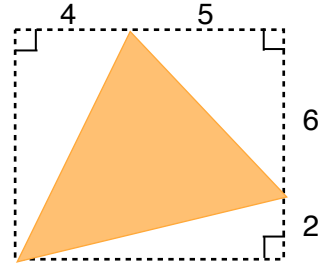


Area of Triangle involving Sine

Starter

1. **(Review of previous material)**
A right-angled triangle has sides 7, 24 and 25. Find its area.
2. **(Review of previous material)** Find the shaded area.



Notes

The area of a triangle is “half base times perpendicular height” or:

$$\text{Area of a triangle} = \frac{\text{base} \times \text{perpendicular height}}{2}$$

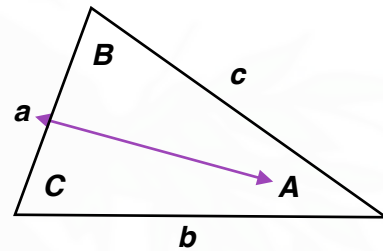
This is fine when we know the perpendicular height of the triangle. If we don't, the equation becomes more complicated.

Notation

A **capital letter** indicates an **angle**.

A **lower case** letter indicates a **side**.

A **lower case side** is opposite its **capital lettered angle**.

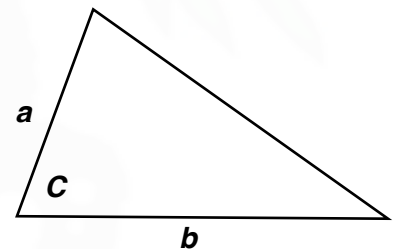


Formula for the area of a triangle involving sine

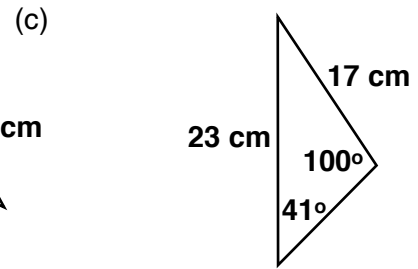
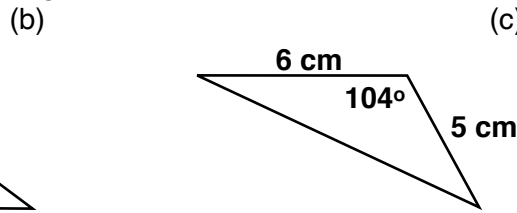
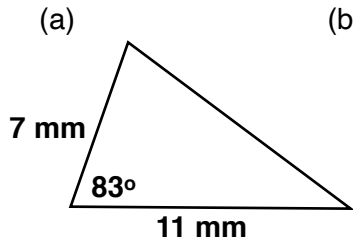
$$\text{Area of a triangle} = \frac{1}{2}ab \sin C$$

Information needed: **two sides and the included angle**

The **included angle** means the **angle between the two sides**.

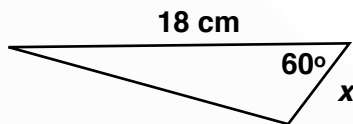


E.g. 1 Find the area of the triangles:

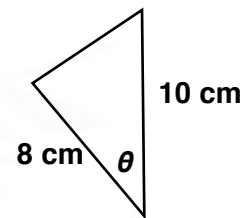


Working: (a) Area of triangle = $\frac{1}{2} \times 7 \times 11 \times \sin 83 = 38.2 \text{ mm}^2$ (3 s.f.)

E.g. 2 Find the value of x , given that the area of the triangle is 20 cm^2 .



E.g. 2 Given that the area of the triangle is 20 cm^2 , find the value of the angle θ .



Working: **E.g. 2** $\frac{1}{2} \times 18 \times x \times \sin 60 = 20$
 $9 \times x \times \sin 60 = 20$
 $x = \frac{20}{9 \sin 60}$
 $x = 2.57 \text{ cm}$ (3 s.f.)

Video: [Area of a triangle using sine](#)

[Solutions to Starter and E.g.s](#)

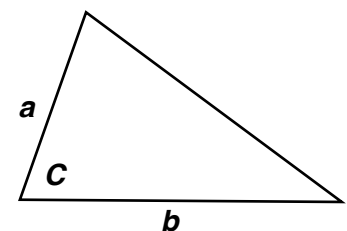
Exercise

- 9-1 class textbook: p427 M13.1 Qu 1-10
- A*-G class textbook: p382 E13.1 Qu 1-8
- 9-1 homework book: p145 M13.1 Qu 1-8
- A*-G homework book: p106 E13.1 Qu 1-8

Summary

- A **capital letter** indicates an **angle**.
- A **lower case** letter indicates a **side**.
- A **lower case side** is opposite its **capital lettered angle**.

$$\text{Area of a triangle} = \frac{1}{2} ab \sin C$$



Information needed: **two sides and the angle in between the sides**

[Homework book answers \(only available during a lockdown\)](#)

