(This Worksheet must be returned with your answer book)

J F HAYES

20 min @ 9K = 3′
20 min @ 5K = 1·67 (for 0′)

RADAR PLOTTING SHEET

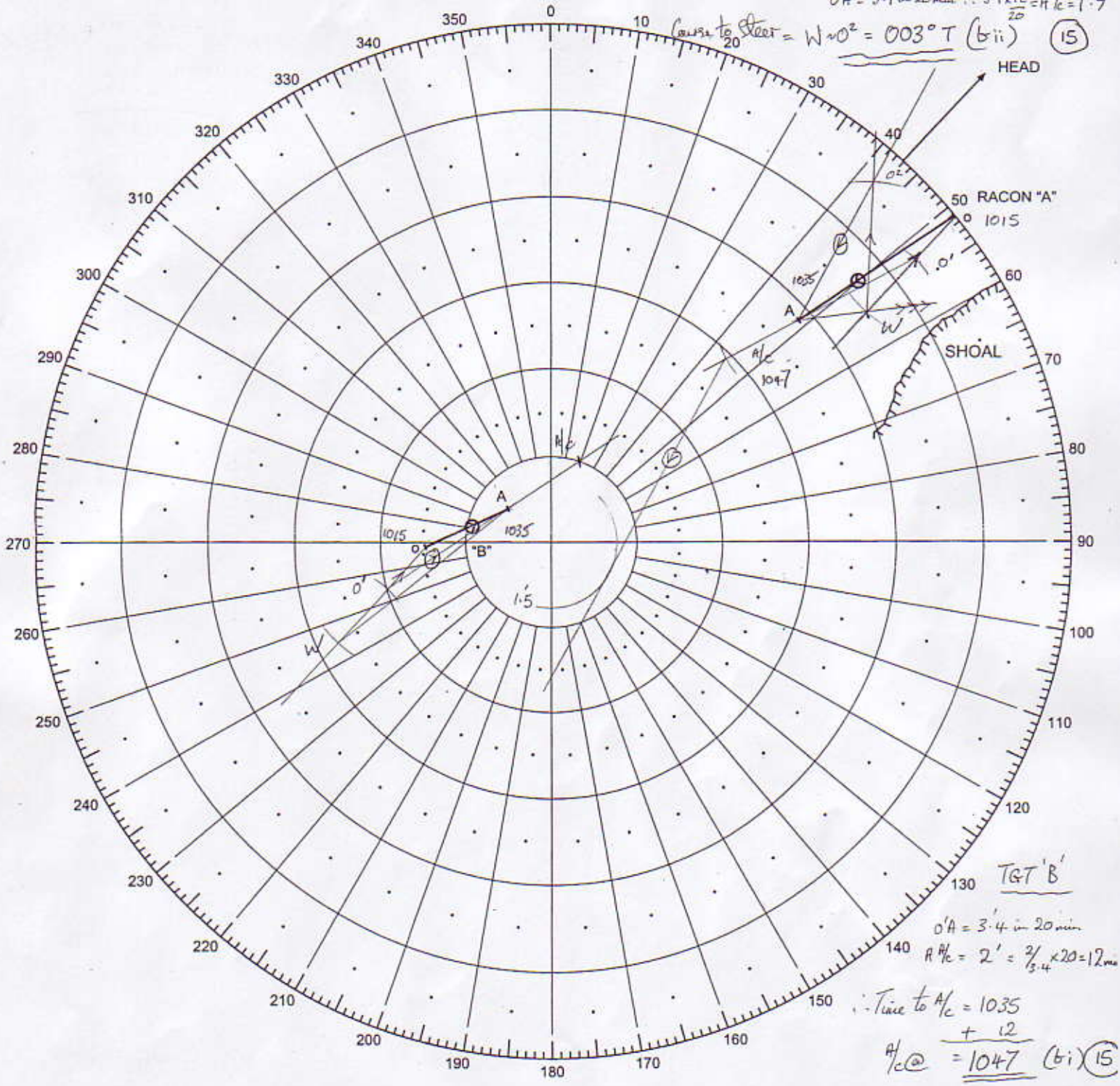
TGT 'A'

'A' A/W = 1·6 in 20 min = 4·8 K

Set is 083° T. (a) 15

O'A = 3·1 in 20 min ∴ 3·1 × 12/20 = A/C = 1·9

Course to Steer = W v O² = 003° T (bii) 15



TGT 'B'

O'A = 3·4 in 20 min

A/C = 2′ = 2/3·4 × 20 = 12 mins

∴ Time to A/C = 1035
+ 12
A/C @ = 1047 (bi) 15

Range Scale 0 1 2 3 4 5 6 7 8 9 10 11 12

(This is not a metric scale)

Signature of Candidate .....

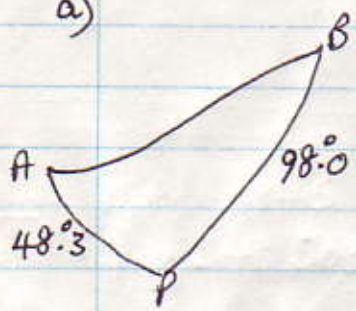
Examination Centre .....

J. F. Hayes
13/7/04.

Chief Mate - SQA - Navigation - Tuesday July 13th 2004.

Q1. Departure C. PALLISER 41° 42's 175° 14'E (Wellington N.Z.)
W/P appr. PANAMA 8° 00'N 79° 00'W
Dlg. 105° 46' E = 105·76667 E

a)



Cos AB = Cos Dlg Sin PA Sin PB + Cos PA Cos PB.
AB = Cos⁻¹(Cos 105·76667 Sin 48·3 Sin 98·0 + Cos 48·3 Cos 98·0)
AB = 107·06669 = 6424·001
= 6424·0
Extra dist = 66·0

(15) (a) Total Dist = 6490·0

b) Depart Wellington March 24d 18h 30m S.T. (12)
N.Z. S.T. − 12h
Depart GMT 24d 06h 30m
6490@14·7K = 441·49659hrs = 18d 09h 30m
Arrival Panama GMT = 11d 16h 00m APRIL
Panama S.T. − 05h

(15) (b) Arrive Panama April 11d 11h 00m S.T.

c) $A = \frac{\text{Tan Lat A}}{\text{Tan Dlg}} = \frac{\text{Tan } 41{\cdot}7}{\text{Tan } 105{\cdot}76667} = 0.25156$ S

$B = \frac{\text{Tan Lat B}}{\text{Sin Dlg}} = \frac{\text{Tan } 8°}{\text{Sin } 105{\cdot}76667} = 0.14604$ N

C = 0.10552 S

Tan Co = 1/CosLat A × C = 1/Cos 41·7 × 0·10552 ∴ Co = 585·495 E

(15) (c) Initial Course = 094·5 T.

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Q3. DR. 10°42'S 130°14'W Time at Ship March 26d 18h 35m

	L.I.T.	+ 8h 41m
	GMT. Approx	27d 03h 16m

∴ Chronometer is 27d 03h 18m 25s

error		- 2m 10s
GMT March	27d 03h 16m	15s

March ♈ 27d 03h : 229° 40.5'

inc 16m 15s : 4° 04.4' DR Lat S 10° 42' ∴ PZ = 79.300

SHA RIGEL : 281° 39.0' Dec S 8° 13.9' ∴ PX = 81.76833

GHA RIGEL : 515° 23.9'

DR Long : -130° 14' W

LHA * : 385 09.9

= 025° 09.9' = 25.165

$\cos ZX = \cos LHA \sin PX \sin PZ + \cos PX \cos PZ$

$= \cos 25.165 \sin 81.76833 \sin 79.3 + \cos 81.76833 \cos 79.3$

∴ ZX = 24°.93723 CZX 24° 56'.2

Calc Alt = 65° 03'.8 (90-)

SA	65° 16'.4
IE	- 1.5
OA	65° 14'.9
Dip 14.2m	- 6.7
AA	65° 08.2
Tc	- 0.4
TA	65° 07'.8
CA	65° 03'.8
Intercept	4'.0 T

A = Tan Lat A / Tan LHA = Tan 10.7 / Tan 25.165 = 0.40218N

B = Tan Dec / Sin LHA = Tan 8.23167 / Sin 25.165 = 0.340215

C = 0.06197N

Tan Cz = 1/C × Cos Lat A = 1/0.06197 Cos 10°.7

∴ Cz = N 86°.51542 W = 273°.5 T

(15) Direction of P/L 003°.5 T / 183°.5 T (a)

Q3. Cont'd

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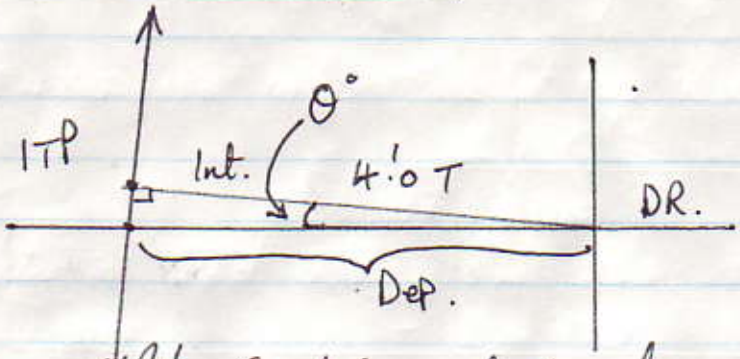

Note: Simplest point to choose is where PL cuts DR latitude. ITP can be chosen but requires more work

$\theta^\circ = 273.^\circ48458 - 270^\circ = 3.^\circ48458$

$\frac{Int}{Dep} = \cos\theta^\circ \therefore Dep = \frac{Int}{\cos\theta} = \frac{4.0}{\cos 3.^\circ48458} = 4.'0074\ W$

Note: Using $\theta = 3.^\circ5$ gives an equally accurate result.

$Dlg = \frac{Dep}{Cos\,lat} = \frac{4.0074}{\cos 10.^\circ7} = 4.'07831\ W = 4.'1\ W$

DR long	130°	14.'0 W
Long @ DR lat	130°	18.'1 W

Direction of PL in 003.°5 T / 183.°5 T

(15) (b) through pos'n 10° 42'S 130° 18.'1 W.

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Q5. RFA @ May 29d 22h 05m GMT 62°15'N 019°20'W

⊙ May 28 @ 62°N = 0235 LMT May 31st @ 62°N = 0229

∴ @ 62°N ⊙ May 30th = 0231 (V/L travelling SW to 62°N

Start long LIT 19°20'W = 1 17 is 1st approx LMT)

1st Approx GMT = 0348 on 30th May

Start GMT = 2205 on 29th May

1st Approx run = 5.43 @ 14.3 = 81.75

1st Approx

Dlat = Dist Cos C = 81.75 Cos 249
= 29.296585

Dep = Dist Sin C = 81.75 Sin 249
= 76.3202 W

Dlg = Dep / Cos Mlat = 76.3202 / Cos 62°00.3
= 162.5662 W

2nd Approx

Dlat = 85.09 Cos 249 = 30.49355

Dep = 85.09 Sin 249 = 79.4384 W

Dlg = 79.4384 / Cos 61°59.7
= 169.18 W

Rendezvous :-

Tan C = Dep / Dlat = 63.687 / 36.5

∴ C = N 60.1823 W
= 299.8 T (c)

Dist = Dlat / Cos C = 36.5 / Cos 60.1823
= 73.4 in 5h 57m
= 73.4 / 5.95 = 12.336
= 12.34 K (14)

Start 62° 15' N 019° 20' W

Dlat 29.35 Dlg 2° 42.6 W

1st Approx 61°45.7 022° 02.6 W

Mlat 62°00.3

⊙ 28th 62°N 0235 31st 0229

60°N 0256 0251

61°45.7 0238 0232

⊙ 30th 0234 LMT.

LIT 022°02.6W 1 28

2nd ⊙ 30d 04 02 GMT (a)

Start 29d 22 05 GMT

5h 57m @ 14.3 = 85.09 (20)

Start 62° 15'N 019° 20' W

Dlat 30.55 Dlg 2° 49.2 W (18)

2nd App: 61° 44.5 N 022° 09.2 W (b)

Mlat 61°59.7

Fregate 61° 08.0 N 019° 56.0 W

Dlat 36.5 N 2° 13.2 W

Mlat 61° 26.2 133.2 W

Dep = Dlg Cos Mlat = 133.2 Cos 61°26.2 = 63.687 W