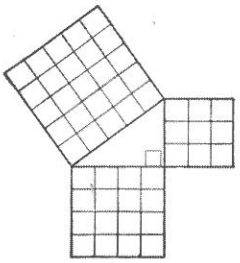
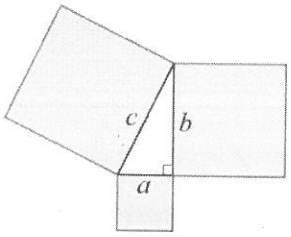
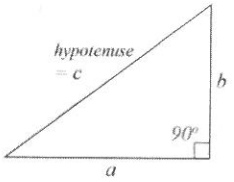
Pythagoras was a Greek philosopher and mathematician who is credited with discovering that the squares of the sides of a right triangle add up to the square of the hypotenuse. We can use this knowledge to find the length of a missing side in a right triangle.







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

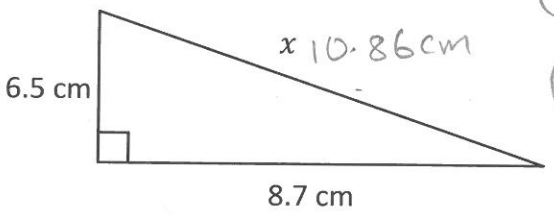
The Pythagorean Theorem is often written as $a^2 + b^2 = c^2$ where c is the hypotenuse and a and b are the sides. We can also write the Pythagorean Theorem as

$$side^2 + side^2 = hypotenuse^2.$$

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

As a result of the Pythagorean Theorem, when we know the lengths of two sides, we can find the length of the missing side.

Example 1 Use the Pythagorean Theorem to find the length of the missing side. (The missing side is labelled with an x).



$(side)^2 + (side)^2 = (hypotenuse)^2$

$(6.5)^2 + (8.7)^2 = x^2$

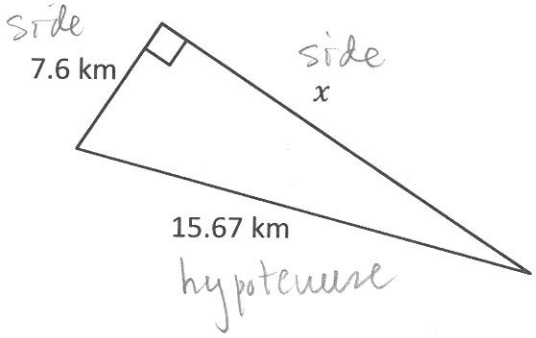
$42.25 + 75.69 = x^2$

$117.94 = x^2$

$\sqrt{117.94} = x$

$10.86\text{ cm} = x$

Example 2 Find the length of the missing side (side x).



$(hypotenuse)^2 = (side)^2 + (side)^2$

$(15.67)^2 = (7.6)^2 + (x)^2$

$245.5489 = 57.76 + x^2$

$245.5489 - 57.76 = x^2$

$187.7889 = x^2$

$\sqrt{187.7889} = x$

$13.70\text{ km} = x$