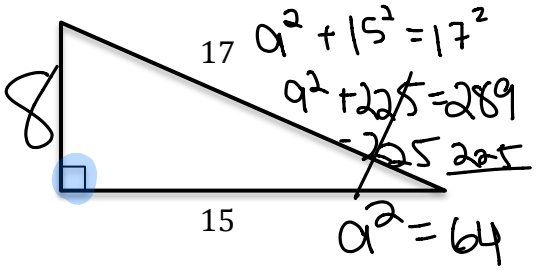
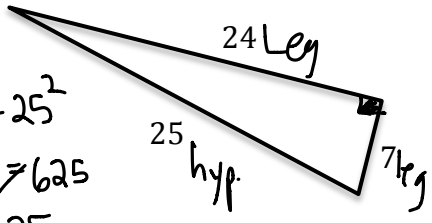
NAME:_____ Math _____, Period _____

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.

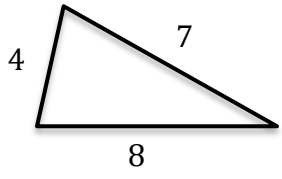
Find the length of the missing side of the triangle below.	How can we prove the triangle below is a right triangle?
 $a^2+b^2=c^2$ $a^2+15^2=17^2$ $a^2+225=289$ $-225\ \ -225$ $a^2=64$	 $7^2+24^2=25^2$ $49+576=625$ $625=625$

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?

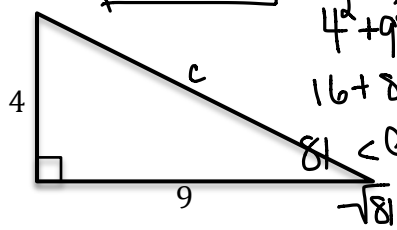


$4^2+7^2\neq 8^2$

$16+49\neq 64$

$65\neq 64$

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



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

$16+81=c^2$

$81<97=c^2<100$

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

c is between 9 & 10. Closer to 10.

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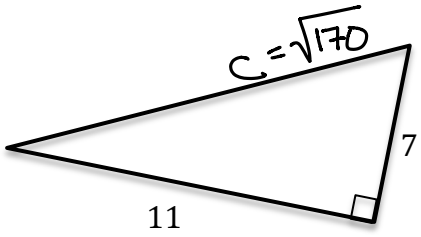
GUIDED PRACTICE:

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.

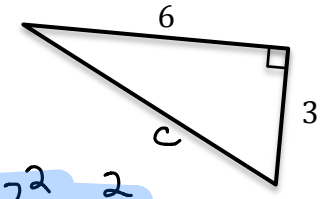


$7^2 + 11^2 = c^2$

$49 + 121 = c^2$

$169 < 170 = c^2 < 196$

c is between 13 & 14, closer to 13

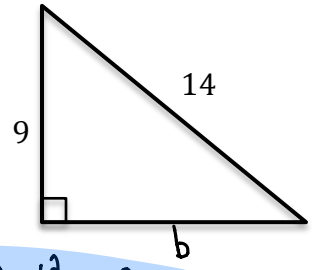


$6^2 + 3^2 = c^2$

$36 + 9 = c^2$

$36 < 45 = c^2 < 49$

c is between 6 & 7, but closer to 7.



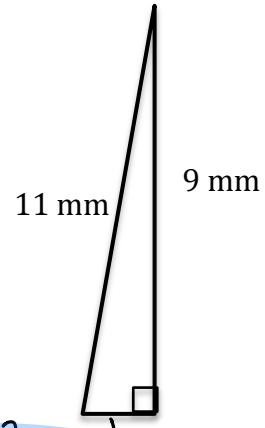
$9^2 + b^2 = 14^2$

$81 + b^2 = 196$

$-81 \quad -81$

$100 < b^2 = 115 < 121$

b is between 10 & 11, but closer to 11.



$9^2 + b^2 = 11^2$

$81 + b^2 = 121$

$36 < b^2 = 40 < 49$

b is between 6 & 7, but closer to 6.

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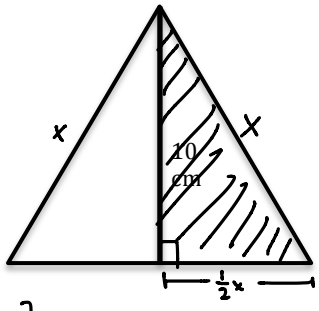
Find the side length of the **equilateral** triangle below.



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

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

$-\frac{1}{4}x^2 \quad -\frac{1}{4}x^2$

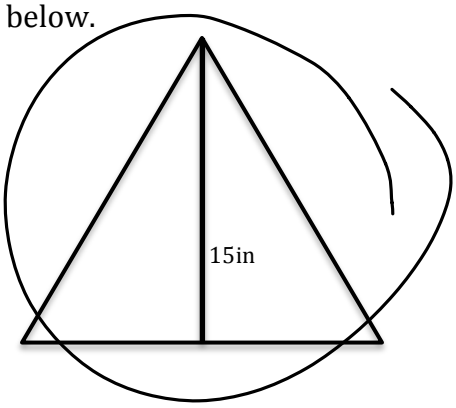
$100 = \frac{3}{4}x^2$

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

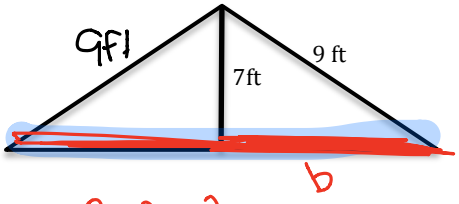
$121 < 133\frac{1}{3} = x^2 < 144$

x is between 11 and 12 and close to the middle.

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



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



$7^2 + b^2 = 9^2$

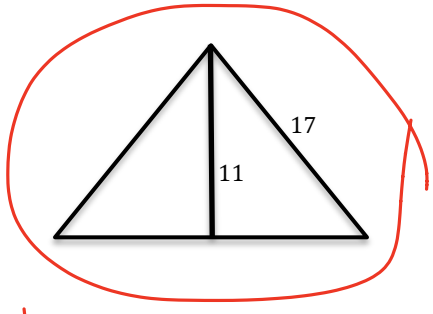
$49 + b^2 = 81$

$b^2 = 32$

b is between 5 and 6, but closer to 6.

The base is between 11 and 12

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



$b^2 + 25 \approx 26$

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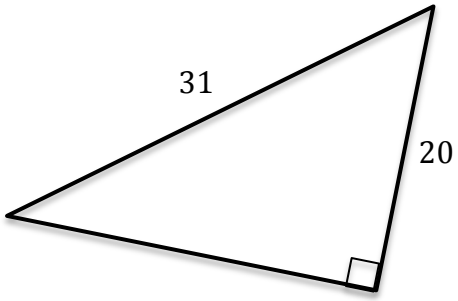
Independent Practice:

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.