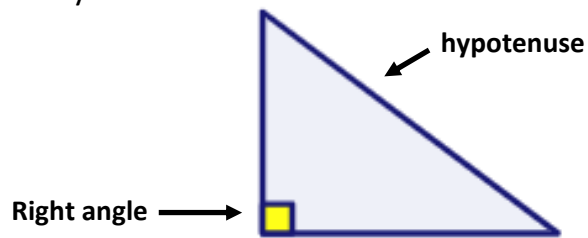


1. Keywords



An 90° angle is called a **right angle**.

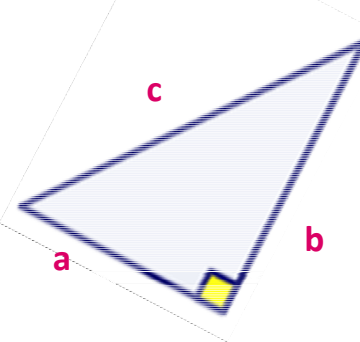
A triangle with a right angle is called a **right angled triangle**.

The longest side is always opposite the right angle.

It is known as the **hypotenuse**.

3. Labelling the sides

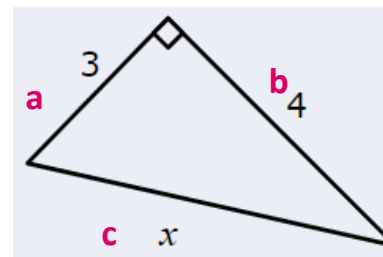
The hypotenuse is usually labelled as **c**, and the shorter sides as **a** and **b**.



4. The formula

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

5. Finding a missing side (hypotenuse)



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

$$3^2 + 4^2 = c^2$$

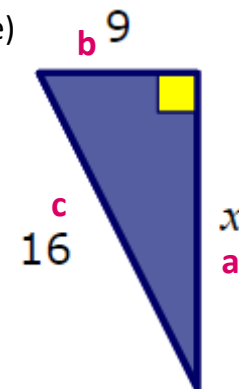
$$9 + 16 = c^2$$

$$c^2 = 25$$

$$c = \sqrt{25}$$

$$c = 5$$

6. Finding a missing side (shorter side)



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

$$a^2 + 9^2 = 16^2$$

$$a^2 + 81 = 256$$

$$a^2 = 256 - 81$$

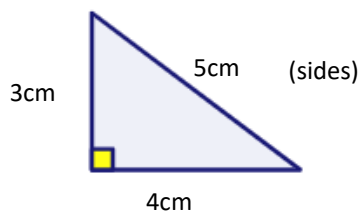
$$a^2 = 175$$

$$a = \sqrt{175}$$

$$a = 13.2 \text{ (1d.p.)}$$

Maths, Y9 - Pythagoras

2. Pythagoras' theorem explained



"For any given right angled triangle. The area of the two smaller squares add up to the area of the largest square."

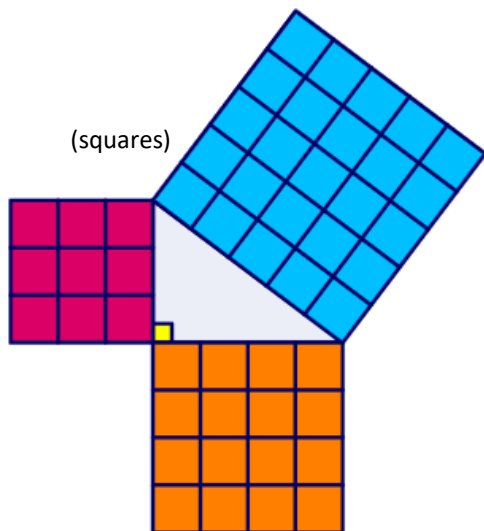
In this case we can see that;

- 1) The square made from the 3cm side has an area of 9cm^2 (9 boxes)
- 2) The square made from the 4cm side has an area of 16cm^2 (16 boxes)
- 3) The square made from the 5cm hypotenuse has an area of 25cm^2 (25 boxes)

Therefore

$$3^2 + 4^2 = 5^2 \text{ (sides)}$$

$$9 + 16 = 25 \text{ (squares)}$$



7. Pythagorean Triples

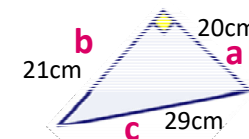
A set of three whole numbers where $a^2 + b^2 = c^2$

Examples;

| a | b | c |
|---|----|----|
| 3 | 4 | 5 |
| 6 | 8 | 10 |
| 5 | 12 | 13 |
| 7 | 24 | 15 |
| 8 | 15 | 17 |

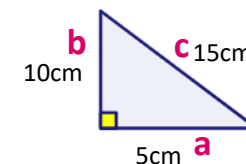
8. Proving a triangle is right angled.

Is $a^2 + b^2$ is equal to c^2 ?



$$20^2 + 21^2 \text{ is equal to } 29^2$$

The triangle is right angled.



$$5^2 + 10^2 \text{ is NOT equal to } 15^2$$

The triangle is NOT right angled.