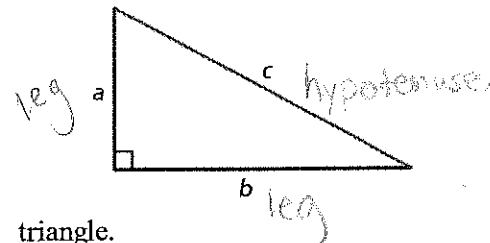


Objectives: Use the Pythagorean Theorem and its converse to solve problems.

Use Pythagorean inequalities to classify triangles.



Pythagorean Theorem: In a right Δ , $a^2 + b^2 = c^2$

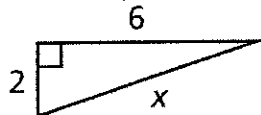
Converse of the Pythagorean Theorem: If $a^2 + b^2 = c^2$, then it is a right triangle.

Pythagorean Inequalities Theorem: If $a^2 + b^2 < c^2$, then it is an obtuse triangle.

If $a^2 + b^2 > c^2$, then it is an acute triangle.

Solve for x using the Pythagorean Theorem. Answers should be whole numbers, or in simplest radical form. (No decimals)

EX 1:



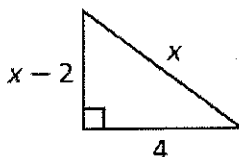
$$2^2 + 6^2 = x^2$$

$$4 + 36 = x^2$$

$$\sqrt{40} = \sqrt{4 \cdot 10}$$

$$x = 2\sqrt{10}$$

EX 2:



$$(x-2)^2 + 4^2 = x^2$$

$$(x-2)(x-2) + 16 = x^2$$

$$x^2 - 2x - 2x + 4 + 16 = x^2$$

$$x^2 - 4x + 20 = x^2$$

$$-4x + 20 = 0$$

$$-4x = -20$$

$$x = 5$$

EX 3: What kind of triangle do the following side lengths create?

a) 5, 7, 10

$$5^2 + 7^2 \stackrel{?}{=} 10^2$$

$$25 + 49 < 100$$

obtuse

b) 8, 10, 6

$$6^2 + 8^2 \stackrel{?}{=} 10^2$$

$$36 + 64 = 100$$

right

c) 9, 13, 15

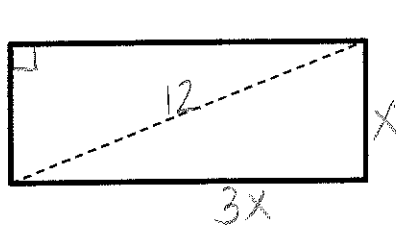
$$13^2 + 9^2 \stackrel{?}{=} 15^2$$

$$169 + 81 \stackrel{?}{=} 225$$

$$250 > 225$$

acute

EX 4: Scott is building a rectangular picture frame. He wants the ratio of the length to the width to be 3:1 and the diagonal to be 12 centimeters. How wide should the frame be? Round to the nearest tenth of a centimeter.



$W = x$
 $l = 3x$ bigger than width

$$x^2 + (3x)^2 = 12^2$$

$$x^2 + 9x^2 = 144$$

$$10x^2 = 144$$

$$x^2 = \sqrt{14.4}$$

width of frame = $x = 3.8$ cm

Pythagorean Triple:

If $a^2 + b^2 = c^2$, and a , b , and c are whole #s.

Common Pythagorean Triples		
3, 4, 5	5, 12, 13	8, 15, 17
7, 24, 25		

- If you can memorize *Pythagorean Triples*, you do not need to show your work.
- The multiples of *Pythagorean Theorems* also work. Complete these: 6, 8, 10 and 10, 24, 26

$$3^2 + 4^2 = 5^2$$

$$9 + 16 = 25$$