NAME: _____ DATE: _____

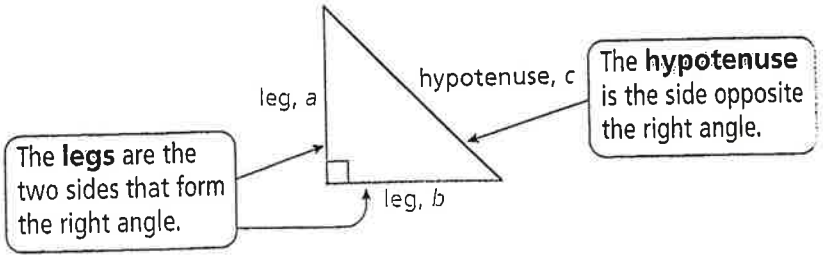
TRIANGLES PERIOD: _____

What Is the Pythagorean Theorem?

(Topic #5)

Sides of a Right Triangle

The sides of a right triangle have special names.

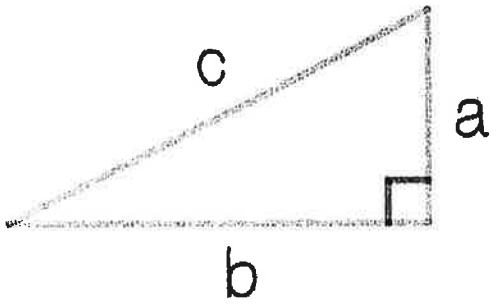


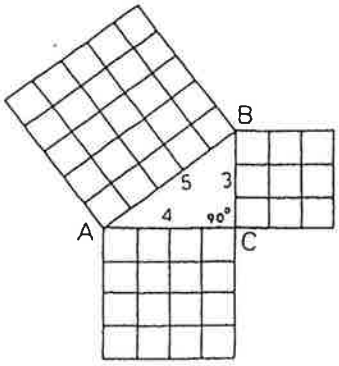
NOTE: In a right triangle, the legs are the shorter sides and the hypotenuse is always the longest side.

The Pythagorean Theorem	
Words	In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.
Algebra	$a^2 + b^2 = c^2$

1. In a right triangle, the side opposite the right angle is called the _____.

2. The other two sides are called the _____ of the right triangle.





In a right triangle, the sum of the areas of the squares on the two **legs** is equal to the area of the square on the **hypotenuse**.

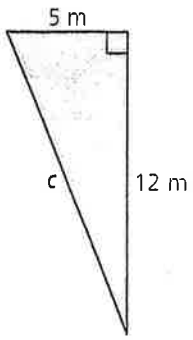
Pythagorean Theorem

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

where a and b represent the legs and c always represents the hypotenuse.

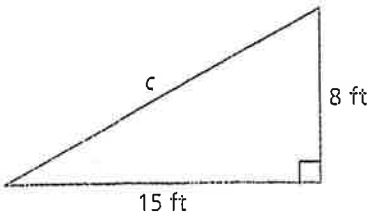
EXAMPLE 1: Finding the Length of a Hypotenuse

Find the length of the hypotenuse of the triangle.

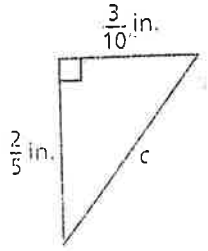


PRACTICE: Find the length of the hypotenuse of the triangle.

1.

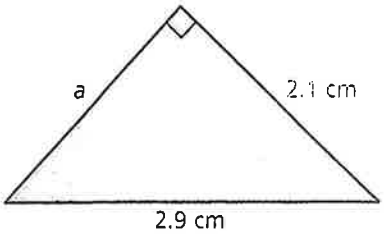


2.



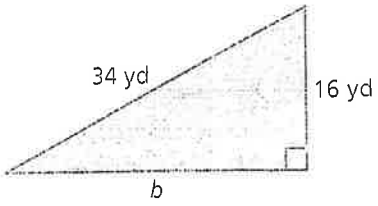
EXAMPLE 2: Finding the Length of a Leg

Find the missing length of the triangle.

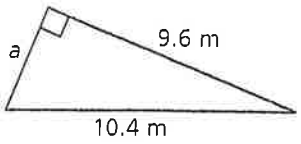


PRACTICE: Find the missing length of the triangle.

3.



4.



NAME: _____ DATE: _____

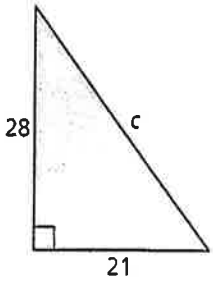
TRIANGLES PERIOD: _____

The Pythagorean Theorem

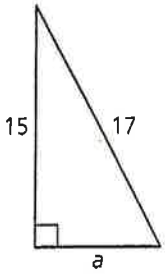
(Topic #5)

Find the missing length of the triangle.

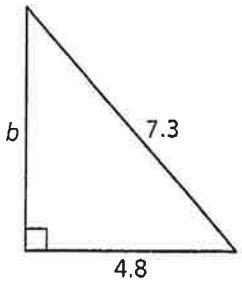
1.



2.

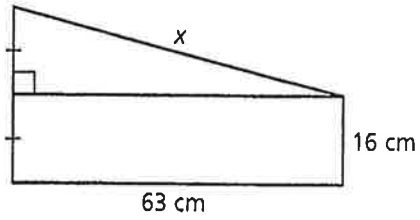


3.



Find the missing length of the figure.

4.



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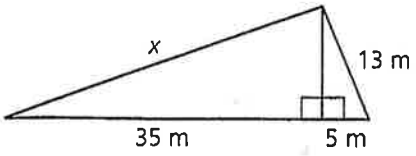
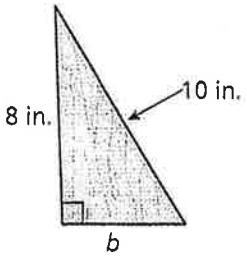


6. In wood shop, you make a bookend that is in the shape of a right triangle. What is the base b of the bookend?



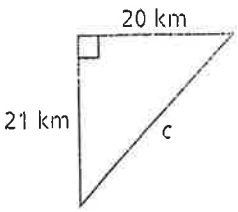
NAME: _____ DATE: _____

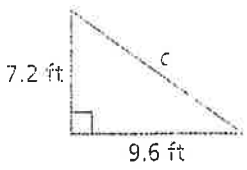
TRIANGLES PERIOD: _____

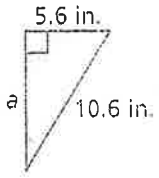
HOMEWORK #5

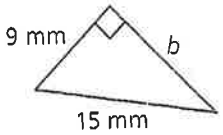
1. In a right triangle, how can you tell which sides are the legs and which side is the hypotenuse?

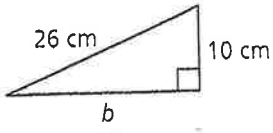
Find the missing length of the triangle.

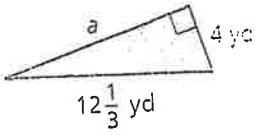
2. 

3. 

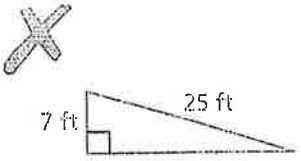
4. 

5. 

6. 

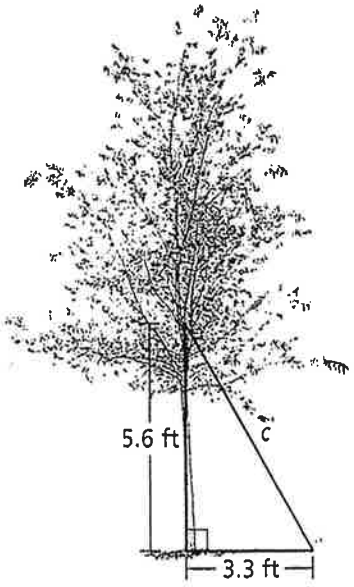
7. 

8. Describe and correct the error in finding the missing length of the triangle.

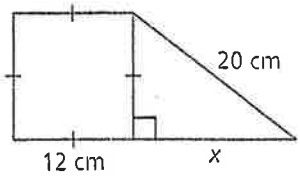


$$a^2 + b^2 = c^2$$
$$7^2 + 25^2 = c^2$$
$$674 = c^2$$
$$\sqrt{674} = c$$

9. How long is the wire that supports the tree?



10. Find the missing length of the figure. Show all work.



NAME: KEY DATE: _____

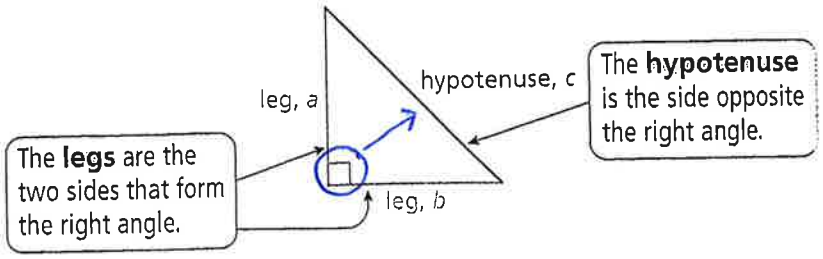
TRIANGLES PERIOD: _____

What Is the Pythagorean Theorem?

(Topic #5)

Sides of a Right Triangle

The sides of a right triangle have special names.

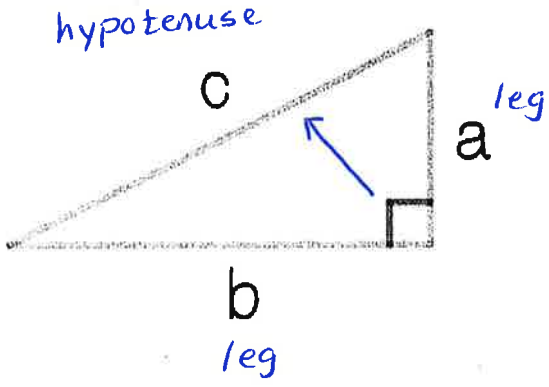


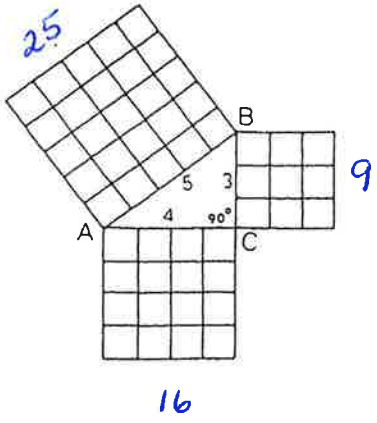
NOTE: In a right triangle, the legs are the shorter sides and the hypotenuse is always the longest side.

The Pythagorean Theorem	
Words	In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.
Algebra	$a^2 + b^2 = c^2$

1. In a right triangle, the side opposite the right angle is called the hypotenuse.

2. The other two sides are called the legs of the right triangle.





In a right triangle, the sum of the areas of the squares on the two **legs** is equal to the area of the square on the **hypotenuse**.

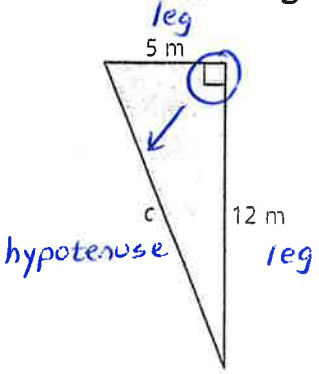
Pythagorean Theorem

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

where a and b represent the legs and c always represents the hypotenuse.

EXAMPLE 1: Finding the Length of a Hypotenuse

Find the length of the hypotenuse of the triangle.



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

$5^2 + 12^2 = c^2$

$25 + 144 = c^2$

$169 = c^2$

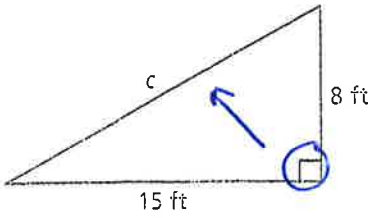
$\sqrt{169} = \sqrt{c^2}$

$13 = c$

$c = 13$ m

PRACTICE: Find the length of the hypotenuse of the triangle.

1.



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

$8^2 + 15^2 = c^2$

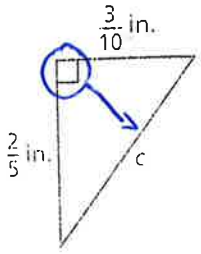
$64 + 225 = c^2$

$289 = c^2$

$\sqrt{289} = \sqrt{c^2}$

$17 = c$ ft

2.



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

$\left(\frac{2}{5}\right)^2 + \left(\frac{3}{10}\right)^2 = c^2$

$\frac{4}{25} + \frac{9}{100} = c^2$

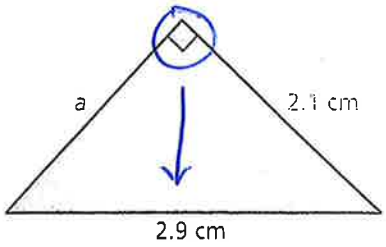
$\frac{1}{4} = c^2$

$\sqrt{\frac{1}{4}} = \sqrt{c^2}$

$\frac{1}{2} = c$ in

EXAMPLE 2: Finding the Length of a Leg

Find the missing length of the triangle.



hypotenuse (c)

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

$a^2 + (2.1)^2 = (2.9)^2$

$a^2 + 4.41 = 8.41$

$-4.41 \quad -4.41$

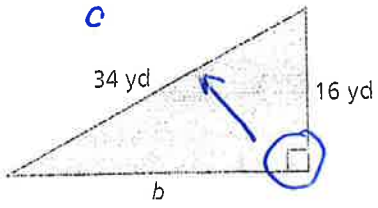
$a^2 = 4$

$\sqrt{a^2} = \sqrt{4}$

$a = 2$ cm

PRACTICE: Find the missing length of the triangle.

3.



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

$16^2 + b^2 = 34^2$

$256 + b^2 = 1156$

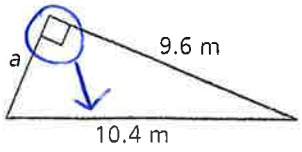
$-256 \qquad -256$

$b^2 = 900$

$\sqrt{b^2} = \sqrt{900}$

$b = 30$ yd

4.



c

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

$a^2 + (9.6)^2 = (10.4)^2$

$a^2 + 92.16 = 108.16$

$-92.16 \qquad -92.16$

$a^2 = 16$

$\sqrt{a^2} = \sqrt{16}$

$a = 4$ m

NAME: KEY
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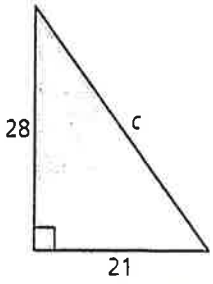
The Pythagorean Theorem

(Topic #5)

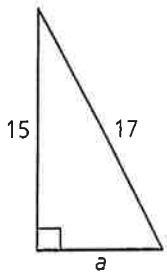
Find the missing length of the triangle.

1.



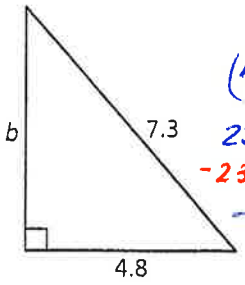
$a^2+b^2=c^2$
$21^2+28^2=c^2$
$441+784=c^2$
$1225=c^2$
$\sqrt{1225}=\sqrt{c^2}$
$35=c$

2.



$a^2+b^2=c^2$
$a^2+15^2=17^2$
$a^2+225=289$
$-225 \quad -225$
$a^2=64$
$\sqrt{a^2}=\sqrt{64}$
$a=8$

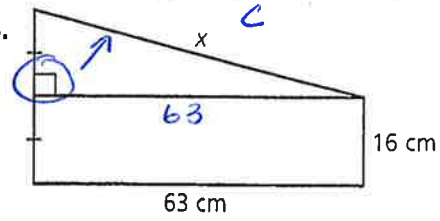
3.



$a^2+b^2=c^2$
$(4.8)^2+b^2=(7.3)^2$
$23.04+b^2=53.29$
$-23.04 \quad -23.04$
$b^2=30.25$
$\sqrt{b^2}=\sqrt{30.25}$
$b=5.5$

Find the missing length of the figure.

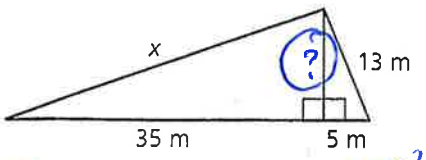
4.



c
16

$a^2+b^2=c^2$
$16^2+63^2=x^2$
$256+3969=x^2$
$4225=x^2$
$\sqrt{4225}=\sqrt{x^2}$
$65=x$

5.



12 m

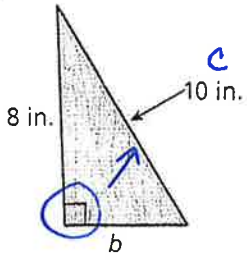
STEP 1

$a^2+b^2=c^2$
$a^2+5^2=13^2$
$a^2+25=169$
$-25 \quad -25$
$a^2=144$
$\sqrt{a^2}=\sqrt{144}$
$a=12$

STEP 2

$a^2+b^2=c^2$
$12^2+35^2=x^2$
$144+1225=x^2$
$1369=x^2$
$\sqrt{1369}=\sqrt{x^2}$
$37=x$
m

6. In wood shop, you make a bookend that is in the shape of a right triangle. What is the base *b* of the bookend?



$a^2+b^2=c^2$
$8^2+b^2=10^2$
$64+b^2=100$
$-64 \quad -64$
$b^2=36$
$\sqrt{b^2}=\sqrt{36}$
$b=6$ in

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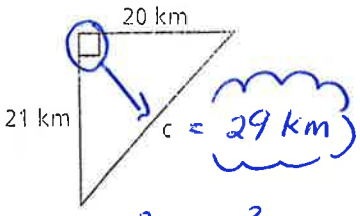
HOMEWORK #5

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

In any right Δ, the legs are the 2 sides that form the right angle. The hypotenuse is the side opposite the right angle. The legs are the shorter sides and the hypotenuse is always the longest side.

Find the missing length of the triangle.

2.



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

$21^2 + 20^2 = c^2$

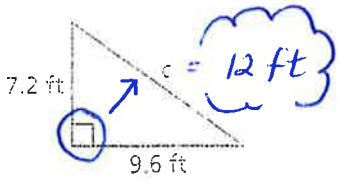
$441 + 400 = c^2$

$841 = c^2$

$\sqrt{841} = \sqrt{c^2}$

$29 = c$

3.



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

$(7.2)^2 + (9.6)^2 = c^2$

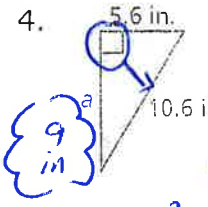
$51.84 + 92.16 = c^2$

$144 = c^2$

$\sqrt{144} = \sqrt{c^2}$

$12 = c$

4.



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

$a^2 + (5.6)^2 = (10.6)^2$

$a^2 + 31.36 = 112.36$

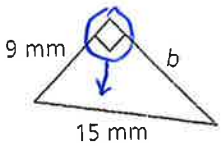
$-31.36 \quad -31.36$

$a^2 = 81$

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

$a = 9$

5.



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

$9^2 + b^2 = 15^2$

$81 + b^2 = 225$

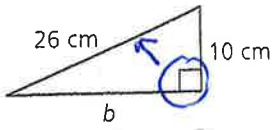
$-81 \quad -81$

$b^2 = 144$

$\sqrt{b^2} = \sqrt{144}$

$b = 12$ mm

6.



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

$10^2 + b^2 = 26^2$

$100 + b^2 = 676$

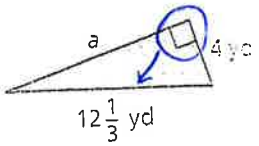
$-100 \quad -100$

$b^2 = 576$

$\sqrt{b^2} = \sqrt{576}$

$b = 24$ cm

7.



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

$a^2 + 4^2 = \left(12\frac{1}{3}\right)^2$

$a^2 + 16 = 152\frac{1}{9}$

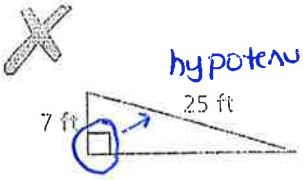
$-16 \quad -16$

$a^2 = 136\frac{1}{9}$

$\sqrt{a^2} = \sqrt{136\frac{1}{9}}$

$a = 11\frac{2}{3}$ yd

8. Describe and correct the error in finding the missing length of the triangle.



You are finding the leg, not the hypotenuse.

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

$7^2 + b^2 = 25^2$

$49 + b^2 = 625$

$-49 \quad -49$

$b^2 = 576$

$\sqrt{b^2} = \sqrt{576}$

$b = 24$ ft

hypotenuse

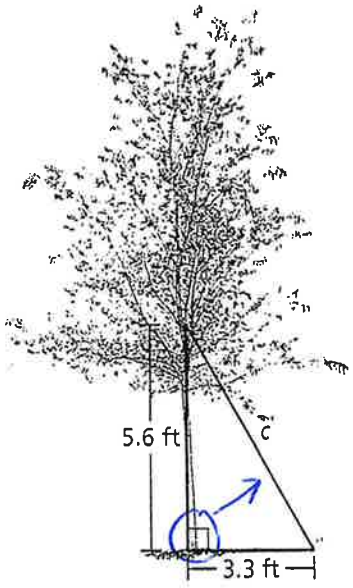
$a^2 + b^2 = c^2$

$7^2 + 25^2 = c^2$

$674 = c^2$

$\sqrt{674} = c$

9. How long is the wire that supports the tree?



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

$(5.6)^2 + (3.3)^2 = c^2$

$31.36 + 10.89 = c^2$

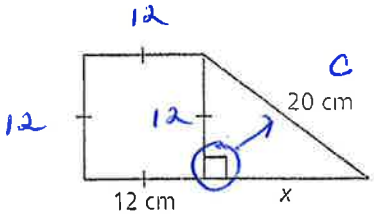
$42.25 = c^2$

$\sqrt{42.25} = \sqrt{c^2}$

$6.5 = c$

ft

10. Find the missing length of the figure. Show all work.



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

$x^2 + 12^2 = 20^2$

$x^2 + 144 = 400$

$-144 \quad -144$

$x^2 = 256$

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

$x = 16$ cm