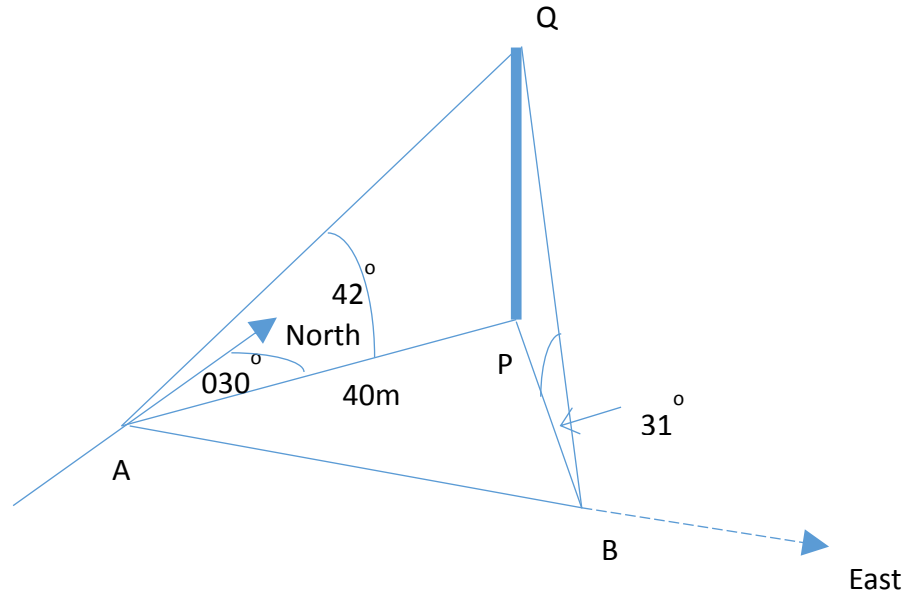


Section 3: The sine and cosine rules

Solutions to Exercise level 3

1. (i)



(ii) $PQ = 40 \tan 42^\circ \approx 36.02$

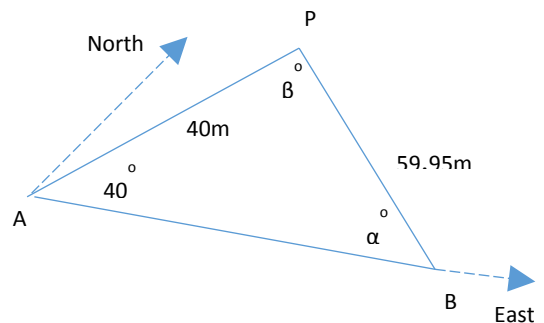
$\Rightarrow PB \approx \frac{36.02}{\tan 31^\circ} = 59.95$

$\angle PAB = 60^\circ$

so in $\triangle PAB$, $\frac{\sin \alpha}{40} = \frac{\sin 60^\circ}{59.95}$

$\Rightarrow \sin \alpha \approx 0.578$

$\Rightarrow \alpha \approx 35.3^\circ$, and so $\beta \approx 84.7^\circ$



$AB^2 = 40^2 + (59.95)^2 - 2(40)(59.95)\cos 84.7^\circ$
 ≈ 4750.99

$\Rightarrow AB \approx 68.9$

so she has walked approximately 68.9 metres from A to B

(iii) The bearing of the mast from B is approximately 324.7° .

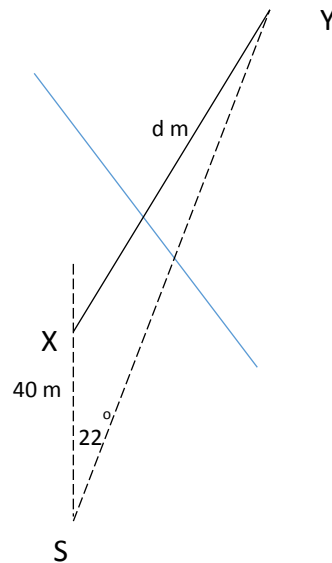
Edexcel AS Maths Trigonometry 3 Exercise solutions

2. (i) $\angle YXS = 140^\circ \Rightarrow \angle XYS = 18^\circ$

$$\Rightarrow \frac{d}{\sin 22^\circ} = \frac{40}{\sin 18^\circ}$$

$$\Rightarrow d \approx 48.49$$

so the bridge is approximately 48.5m long.



(ii) $PQ = 48.49 - 20 = 28.49$

$$\angle QPD = \angle QPE - \angle DPE$$

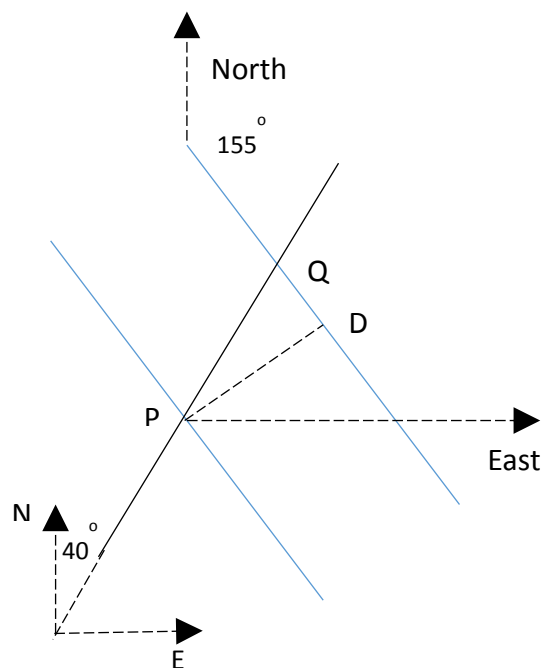
$$= 50^\circ - 25^\circ$$

$$= 25^\circ$$

$$\Rightarrow PD = PQ \cos 25^\circ$$

$$\approx 25.8$$

so the canal is 25.8 m wide.



(iii) $XH = \frac{1}{2}XY = 24.25$

$$HR = (24.25) \sin 40^\circ$$

$$\approx 15.59$$

$$RX = (24.25) \cos 40^\circ$$

$$\approx 18.58$$

$$\tan \alpha = \frac{15.59}{40 + 18.58}$$

$$\approx 0.266$$

$$\Rightarrow \alpha \approx 14.9^\circ$$

so the bearing of H from the surveyor is 015° .

