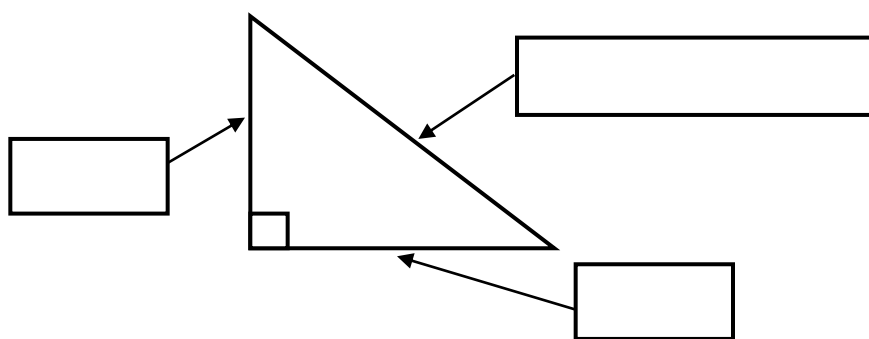


## TOPIC 9-2: PYTHAGOREAN THEOREM & ITS CONVERSE

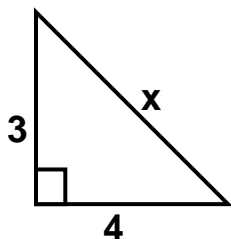
**PYTHAGOREAN THEOREM:** The square of the hypotenuse is equal to the sum of the squares of the legs.

$$(\text{Hypotenuse})^2 = (\text{Leg})^2 + (\text{Leg})^2$$



**PYTHAGOREAN THEOREM:**

**EXAMPLE 1** Find the value of 'x'.



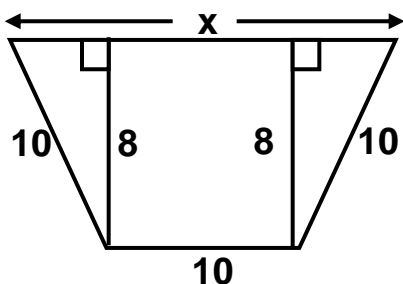
So in Example 1 - {3, 4, 5} is a Pythagorean Triple...What does that mean?

Name 2 other Pythagorean Triples:

a) { \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ }

b) { \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ }

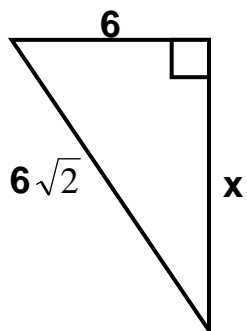
**EXAMPLE 2** Find the value of  $x$  in the isosceles trapezoid shown below. (Think Triple!)



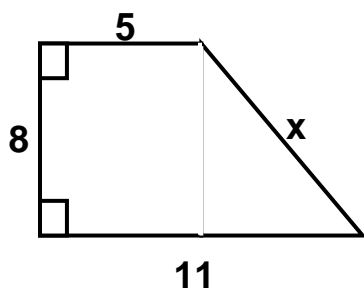
But most of the time, we will not have Pythagorean Triples!

Look at the different ways you will work with Pythagorean problems.....

**EXAMPLE 3** Find a LEG



**EXAMPLE 4** Find the HYPOTENUSE...

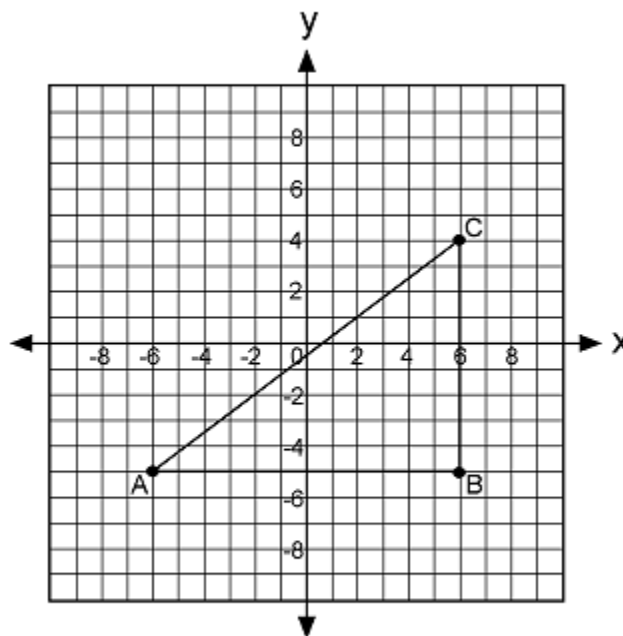


(If there is no picture, draw and label a picture first.)

**EXAMPLE 5** Find the length of the diagonal of a rectangle with a perimeter of 24 and a length of 8. (The diagonal is the ???)

**EXAMPLE 6** From a GRID...

In the diagram below,  $\triangle ABC$  is a right triangle.



What is the length of  $\overline{AC}$ ?

**Converse of the Pythagorean Theorem:**

If  $c^2 = a^2 + b^2$ , then a ***RIGHT TRIANGLE*** is formed.

**Determine if a right triangle can be formed.**

(a) 5, 12, 4

YES or NO

(b) 6, 7, 8

YES or NO

(c) 1, 3,  $\sqrt{10}$

YES or NO

(d)  $\sqrt{9}$ ,  $\sqrt{16}$ ,  $\sqrt{27}$

YES or NO