"I know what we're going to do today."

1) Introduce Topic B - Right Triangles

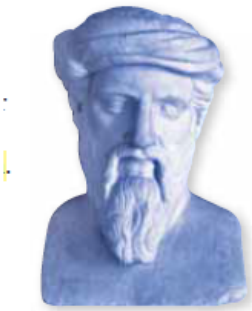
2) Lesson 10: Who was Pythagoreas? What did he discover?

3) homework: page 53, 58-60

May 9-3:48 PM

Lesson 7·1

Essential Question: How are the lengths of the sides of a right triangle related?



Pythagoras
(c. 570 B.C.–c. 490 B.C.)

Pythagoras was a Greek mathematician and philosopher who discovered one of the most famous rules in mathematics. In mathematics, a rule is called a **theorem**. So, the rule that Pythagoras discovered is called the Pythagorean Theorem.

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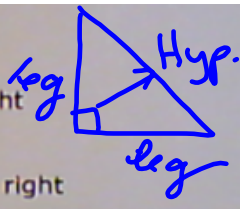
Right Triangles:



The **hypotenuse** is the side across from the right angle.

It is always the longest side of the right triangle.

The two shorter sides of the right triangle form the right angle and are called legs.

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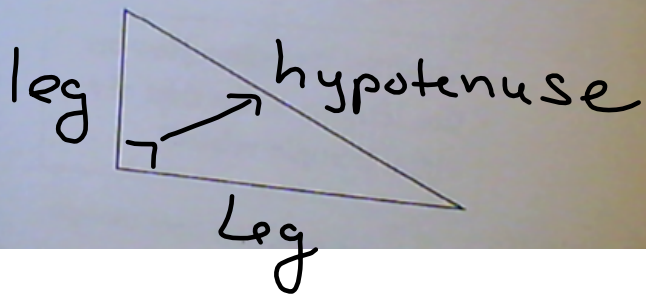
Label the right angle, hypotenuse, and legs in the following right triangle.



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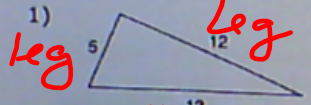
Practice.

Label the right angle, legs, and hypotenuse in each of the following.

1)



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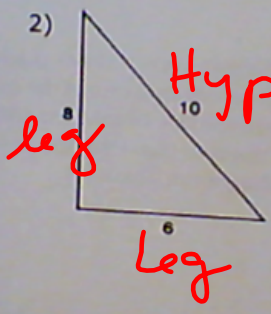

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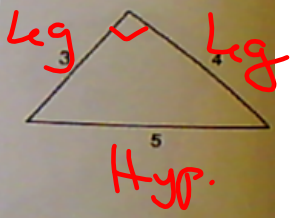

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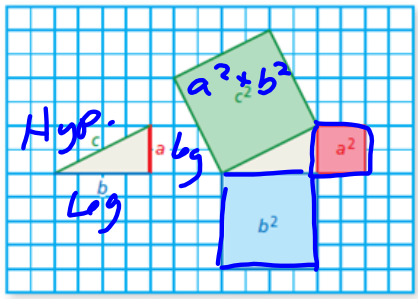
1 ACTIVITY: Discovering the Pythagorean Theorem

Work with a partner.

a. On grid paper, draw any right triangle. Label the lengths of the two shorter sides (the **legs**) a and b.

b. Label the length of the longest side (the **hypotenuse**) c.

c. Draw squares along each of the three sides. Label the areas of the three squares a^2, b^2, and c^2.



d. Cut out the 2 smaller squares and cut each one along its grid lines. Try to arrange all of the smaller squares into the large square.

e. What does this tell you about the relationship among a^2, b^2, and c^2?

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

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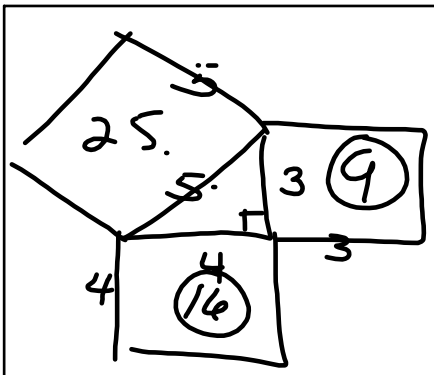

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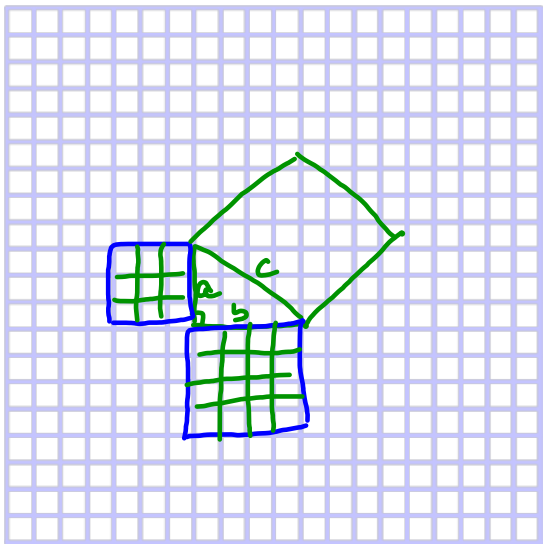

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Pythagorean Theorem

The Pythagorean Theorem Formula: $a^2+b^2=c^2$

Used to : find a missing side in a Right triangle

In any Right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.

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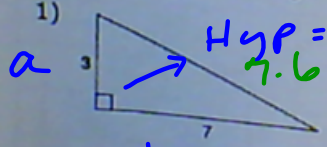
The Pythagorean Theorem Formula: $a^2+b^2=c^2$

Examples:

Find the missing side length in each right triangle.

1)



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

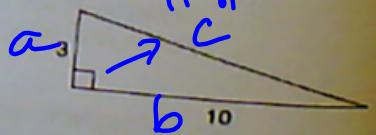
$3^2+7^2=c^2$

$9+49=c^2$

$\sqrt{58}=\sqrt{c^2}$

$7.6=c$

2)



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

$3^2+10^2=c^2$

$9+100=c$

$\sqrt{109}=\sqrt{c^2}$

$10.4=c$

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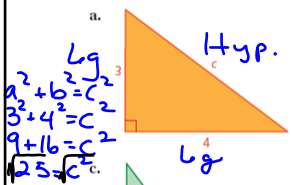
2 ACTIVITY: Finding the Length of the Hypotenuse

Work with a partner. Use the result of Activity 1 to find the length of the hypotenuse of each right triangle.

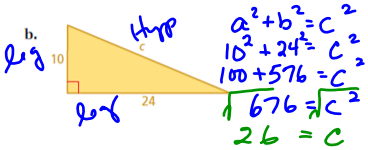
a.



Leg Hyp. Leg

$a^2+b^2=c^2$
$3^2+4^2=c^2$
$9+16=c^2$
$\sqrt{25}=\sqrt{c^2}$
$5=c$

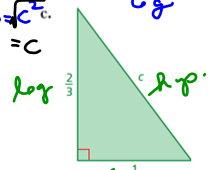
b.



Leg Hyp. Leg

$a^2+b^2=c^2$
$10^2+24^2=c^2$
$100+576=c^2$
$\sqrt{676}=\sqrt{c^2}$
$26=c$

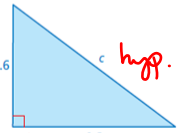
c.



Leg Hyp. Leg

$a^2+b^2=c^2$
$\left(\frac{2}{3}\right)^2+\left(\frac{1}{2}\right)^2=c^2$
$\frac{4}{9}+\frac{1}{4}=c^2$
$\frac{16}{36}+\frac{9}{36}=c^2$
$\sqrt{\frac{25}{36}}=\sqrt{c^2}$
$\frac{5}{6}=c$

d.



Leg Hyp. Leg

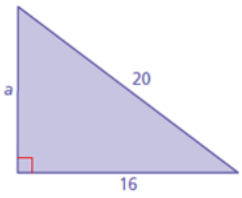
$a^2+b^2=c^2$
$(.6)^2+(.8)^2=c^2$
$.36+.64=c^2$
$\sqrt{1.00}=\sqrt{c^2}$
$1=c$

May 9-3:51 PM

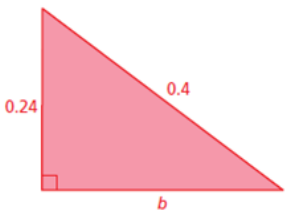
3 ACTIVITY: Finding the Length of a Leg

Work with a partner. Use the result of Activity 1 to find the length of the leg of each right triangle.

a.



b.



② subtract c^2-a^2 or c^2-b^2

③ square Root

May 9-3:51 PM

What Is Your Answer?

4. **IN YOUR OWN WORDS** How are the lengths of the sides of a right triangle related? Give an example using whole numbers.

May 9-3:51 PM

EXIT TICKET 7-1

SWBAT understand relationships in the Pythagorean Theorem

Needs More Time ◯ Met ◯ Mastered ◯

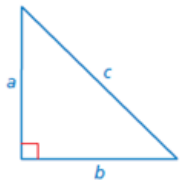
1. **VOCABULARY** In a right triangle, how can you tell which sides are the legs and which side is the hypotenuse?
2. **DIFFERENT WORDS, SAME QUESTION** Which is different? Find "both" answers.

Which side is the hypotenuse?

Which side is the longest?

Which side is a leg?

Which side is opposite the right angle?



May 9-3:52 PM

Vocabulary and Concept Check

1. **VOCABULARY** In a right triangle, how can you tell which sides are the legs and which side is the hypotenuse?

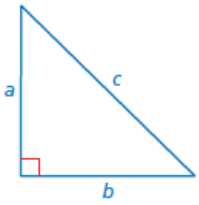
2. **DIFFERENT WORDS, SAME QUESTION** Which is different? Find "both" answers.

Which side is the hypotenuse?

Which side is the longest?

Which side is a leg?

Which side is opposite the right angle?



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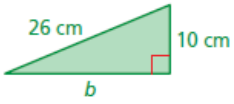
Practice and Problem Solving

Find the missing length of the triangle.

1 2 3.



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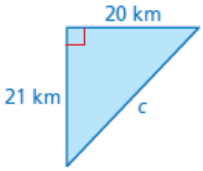

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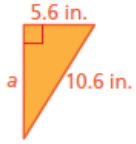

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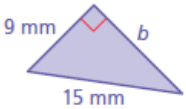

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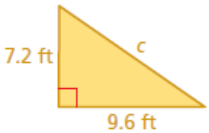

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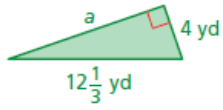

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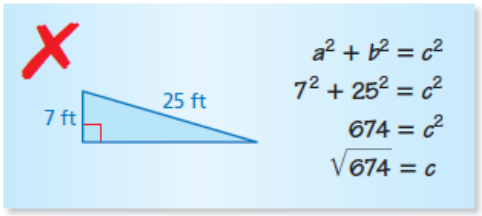
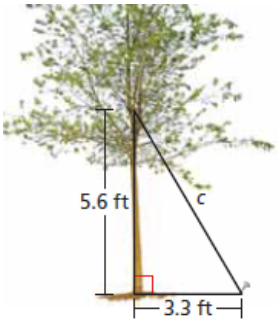
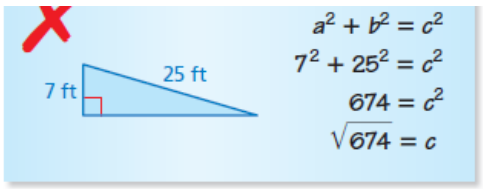
9. **ERROR ANALYSIS** Describe and correct the error in finding the missing length of the triangle.



$a^2 + b^2 = c^2$
$7^2 + 25^2 = c^2$
$674 = c^2$
$\sqrt{674} = c$

May 13-1:19 PM





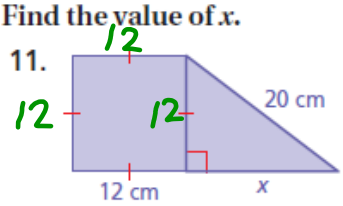
$a^2 + b^2 = c^2$
$7^2 + 25^2 = c^2$
$674 = c^2$
$\sqrt{674} = c$

10. **TREE SUPPORT** How long is the wire that supports the tree?

May 13-1:19 PM

Find the value of x.

11.



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

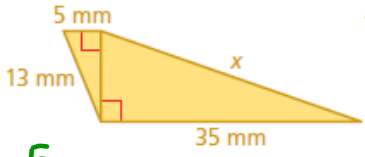
$12^2+b^2=26^2$

$144+b^2=400$ (3, 9, 10) -144

$\sqrt{b^2}=\sqrt{256}$

$b=16$

12.



5, 4, 13, ?, 12

$13^2=169$

$5^2=25$

144

$\sqrt{144}=12$

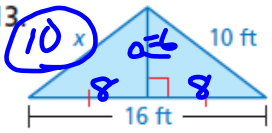
$12^2=144$

$35^2=1225$

1369

$\sqrt{1369}=37$

13.



$10^2=100$

$8^2=64$

36

$\sqrt{36}=6$

6^2+8^2

$36+64$

$\sqrt{100}=10$

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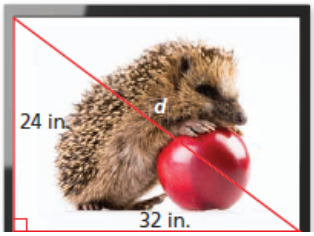


14. **FLAT SCREEN** Televisions are advertised by the lengths of their diagonals. A store has a sale on televisions 40 inches and larger. Is the television on sale? Explain.

15. **BUTTERFLY** Approximate the wingspan of the butterfly.

$24^2=576$

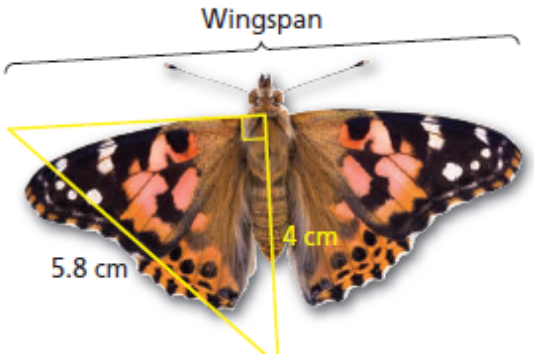
$32^2=1024$

1600

$\sqrt{1600}=40$

May 13-1:19 PM

15. **BUTTERFLY** Approximate the wingspan of the butterfly.



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16. **PGA** The Players Championship is played at TPC Sawgrass golf course in Ponte Vedra Beach. The figure shows the location of the golf ball after a tee shot. How many feet from the hole is the ball?

$181^2 = 32,761$

$180^2 = 32\,400$

361

$\sqrt{361} = 19$ yards

May 13-1:20 PM

17. **SNOWBALLS** You and a friend stand back-to-back. You run 20 feet forward then 15 feet to your right. At the same time, your friend runs 16 feet forward then 12 feet to her right. She stops and hits you with a snowball.
    a. Draw the situation in a coordinate plane.
    b. How far does your friend throw the snowball?

18. **Algebra** The legs of a right triangle have lengths of 28 meters and 21 meters. The hypotenuse has a length of $5x$ meters. What is the value of x?

May 13-1:20 PM

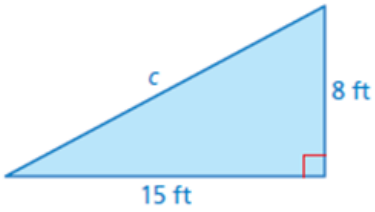
EXIT TICKET 7-2

SWBAT use the Pythagorean Theorem to solve problems

Needs More Time ◯ Met ◯ Mastered ◯

Find the length of the hypotenuse of the triangle.

1.



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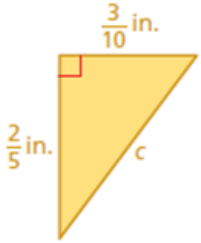

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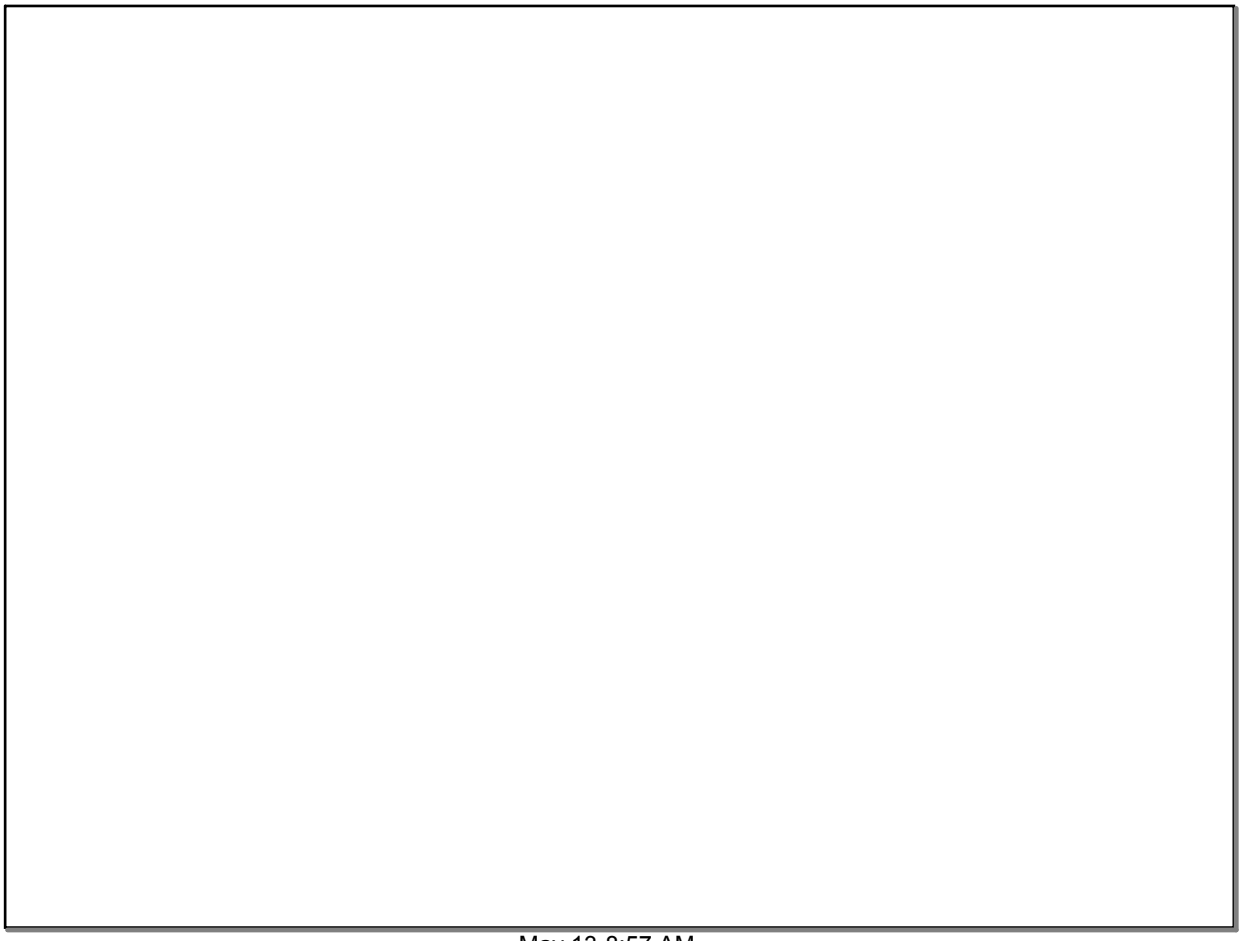

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