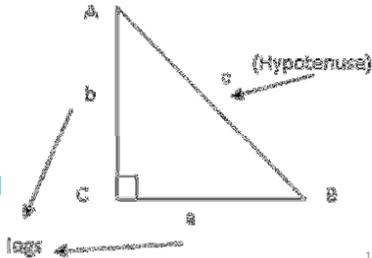


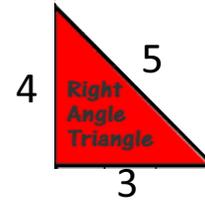
# 1.1 Pythagorean Theorem

- 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.



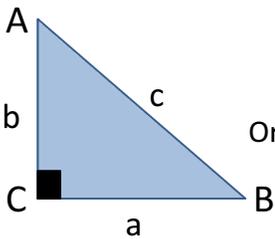
The great Greek Mathematician Pythagoras discovered an interesting relation between the side lengths of the right triangle.



**Pythagorean Theorem:** If triangle ABC is a right triangle, then

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

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

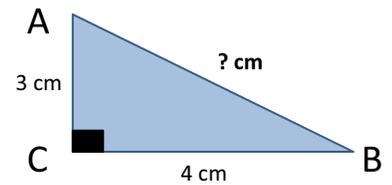


Or, if we are solving for the leg.

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

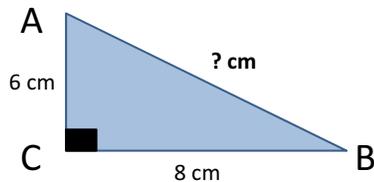
$$a = \sqrt{c^2 - b^2}$$

Ex 1: find the missing side length



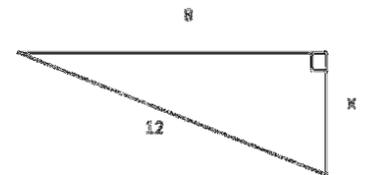
X here is a hypotenuse  
So we use  $c^2 = a^2 + b^2$

Ex 2: find the missing side length



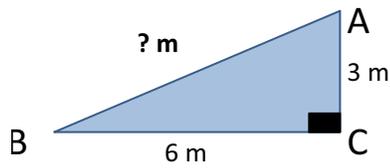
X here is a hypotenuse  
So we use  $c^2 = a^2 + b^2$

Ex 3: find the missing side length



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

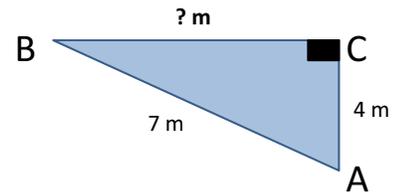
Ex 4: find the missing side length



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

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Ex 5: find the missing side length



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

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Practice: Page 4  
# 1(a,d), 2(a,d), 3-8



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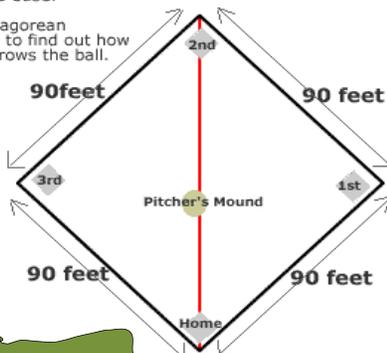
### The converse of the Pythagorean Theorem

- The reverse is also true that is if  $c^2 = a^2 + b^2$  then triangle ABC is a right triangle with angle  $C = 90^\circ$
- 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.

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A baseball diamond is really a 90 foot square.  
Let's say the catcher is throwing the ball from home to second base:

Use Pythagorean Theorem to find out how far he throws the ball.



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Practice: Page 6  
# 9-12, 14, 15, 17



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