

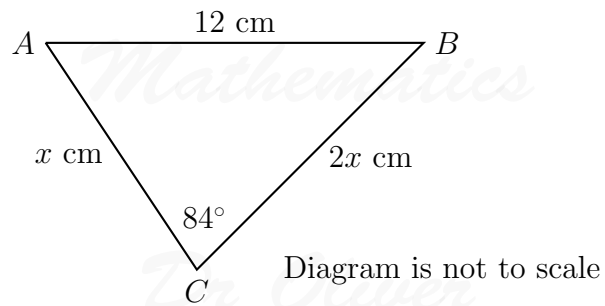
Dr Oliver Mathematics

Worked Examples

Super Trigonometry 3

From: Mathsbox 8/9 Revision Packs

1. The diagram shows triangle ABC .



- $AB = 12$ cm.
- $BC = 2x$ cm.
- $AC = x$ cm.
- $\angle ACB = 82^\circ$.

Find x .

Give your answer correct to 1 decimal.

Solution

We use the cosine rule:

$$\begin{aligned} AB^2 &= AC^2 + BC^2 - 2 \times AC \times BC \times \cos ACB \\ \Rightarrow 12^2 &= x^2 + (2x)^2 - 2 \times x \times 2x \times \cos 84^\circ \\ \Rightarrow 144 &= x^2 + 4x^2 - 4x^2 \cos 84^\circ \\ \Rightarrow 144 &= 5x^2 - 4x^2 \cos 84^\circ \\ \Rightarrow 144 &= x^2(5 - 4 \cos 84^\circ) \\ \Rightarrow x^2 &= \frac{144}{5 - 4 \cos 84^\circ} \\ \Rightarrow x &= \sqrt{\frac{144}{5 - 4 \cos 82^\circ}} \\ \Rightarrow x &= 5.606\,077\,527 \text{ (FCD)} \\ \Rightarrow x &= \underline{\underline{5.6 \text{ cm (1 dp)}}}. \end{aligned}$$