

NAME: _____

Math _____, Period _____

Mr. Rogove

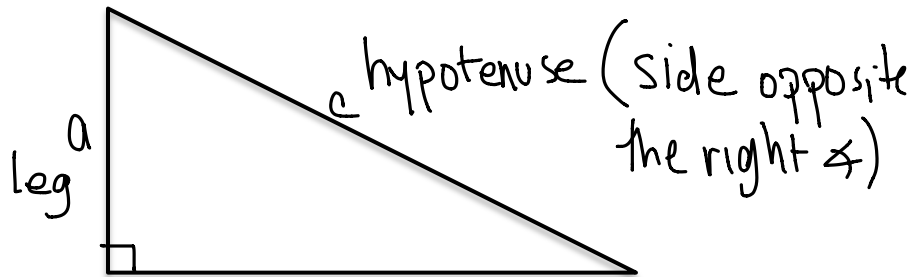
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LEARNING OBJECTIVE: We will prove the Pythagorean Theorem to be $a^2 + b^2 = c^2$. (G8M2L12)

CONCEPT DEVELOPMENT:

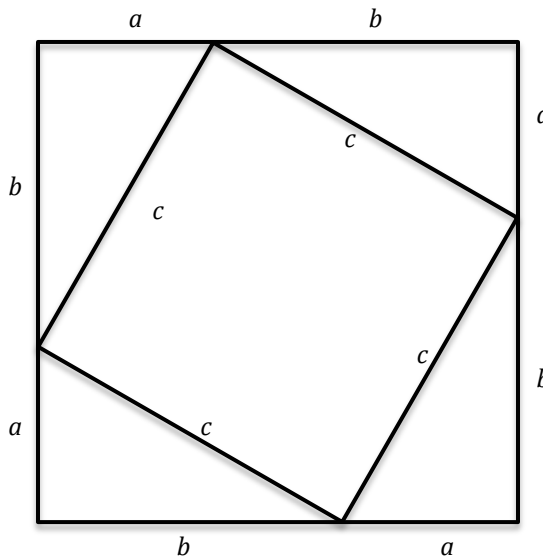
Pythagorean Theorem: If the lengths of the legs of a right triangle are a and b , and the length of the hypotenuse is c , then $a^2 + b^2 = c^2$.

Anatomy of a Right Triangle



Proving the Pythagorean Theorem

leg (side adjacent the right angle)

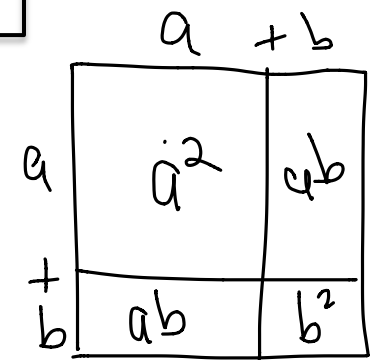


$$(a+b)(a+b) = c^2 + \frac{1}{2}ab \cdot 4$$

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

$$\begin{matrix} -2ab & & -2ab \end{matrix}$$

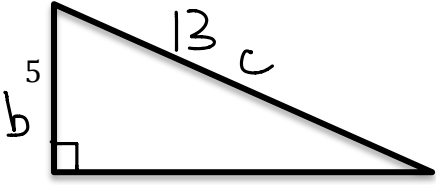
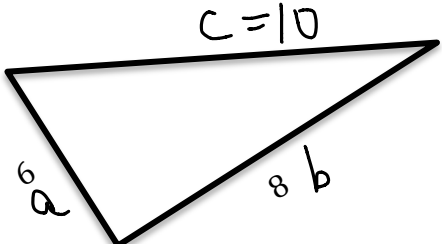
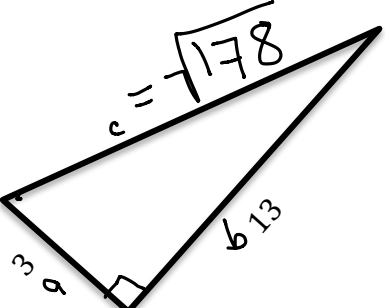
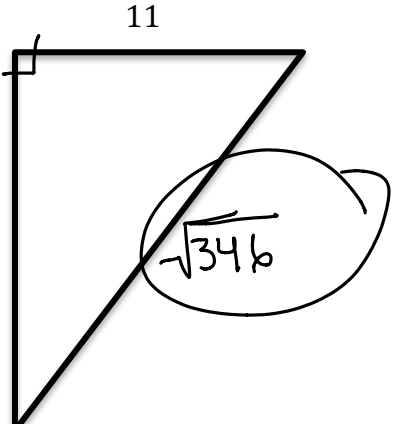
$$a^2 + b^2 = c^2$$



GUIDED PRACTICE:**Steps for Finding the Length of the sides of a Right Triangle**

1. Identify the length of the given sides of a right triangle.
2. Use the Pythagorean Theorem ($a^2 + b^2 = c^2$) to substitute the length of the given sides for a , b , or c .
3. Simplify and determine the length of the missing side.

Note: Triangles NOT drawn to scale!!

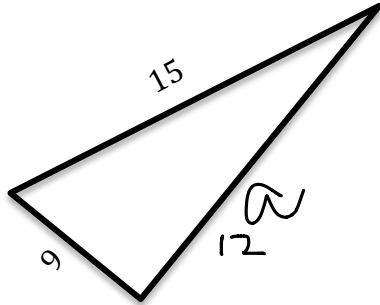
 <p> $a = 12$ $a^2 + b^2 = c^2$ $12^2 + 5^2 = c^2$ $144 + 25 = c^2$ $169 = c^2$ $\sqrt{169} = \sqrt{c^2}$ $c = 13$ </p>	 <p> $c = 10$ $6^2 + 8^2 = c^2$ $36 + 64 = c^2$ $100 = c^2$ $\sqrt{100} = c$ </p>
 <p> $c = \sqrt{178}$ $3^2 + 13^2 = c^2$ $9 + 169 = c^2$ $178 = c^2$ $\sqrt{178} = c$ </p>	 <p> $11^2 = 121$ $c^2 = 346$ $15^2 = 225$ $\frac{\quad}{346}$ $c = \sqrt{346}$ </p>

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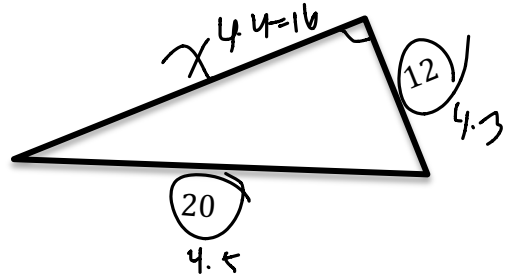
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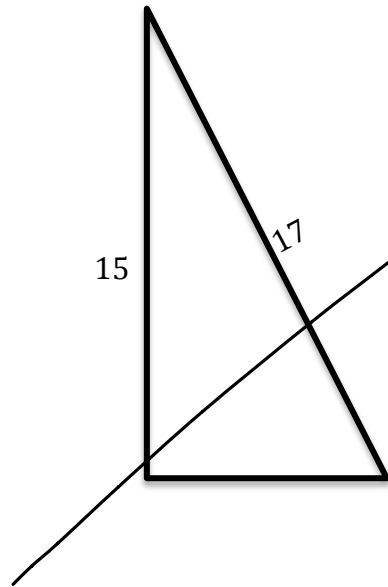
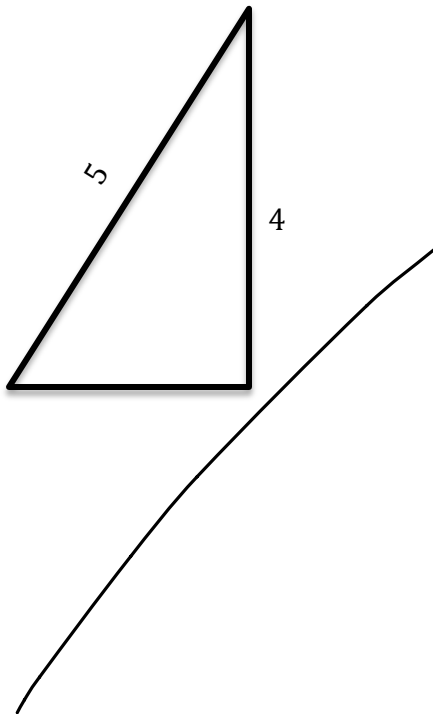
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$$\begin{aligned} a^2 + b^2 &= c^2 \\ a^2 + 12^2 &= 15^2 \\ a^2 + 81 &= 225 \\ -81 \quad -81 & \\ a^2 &= 144 \\ a &= 12 \end{aligned}$$



$$\begin{aligned} 12^2 + b^2 &= 20^2 \\ 144 + b^2 &= 400 \\ -144 \quad -144 & \\ \sqrt{b^2} &= \sqrt{256} \quad \boxed{b=16} \end{aligned}$$

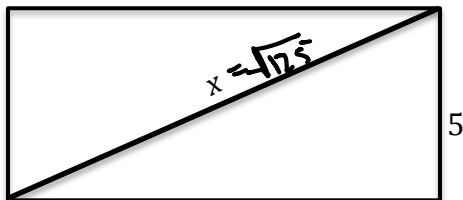
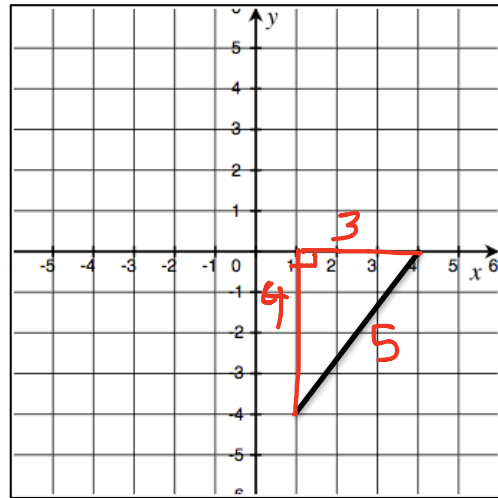
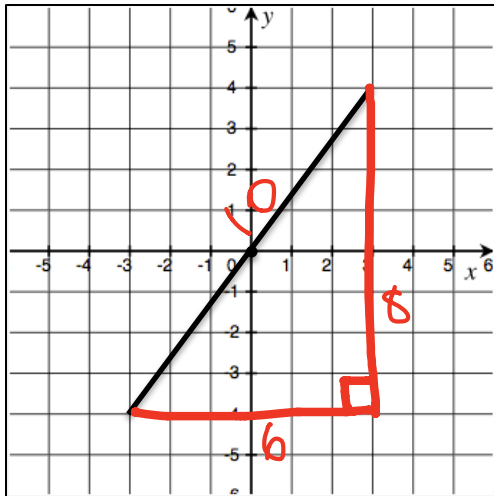


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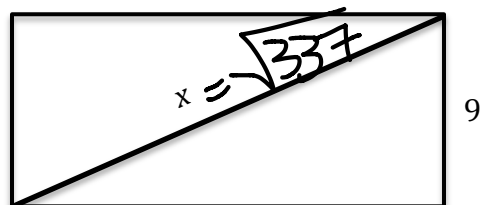
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$$\begin{aligned} 10^2 + 5^2 &= x^2 \\ 100 + 25 &= x^2 \\ 125 &= x^2 \\ \sqrt{125} &= x \end{aligned}$$



$$\begin{aligned} 16^2 + 9^2 &= x^2 \\ 256 + 81 &= x^2 \\ \sqrt{337} &= x \\ \sqrt{337} &= x \end{aligned}$$

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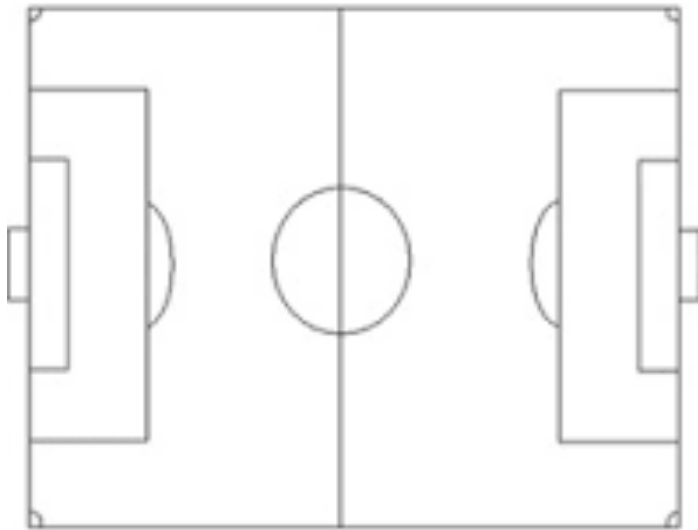
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INDEPENDENT PRACTICE:

ACTIVATING PRIOR KNOWLEDGE:

CLOSURE:

The dimensions of a soccer field are 90 yards wide by 120 yards long.
What is the diagonal distance from one corner to the other?



TEACHER NOTES:

Homework is going to be Problem set from lesson 15 and 16?