		16.4		13°2		N 58°		07:01		07:54		08:46		11:11		11:18		11:27			
	07	197°56'.6		289°57'.8		33.7		54°47'.5		11°8		230°29'.3		07.7		31°07'.5		22.0		Alkaid		153°01'.0		49°15'.5 N		285°06'.6		24°8		202°03'.0		15°9		29.6		13°1		55°1		56°		06:55		07:44		08:31		11:13		11:23		11:35	
	08	212°59'.1		304°56'.8		33.8		69°50'.1		11°9		245°31'.3		07.5		28°09'.9		22.0		Alnair		27°47'.1		46°54'.9 S		300°06'.3		24°7		216°37'.9		15°9		42.7		13°2		54°		06:49		07:35		08:19		11:15		11:27		11:42			
	09	228°01'.6		319°55'.8		33.9		84°52'.7		12°1		260°33'.3		07.4		43°12'.3		22.0		Alnilam		275°48'.6		1°11'.7 S		315°06'.0		24°7		231°12'.8		15°8		55.9		13°1		52°		06:43		07:27		08:08		11:17		11:31		11:48			
	10	243°04'.0		334°54'.9		34.1		99°55'.2		12°2		275°35'.3		07.2		58°14'.6		21.9		Alphard		217°58'.4		8°42'.2 S		330°05'.7		24°6		245°4																							

