

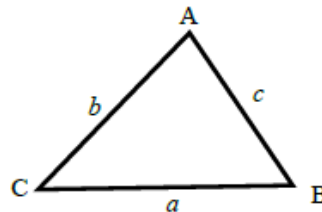
The Sine rule to find missing sides

A LEVEL LINKS

Scheme of work: 4a. Trigonometric ratios and graphs

Key points

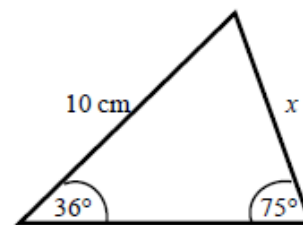
- a is the side opposite angle A .
 b is the side opposite angle B .
 c is the side opposite angle C .

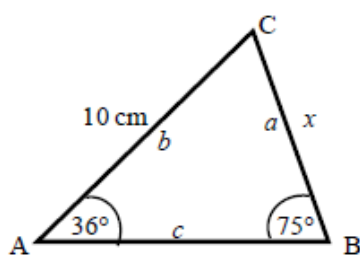


- You can use the sine rule to find the length of a side when its opposite angle and another opposite side and angle are given.
- To calculate an unknown side use the formula $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$.
- Alternatively, you can use the sine rule to find an unknown angle if the opposite side and another opposite side and angle are given.
- To calculate an unknown angle use the formula $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$.

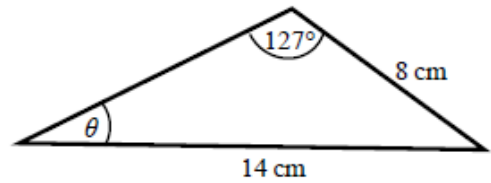
Examples

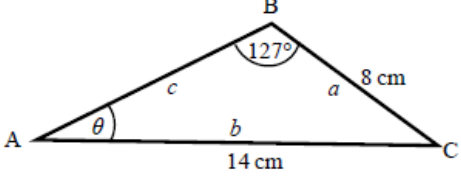
Example 1 Work out the length of side x .
Give your answer correct to 3 significant figures.



 $\frac{a}{\sin A} = \frac{b}{\sin B}$ $\frac{x}{\sin 36^\circ} = \frac{10}{\sin 75^\circ}$ $x = \frac{10 \times \sin 36^\circ}{\sin 75^\circ}$ $x = 6.09 \text{ cm}$	<ol style="list-style-type: none"> 1 Always start by labelling the angles and sides. 2 Write the sine rule to find the side. 3 Substitute the values a, b, A and B into the formula. 4 Rearrange to make x the subject. 5 Round your answer to 3 significant figures and write the units in your answer.
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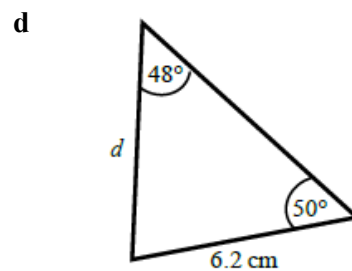
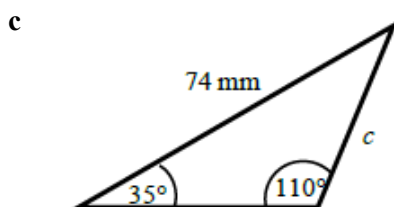
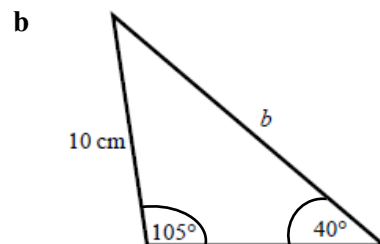
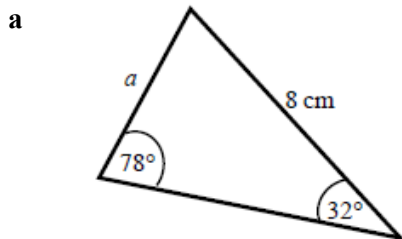
Example 2 Work out the size of angle θ .
Give your answer correct to 1 decimal place.



 $\frac{\sin A}{a} = \frac{\sin B}{b}$ $\frac{\sin \theta}{8} = \frac{\sin 127^\circ}{14}$ $\sin \theta = \frac{8 \times \sin 127^\circ}{14}$ $\theta = 27.2^\circ$	<ol style="list-style-type: none"> 1 Always start by labelling the angles and sides. 2 Write the sine rule to find the angle. 3 Substitute the values a, b, A and B into the formula. 4 Rearrange to make $\sin \theta$ the subject. 5 Use \sin^{-1} to find the angle. Round your answer to 1 decimal place and write the units in your answer.
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Practice question

1 Find the length of the unknown side in each triangle.
Give your answers correct to 3 significant figures.



Answers

1 a 4.33 cm **b** 15.0 cm **c** 45.2 mm **d** 6.39 cm