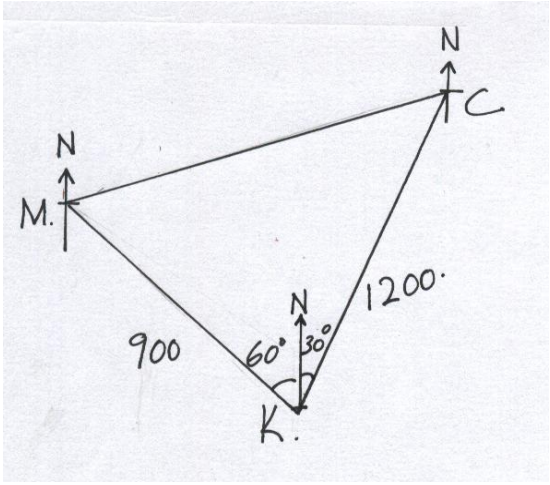
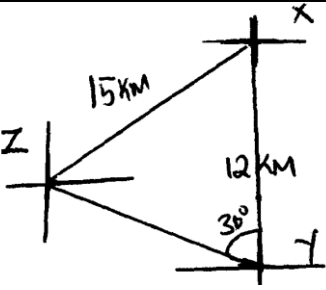
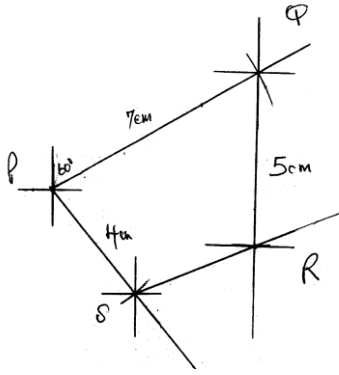


2. Scale drawing

| | | | |
|-----------|--|---|------------------------------|
| <p>1</p> | <p>(i)</p>  <p>(ii) $MC = \sqrt{1200^2 + 900^2}$ $= \sqrt{1440000 + 810000}$ $= \sqrt{2250000}$ $= 1500m$</p> | <p>B₁</p> <p>M₁</p> <p>A₁</p> <p>3</p> | <p>✓ sketch not on scale</p> |
| <p>2.</p> |  <p>$\frac{\sin 30^\circ}{15} = \frac{\sin Z}{12}$</p> <p>$\sin Z = 0.4$</p> <p>$\angle Z = 23.580$</p> <p>$\angle x = 180^\circ - 30^\circ - 23.58^\circ$</p> <p>$= 126.42^\circ$</p> <p>Compass bearing</p> <p>N53.580W</p> | <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> | |
| | | <p>04</p> | |

3.



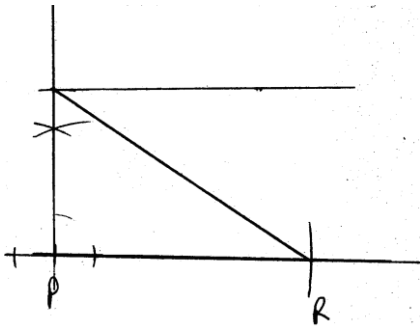
Distance of R from S

$$3.8\text{cm} \pm 0.1$$

$$3.8 \times 4 = 15.2\text{m}$$

Bearing of R from S

$$0680 \pm 10$$



Angle of depression = 330

B1

600 bearing
from P and 7cm
drawn

B1

South of Q and
5cm drawn from
P

B1

B1

1400 bearing
from P and 4cm

B1

B1

drawn
Completed
diagram.

B1

B1

B1

B1

Award of 3
digits only

Posts P drawn

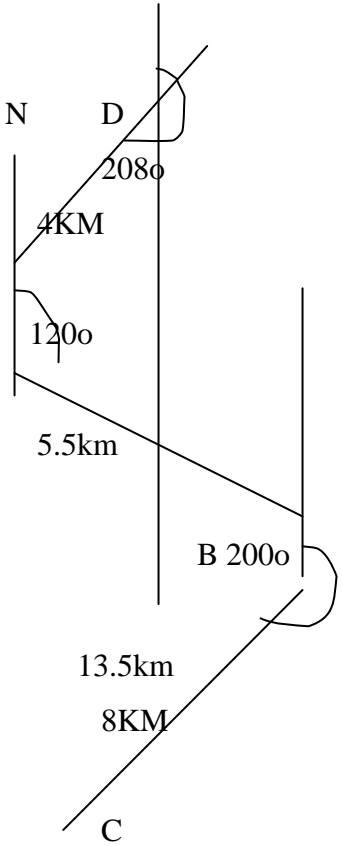
Position P and R
shown and
triangle
completed

Angle of
depression given

10

4

1cm represent 1km



Bearing 030o 4km from starting point

1M

Bearing of starting point A

1M

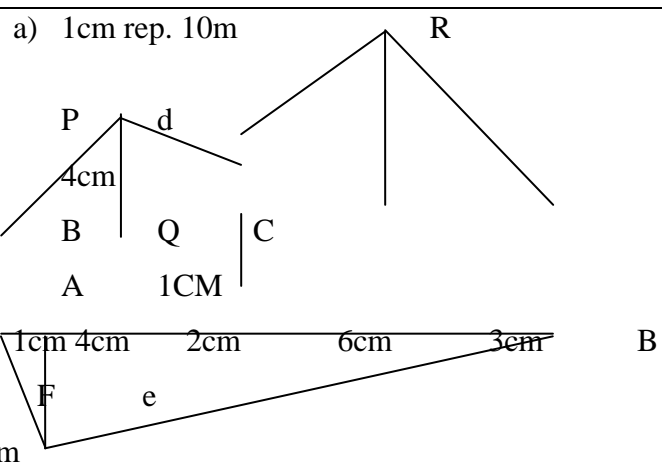
Use of scale correctly and plotting of points

1M

Use of bearing correctly

A1

5



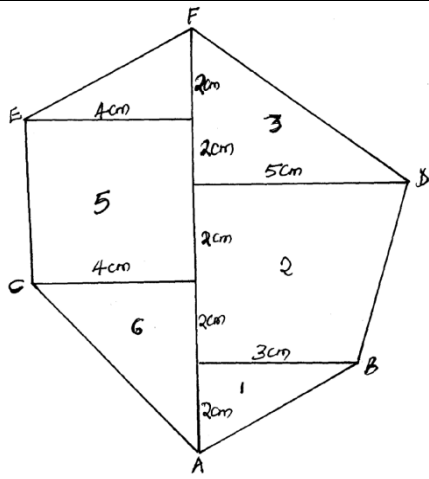
B1

Correct scales

B1

Correct drawing

b) Area
 $A = \frac{1}{2} \times 5 \times 2 = 5\text{cm}^2$
 $B = \frac{1}{2} \times 2(2+1) = 3\text{cm}^2$
 $C = \frac{1}{2} \times 6(1+4) = 15\text{cm}^2$
 $D = \frac{1}{2} \times 3 \times 4 = 6\text{cm}$



(b) Area1 = $\frac{1}{2} \times 2 \times 3 = 3\text{cm}^2$
 Area2 = $\frac{1}{2} \times 4(5+3) = 16\text{cm}^2$
 Area3 = $\frac{1}{2} \times 5 \times 4 = 10\text{cm}^2$
 Area4 = $\frac{1}{2} \times 2 \times 4 = 4\text{cm}^2$
 Area5 = $4 \times 4 = 16\text{cm}^2$
 Area6 = $\frac{1}{2} \times 4 \times 4 = 8\text{cm}^2$
 Total area = $(3+16+10+4+16+8)\text{cm}^2$
 $= 57\text{cm}^2$
 Actual area = $(57 \times 100)\text{m}^2$
 $= 5700\text{m}^2$
 (c) $10,000\text{m}^2 = 1\text{ha}$
 $5700\text{m}^2 = ?$
 1×5700
 $10,000$
 $= 0.57\text{ha}$

S1

Scale

B1

Base line

B2

Offsets (all –
 offsets) A want
 B1 for at least 2

✓

B1

B1

(3 areas)

M1

(3 areas)

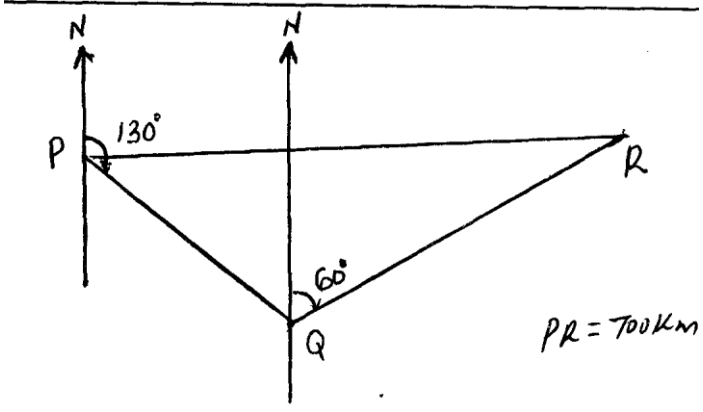
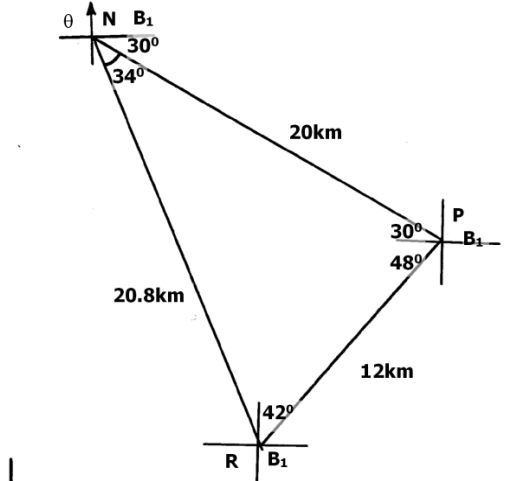
A1

Addition of all
 six areas

M1

A1

10

| | | | |
|------------|---|--|--|
| <p>9.</p> |  | <p>B1 B1 B1</p> | <p>For North line at 600 may be simplified ✓ location of R</p> <p>✓ for 700km ± 10km</p> |
| <p>10.</p> | <p>(a) $\sin \theta = 8/12$ $\text{DOC} = 41.81 \times 2$ $= 83.620$ (b) Area of $\Delta \text{PCO} = (16 \times 20) - (\frac{1}{2} \times 122 \times \sin 83.62)$ $= 320 - 71.15$ $= 248.45$ (c) $83.62 \times 22 \times 122$ $\frac{360}{7}$ $= 105.09 \text{cm}^2$ (d) $248.45 - 105.09$ $= 353.54$</p> | <p>M1 M1 A1 M1 M1 A1 M1 A1 M1 A1</p> | |
| | | <p>10</p> | |
| <p>11.</p> |  | <p>B1 B1 B1</p> | <p>Locating Q Locating P Locating R</p> |

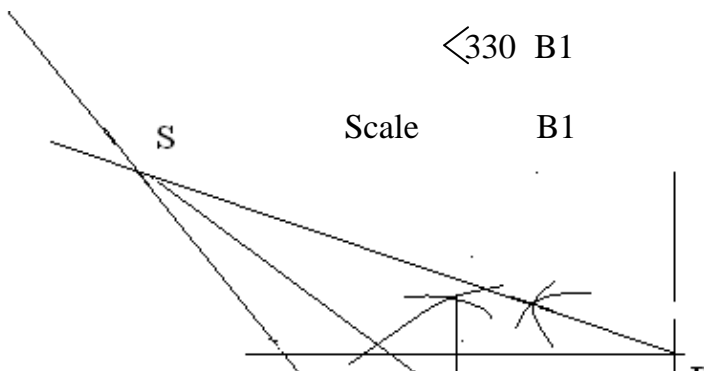
| | | | |
|--|--|---|--|
| | <p> $1\text{ cm} = 2\text{ km}$ $20\text{ km} = 10\text{ cm}$ $12\text{ km} = 6\text{ cm}$ i) $10.4\text{ cm} \times 2 = 20.8\text{ km}$ ii) 042° iii) 154° c) Area of $PQR = \frac{1}{2}ab \sin C$ $= \frac{1}{2} \times 20 \times 12 \sin 78^\circ$ $= 120 \times 78^\circ$ $= 117.38\text{ km}^2$ </p> | <p> M1A1 B1 B2 M1 A1 </p> | |
| | | <p>10</p> | |

| | | | | |
|------------|--|---|--|--|
| <p>12.</p> | <p> 1:50,000 L.S.F. 1:25,000,000 A.S.F. 17cm²: 425000000 cm² 42500 m² $\frac{42500}{10,000}$ = 4.25 ha </p> | <p> M1 <u>A1</u> 2 </p> | | <p>13.</p> <p><u>Posi</u> <u>tion</u> <u>s</u></p> |
|------------|--|---|--|--|

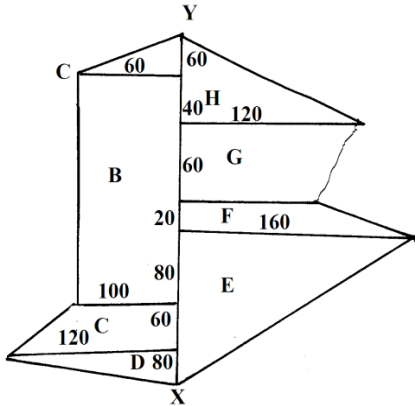
Q B1
R B1
S B1
Const < 300 B1

< 330 B1

Scale B1

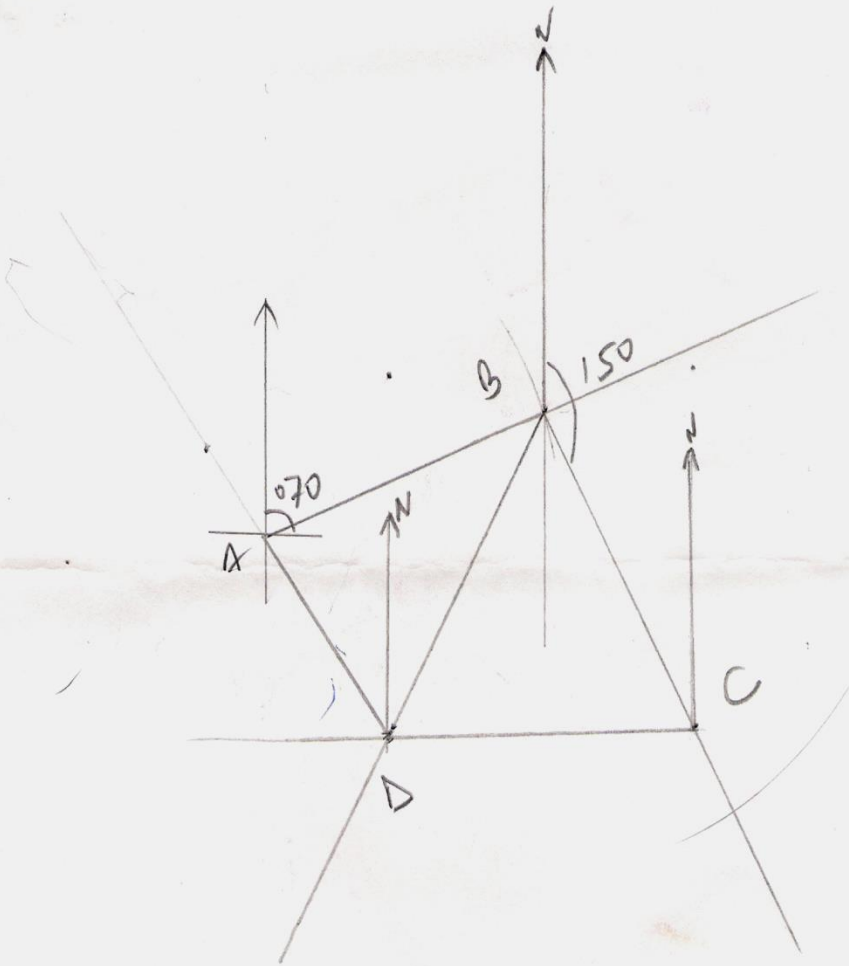


- b.) i. $7.8 \times 50 = 390 \text{ km.}$ B1
 ii. $7.10 \times 50 = 355 \text{ km}$ B1
 iii. 320^0 B2

| | | | |
|-----|--|----------------------------------|--|
| 14. | $\text{Area} = 35100000\text{m}^2$ $= 3510000000000\text{cm}^2$ $\text{Area} = 2.6 \times 1.5 = 3.9\text{cm}^2$ $\text{Scale} = 3.9:351000000000$ $= 900000000000$ $\therefore n = 9 \times 10^{10}$ | M1 A1 B1 | ✓ finding area ✓ area (actual) |
| | | 03 | |
| 15. |  <p>Areas.</p> | B3 M1 M1 M1 | 3 for at least 6. 2 for at least 4, 1 for at least 2 |

| | | | |
|--|--|---------------------------------|--|
| | $A = \frac{1}{2} \times 60 \times 60 = 1800m^2$ $B = \frac{(60+100)}{2} \times 200 = 16000m^2$ $C = \frac{(100+120)}{2} \times 60 = 6600m^2$ $D = \frac{1}{2} \times 120 \times 80 = 4800m^2$ $E = \frac{1}{2} \times 160 \times 220 = 17600m^2$ $F = \frac{(160+100)}{2} \times 20 = 2600m^2$ $G = \frac{(100+120)}{2} \times 60 = 6600m^2$ $H = \frac{1}{2} \times 120 \times 100 = 6000m^2$ $\text{Total area} = 62000m^2 = \frac{62000}{10000} = 6.2\text{ha}$ <p>1ha = 80,000 6.2ha = 80000 x $\frac{6.2}{1}$ = ksh 496,000.00</p> | M1 B1 M A1 | |
| | | 10 | |

| | | | |
|----|--|--|--|
| 16 | | B1 B1 B1 B1 B1 | Locating A Locating B Locating C Locating D North at D |
|----|--|--|--|



- i) $AD = 3.5 \pm 0.1 \times 50 = 175 \pm 5 \text{ M.}$
 ii) $BD = 5.2 \pm 0.1 \times 50 = 260 \pm 5 \text{ M}$
 iii) Bearing of A from D $323^\circ \pm 1^\circ$

M1
A1
M1
A1
B1

10

17. a) $\frac{YZ}{\sin 28^\circ} = \frac{13.5}{\sin 100^\circ}$
 Duration of travel = $8:55 \text{ a.m} - 7:35 \text{ a.m}$
 $= \frac{4}{3}$
 Speed = $\frac{6.436}{\frac{4}{3}}$

$$= 4.827\text{km/hr}$$

$$(b) \quad \frac{13.5}{\sin 10^\circ} = \frac{6.436 + ZQ}{\sin 118^\circ}$$

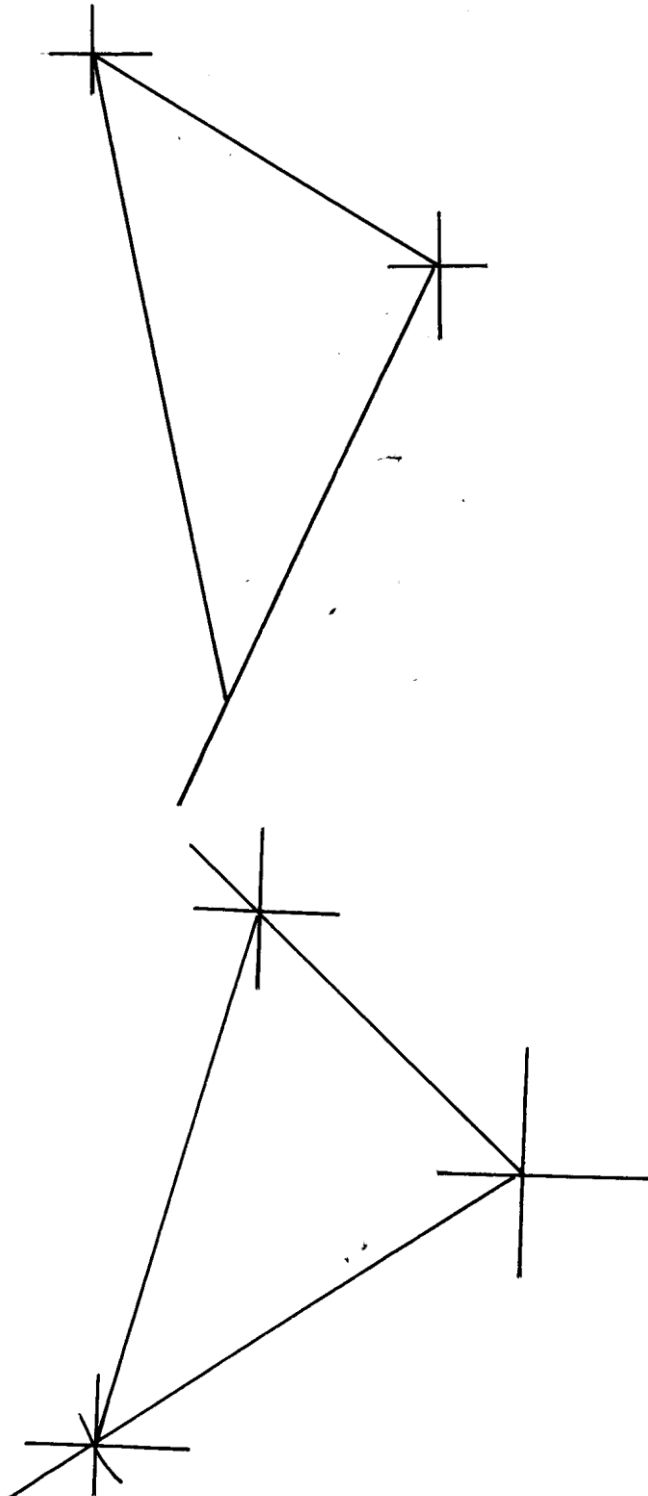
$$6.436 + ZQ = 13.5 \times \frac{\sin 118^\circ}{\sin 10^\circ} = 68.659$$

$$ZQ = 68.659 - 6.436$$

$$= 62.223$$

18.

1cm rep 100km

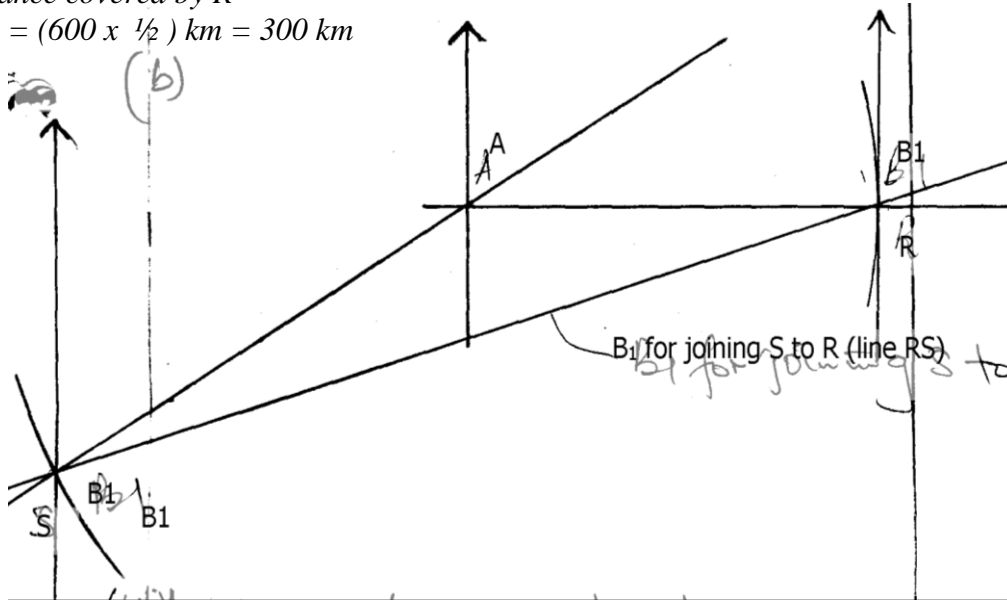


b) i) 049 ± 1

- ii) 190 ± 1
- c) 6.7 ± 0.1
 670 ± 10

19. a) (i) Distance covered by s
 $= (750 \times \frac{1}{2}) \text{ km} = 375 \text{ km}$

Distance covered by R
 $= (600 \times \frac{1}{2}) \text{ km} = 300 \text{ km}$

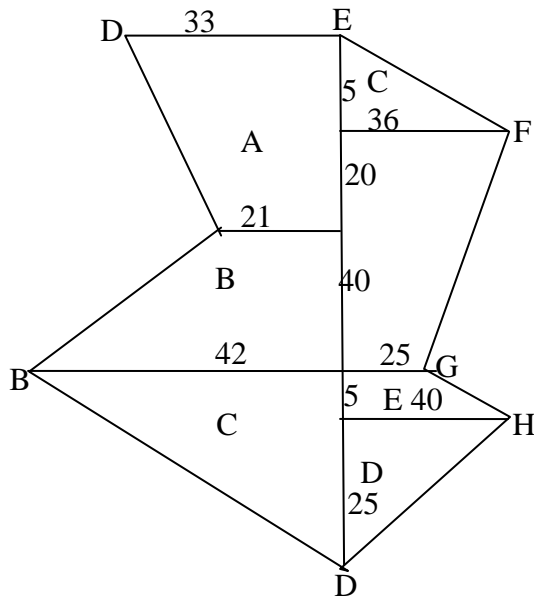


(b) (i) Distance between the two aeroplanes
 $= 12.5 \times 50 = 625 \pm 5 \text{ km}$

(ii) Speed = $\left[\frac{625 \times 60}{45} \right] \text{ km/hr}$
 $= 833 \frac{1}{3} \text{ km/h}$

(c) (i) Bearing of S from $R = 225^\circ$
(ii) The bearing of R from $S = 72^\circ$

20.



$$\begin{aligned}
\text{Area A: } & \frac{1}{2} \times 25 (33 + 21) = 675 \\
\text{Area B: } & \frac{1}{2} \times 40 (21 \times 42) = 1260 \\
\text{Area C: } & \frac{1}{2} \times 30 \times 42 = 630 \\
\text{Area D: } & \frac{1}{2} \times 25 \times 40 = 500 \\
\text{Area E: } & \frac{1}{2} \times 5 (40 + 25) = 162.5 \\
\text{Area F: } & \frac{1}{2} \times 60 (25 + 36) = 1830 \\
\text{Area G: } & \frac{1}{2} \times 5 \times 36 = 90 \checkmark \\
& = 5,147.5\text{m}^2
\end{aligned}$$

21. A to C = 96 ± 1 km
Bearing = 300°

(i) 62 ± 1 km
(ii) 97 ± 1 km
a. 304°
 030°

22. Graph

b) i) 80 km
ii) 11.06a.m

c) Average speed of the 2nd train
Time taken = $80 \div 1^{11}/_{12} = \frac{80 \times 12}{23}$
 $= 41.74\text{km/h}$

23. L.S.F = $\frac{4}{2000000} = \frac{1}{500000}$
A.S.F = $\frac{1}{5 \times 10^5} = \frac{1}{2.5 \times 10^{11}}$

Area of rectangle = $(2.4 \times 1.5) \text{ cm}^2$
 $= 3.6\text{cm}^2$

Actual area = $\frac{3.6 \times 2.5 \times 10^{11} \text{ ha}}{100 \times 10000}$
 $= 9 \times 10^5$
 $= 900,000\text{ha}$

24. a) $\triangle ABD$ \checkmark ly constructed
 $\triangle ABP$

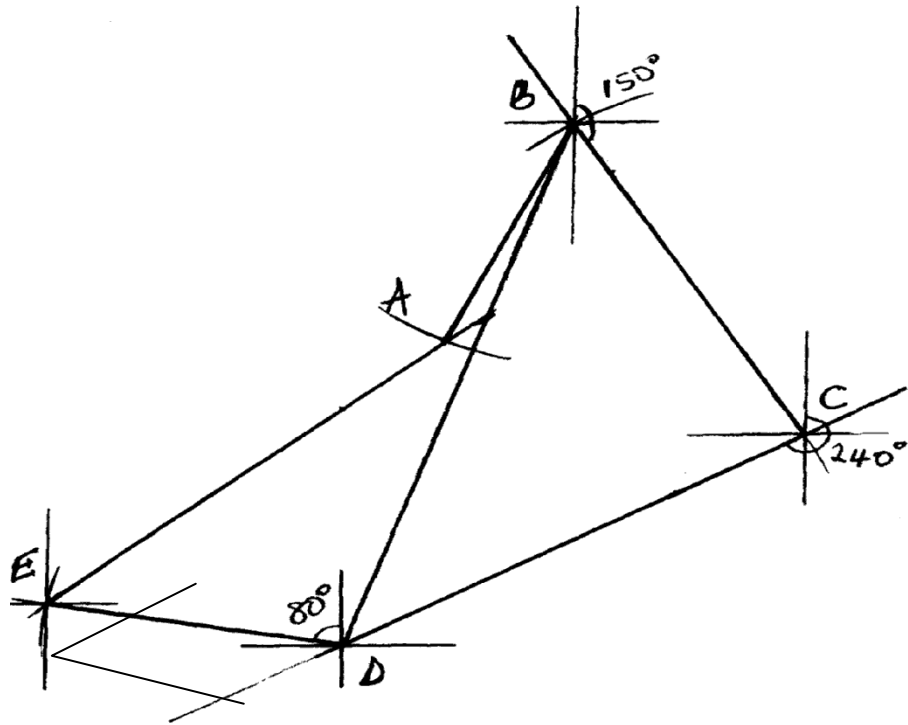
b) i) $AD = 4.5 + 0.1\text{cm}$
Distance A + D
 $= 4.5 \times 10 = 45\text{km}$

ii) Bearing of (i) from B
 $= 241 + 1$

iii) Bearing P from D
 $= 123 = 2$

iv) $Dp = 12.9 + 0.2 \text{ am}$
Distance D + P = 12.9×10
 $= 129 \text{ km}$

25. a)

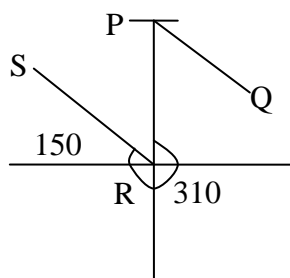


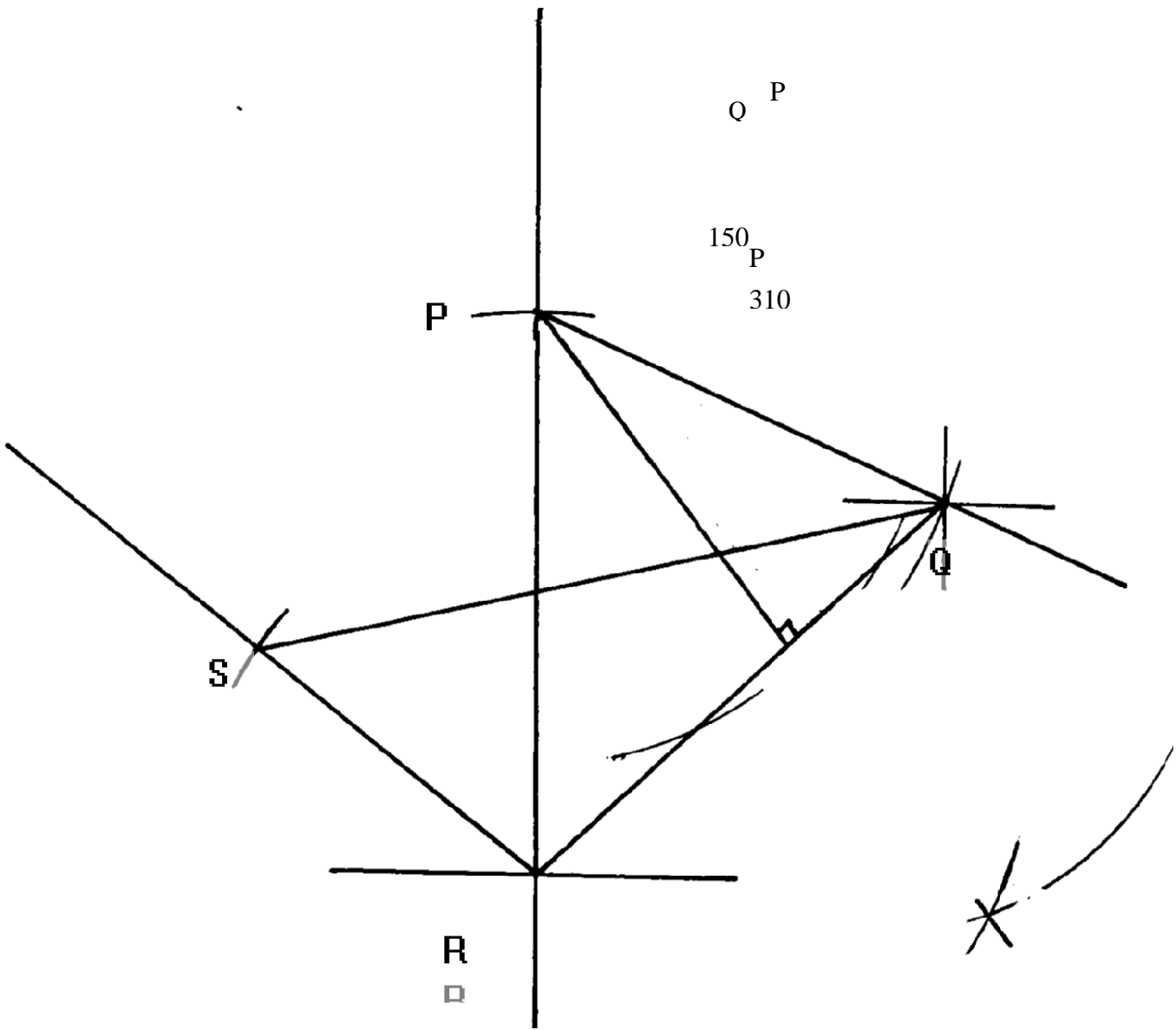
b) i) $6.8 + 0.1\text{cm}$
Distance Ae = $340 + 5\text{ km}$

ii) $180 + 18 = 198 + 2$

26. a)

310^{P}





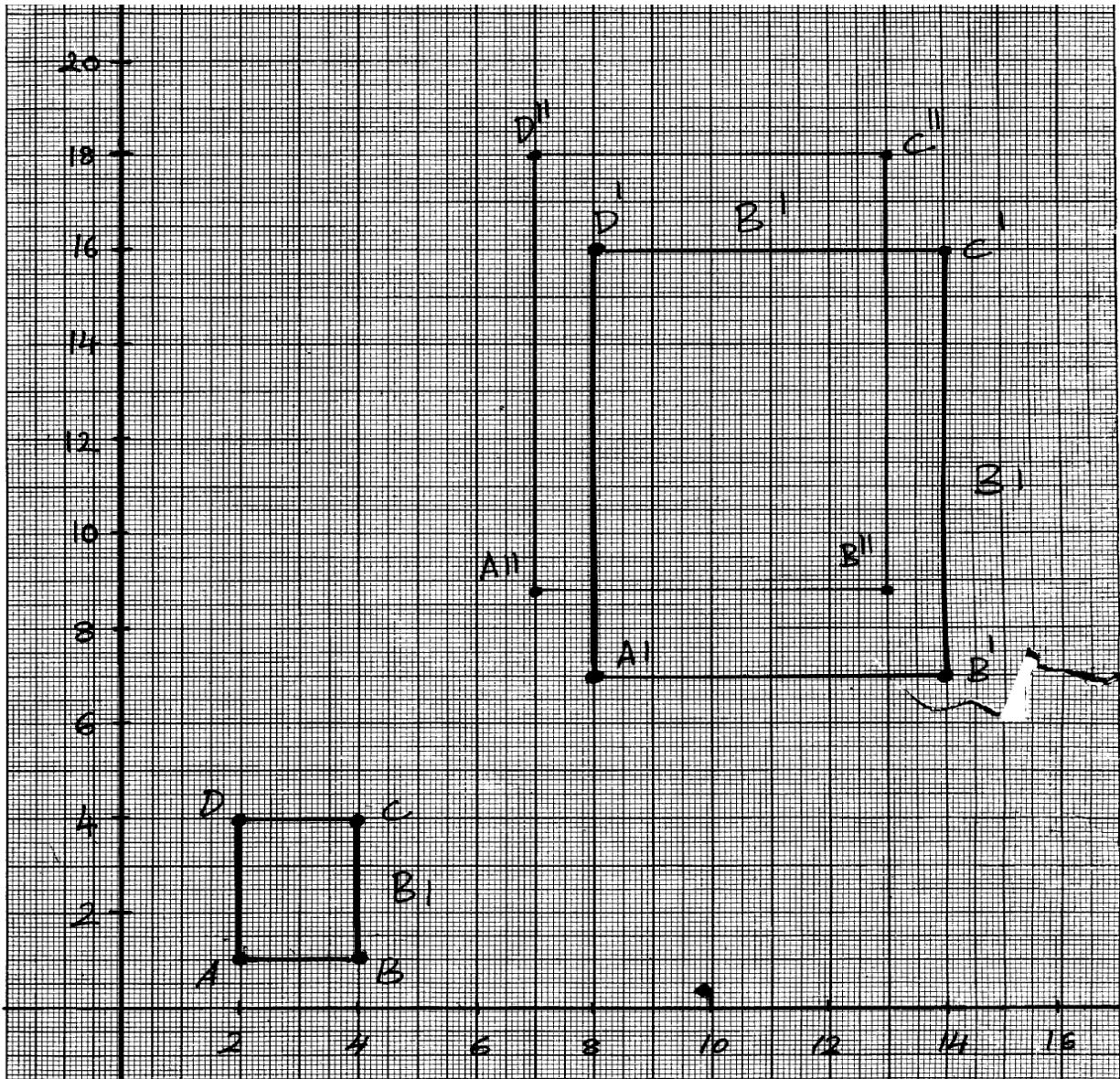
- b) (i) $SP = 7.8 \times 50 = 390 \text{ km} \pm 5 \text{ km}$
(ii) $S \ \& \ Q = 255^\circ \pm 1^\circ$
(iii) $4 \times 50 = 200 \text{ km} + 5 \text{ km}$

27. (a) Scale = 50km
Drawing accurately $\angle NCE = 25^\circ$
 $\angle NCT = 145^\circ$
 $\angle NTY = 90^\circ$
Lines drawn //

(b) By measurement:

- (i) Distance $SY = 6.9 \times 50 = 345 \pm 5 \text{ km}$
Bearing Y For S = $360^\circ - 114 = 246 \pm 1^\circ$
(ii) distance $ST = 7.9 \times 50 = 39.5 \pm 5 \text{ km}$
(iii) distance $YT = 9.8 \times 50 = 490 \text{ km}$

28.



$XY = 250m$

Area of A = $\frac{1}{2} \times 50 \times 60 = 1500m^2$

B = $\frac{1}{2} \times 70 \times 60 = 2100m^2$

C = $\frac{1}{2} (60 + 80) \times 120 = 11050m^2$

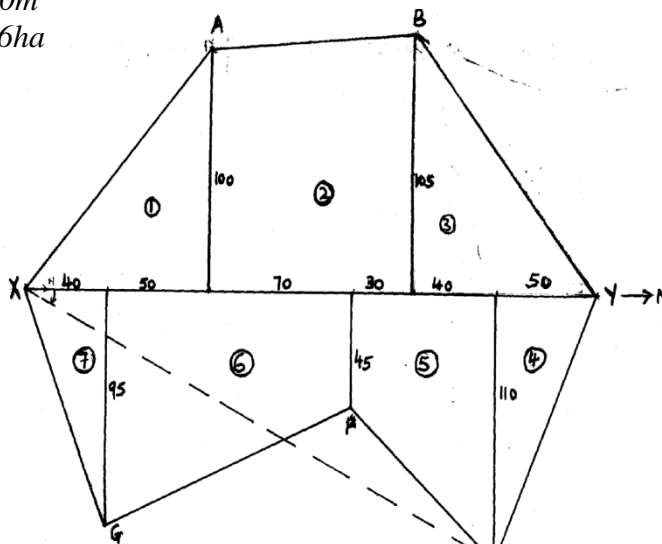
D = $\frac{1}{2} \times 80 \times 80 = 3200m^2$

F = $\frac{1}{2} \times 10 \times 70 = 350m^2$

Total area = $26600m^2$

Ha = $\frac{26600}{10,000} = 2.66ha$

29.



(b) Total area = area (1) + (2) + (3) + (4) + (5) + (6) + (7)

$$\text{Area (1)} = \frac{1}{2} \times 90 \times 100 = 4500\text{m}^2$$

$$(2) = \frac{(100 + 105)10}{2} = 10250\text{m}^2$$

$$(3) = \frac{1}{2} \times 90 \times 105 = 4725\text{m}^2$$

$$(4) = \frac{1}{2} \times 50 \times 110 = 2750\text{m}^2$$

$$(5) = \frac{1}{2} \times (110 + 45)70 = 5425\text{m}^2$$

$$(6) = \frac{(45 + 95) 120}{2} = 8400\text{m}^2$$

$$(7) = \frac{1}{2} \times 40 \times 95 = 1900\text{m}^2$$

$$\text{Total area} = 37,950\text{m}^2$$

$$\text{In hectares} = \frac{(37950)}{10,000} \text{ ha} = 3.795\text{ha}$$

(c) (i) bearing of E from x is $0.25 \pm 1^\circ$

$$(ii) \text{Distance Ex} = (12.8 \ 0.1 \times 20\text{m}) = 256 \pm 2\text{m}$$

30. Area

$$A = \frac{1}{2} \times 170 \times 80 = 6800$$

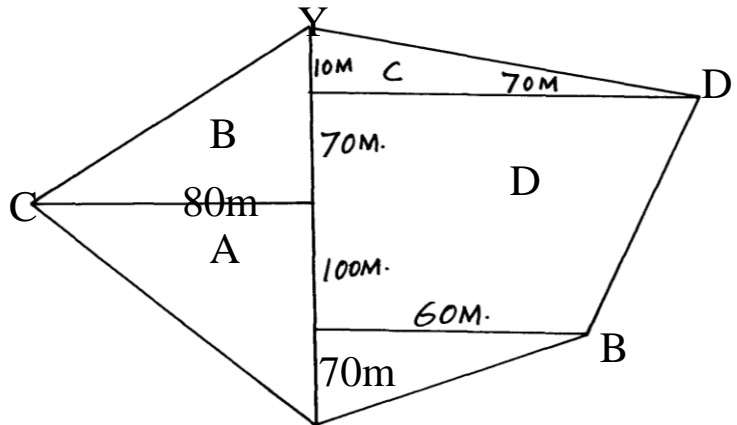
$$B = \frac{1}{2} \times 80 \times 80 = 3200$$

$$C = \frac{1}{2} \times 10 \times 70 = 350$$

$$D = \frac{1}{2} \times 170 \times 130 = 11050$$

$$E = \frac{1}{2} \times 70 \times 60 = 2100$$

$$\text{Total} = 23,500 \text{ m}^2$$



31. (a) L.s.f = 1

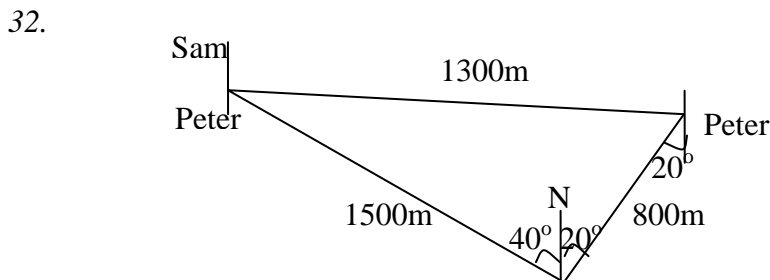
$$\frac{1}{40,000} = \frac{3.25}{x}$$

$$x = 130,000\text{cm}$$

(b) A.s.f

$$\left(\frac{1}{40,000} \right)^2 = \left(\frac{x}{36,000,000} \right)^2$$

$$x = 0.0225\text{cm}^2$$

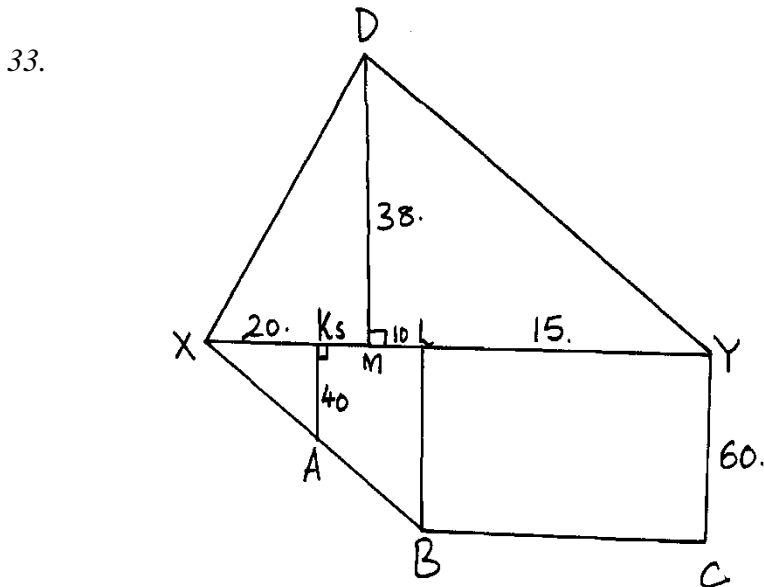


(a) bearing = $180 + 20 = 200^\circ$ John

(b) $a^2 = 1500 +$
 $a^2 = b^2 + c^2 - 2bc \cos A$

$$\begin{aligned}
 a^2 &= 1500^2 + 800^2 - 2 \times 1500 \times 800 \cos 60 \\
 &= 2250000 + 640000 - 1200000 \\
 &= 1690000 \\
 \therefore a &= 1300m
 \end{aligned}$$

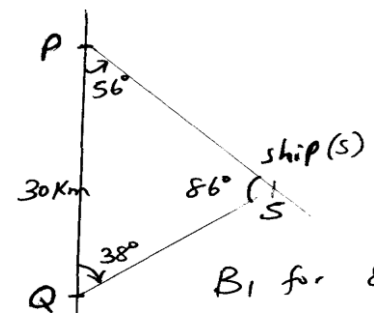
(c) $\frac{1300}{\sin 60} = \frac{1500}{\sin c}$
 $1300 \sin c = 1500 \sin 60$
 $\sin c = \frac{1500 \sin 60}{1300}$
 $= 0.9993$
 $\therefore c = 87.79^\circ$
 $c = 87.80$



Area of $\triangle XYD = \frac{1}{2} \times 50 \times 38 = 950m^2$
Area of $XBCY = \frac{1}{2} (50 + 15) 60$
 $= \frac{1}{2} \times 65 \times 60$
 $= 1950m^2$
Total Area $= (950 + 1950)m^2$
 $= 2900m^2$

34. B_1 for 86°
 $\frac{30}{\sin 86^\circ} = \frac{QS}{\sin 56^\circ}$
 $QS = \frac{30 \sin 56^\circ}{\sin 86^\circ}$
 $= 24.93km$

35. $1cm$ for $100000cm$
 $1cm^2 = (100000cm)^2$
Area $= 5.4 \times 4.5 \times 100000 cm^2$
 $= \frac{5.4 \times 4.5 \times 100000 \times 100000 Km^2}{100000 \times 100000}$
 $= 24.3km^2$

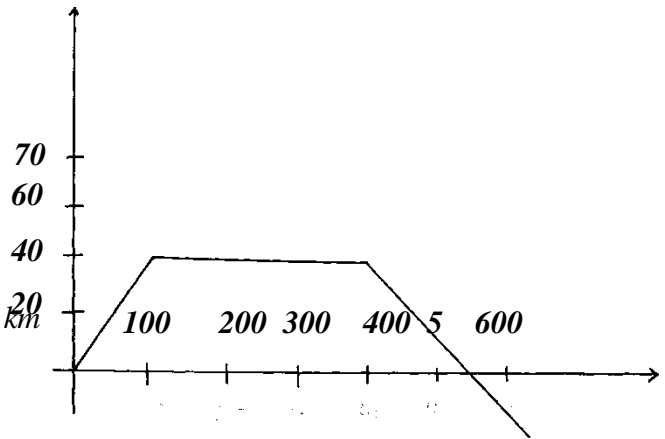


36. $\frac{\theta}{360} \times \frac{22}{7} \times 6370 \times 2 = 900$
 $= \frac{900 \times 360 \times 7}{22 \times 6370 \times 2}$
 $= 8.1^\circ$
 Latitude of B = $8.1^\circ - 5^\circ N$
 $= 3.5^\circ S$

37. i) $acc = \frac{40 - 20}{100 - 50}$
 $= \frac{20}{50} = 0.4 m/s$

ii) $\frac{20 - 40}{460 - 400} = \frac{-20}{60} = 0.3333 m/s^2$

iii) Area = $\frac{1}{2} (520 + 300) \times 40 \times \frac{1}{1000} = 16.4 km$

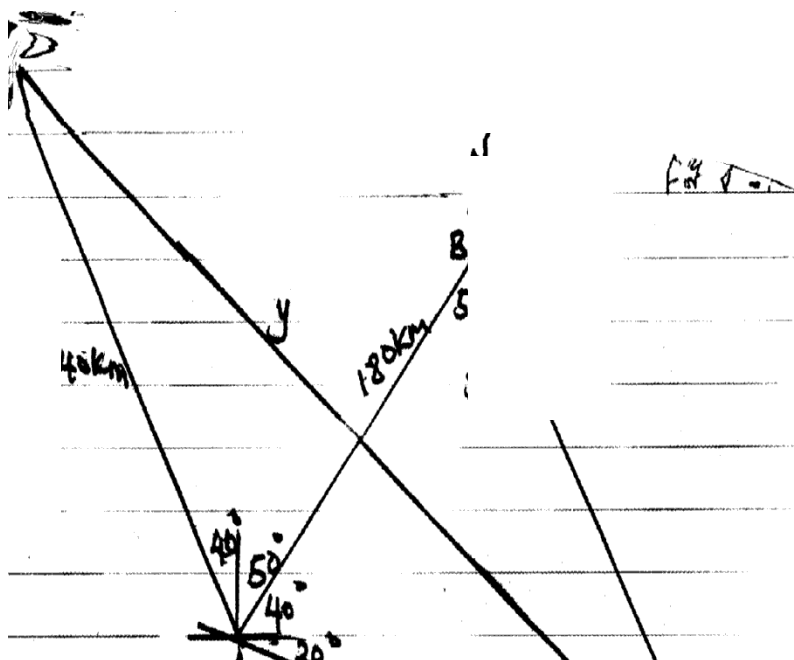


38. a) $Tan 11.3 = \frac{200}{x}$
 $x = \frac{200}{Tan 11.3} = 100.1m$

b) $\frac{(36 \times 1000) m/s}{60 \times 60}$
 $D = (10 \times 5) 50m \quad Tan \theta = 7.590$
 < of depression = 7.590

c) i) $\sqrt{50.9^2 - 49.9^2} = 10.04cm$
 ii) $Tan \theta = \frac{10.04}{200}$
 $= 2.874^\circ$
 $= 3^\circ$

39. a) Make a sketch to show positive of A, B, C and D



For \checkmark sketch
 For \checkmark exp. of x
 For \checkmark ans.
 For \checkmark Sub.
 $\checkmark \cos 150$
 For taking sq. root.
 For exp. of BC

Use sine rule in $\triangle ABC$

$$\frac{x}{\sin 80^\circ} = \frac{180}{\sin 40^\circ} \Rightarrow x = \frac{180 \sin 80^\circ}{\sin 40^\circ}$$
$$= 275.8$$

Hence $AC = 276 \text{ km}$

(b) Use the cosine rule in $\triangle AD$ when $\angle DAC = 150^\circ$

$$y^2 = 240^2 + 276^2 - 2 \times 240 \times 276 \cos 150^\circ$$
$$= 576000 + 76180 - 132480 (-\cos 30^\circ)$$
$$= 133776 + 114731 = 248507$$

$$y = \sqrt{248507}$$
$$= 498.5$$

Hence $CD = 499 \text{ km}$

(c) Using sine rule in $\triangle ABC$ we have

$$\frac{BC}{\sin 60^\circ} = \frac{180}{\sin 40^\circ}$$

$$BC = \frac{180 \sin 60^\circ}{\sin 40^\circ}$$
$$= 242.5$$
$$= 243 \text{ km}$$