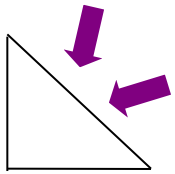
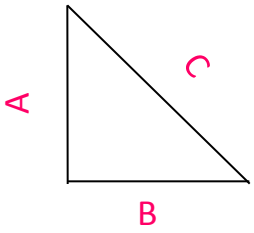
Growing Futures

Pythagorean Theorem

In mathematics, the Pythagorean theorem, also known as Pythagoras's theorem states that the square of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the other two sides.

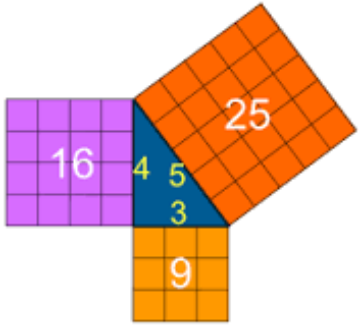


"The theorem makes reference to a right-angled triangle such as that shown in Figure 1. Theside opposite the right-angle is the longest side and is called the hypotenuse.



The theorem can be written as an equation relating the lengths of the sides a, b and c, often called the "Pythagorean equation"

$A^2 + B^2 = C^2$ where c represents the length of the hypotenuse and a and b the lengths of the triangle's other two sides.



What the theorem says is that the area of the square on the hypotenuse is equal to the sum of the areas of the squares on the two shorter sides. Figure 2 shows squares drawn on the hypotenuse and on the two shorter sides. The theorem tells us that area A + area B = area C.

Example

Suppose we wish to find the length of the hypotenuse of the right-angled triangle shown . We have labelled the hypotenuse c.

a = 3

b = 4

c

Using the theorem:

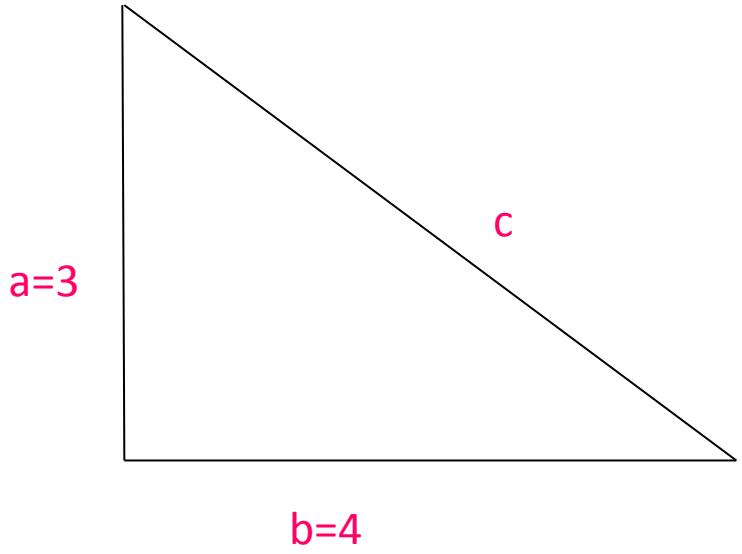
$a^2 + b^2 = c^2$

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

$9 + 16 = c^2$

$25 = c^2$

$5 = c$



So 5 is the length of the hypotenuse, the longest side of the triangle