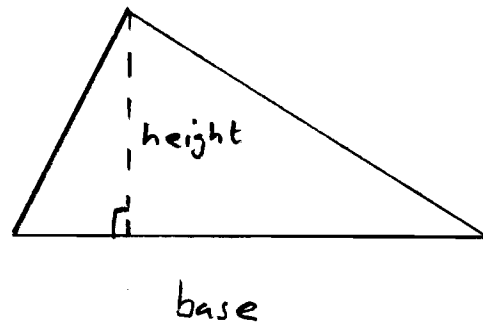
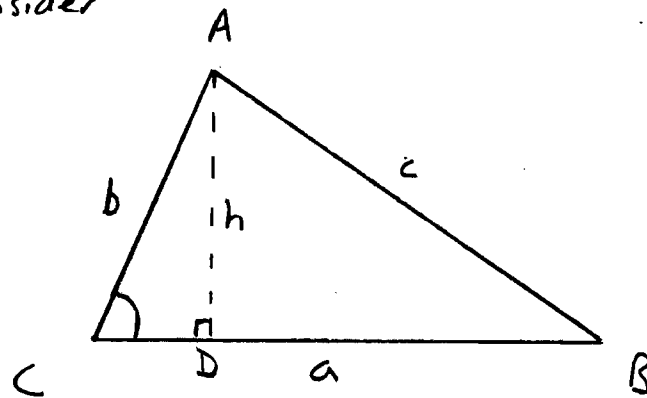


AREA OF TRIANGLE BY TRIGONOMETRYTRANSCRIPT

$$\text{Area of triangle} = \frac{1}{2} \text{ base} \times \text{height}$$



Now consider



$$\text{Area of triangle ABC} = \frac{1}{2} \text{ base} \times \text{height}$$

$$\text{Area of triangle ABC} = \frac{1}{2} ah \quad \text{①}$$

but in triangle ACD

$$\sin C = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin C = \frac{h}{b}$$

$$\therefore b \sin C = h$$

Substituting for h in ①

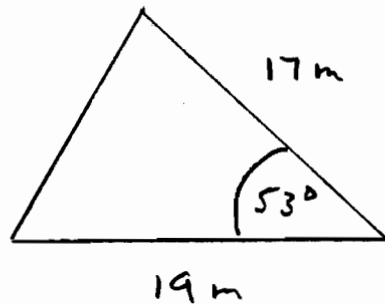
$$\underline{\text{Area of triangle ABC} = \frac{1}{2} ab \sin C}$$

More generally, the area of a triangle is given by:

$$\text{Area} = \frac{1}{2} \times \text{product of two sides} \times \text{sine of their included angle}$$

Example 1

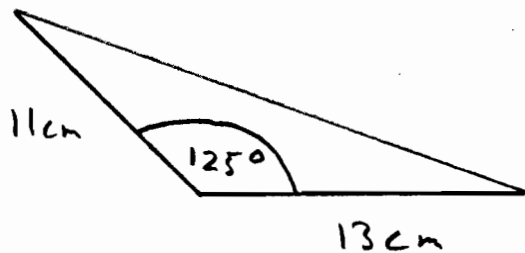
Find area



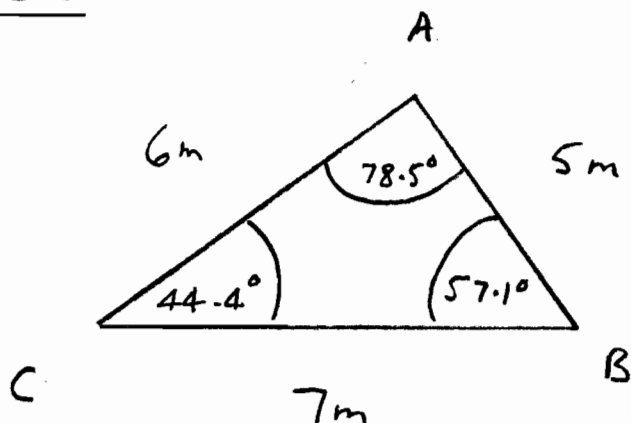
$$\begin{aligned} \text{Area} &= \frac{1}{2} \times 19 \times 17 \times \sin 53^\circ \\ &= 128.98 \text{ m}^2 \end{aligned}$$

Example 2

Find area



$$\begin{aligned} \text{Area} &= \frac{1}{2} \times 11 \times 13 \times \sin 125^\circ \\ &= 58.57 \text{ cm}^2 \end{aligned}$$

Example 3

Write down three formulae for the area of this triangle. Then use each formula to determine the area.

i)
$$\text{Area} = \frac{1}{2} ab \sin C$$

ii)
$$\text{Area} = \frac{1}{2} ac \sin B$$

iii)
$$\text{Area} = \frac{1}{2} bc \sin A$$

i)
$$\text{Area} = \frac{1}{2} \times 7 \times 6 \times \sin 44.4^\circ = 14.7 \text{ m}^2$$

ii)
$$\text{Area} = \frac{1}{2} \times 7 \times 5 \times \sin 57.1^\circ = 14.7 \text{ m}^2$$

iii)
$$\text{Area} = \frac{1}{2} \times 6 \times 5 \times \sin 78.5^\circ = 14.7 \text{ m}^2$$