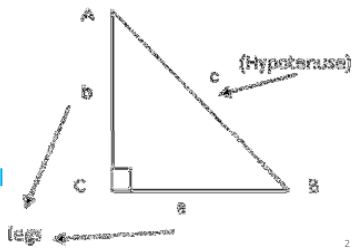


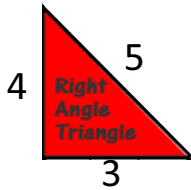
L 1 Pythagorean Theorem

- In a right triangle, the side opposite the 90° angle is called the **hypotenuse** and the remaining two sides are called the **legs**.

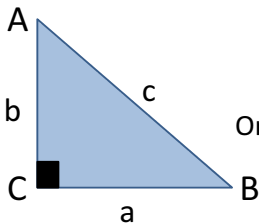
Note: Vertices are labeled with CAPITAL LETTERS while, sides are labeled with small letters.



The great Greek Mathematician Pythagoras discovered an interesting relation between the side lengths of the right triangle.



Pythagorean Theorem: If triangle ABC is a right triangle, then $c^2 = a^2 + b^2$



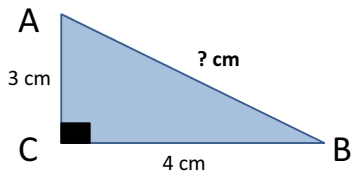
$$c = \sqrt{a^2 + b^2}$$

Or, if we are solving for the leg.

$$a^2 = c^2 - b^2$$

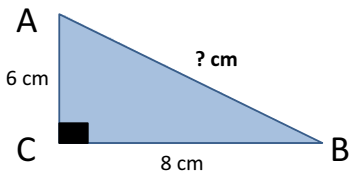
$$a = \sqrt{c^2 - b^2}$$

Ex 1: find the missing side length



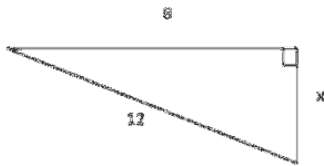
X here is a hypotenuse
So we use $c^2 = a^2 + b^2$

Ex 2: find the missing side length



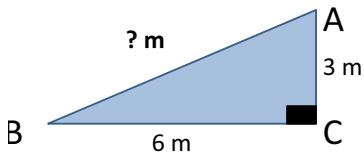
X here is a hypotenuse
So we use $c^2 = a^2 + b^2$

Ex 3: find the missing side length



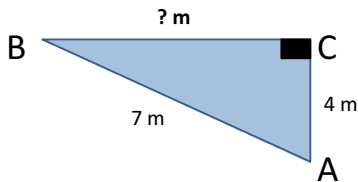
X here is a leg
So we use $a^2 = c^2 - b^2$

Ex 4: find the missing side length



X here is a hypotenuse
So we use $c^2 = a^2 + b^2$

Ex 5: find the missing side length



X here is a leg
So we use $a^2 = c^2 - b^2$

The converse of the Pythagorean Theorem

- The reverse is also true that is if $c^2 = a^2 + b^2$ then triangle ABC is a right triangle with angle C = 90°
- Some common Pythagorean triples are:
{3,4,5} , {5,12,13} , {8,15,17} , {9,40,41}
- and their multiples like
{6,8,10} , {9,12,15} and {10,24,26} etc.