# PYTHAGORAS AND TRIGONOMETRY

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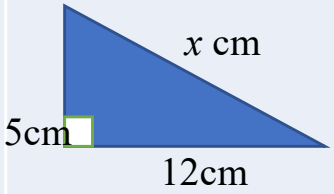
| **Keywords:** | Hypotenuse / Opposite / Adjacent / Complementary angle / Square Root / Inverse | | | | | |
| **Definition / Description:** | **Hypotenuse**: The longest side of a right angled triangle | **Opposite:** The side opposite the given angle | **Adjacent:** The side in between the given angle and the right angle | **Complementary :** Angles to add up to 90° | **Square Root:** A number which produces a specified quantity when multiplied by itself. | **Inverse:** The reverse or opposite |
| **Knowledge points:** | Calculate missing sides of a right angled triangle<br>Use Pythagoras to solve problems in 3D<br>Work fluently with the hypotenuse, opposite and adjacent sides<br>Use the tangent, sine and cosine ratio to find missing side lengths<br>Use sine, cosine and tangent to find missing angles<br>Select the appropriate method to solve right-angled triangle problems | | | | | |

**Knowledge point examples:**

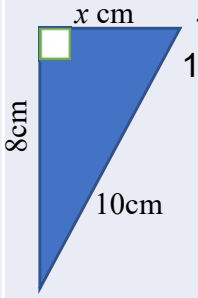
Finding the hypotenuse:

$a^2 + b^2 = c^2$
$5^2 + 12^2 = x^2$
$25 + 144 = x^2$
$169 = x^2$
$\sqrt{169} = x$
$x = 13\text{cm}$

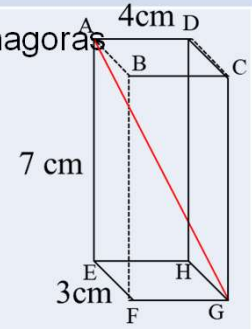



Finding the Shorter Side

$c^2 - b^2 = a^2$
$10^2 - 8^2 = x^2$
$100 - 64 = x^2$
$36 = x^2$
$\sqrt{36} = x$
$x = 6\text{cm}$




3D Pythagoras




$AG = \sqrt{a^2 + b^2 + c^2}$
$= \sqrt{7^2 + 3^2 + 4^2}$
$= \sqrt{76}$
$= 8.6\text{ cm}$

SOHCAHTOA: Side

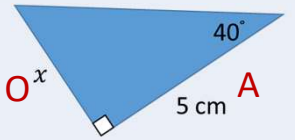
Label your triangle and select the correct ratio

$\tan\theta = \frac{opp}{adj}$

$\tan 40 = \frac{x}{5}$

$5 \times \tan 40 = x$

$4.19\text{ cm} = x$




SOHCAHTOA : Angle

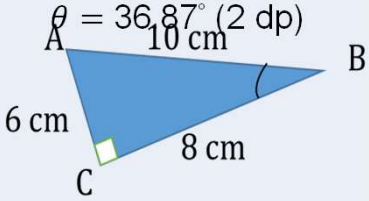
Label, select ratio and Do not forget to use $\sin^{-1}$ when finding the angle

Let angle ABC $= \theta$

$\sin\theta = \frac{6}{10}$

$\theta = \sin^{-1}\frac{6}{10}$

$\theta = 36.87^\circ$ (2 dp)

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| **Linked Knowledge Maps:** | Further Trigonometry / 3D Shape / 2D Shape / Bearings |