Geometry H   Name: _____

7.1 – Pythagorean Theorem   Date: _____ Period: _____
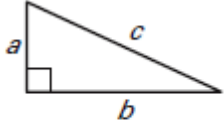
- I can use the Pythagorean Theorem to find side lengths in triangles.
- I can identify if sides of a right triangle form a Pythagorean Triple.

| Pythagorean Theorem	In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.	$c^2 = a^2 + b^2$
Pythagorean Triple	A Pythagorean triple is a set of three positive integers a, b, and c that satisfy the equation of $c^2 = a^2 + b^2$	**Examples of Pythagorean Triples:** 3, 4, 5; 5, 12, 13 8, 15, 17 7, 24, 25 **Examples of non-Pythagorean Triples:** $\sqrt{3}$, 1, 4 2.5, 3.5, 18.5

Example 1: Use Pythagorean Theorem to find length of missing side of a right triangle.

a) Solve for x.
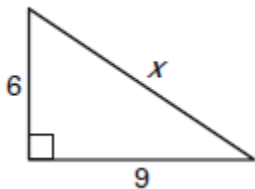
Example 2: Use Pythagorean Theorem to solve real-world problems.

a) A ladder rests against a house. The foot of the ladder is 8 feet from the house. The top of the ladder rests 15 feet above the ground. What is the length of the ladder?
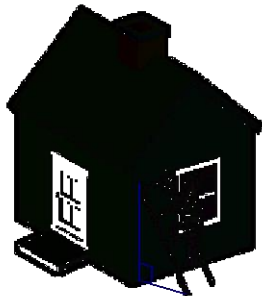
b) A developer is planning a new park in the shape of a right triangle, as represented in the diagram below. Find the perimeter and area of the new park.
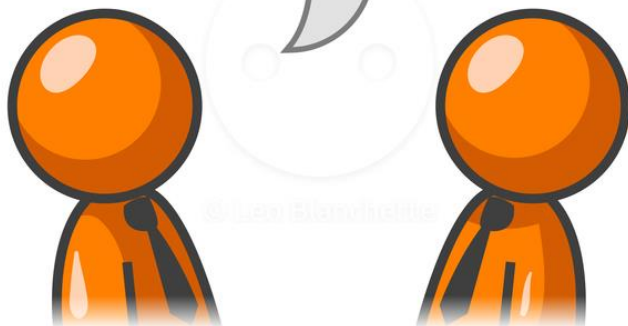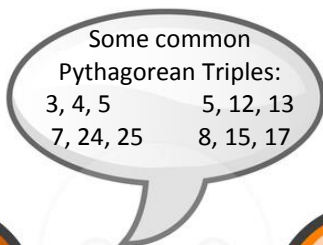
30 yd
24 yd
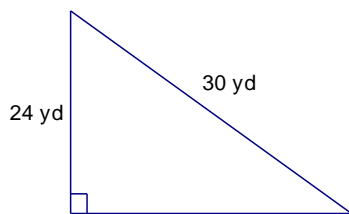
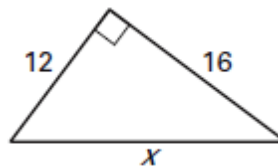**Example 3: Find the area of an isosceles triangle.**
Find the area of the isosceles triangle with side lengths 16 meters, 17 meters, and 17 meters.

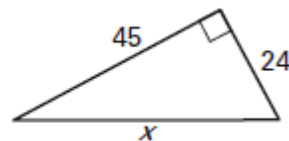In an isosceles triangle, the height to the base is also a perpendicular bisector!
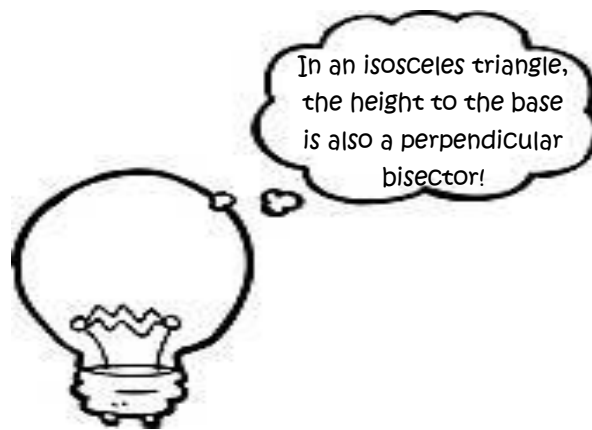
Example 4: Use a Pythagorean Triple

Some common Pythagorean Triples:
3, 4, 5   5, 12, 13
7, 24, 25   8, 15, 17

a) Find the value of x using Pythagorean Triples.

12   16
x

b) Find the value of x using Pythagorean Triples.

45   24
x

c) 24 and 32 are two sides of a right triangle. All three side lengths of the triangle are integers and together form a Pythagorean Triple. Find the length of the third side and tell whether it is a leg or the hypotenuse.