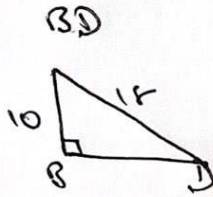


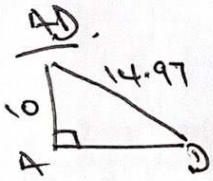
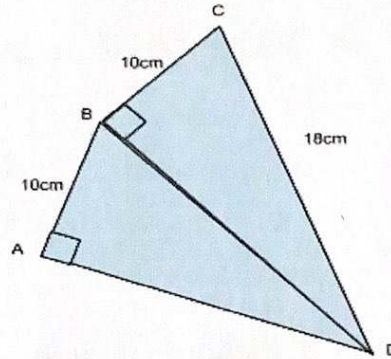


QT Pythagoras' Theorem - Challenging

- 1 (a) Calculate the lengths BD and AD, giving your answers correct to 2 decimal places.
(b) What is the total perimeter of the shape?
(c) What is the total area of the quadrilateral?



$$\begin{aligned}a^2 &= b^2 + c^2 \\18^2 &= 10^2 + c^2 \\18^2 - 10^2 &= c^2 \\14.966 &= c \\BD &= \underline{\underline{14.97\text{cm}}}\end{aligned}$$



$$\begin{aligned}a^2 &= b^2 + c^2 \\224 &= 10^2 + c^2 \\224 - 10^2 &= c^2 \\11.1355 &= c \\AD &= \underline{\underline{11.14\text{cm}}}\end{aligned}$$

(b) Perimeter

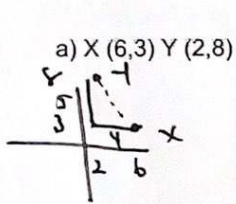
$$\begin{aligned}AB + BC + CD + DA \\10 + 10 + 18 + 11.14 \\= \underline{\underline{49.14\text{cm}}}\end{aligned}$$

(c) Area ABD + BCD

$$\begin{aligned}\frac{b \times h}{2} + \frac{b \times h}{2} \\ \left(\frac{10 \times 11.14}{2}\right) + \left(\frac{10 \times 14.97}{2}\right) \\ \underline{\underline{130.55\text{cm}^2}}\end{aligned}$$

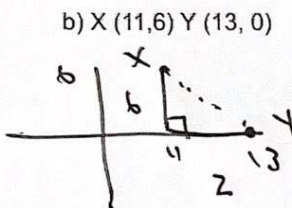


2. Find the length of XY when X and Y have the coordinates. Give your answer correct to 3 significant figures.



$$a^2 = b^2 + c^2$$
$$= 4^2 + 5^2$$
$$a^2 = 41$$

$$a = \sqrt{41} \rightarrow a = 6.403124 = \underline{\underline{6.40}}$$

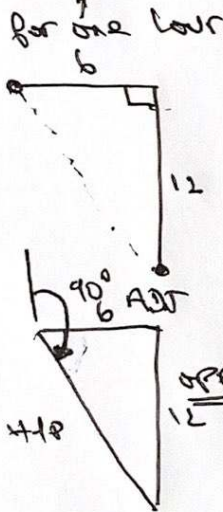


$$a^2 = b^2 + c^2$$
$$= 6^2 + 2^2$$

$$a^2 = 40$$

$$a = \sqrt{40} \quad a = 6.324555 = \underline{\underline{6.32}}$$

3. Joe travels at 12 km/h for an hour due north. He then turns due west and travels at 6 km/h. How far is he from his starting point? What bearing must he travel to return home?



$$a^2 = b^2 + c^2$$
$$= 6^2 + 12^2$$

$$a^2 = 180$$

$$a = 13.4164$$

$$\text{Distance} = 13.4 \text{ km (1 dp)}$$

Sol Cal Toa

$$\tan = \frac{\text{OPP}}{\text{ADJ}}$$

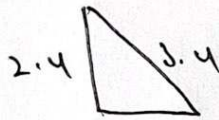
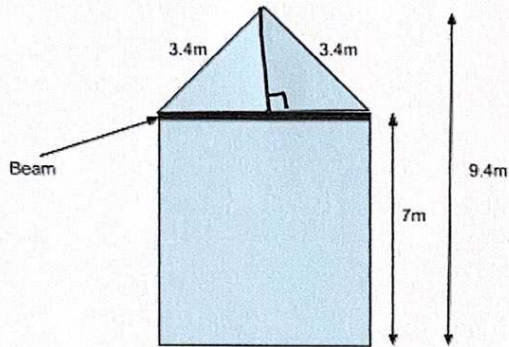
$$\tan x = \frac{12}{6}$$

$$\rightarrow \tan^{-1}\left(\frac{12}{6}\right) = 63.435^\circ$$

$$\therefore \text{Bearing } 90 + 63.435$$
$$\underline{\underline{153.435^\circ}}$$



4. A builder is replacing a roof beam and needs to know its length. The measurements he knows are shown on the diagram. How long should the beam be? Give your answer correct to 2 decimal places.



$$\begin{aligned} a^2 &= b^2 + c^2 \\ 3.4^2 &= 2.4^2 + c^2 \\ 3.4^2 - 2.4^2 &= c^2 \\ 5.8^2 &= c^2 \\ 2.4083 &= c \end{aligned}$$

$$\begin{aligned} \text{Total} &= 4.8166 \\ &= \underline{\underline{4.82\text{m}}} \end{aligned}$$