

Area of a triangle

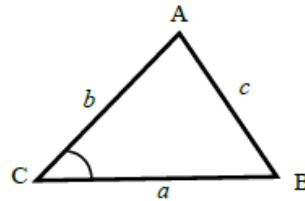
A LEVEL LINKS

Scheme of work: 4a. Trigonometric ratios and graphs

Textbook: Pure Year 1, 9.3 Areas of triangles

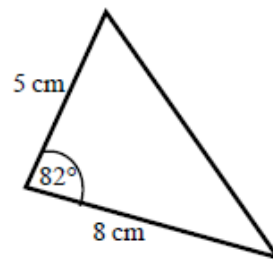
Key points

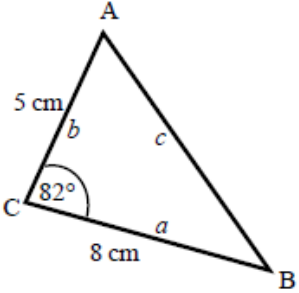
- a is the side opposite angle A .
 b is the side opposite angle B .
 c is the side opposite angle C .
- The area of the triangle is $\frac{1}{2}ab \sin C$.



Examples

Example 1 Find the area of the triangle.

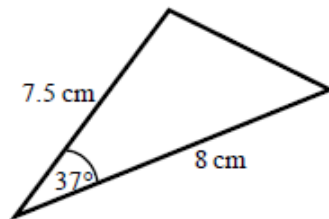


 <p>Area = $\frac{1}{2}ab \sin C$</p> <p>Area = $\frac{1}{2} \times 8 \times 5 \times \sin 82^\circ$</p> <p>Area = 19.805 361...</p> <p>Area = 19.8 cm²</p>	<ol style="list-style-type: none"> 1 Always start by labelling the sides and angles of the triangle. 2 State the formula for the area of a triangle. 3 Substitute the values of a, b and C into the formula for the area of a triangle. 4 Use a calculator to find the area. 5 Round your answer to 3 significant figures and write the units in your answer.
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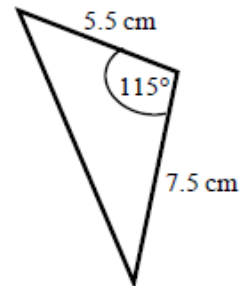
Practice questions

- 1 Work out the area of each triangle.
Give your answers correct to 3 significant figures.

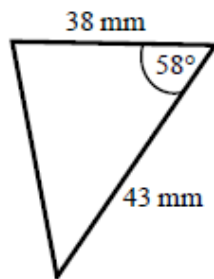
a



b



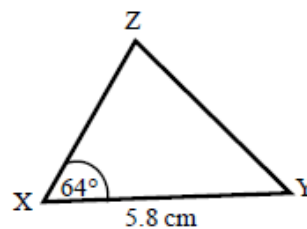
c



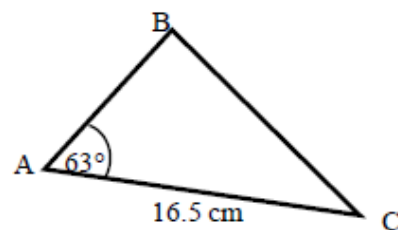
- 2 The area of triangle XYZ is 13.3 cm^2 .
Work out the length of XZ.

Hint:

Rearrange the formula to make a side the subject.



- 3 The area of triangle ABC is 86.7 cm^2 .
Work out the length of BC.
Give your answer correct to 3 significant figures.



- 4 In triangle ABC , $AC = 7$ cm, $BC = 10$ cm and angle $BAC = 65^\circ$
- (a) Find, to the nearest 0.1° , the size of angle ABC .
- (b) Find, in cm^2 to 3 significant figures, the area of triangle ABC .

5

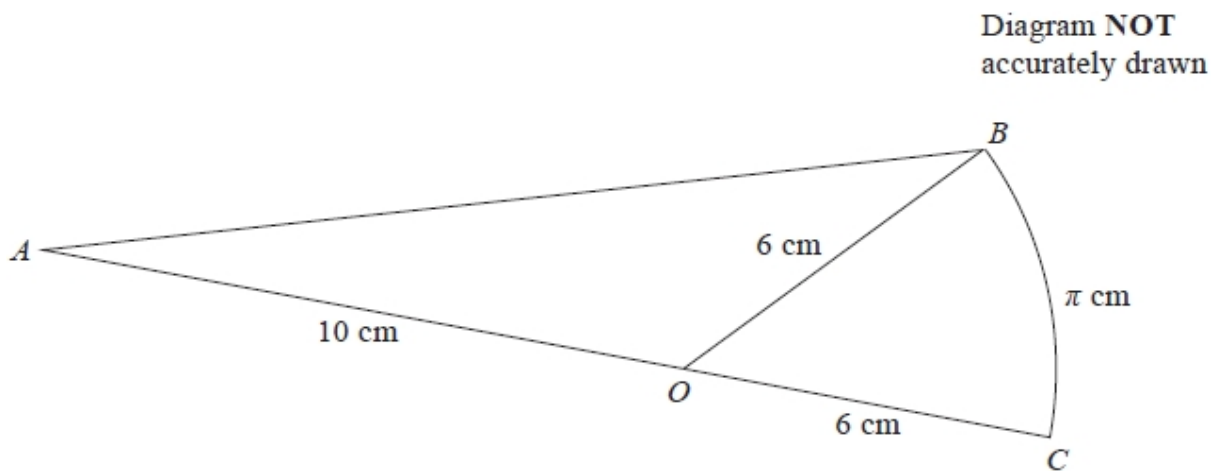


Figure 1

Figure 1 shows a shape ABC in which AOB is a triangle, AOC is a straight line and OBC is a sector of a circle with centre O .

$AO = 10$ cm, $OC = OB = 6$ cm and the length of arc $BC = \pi$ cm.

Find, to 3 significant figures,

- (a) the length of AB ,
- (b) the area of the shape ABC .

Answers

1 a 18.1 cm^2 b 18.7 cm^2 c 693 mm^2

2 5.10 cm

3 15.3 cm

4 a $B = 39.37\dots = 39.4^\circ$

b $\text{Area} = \frac{1}{2} \times 10 \times 7 \sin(180 - 65 - 39.37)$
 $= 33.90\dots = 33.9 \text{ (cm}^2\text{)}$

5 a $15.4894\dots = 15.5 \text{ cm}$

b $\text{Area} = \frac{1}{2} \times 10 \times 6 \times \sin \frac{5\pi}{6} + \frac{\pi}{6} \times \frac{6^2}{2} = 24.424\dots$