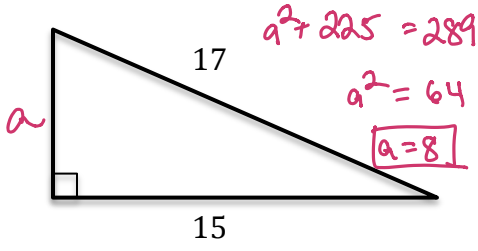
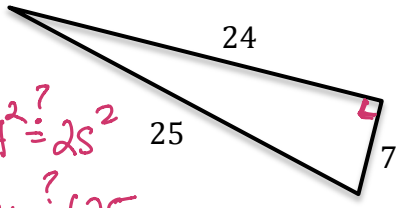
NAME:_____ Math _____, Period _____

Mr. Rogove Date:_____

LEARNING OBJECTIVE: We will use the Pythagorean Theorem to introduce the concept of irrational numbers. (G8M7L1)

ACTIVATING PRIOR KNOWLEDGE:

We know what the Pythagorean theorem is AND its converse.

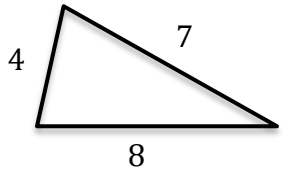
Find the length of the missing side of the triangle below.	How can we prove the triangle below is a right triangle?
 $a^2+15^2=17^2$ $a^2+225=289$ $a^2=64$ $\boxed{a=8}$ PYTHAG. THM	 $7^2+24^2 \stackrel{?}{=} 25^2$ $49+576 \stackrel{?}{=} 625$ $625 \stackrel{\checkmark}{=} 625$ CONVERSE OF PYTHAG THM

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

Converse of the Pythagorean Theorem: If the sum of the squares of the lengths of two shorter legs of a triangle equals the square of the length of the longest leg, the triangle is a right triangle.

What can we say about the following triangle?



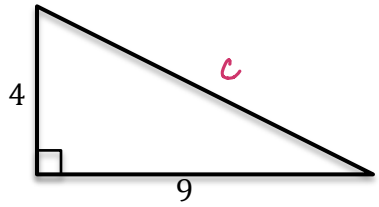
Not a right $\triangle$

$4^2+7^2 \neq 8^2$

$16+49 \neq 64$

$a^2+b^2 \neq c^2$

How can we figure out the length of the missing side of this triangle? (estimate as between 2 integers)



$4^2+9^2=c^2$

$16+81=c^2$

$97=c^2$

$\boxed{c=\sqrt{97}}$

$\sqrt{81} < \sqrt{97} < \sqrt{100}$

$9 < \sqrt{97} < 10$

$\sqrt{97}$ is between 9 & 10

Closer to 10

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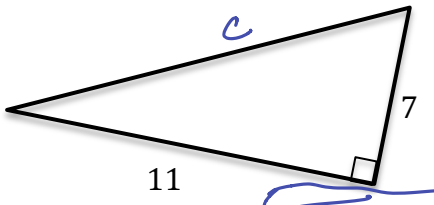
Guided Practice:

Steps for Determining The Length of Missing Sides of Right Triangles

1. Recall the Pythagorean Theorem ($a^2 + b^2 = c^2$).
2. Substitute the length of the given side into the theorem.
3. Solve for the missing side length.
4. If the square of the missing side length is NOT a perfect square, estimate its approximate value as between two integers.



$11^2 + 7^2 = c^2$

$121 + 49 = c^2$

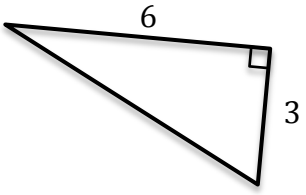
$170 = c^2$

$c = \sqrt{170}$

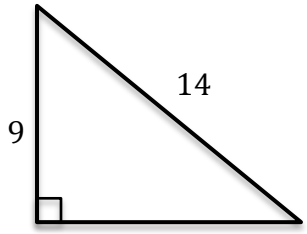
$\sqrt{169} < \sqrt{170} < \sqrt{196}$

$13 < \sqrt{170} < 14$

$\sqrt{170}$ is between 13 & 14 but closer to 13



$\sqrt{45}$ is between 6 & 7, but closer to 7.



$a^2 + 9^2 = 14^2$

$a^2 + 81 = 196$

$-81 \quad -81$

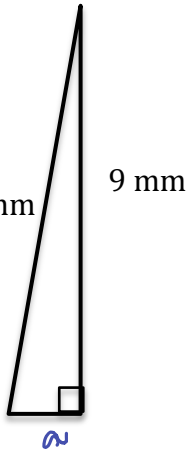
$a^2 = 115$

$a = \sqrt{115}$

$\sqrt{100} < \sqrt{115} < \sqrt{121}$

$10 < \sqrt{115} < 11$

a is between 10 & 11 but closer to 11.



$\sqrt{40}$ between 6 & 7 closer to 6

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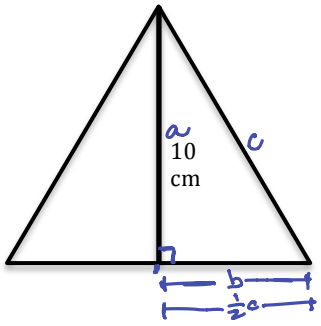
Find the side length of the **equilateral** triangle below.



$10^2 + \left(\frac{1}{2}c\right)^2 = c^2$

$100 + \frac{1}{4}c^2 = c^2$

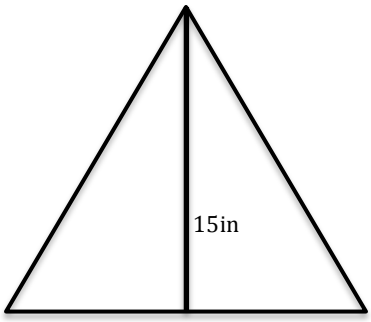
$\frac{4}{3}(100) = \left(\frac{3}{4}c^2\right)\frac{4}{3}$

$133\frac{1}{3} = c^2$

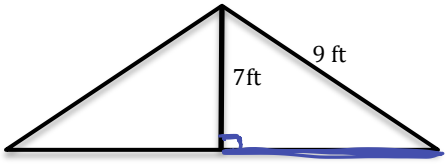
$c = \sqrt{133\frac{1}{3}}$

between 11 & 12 and close to 11.5

Find the side length of the **equilateral** triangle below.



Find the length of the base of the **isosceles** triangle below.



$a^2 + 7^2 = 9^2$

$a^2 + 49 = 81$

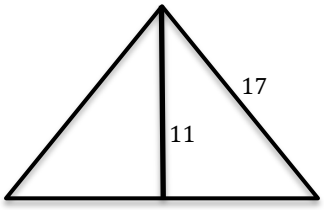
$a^2 = 32$

$a = \sqrt{32}$

between $5\frac{1}{2}$ & 6

The base is between 11 & 12

Find the length of the base of the **isosceles** triangle below.



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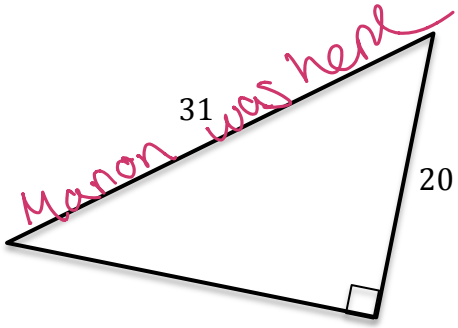
Independent Practice:

Problem Set from Lesson 1, Mod 7 Grade 8 will be independent practice. Should not take too long.

Closure:

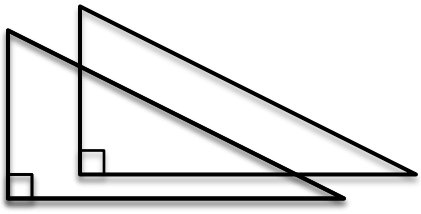
Find the length of the missing side



Notes:

This aligns to Lesson 1, Module 7 Incorporate Estimating Square Roots NCTM?

Need to do the Module 2 lessons on Pythagorean theorem before this one for Math 8.



Abby was here?