



47 - Pythagoras' Theorem and Trigonometry

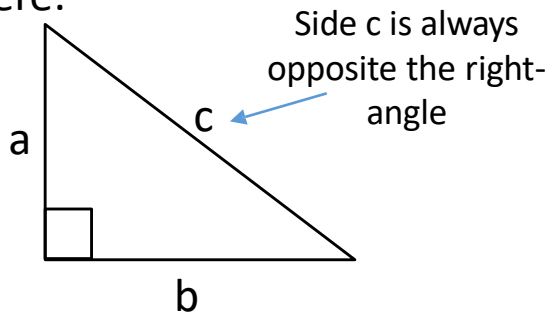
**Pythagoras' Theorem:**

This theorem can be used to calculate the length of sides on right-angled triangles.

The theorem is:

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

Where:



When calculating the length of side c, use  $a^2 + b^2 = c^2$

When calculating the length of a shorter side (a or b) use  $c^2 - b^2 = a^2$

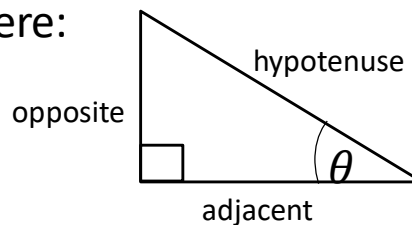
**Trigonometry:**

Trigonometry is concerned with the calculation of the length of sides and angles in triangles.

The following trigonometry functions or ratios apply to right-angles triangles:-

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}} \quad \cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}} \quad \tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

Where:



**SOH-CAH-TOA!**

To calculate angles, the trigonometry function needs to change sides – to do this, the inverse of the function must be used:-  
 $\sin^{-1}$  ;  $\cos^{-1}$  ;  $\tan^{-1}$

**Linked Prior Topics**

To calculate the square and square roots of numbers, solving equations, rearranging formulae.

**Vocabulary**

Pythagoras' Theorem, opposite, adjacent, hypotenuse, sine, cosine, tangent, trigonometry, trigonometric function, trigonometric ratio, inverse

**Linked Future Topics**

Sine rule, cosine rule, area of a triangle using trigonometry, bearings, co-ordinate geometry, angles of depression, angles of elevation, sine/cos/tan graphs