- The Starfinder (2102-D) is an instrument used for identifying stars and planets based on their • azimuth (bearing) and altitude (height).
- The key to star identification problems is three-fold:
 - Use the correct hemisphere on the backing plate (North or South)
 - Use the correct plate based on latitude (all USCG Problems use the 25° plate).
 - Find the LHA of Aries (based on the GHA of Aries and your DR longitude).
- The vast majority of problems on USCG exams are of major navigational stars. However, there are some problems in the database seeking minor stars. For these minor star problems, the procedure is the same but requires an extra step at the end of looking up the star's right ascension (RA) and declination (dec) in the back of the Nautical Almanac.

SID D1. On 17 March your 1845 DR position is latitude 25° 10.0' N, longitude 66° 48.0' W. You observe an unidentified star bearing 320° T at an observed altitude (ho) of 50° 02.9'. The chronometer reads 10h 47m 49s and is 1m 54s fast. What star did you observe?

ARIES

G.M.T

Answer: Mirfak.

	1411.		G.M.1.	G.H.A.
Step 1:	Determine the correct chronometer time of the sight. Chronometer: 10h 47m 49s Chronometer error: 1m 54s fast Correct chronometer time: $10:47:49 - 00:01:54 = 10:45:55$		17 00 01 02 03 04 05 06 07 07 07 0 07 0 0 10 09 11	° , 174 28.8 189 31.3 204 33.8 219 36.2 234 38.7 249 41.2 264 43.6 279 46.1 294 48.6 309 51.0 324 53.5 339 55.9
Step 2:	Determine the GMT of the sight. Chronometer: 10h 45m 55s 1845 ZT DR Longitude: 66° 48.0' W corresponds to (+4 ZD) GMT of sight: <u>22:45:55</u>		S 12 D 13 A 14 Y 15 16 17 18 19 20 21 22	354 58.4 10 00.9 25 03.3 40 05.8 55 08.3 70 10.7 85 13.2 100 15.7 115 18.1 130 20.6 145 23.1
Step 3:	Determine the GHA of Aries for the time of the sight. GHA Aries (hours): 145° 23.1' GHA Aries (increment): 11° 30.6' GHA Aries (Total): 145° 23.1' + 11° 30.6' = 156° 53.7'	4 5 ₁	SUN PLANETS	160 25.5 ARIES
Step 4:	Determine the LHA of Aries for the time of the sight. GHA Aries: 156° 53.7' DR Longitude: 66° 48.0' W (W longitude subtract, E longitude add) LHA Aries: 156° 53.7' – 66° 48.0' W = $90^{\circ} 05.7'$	55 56 57 58 59	11 28.8 11 29.0 11 29.3 11 29.5 11 29.8	11 30-6 11 30-9 11 31-1 11 31-4 11 31-6

Star Identification Problems

- Step 5: Set up the Starfinder. LHA Aries: 90° 05.7' Observer's Latitude (nearest incremental degree): 25° N
- Step 6: Search the Starfinder field based on the given altitude and azimuth.
 Observed altitude (ho): 50° 02.9'
 Observed azimuth: 320° T
- Step 7:Identify the observed body.Mirfak is the closest body to the observed altitude and azimuth.



Star Identification Problems

SID D2. On 23 September, while taking stars for an evening fix, an unidentified star is observed bearing 261° T at an observed altitude (ho) of 61° 35'. Your 1836 zone time DR position is latitude 25° 18' S, longitude 162° 36' E. The chronometer reads 07h 34m 12s, and the chronometer error is 1m 54s slow. Your vessel is steaming on a course of 230° T at a speed of 18 knots. What star did you observe?

ARIES

9 01.5 9 01.7

9 02.0 9 02-2

9 02.5

9 02.7

9 03.0

9 03-2 9 03-5

9 03.7

Answer: Antares.

Step 1:	Determine the correct chronometer time of the sight.	7	22.00	1 46 2
500p 11	Chronometer: 7h 34m 12s	4	01	16 47.6
	Chronometer array: 1m 54s glow		02 03	31 50.1
	Childholleter effor. This 348 slow $C_{1} = \frac{1}{2} + \frac$		04	61 55.0
	Correct chronometer time: $0/:34:12 + 00:01:54 = 0/:36:06$		05	76 57.5
			w 07	07 02.4
Step 2:	Determine the GMT of the sight.		E 08 1	L22 04.9 L37 07.4
	Chronometer: 07h 36m 06s		D 10 1	52 09.8
	1836 ZT DR Longitude: 162° 36.0' E corresponds to (-11 ZD)		E 12	182 14.7
	GMT of sight: 07:36:06		D 13	197 17.2
	8		14	227 22.1
Sten 3.	Determine the GHA of Aries for the time of the sight		16 1	242 24.6
Step 5.	GHA Aries (hours): 107° 02 4'		18	272 29.5
	CILA Aries (incurrent): 02.02		19 20	287 32.0 302 34.5
	GHA Aries (increment): 9° 03.0		21	317 36.9
	GHA Aries (10tal): $107^{\circ} 02.4^{\circ} + 9^{\circ} 03.0^{\circ} = 116^{\circ} 05.4^{\circ}$		22	332 39 .4 347 41.9
C	Determine the LULA of Anice for the time of the sight			
Step 4:	Determine the LHA of Aries for the time of the sight.			
	GHA Aries: 116° 05.4′			
	DR Longitude: 162° 36.0' E (E longitude add, W longitude sub	otract	t)	
	LHA Aries: $116^{\circ} 05.4' + 162^{\circ} 36.0' \text{ W} = 278^{\circ} 41.4'$			T
		36	SUN PLANET	ARIE
Step 5:	Set up the Starfinder.			
-	LHA Aries: 278° 41.4'		9 0 0.0	9 01.
	Observer's Latitude (nearest incremental degree): 25° S	01	9 00-3	9 01.
		02	9 00-5	9 02.
Step 6.	Search the Starfinder field based on the given altitude and	04	9 00-8	9 02.
Step 0.	scaren the Starmider field based on the given attitude and	05	9 01.3	9 02
	$\frac{d2}{d1} = \frac{1}{2} $	06	9 01.5	9 03.
	Observed altitude (no): 61° 35.0°	07	9 01.8	9 03-2
	Observed azimuth: 261° T	08	9 02.0	9 03.
Stan 7	Libertific the charges of he dee	1		
Step /:	Identify the observed body.	1		
	Antares is the closest body to the observed altitude and azimut	n.		

Star Identification Problems



SID D3. On 12 June 1981, your DR 1845 position is LAT 21° 47' N, LONG 46° 52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 313° T at a sextant altitude (Hs) of 14° 56.3'. The index error is 0.5' on the arc and the height of eye is 45 feet. The chronometer reads 09:43:27 and the chronometer error is 1m 46s slow. What star did you observe?

Answer: Menkalinan (Minor Star)

- Step 1: Determine the correct chronometer time of the sight. Chronometer: 9h 43m 27s Chronometer error: 1m 46s slow Correct chronometer time: 09:45:13
 Step 2: Determine the GMT of the sight. 1845 ZT DR Longitude: 46° 52'W corresponds to (±3)
- 1845 ZT DR Longitude: 46° 52'W corresponds to (+3 ZD) GMT of sight: <u>21:45:13</u>
- Step 3: Determine the GHA of Aries for the time of the sight.
 GHA Aries (hours): 216° 05.6'
 GHA Aries (increment): 11° 20.1'
 GHA Aries (Total): 227° 25.7'
- Step 4: Determine the LHA of Aries for the time of the sight.
 GHA Aries: 227° 25.7'
 DR Longitude: 46° 52'W (E longitude add, W longitude subtract)
 LHA Aries: 180° 33.7'
- Step 5: Set up the Starfinder. LHA Aries: 180° 33.7' Observer's Latitude (nearest incremental degree): 25° S
- Step 6: Determine the Height Observed (Ho) by applying index error, height of eye and apparent altitude corrections.

Hs = $14^{\circ} 56.3'$ IC = +0.5'Dip = -6.5'Ha = $14^{\circ} 50.3'$ Alt Corr = -3.6'Ho = $14^{\circ} 46.7'$

- Step 7: Make a mark on the Starfinder plate at the appropriate Ho and Azimuth.
 Observed altitude (ho): 14° 46.7'
 Observed azimuth: 313° T
- Step 8:Find the Right Ascension and Declination of the body.Put the red template on the Starfinder.Align 0° line with mark you made in Step 8.RA is the outer number on the Starfinder = 87° Declination is based on location on the red plate = 45° N
- Step 9: Find the SHA. SHA = 360-RA = 273°
- Step 10: Look in the back of the Nautical Almanac for the best match (note more accuracy can be obtained by averaging the 25° and 15° plate, which is rarely necessary to answer the exam question).
 B Auriga, or Menkalinan.



272	STARS,				JANUARY—JUNE										
Mag.	Name and Number	S.H.A.					Dec.								
	runne und runnoer		JAN.	FEB.	MAR.	APR.	MAY	JUNE		JAN.	FEB.	MAR.	APR.	MAY	JUNE
	Continue			,				<i>.</i> .							,
1.0	a Geminorum	240	39.0	39.0	39-1	39.2	39.4	39.4	N. 31	55.7	55.8	55.8	55.9	55.9	55.8
3.3	σ Puppis	247	50.2	50.5	50.4	50-6	50.8	50.9	5.43	15.9	10.0	10.1	10.1	10.1	10.0
3.1	p Canis Minoris	248	28-0	28.0	28.1	28-2	28.3	28.4	N. 8	19.0	19.0	19.5	19.0	19.0	19.0
2.4	η Canis Majoris	249	09.0	09.0	09.7	09-9	10.0	10.1	5. 29	10.1	10.5	10.3	10.3	10.5	10.1
2.7	π Puppis	250	52.0	52.0	52.8	53-0	23.1	53.5	5. 37	03.9	04.0	04-1	04-1	04.1	04.0
2.0	δ Canis Majoris	253	05.5	05.2	05-6	05-8	05.9	o 6 ∙o	S. 26	21.9	22.0	22.1	22-1	22.0	21.9
3·1	o Canis Majoris	254	26.3	26.3	26.4	26-6	26.7	26.8	S. 23	48.4	48.6	48.6	48-6	48.6	48.5
1.6	ε Canis Majoris 19	255	31.6	31.6	31.7	31-9	32-0	32.1	S. 28	56.9	57.0	57.1	57·I	57.0	56.9
2.8	τ Puppis	257	37.6	37.7	37.9	38-1	38.4	38.5	S. 50	35.7	35.8	35.9	35.9	35.8	35.7
-1.6	a Canis Majoris 18	258	55.2	55.2	55.3	55.5	55-6	55.6	S. 16	41.6	41.7	41.7	41.7	41.6	41.2
1.9	y Geminorum	260	50.6	50.7	50.8	50-9	51-0	51.0	N. 16	24-9	24.9	24.9	24.9	24.9	24.9
-0.9	a Carinæ 17	264	06.6	06.7	06.9	07.3	07.4	07.2	S. 52	41.3	41.4	41.5	41.2	41.4	41.3
2.0	β Canis Majoris	264	31.9	31.9	32.0	32.5	32.3	32.3	S. 17	56-9	57.0	57.1	57.0	57.0	56.9
2.7	θ Aurigæ	270	23.4	23.5	23.2	23.8	23-9	23.9	N. 37	12.7	12.7	12.7	12.7	12.7	12.7
2·1	β Aurigæ	270	27.8	27.9	28·0	28-2	28.3	28.3	N. 44	56.8	56.8	56.9	56-8	56-8	56.7
Var.‡	a Orionis 16	271	27.7	27.8	27.9	28·0	28·I	28·I	N. 7	24.1	24.1	24·I	24·I	24-1	24.2
2.2	κ Orionis	273	17.0	17.1	17.2	17.4	17.4	17:4	S. 9	40-7	40.8	40.8	40.8	40.7	40.6
1.9	ζ Orionis	275	02.9	02.9	03-1	03-2	03-3	03.5	S. 1	57.3	57.3	57.3	57.3	57.3	57.2
2.8	a Columbæ	275	15.4	15.5	15.6	15-8	15-9	15.9	S. 34	05-3	05.4	05.4	05.4	05.3	05.1
3.0	ζ Tauri	275	52.2	52.3	52.4	52.6	52-6	52.6	N. 21	07.8	07.8	07.8	07-8	07.8	07.8

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STARS. JANUARY-JUNE