The Pythagorean Theorem

SOL G.8

Learning Target: By the end of class today, I will be able to solve real world problems to classify triangles and find missing sides of right triangles using the Pythagorean theorem by solving problems collaboratively as a class and answering 4 out of 5 questions correctly on an exit ticket.

Essential Questions: G.8

·How is the Pythagorean Theorem derived and what is significant about its derivation?
·How are ratios used to solve for unknown lengths of sides in a right triangle?

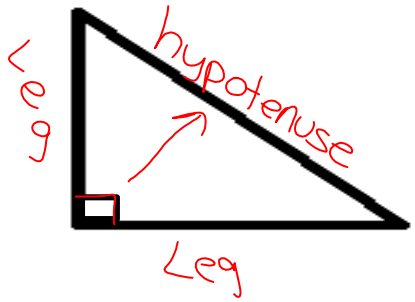
Today's Agenda

- ✓DO NOW
- ✓Intro to Right Triangles
- ✓Pythagorean Theorem
- ✓Workertown Map Activity
- ✓Exit Ticket

CODE YELLOW

Vocabulary

Right Triangle – A triangle with one right angle



Hypotenuse
the longest side
of a right triangle

The Pythagorean Theorem

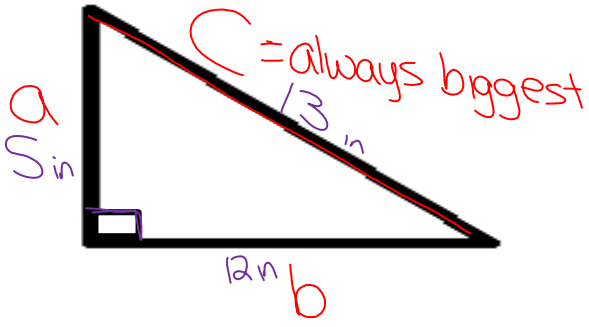
$$c^2 = a^2 + b^2$$

CODE YELLOW

The Pythagorean Theorem

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

$13^2 = 5^2 + 12^2$



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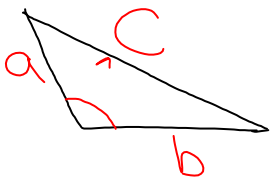
Other types of triangles:

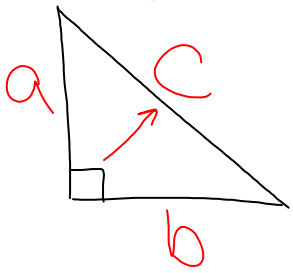
Obtuse



$c^2 > a^2 + b^2$

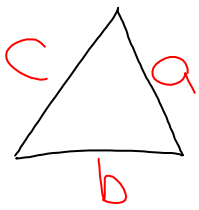
greater

Right



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

Acute



$c^2 < a^2 + b^2$

less

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Use the following sets of given side lengths to determine if the triangle is a right, obtuse, or acute triangle.

1) **7, 10, 12** (c)

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

$12^2 = 10^2 + 7^2$

$144 = 100 + 49$

$144 < 149$ acute

2) **4, 8, 9** (c)

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

$9^2 = 4^2 + 8^2$

$81 = 16 + 64$

$81 > 80$ obtuse

3) **4, 5, 3** (c)

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

$5^2 = 4^2 + 3^2$

$25 = 16 + 9$

$25 = 25$ right

CODE GREEN

Use the following sets of given side lengths to determine if the triangle is a right, obtuse, or acute triangle.

1) **6, 10, 8** (c)

$100 = 100$

right

2) **3.4, 6.3, 7.1** (c)

$50.41 < 51.25$

acute

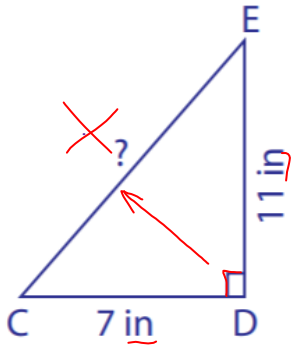
3) **4, 8, 11** (c)

$121 > 80$

obtuse

CODE YELLOW

Solving for missing sides:



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

$x^2 = 11^2 + 7^2$

$x^2 = 121 + 49$

$\sqrt{x^2} = \sqrt{170}$

$x = 13.04$

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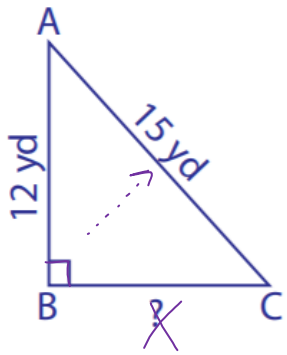
Solving for missing sides:



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

$15^2 = x^2 + 12^2$

$225 = x^2 + 144$

$-144 \quad -144$

$81 = x^2$

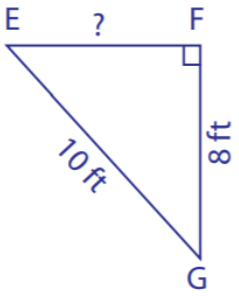
$\sqrt{81} = \sqrt{x^2}$

$9 = x$

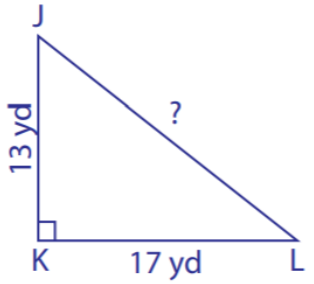
CODE GREEN

Solving for missing sides:

1



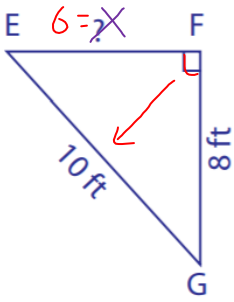
2



CODE RED – DO NOW

Solving for missing sides:

1



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

$10^2 = 8^2 + x^2$

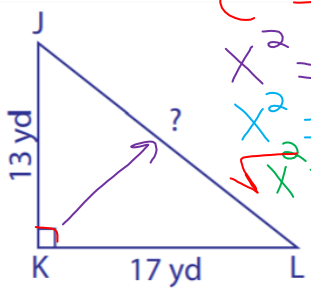
$100 = 64 + x^2$

$-64 \quad -64$

$36 = x^2$

$6 = x$

2



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

$x^2 = 13^2 + 17^2$

$x^2 = 169 + 289$

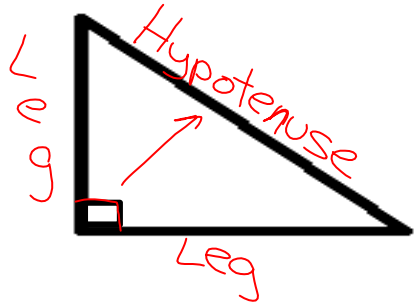
$x^2 = 458$

$x = 21.4$

CODE YELLOW

Vocabulary

Right Triangle – A triangle with one right angle



Hypotenuse
the longest side
of a right triangle

The Pythagorean Theorem

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

CODE YELLOW

Which of the following sets of numbers could be the side lengths of a right triangle?

1) **9, 3, 8**

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

$9^2 = 3^2 + 8^2$

$81 = 9 + 64$

$81 > 73$

2) **12, 13, 5**

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

$13^2 = 12^2 + 5^2$

$169 = 144 + 25$

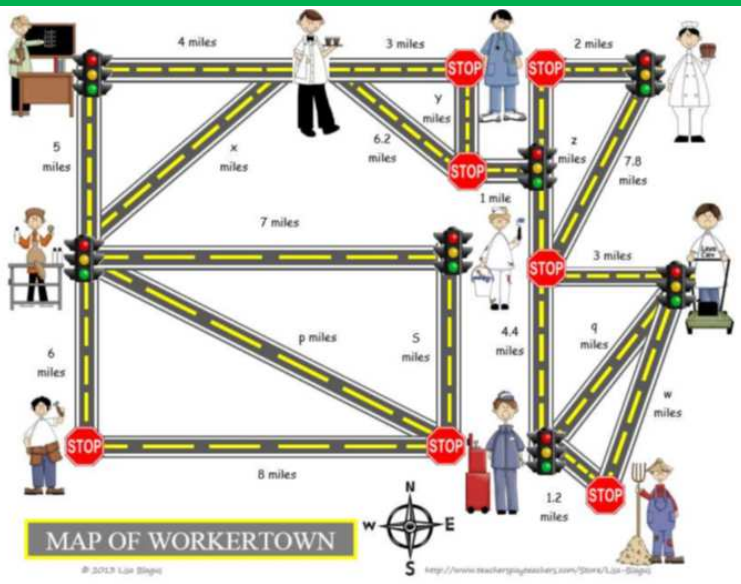
$169 = 169$ ✓

3) **4, 6, 11**

10

Not a triangle

CODE GREEN



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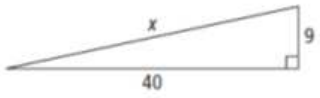
Gridded Response

Solve each exercise and enter your answer on the grid provided.
What is the value of x?

1.



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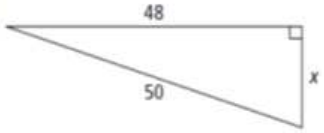

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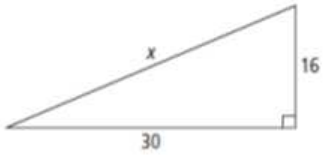

4.