NAME:_____ Math 7.2, Period _____

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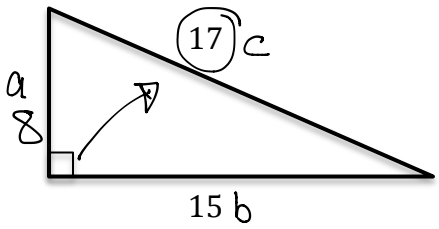
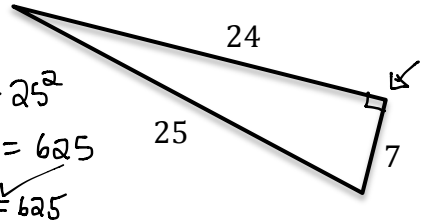
LEARNING OBJECTIVE: We will use the Pythagorean Theorem to introduce the concept of irrational numbers. (Lesson 67)

ACTIVATING PRIOR KNOWLEDGE:

We know what the Pythagorean theorem is AND its converse.

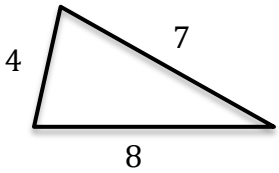
Find the length of the missing side of the triangle below.	How can we prove the triangle below is a right triangle?
$a^2+b^2=c^2$  $a^2+15^2=17^2$ $a^2+225=289$ $-225 \quad -225$ $a^2=64$ $\boxed{a=8}$	 $7^2+24^2=25^2$ $49+576=625$ $625=625$

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?

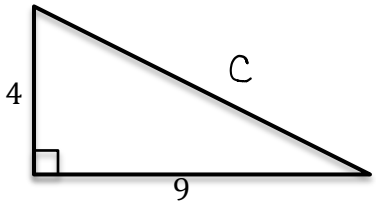


$4^2+7^2=8^2$

$16+49 \neq 64$

It is NOT a right triangle

How can we figure out the length of the missing side of this triangle?



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

$16+81=c^2$

$97=c^2$

81

9

97 100

10

c is between 9 & 10, but closer to 10

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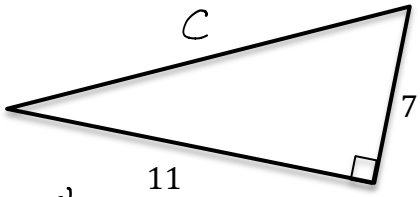
Guided Practice:

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.



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

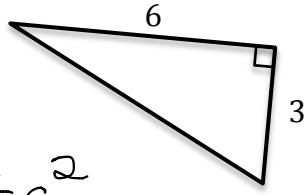
$49 + 121 = c^2$

$170 = c^2$

c is between 13 & 14, but closer to 13

13 14

169 170 196



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

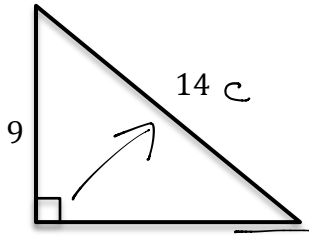
$9 + 36 = c^2$

$45 = c^2$

c is between 6 & 7, but closer to 7

6 7

36 45 49



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

$81 + b^2 = 196$

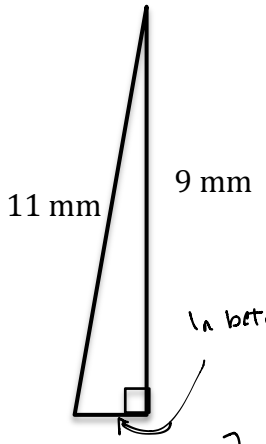
$-81 \quad -81$

$b^2 = 115$

b is between 10 and 11 but closer to 11

10 11

100 115 121



a is between 6 & 7, closer to 6

$a^2 + 9^2 = 11^2$

$a^2 + 81 = 121$

$-81 \quad -81$

$a^2 = 40$

36 40 49

6 7

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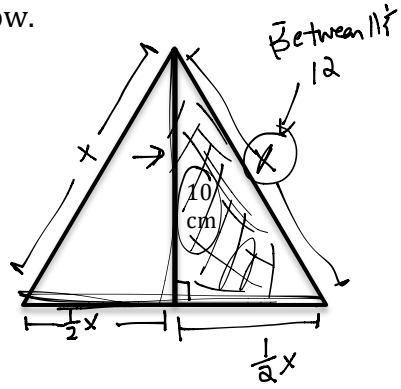
Find the side length of the **equilateral** triangle below.



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

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

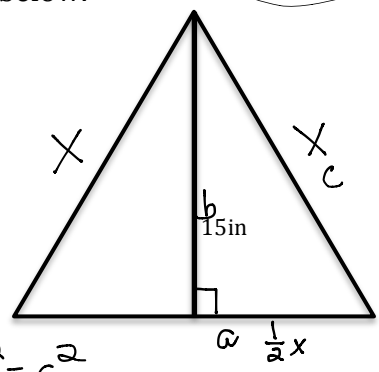
$-\frac{1}{4}x^2 \quad -\frac{1}{4}x^2$

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

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

11 121 $133\frac{1}{3}$ 12 144

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



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

$(\frac{1}{2}x)^2+15^2=x^2$

$\frac{1}{4}x^2+225=x^2$

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

$(225=\frac{3}{4}x^2)\frac{4}{3}$

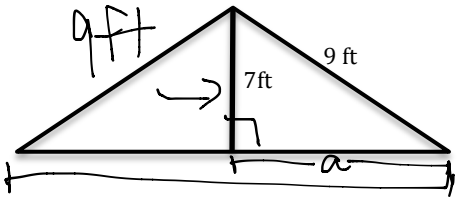
$300=x^2$

289 324

17 18

x is between 17 & 18 but closer to 17

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



9 ft

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

$a^2+49=81$

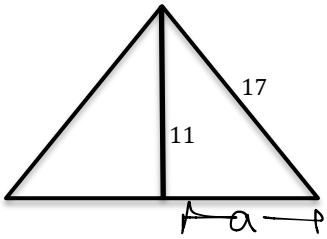
$-49 \quad -49$

$a^2=32$

25 36

The base is between 11 & 12 ft

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



$a^2+11^2=17^2$

$a^2=168$

144 169

12 13 → 26

the base is between 25 & 26 closer to 26

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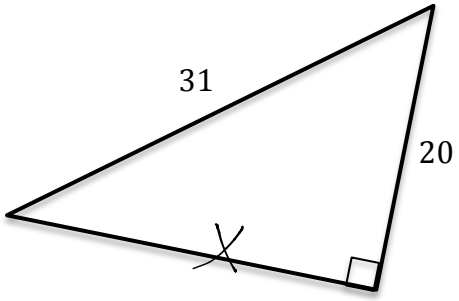
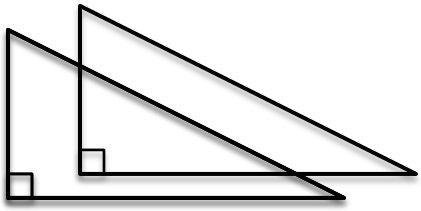
Independent Practice:

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?