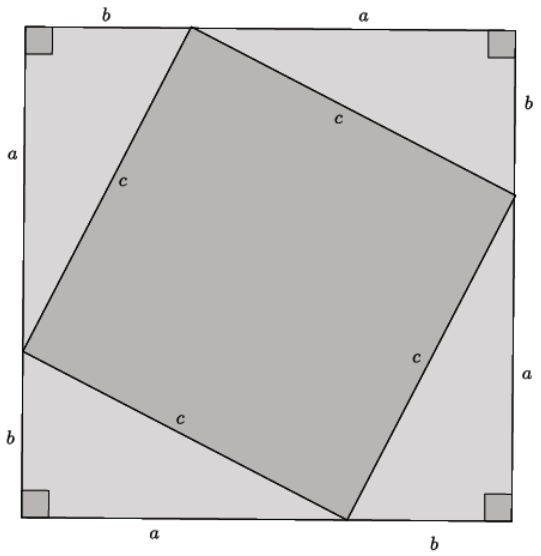
Advanced Math 7 Period _____ Name: _____

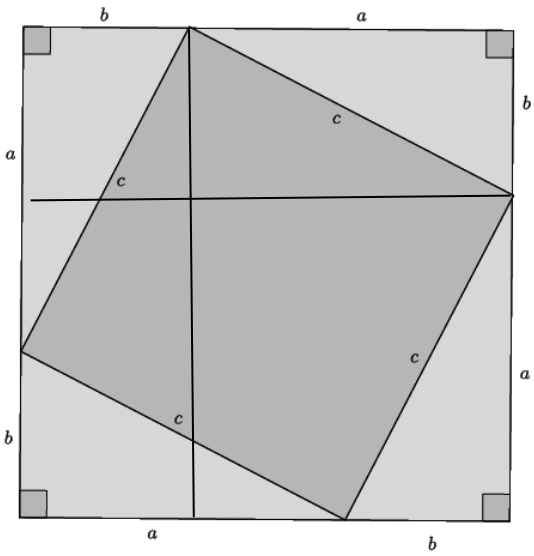
8.P.3 **Informal Proof of the Pythagorean Theorem** Date:_____

Student Objective

- I will know the Pythagorean Theorem and be shown an informal proof of the theorem.

Calculate the area of the outside square:





- Are the four triangles with sides lengths a and b congruent? If so, how do you know?
- What is the area of just one triangle?
  - $\frac{1}{2}ab$
- Does each triangle have the same area? If so, what is the sum of all four of those areas?
  - $4\left(\frac{1}{2}ab\right) =$ _____.
  - What is the area of the inside square?_____
- Put them together to find the area of the outside square._____
- Looking at the outside square only, the square with side lengths $(a + b)$, what is its area?
  - *The area of one rectangle is*_____.
  - *The area of the small square is*_____.
  - *The area of the large square is*_____.
- Put them together to find the area of the outside square._____
- Setting the two expressions equal:

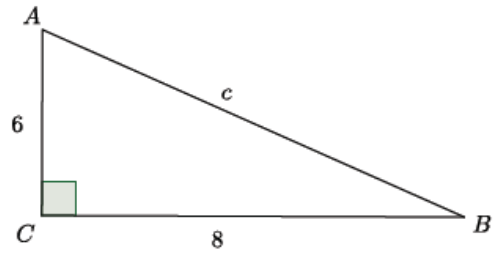
- Therefore $a^2 + b^2 = c^2$ for right triangles. The sum of the squares on the legs of a right triangle is equal to the square on the hypotenuse.

Classwork

Example 1

Now that we know what the Pythagorean Theorem is, let's practice using it to find the length of a hypotenuse of a right triangle.

Determine the length of the hypotenuse of the right triangle.



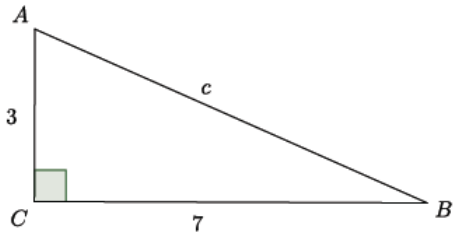
The Pythagorean Theorem states that for right triangles $a^2 + b^2 = c^2$ where a and b are the legs and c is the hypotenuse. Then,

$$a^2 + b^2 = c^2$$
$$6^2 + 8^2 = c^2$$
$$36 + 64 = c^2$$
$$100 = c^2$$

Since we know that $100 = 10^2$, we can say that the hypotenuse $c = 10$.

Example 2

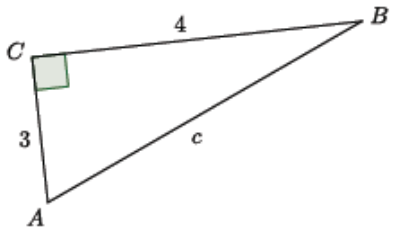
Determine the length of the hypotenuse of the right triangle.



Exercises 1–5

For each of the exercises, determine the length of the hypotenuse of the right triangle shown. Note: Figures not drawn to scale.

1.



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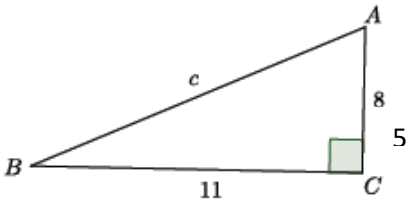

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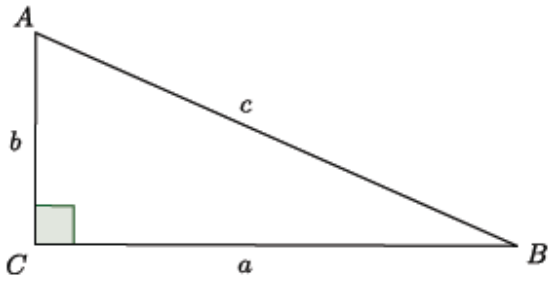
Lesson Summary

Given a right triangle ABC with C being the vertex of the right angle, then the sides AC and BC are called the *legs* of $\triangle ABC$ and AB is called the *hypotenuse* of $\triangle ABC$.



Take note of the fact that side a is opposite the angle A, side b is opposite the angle B, and side c is opposite the angle C.

The Pythagorean Theorem states that for any right triangle, $a^2 + b^2 = c^2$.

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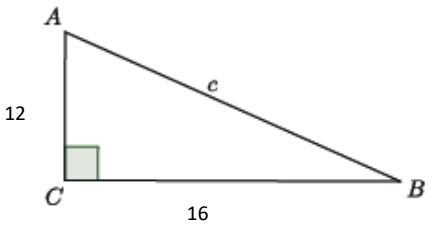
Homework Homework Homework Homework Homework

For each of the problems below, determine the length of the hypotenuse of the right triangle shown. Note: Figures not drawn to scale.

1.



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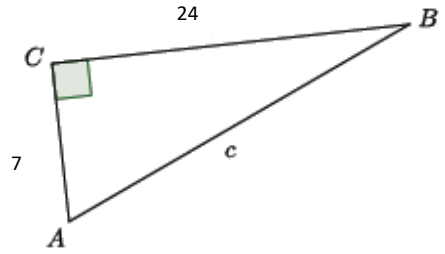

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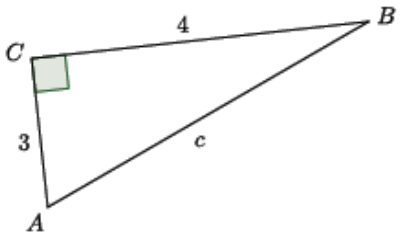

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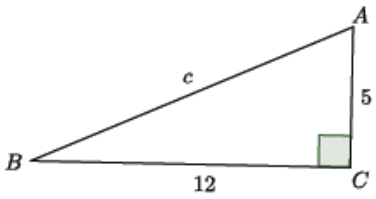

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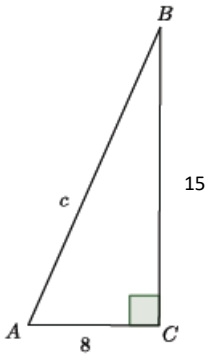

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