



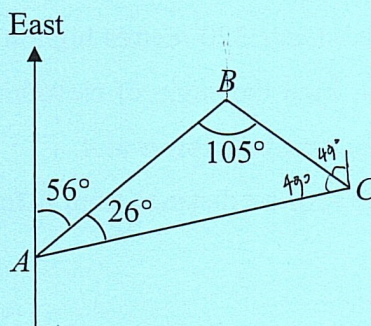
Name: Wen Ren Hoo (27) Class: 3L1 Date: 9th Sept

MA304.4.E1 – Bearings and 3D Problems Exercise

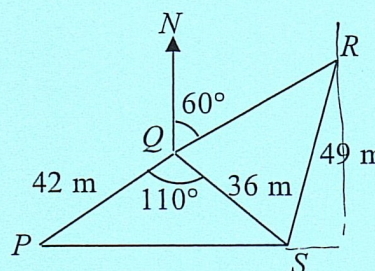
- A man drives for 8 km in the direction 120° and then 10 km in the direction 210° .
 - How far is he from the starting point?
 - What direction must he now travel to return to the starting point?
- A whirlpool lies 150 m due north of a seaman. He begins to steer his boat and travel at a direction of 065° . Determine how far he must sail before he is
 - due east of the whirlpool,
 - as close as possible to the whirlpool,
 - equidistant from his original position and the whirlpool.

- The figure shows the positions of three points A , B and C . State the bearing of

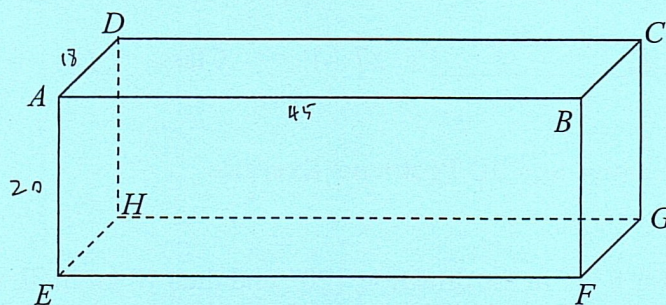
- B from A
- C from A
- A from B
- C from B
- A from C
- B from C



- The figure shows the position of four points P , Q , R and S in a plane. S is due east of P . The three points P , Q and R are **not** on a straight line.
 - Calculate the distance PS .
 - Calculate the bearing of S from R .



5. A rectangular cuboid, with base $EFGH$, lies on a horizontal ground and has sides $AE = 20$ cm, $AD = 18$ cm and $AB = 45$ cm.



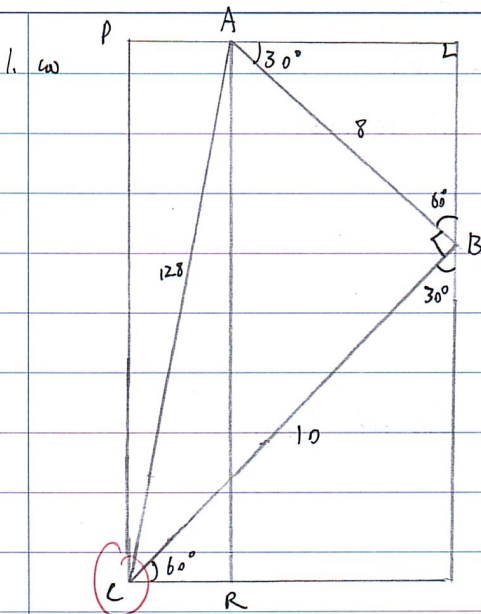
- (a) Find the angle of elevation of D from F .
 - (b) Find the angle made between the triangle BDF and the rectangle $BCGF$.
 - (c) A 30 cm stick stands vertically at the midpoint of AB . Find the angle of elevation of the top of the stick from G .
6. It is given that B is at a bearing between 000° and 090° from A , and is 150 metres away from C , where the latter is 220 metres due east of A . Given that $\angle ABC = 90^\circ$, find the distance of B from A .
- (a) If D is a point such that $ABCD$ forms a rectangle, find the bearing of D from B .
 - (b) A tower stands 320 metres high at point D while another stands 180 metres high at point A . Find the angle of elevation of a man standing on the top of the tower at D from the top of the tower at A .
 - (c) Find the shortest distance from D to AC .



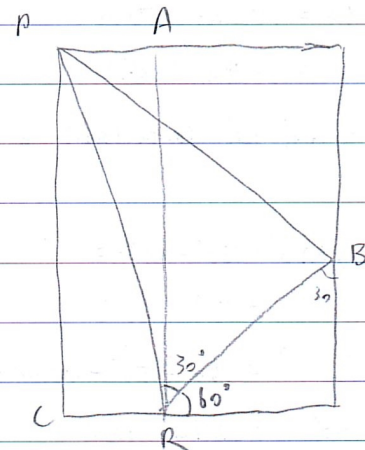
B-

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Wrong representation...



$$\angle ABC = 180^\circ - 30^\circ - (180^\circ - 90^\circ - 30^\circ)$$

$$= 90^\circ$$

$$\text{Length of } AC = \sqrt{10^2 + 8^2} \text{ km}$$

$$= 12.8 \text{ km (3 s.f.)}$$

$\therefore$ He was 12.8 km from the starting point.

$$\frac{8 \text{ km}}{\sin(\angle ACB)} = \frac{12.8 \text{ km}}{\sin(90^\circ)}$$

$$\angle ACB = \sin^{-1}\left(\frac{8 \sin(90^\circ)}{12.8 \text{ km}}\right)$$

$$= \sin^{-1}\left(\frac{8}{12.8}\right)$$

$$\angle PCA = \sin^{-1}\left(\frac{8}{12.8}\right) + 60^\circ - 90^\circ$$

$$= 8.7^\circ \text{ (1 d.p.)}$$

it's just sine ratio.

$$\angle APB = \tan^{-1}\left(\frac{10}{8}\right)$$

$$= 51.3^\circ \text{ (1 d.p.)}$$

$$\angle PRB = 90^\circ - 51.3^\circ$$

$$= 38.7^\circ$$

$$\angle PRA = 38.7^\circ - 30^\circ = 8.7^\circ$$

$$\text{Bearing: } 351.3^\circ$$

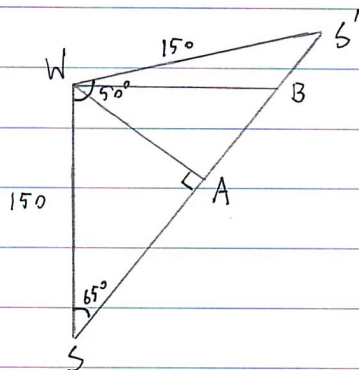
based on wrong diagram

did you answer the question?



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2.



$$\cos(65^\circ) = \frac{150 \text{ m}}{SB}$$

$$SB = \frac{150 \text{ m}}{\cos(65^\circ)}$$

$$= 355 \text{ m (3sf.)}$$

He needs to sail 355 m (3sf.)

$$\cos(65^\circ) = \frac{SA}{150}$$

$$SA = 150 \cos(65^\circ) \text{ m}$$

$$= 63.4 \text{ m (3sf.)}$$

He must sail 63.4 m (3sf.) to be closest to the whirpool.

$$\angle WS'S' = 180^\circ - 65^\circ \times 2$$

$$= 50^\circ$$

$$(SS')^2 = 150^2 + 150^2 - 45000 \cos(50^\circ) \text{ m}^2$$

$$SS' = 127 \text{ m (3sf.)}$$

He needs to sail 127 m (3sf.)

177 m

Wrong understanding
of question.

3. $\cos 146^\circ$

$\cos 172^\circ$

$\cos 326^\circ$

$\cos 221^\circ$

$\cos 352^\circ$

$\cos 041^\circ$

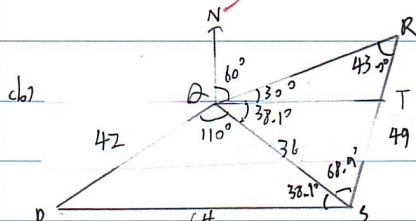
working? presentation?



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4. (a) $PS^2 = 42^2 + 36^2 - 2 \cdot 42 \cdot 36 \cos(110^\circ) \text{ m}^2$
 $PS = 64.0 \text{ m (3sf.)}$



$$\frac{42}{\sin(\angle QSP)} = \frac{64}{\sin(110^\circ)}$$

$$\angle QSP = \sin^{-1}\left(\frac{42 \sin(110^\circ)}{64}\right)$$

$$= 38.1^\circ \text{ (1d.p.)}$$

$$\angle TQS = \angle QSP = 38.1^\circ \text{ (1d.p.)}$$

$$\frac{49}{\sin(68.1^\circ)} = \frac{36}{\sin(\angle QRS)}$$

$$\angle QRS = \sin^{-1}\left(\frac{36 \sin(68.1^\circ)}{49}\right)$$

$$= 43.0^\circ \text{ (1d.p.)}$$

$$\angle QSR = 180^\circ - 68.1^\circ - 43.0^\circ$$

$$= 68.9^\circ \text{ (1d.p.)}$$

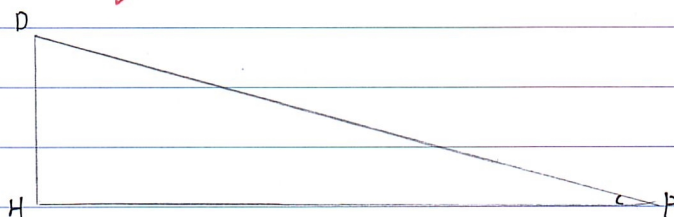
$$\text{Bearing of S from R} = 180^\circ + (90^\circ - 73^\circ)$$

$$= 197^\circ$$

exactly
197.0?

$$197.0^\circ \text{ (1d.p.)}$$

5. (a)

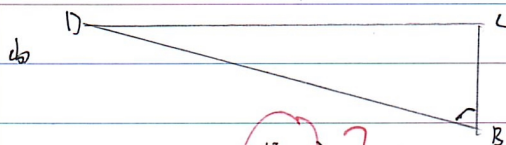


$$\text{Length of HF} = \sqrt{18^2 + 45^2} \text{ cm}$$

$$= 48.5 \text{ cm (3sf.)}$$

$$\text{Angle of elevation} = \tan^{-1}\left(\frac{18}{48.5}\right)$$

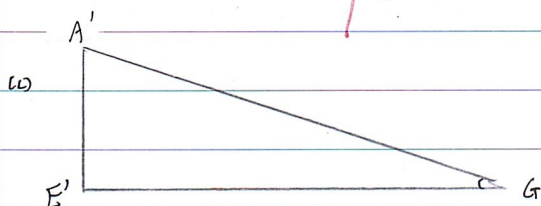
$$= 22.4^\circ \text{ (1d.p.)}$$



$$\text{Angle} = \cos^{-1}\left(\frac{18}{28.5}\right) ?$$

$$= 50.8^\circ \text{ (1d.p.)}$$

$$68.2^\circ$$



$$E'G = \sqrt{22.5^2 + 30.1^2} \text{ cm}$$

$$= 30.1 \text{ cm (3sf.)}$$

$$E'G = \sqrt{22.5^2 + 50^2} \text{ cm}$$

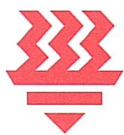
$$= 54.8 \text{ cm (3sf.)}$$

$$\text{Angle of elevation} = \tan^{-1}\left(\frac{30}{30.1}\right)$$

$$= 44.9^\circ \text{ (1d.p.)}$$



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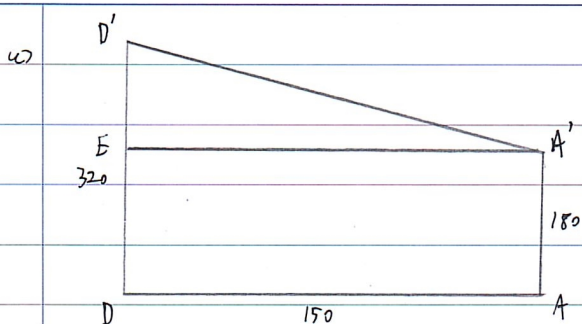


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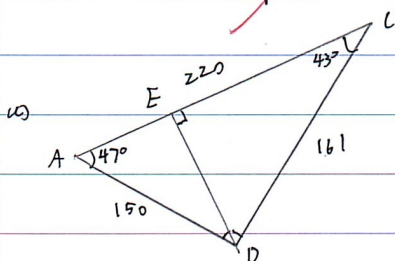
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$$\angle D'A'E = \tan^{-1}\left(\frac{140}{150}\right) \\ = 43.0^\circ \text{ (1 d.p.)}$$

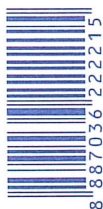
statement? The angle of elevation is 43.0° (1 d.p.)



$$\frac{DE}{\sin(43^\circ)} = \frac{161}{\sin(90^\circ)}$$

$$DE = \frac{161 \sin(43^\circ)}{\sin(90^\circ)} \text{ cm} \\ = 110 \text{ cm (1 d.p.)}$$

I wonder - what really
is your attitude
towards assignments? 14/9/21
You don't care because it is
non-consequential to your grades?



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