

# PYTHAGORAS' THEOREM

Note Title

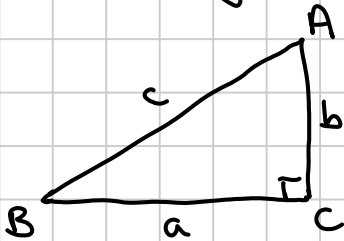
13/06/2011

The side opposite the right angle in a right-angled triangle is called the HYPOTENUSE.

Pythagoras' Theorem states that:

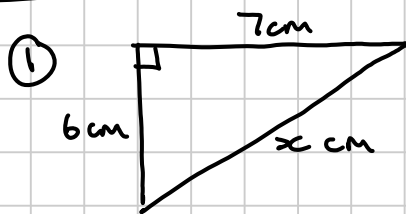
The area of the square on the hypotenuse of a right-angled triangle is equal to the sum of the areas of the squares on the other two sides

or in symbols:



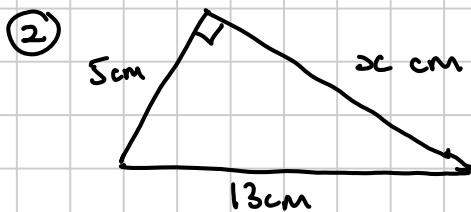
$$a^2 + b^2 = c^2$$

## Examples



Find  $x$

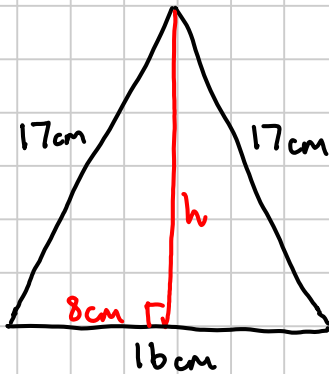
$$\begin{aligned}x^2 &= 7^2 + 6^2 \\&= 85 \\x &= \sqrt{85} \\&= \underline{\underline{9.22 \text{ cm}}} \quad (3 \text{ s.f.})\end{aligned}$$



Find  $x$

$$\begin{aligned}5^2 + x^2 &= 13^2 \\(-5^2) \quad \quad \quad (-5^2) \\x^2 &= 13^2 - 5^2 \\&= 169 - 25 \\&= 144 \\x &= 12 \text{ cm}\end{aligned}$$

③



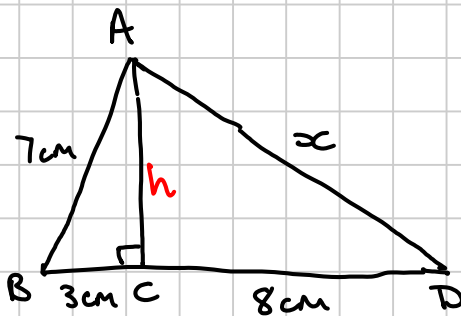
Find the area of this triangle.

$$\begin{aligned}h^2 &= 17^2 - 8^2 \\ &= 289 - 64 \\ &= 225\end{aligned}$$

$$\begin{aligned}h &= \sqrt{225} \\ &= 15 \text{ cm.}\end{aligned}$$

$$\begin{aligned}\text{Area} &= \frac{1}{2} \times 16 \times 15 \\ &= \underline{\underline{120 \text{ cm}^2}}\end{aligned}$$

④



$$AB = 7 \text{ cm}$$

$$BC = 3 \text{ cm}$$

$$CD = 8 \text{ cm}$$

Find AD.

First find  $h$ :

$$\begin{aligned}h^2 &= 7^2 - 3^2 \\ &= 40\end{aligned}$$

Now find  $x$ :

$$\begin{aligned}x^2 &= 8^2 + h^2 \\ &= 64 + 40 \\ x &= \sqrt{104} \\ &= \underline{\underline{10.2 \text{ cm}}} \quad (3 \text{ s f})\end{aligned}$$