3.2 Triangle trigonometry

Checklist

What you should know

By the end of this subtopic you should be able to:

- calculate an unknown side using a trigonometric ratio (sine, cosine or tangent)
- calculate an unknown angle using inverse trigonometric functions ($\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$)
- use the cosine rule:

$$c^2 = a^2 + b^2 - 2ab\cos C$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$a^2 = b^2 + c^2 - 2bc\cos A$$

- use the sine rule:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

- use the formula for the area of a triangle:

$$\text{area} = \tfrac{1}{2}ab\sin C = \tfrac{1}{2}ac\sin B = \tfrac{1}{2}bc\sin A$$

- choose the correct rule from trigonometric ratios in a right-angled triangle, the sine rule and the cosine rule to find missing lengths and/or angles in any given triangle.