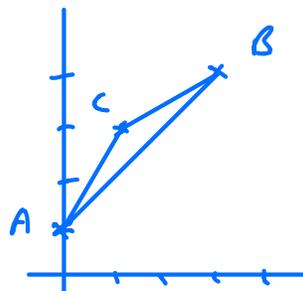


Mixed Exercise 9

Q7 $A(0, 1)$
 $B(3, 4)$
 $C(1, 3)$



c $AB = \sqrt{(3-0)^2 + (4-1)^2} = \sqrt{18}$

a $BC = \sqrt{(3-1)^2 + (4-3)^2} = \sqrt{5}$

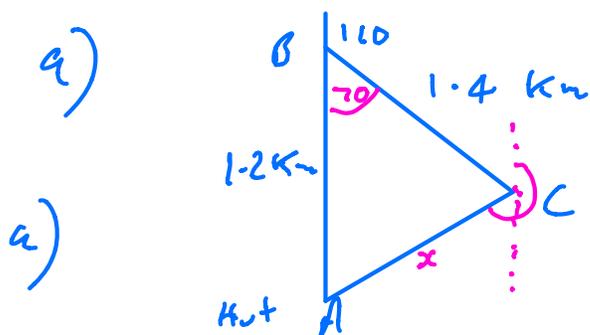
b $AC = \sqrt{(1-0)^2 + (3-1)^2} = \sqrt{5}$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

$$\cos C = \frac{5 + 5 - 18}{2 \times \sqrt{5} \times \sqrt{5}} = \frac{-8}{10} = -\frac{4}{5}$$

b) $\text{Area} = \frac{1}{2} ab \sin C$
 $= \frac{1}{2} \sqrt{5} \sqrt{5} \times \frac{3}{5}$
 $= \frac{3}{2} \text{ units}^2$

$$\begin{aligned} \sin C &= \sqrt{1 - \cos^2 C} \\ &= \sqrt{\frac{25}{25} - \frac{16}{25}} \\ &= \frac{3}{5} \\ &= +\frac{3}{5} \end{aligned}$$



$$x^2 = 1.2^2 + 1.4^2 - 2 \times 1.2 \times 1.4 \cos 70^\circ \quad \text{cosine rule}$$

$$x = 1.50 \text{ km}$$

so 1.50 km from hut

b)

$$\text{Sine Rule} \quad \frac{1.4}{\sin A} = \frac{1.50}{\sin 70}$$

$$\frac{\sin A}{1.4} = \frac{\sin 70}{1.50}$$

$$\sin A = \frac{\sin 70}{1.50} \times 1.4$$

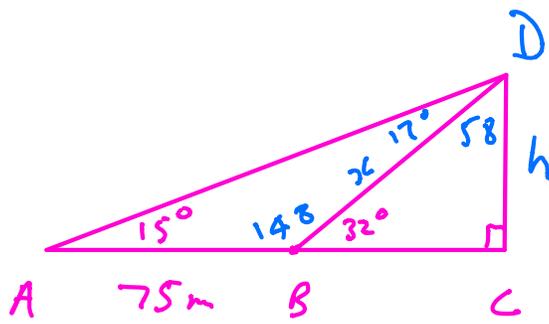
$$A = \sin^{-1} \left(\frac{\sin 70}{1.50} \times 1.4 \right)$$

$$A = 61.3^\circ$$

$$\begin{aligned} \text{Bearing of hut from C} &= 180^\circ + 61.3^\circ \\ &= 241^\circ \end{aligned}$$

$$\begin{aligned} \text{c) Area} &= \frac{1}{2} \times 1.2 \times 1.4 \times \sin 70 \\ &= 0.789 \text{ km}^2 \end{aligned}$$

11)



In $\triangle ABD$ sine rule

$$\frac{75}{\sin 17^\circ} = \frac{x}{\sin 15^\circ}$$

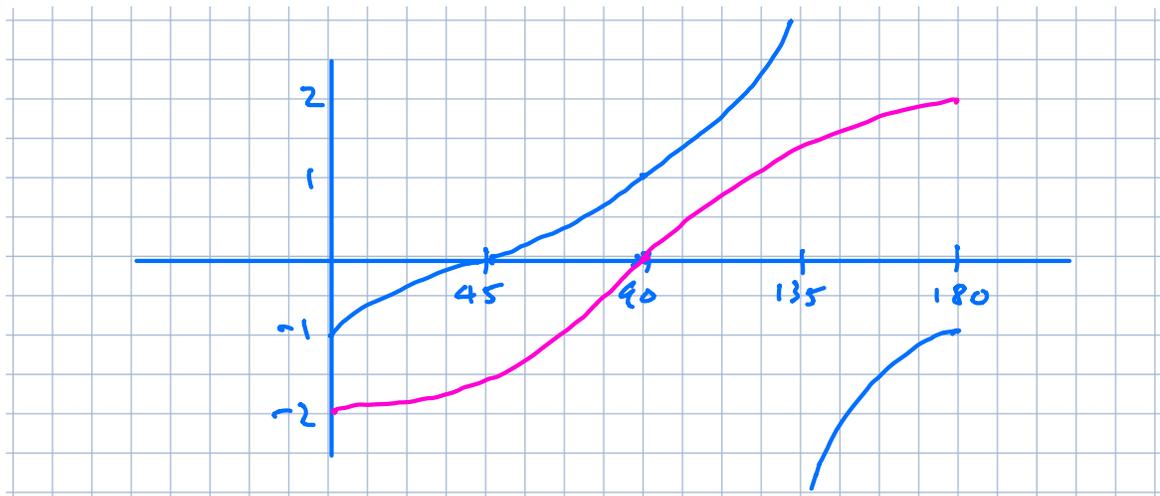
$$x = \frac{75}{\sin 17} \times \sin 15 = 66.393 \text{ m}$$

In $\triangle BCD$ $\sin 32^\circ = \frac{h}{x}$

$$66.393 \times \sin 32^\circ = h$$

$$h = 35.2 \text{ m}$$

Q13



0 solutions to $\tan(x-45^\circ) + 2\cos x = 0$

Q 15 $f(x) = \sin px \quad p \in \mathbb{R}, \quad 0 < x \leq 360^\circ$

Aside: Set Notation

\mathbb{N} natural numbers
1, 2, 3, 4, ...

\mathbb{Z} integers ... -2, -1, 0, 1, 2, 3, ...

\mathbb{Q} rationals $\frac{p}{q}$ where p, q
integers

\mathbb{R} reals

\in is a member of

$:$ such that

\exists there exists

$$p = \frac{180}{36} = 5$$

$y = \sin 5x$ crosses x -axis at 36°

$$\text{Period} = \frac{360}{5} = 72^\circ$$
