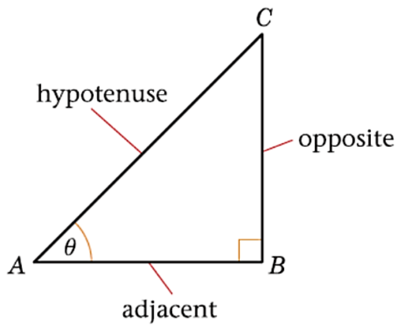
SOH CAH TOA

$$\sin(\theta) = \frac{opp}{hyp} \qquad \cos(\theta) = \frac{adj}{hyp} \qquad \tan(\theta) = \frac{opp}{hyp}$$



When you are finding a missing angle, you need to use inverse trigonometric ratios

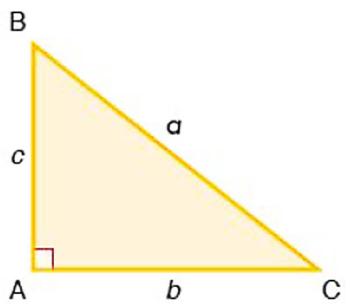
$$\theta = \sin^{-1}\left(\frac{opp}{hyp}\right) \text{ or } \theta = \cos^{-1}\left(\frac{adj}{hyp}\right) \text{ or } \theta = \tan^{-1}\left(\frac{opp}{adj}\right)$$

(whichever is applicable)

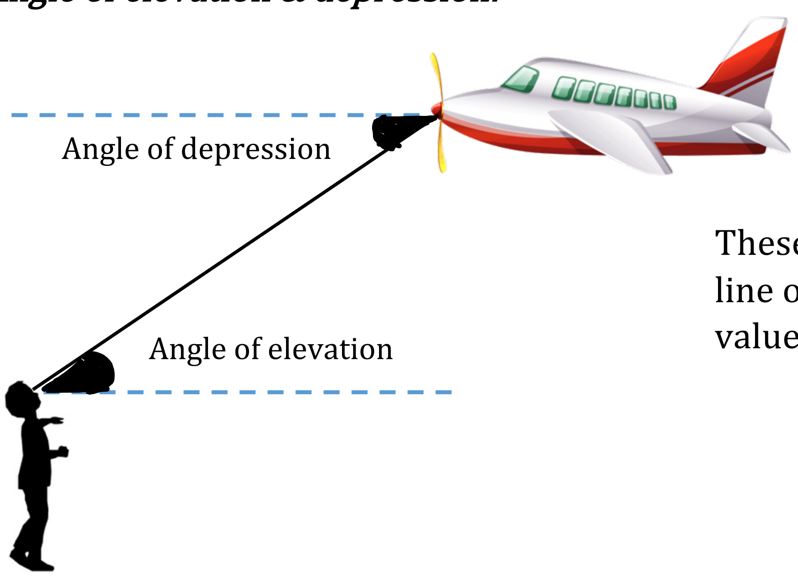
Pythagoras theorem:

This theorem is only applicable for right-angled triangles.

$$a^2 = b^2 + c^2$$



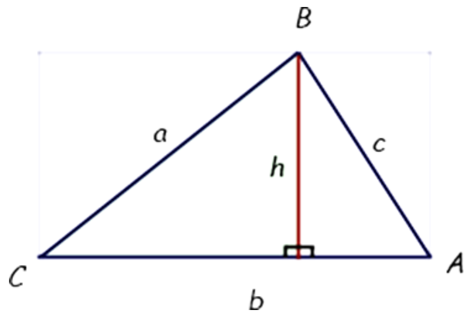
Angle of elevation & depression:



These angles are formed between the line of sight and the horizontal. Their values are the same (alternate angles).

Area of a triangle:

$$A = \frac{1}{2}bh \qquad or \qquad A = \frac{1}{2}\, a\, b \sin C$$



Sine rule:

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

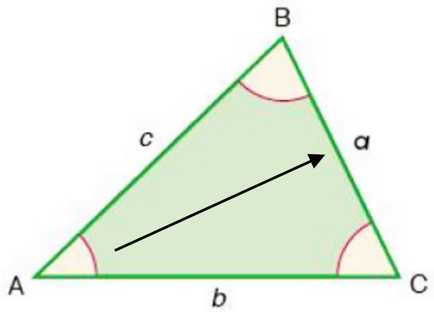
alternatively;

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

Angle & opposite side

Ambiguous case of sine rule

$$\sin(\theta) = \sin(180 - \theta)$$



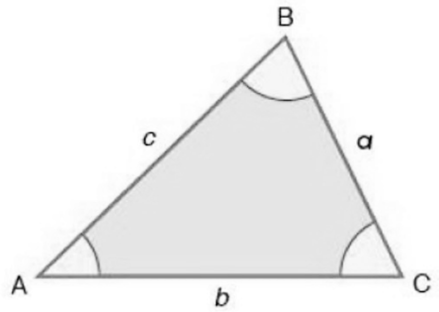
Cosine rule:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

alternatively;

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$



Re-arranging the cosine rule:

You may find the following re-arrangement useful where the angle is unknown.

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

Which one should I use? (Sine or cosine rule):

***An angle** and the length of its **opposite side** are given* ➡ **use sine rule**

Lengths of three sides are given **(SSS)**

Lengths of two sides and the angle in between are given **(SAS)**

➡ **use cosine rule**