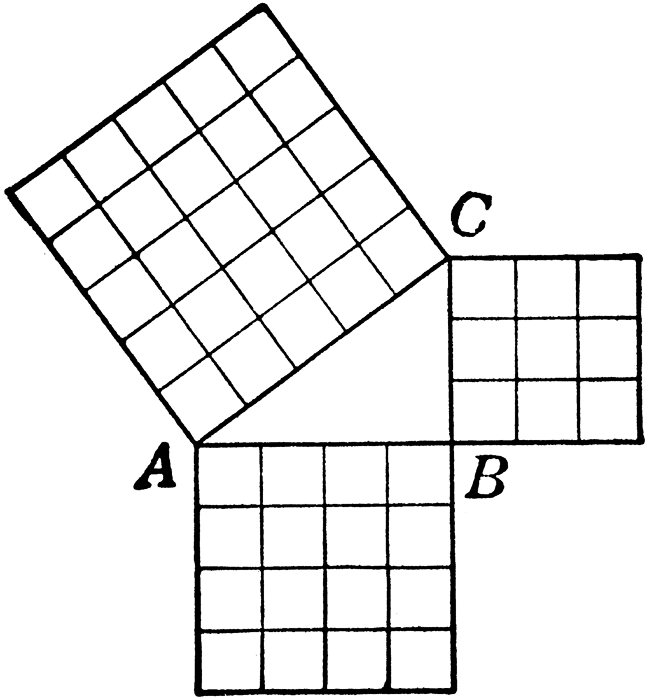
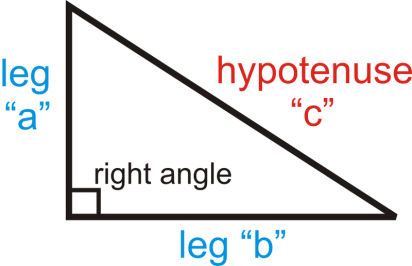
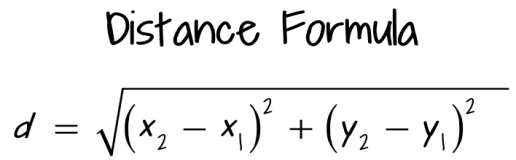
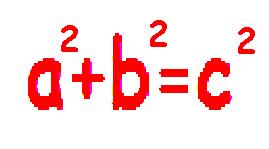
[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwiYnqavrYzKAhVH4SYKHWxeCeUQjRwIBw&url=http://www.crewtonramoneshouseofmath.com/pythagorean-theorem.html&psig=AFQjCNHuSjLs-majQBvgBl6hSQP_SlByvw&ust=1451866220717972)**NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

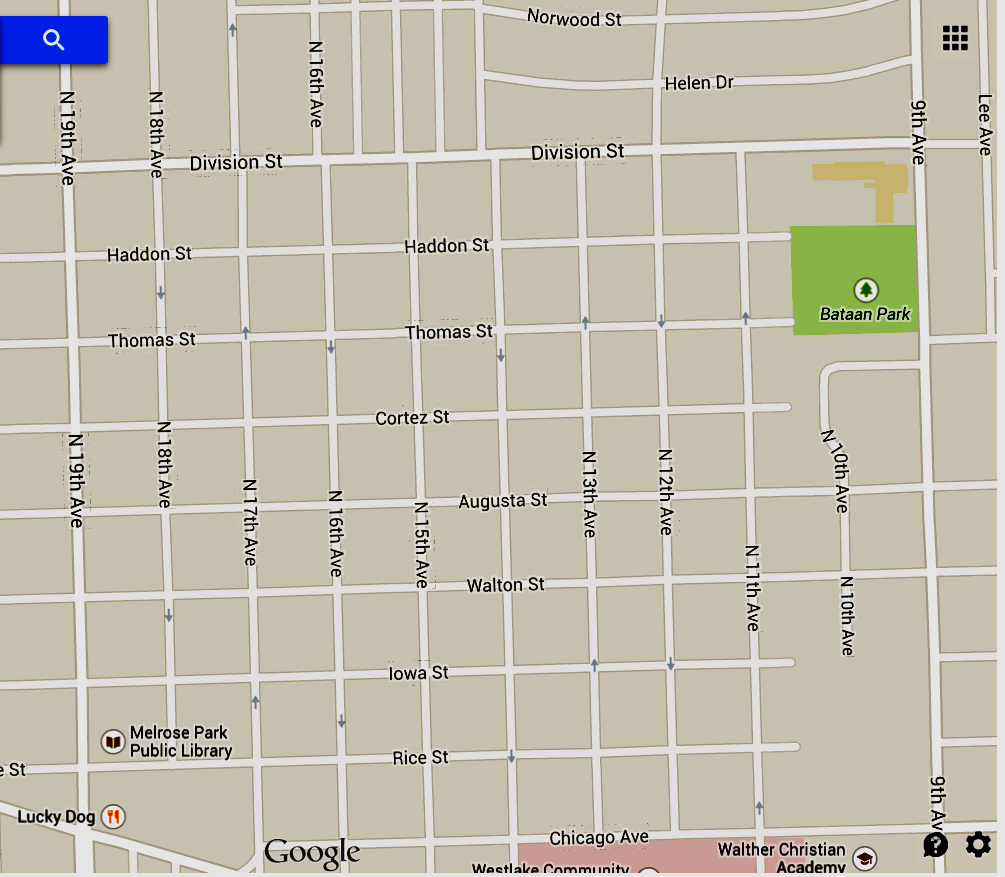
[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwiTlN-9rYzKAhWJQyYKHUJ5BtsQjRwIBw&url=http://www.ck12.org/geometry/Pythagorean-Theorem-and-Pythagorean-Triples/lesson/Pythagorean-Theorem-and-Pythagorean-Triples-Intermediate/&psig=AFQjCNHuSjLs-majQBvgBl6hSQP_SlByvw&ust=1451866220717972)**Pythagorean Theorem,**

**Converse, Radicals,**

**Distance, Midpoint &**

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwii09zWrYzKAhVKLSYKHZ--ANQQjRwIBw&url=https://www.emaze.com/@ALOTWCFW/Pythagorean-Theorem&psig=AFQjCNHuSjLs-majQBvgBl6hSQP_SlByvw&ust=1451866220717972)**Special Triangles**

**INTRODUCTION**

Dave and Ally are

friends who are trying

to find each other.

1. Dave is at the corner

of 19th and Division,

Ally is at 11th and Iowa.

Draw a point at each

of those intersections.

2. If Dave walked South

To Iowa St, and then

West to 11th, how many

blocks would he walk?

3. Ally owns a helicopter.

If she flies from her

location directly to

19th and Division, how

many blocks would she travel?

**PYTHAGOREAN THEOREM**

To use the **PYTHAGOREAN THEOREM**, we must review

**RIGHT TRIANGLES** and **SQUARE ROOTS**

**RIGHT TRIANGLES**

1. The Pythagorean Theorem only works in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ triangle.

2. In a right triangle, the longest (slanty) side that is always across from the right angle is

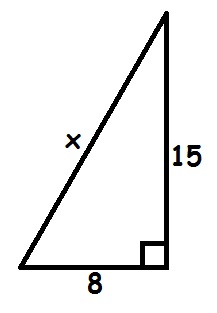
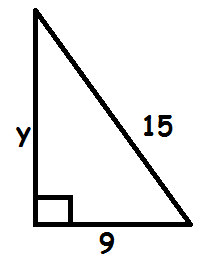
called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. The other two sides are shorter, and “touch” at the right angle. They are called \_\_\_\_\_\_\_\_

4. In the formula , c is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. In the formula , a and b are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

In the triangles below, write the numbers in the correct blanks:

6. 7.

**SQUARE ROOTS I**

1. A SQUARE ROOT is a way of asking \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What are the perfect squares? **4, 9, \_\_, \_\_\_, \_\_\_, 49, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_**

Complete the following:

3.  4.  5.  6. 

Use a calculator to give an an *approximate value*. Round to the nearest *tenth*.

7.  8.  9.  10. 

11. If you are asked to find “the square root of Ω”,  you are really being asked to find a

number that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PYTHAGOREAN THEOREM II**

For each of the following triangles, find the length of the HYPOTENUSE (c).

Write the equation used for each problem.

30

**1. 2. 3. 4.**

24

7

c

c

24

10

c

40

8

6

c

For each of the following triangles, find the length of the HYPOTENUSE (c):

Write the equation used for each problem.

For these problems, c will be a decimal, use your calculator, and round to the nearest *tenth*.

**5. 6. 7. 8.**

7

14

c

8

c

10

5

c

20

c

12

10

**9. 10. 11. 12.**

10

X

20

8

15

12

X

17

12

16

X

X

**AM🡪 Math8 🡪 4 Pythagorean Theorem 🡪EXPLORING 🡪** *Understanding Pythagorean…*

**SLIDE #1:**

1) A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ triangle is a triangle with one angle measuring \_\_\_\_\_\_\_\_\_o

2) ***Label the triangle:*** Right angle, leg 1, leg 2, hypotenuse

3) Drag the **vertices.**

What side is **always** the longest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**SLIDE #2:**

4) Fill in the table with the measures of the sides of several right triangles.

|  |  |  |  |
| --- | --- | --- | --- |
| **a, b, c** | **a2** | **b2** | **c2** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

5) ***Label the triangle:*** Right angle, a, b, and c.

6) The **Pythagorean Theorem:** \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_, where \_\_\_\_ and \_\_\_\_\_\_ are lengths of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a right triangle and \_\_\_\_\_\_\_ is the length of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7) The sum of the values for \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ is equal to the value of \_\_\_\_\_\_\_\_\_\_.

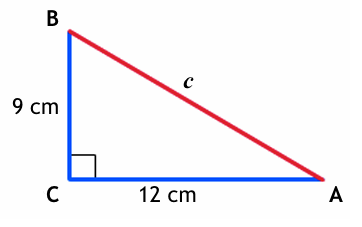
**SLIDE #3: *Fill in the blanks:***

8) The two sides of that form the right angle are called the triangle’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9) The side opposite the right angle is called the triangle’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

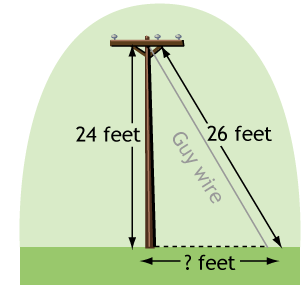
10) The Pythagorean Theorem says that for any right triangle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**SLIDE #4:**

****11) Find the missing length. ***Show your work!***

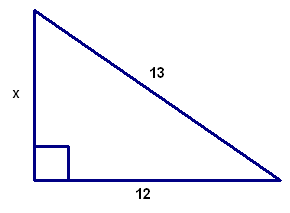
**C = \_\_\_\_\_\_\_\_\_\_\_**

**SLIDE #5:**

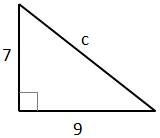
12) How far from the base of the telephone pole should the end of the guy wire be set? ***Show your work!***

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

**REINFORCE: *EXTRA PRACTICE – NOT in agile mind***

13) What are you looking for? *Leg or hypotenuse (circle)* ***SHOW YOUR WORK:***

x = \_\_\_\_\_\_\_\_\_

14) What are you looking for? *Leg or hypotenuse (circle)* ***SHOW YOUR WORK: Round nearest tenth!***

c = \_\_\_\_\_\_\_\_\_

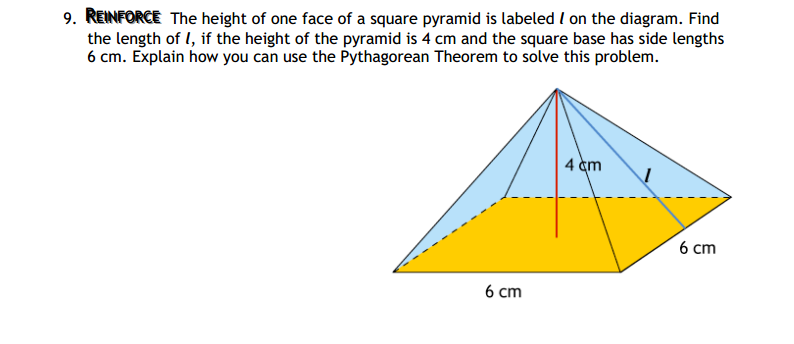
15) Find the **hypotenuse** of a right triangle with **legs** of 5cm and 6cm. ***Show your work! Round nearest tenth!***

**Hypotenuse: \_\_\_\_\_\_\_\_\_\_\_\_**

16) A garden plot is in the shape of a right triangle. The right triangle has a **hypotenuse** of 10 feet and one leg that is 7 feet long. How long is the other **leg** of the triangle? ***Round nearest tenth!***

**Leg : \_\_\_\_\_\_\_\_\_\_\_\_**

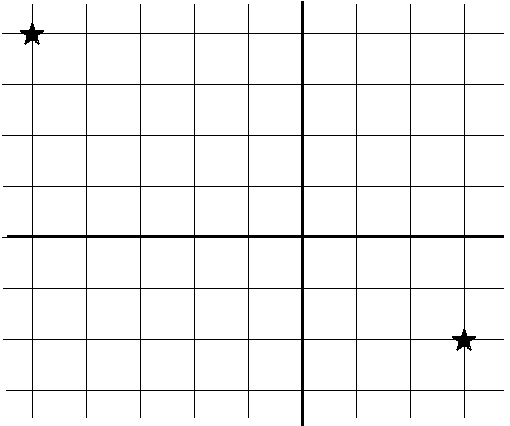
17) Use the square pyramid to answer the question. Find the length of ***l***when the height of the pyramid is 4cm and the base is 6cm. ***Hint: sketch the triangle that is drawn inside the pyramid.***



***l* : \_\_\_\_\_\_\_\_\_\_\_\_**

**DISTANCE FORMULA**

The Pythagorean Theorem can be used to find the distance between objects with any graph or overlay.



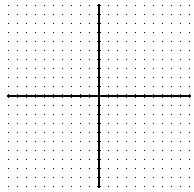
1. In the graph on the right, find the coordinates of the two locations,and draw them into the

graph.

2. Draw in the right triangle that would be used to find the distance between the two points

shown.

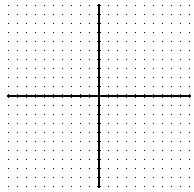
3. Use the Pythagorean theorem to find the distance between the two points.

INCLUDE THE EQUATION.

4. Graph the points A (4, -5) and B (-1, 7)

5. Draw in the triangle and perform the Pythagorean

Theorem to find the distance between A and B

6. What is the distance between

C (8, 2) and D (-4, 5)? Round your

answer to the nearest *tenth*.

**INCLUDE THE EQUATION!**

7. A problem like #6 can be done without the graph by using the distance formula:

****

= the x-coordinate from the first point.

= the x-coordinate from the second point.

= the y-coordinate from the first point.

= the y-coordinate from the second point.

Write the points (8,2) and (-4,5) into the correct locations in the distance formula:

****

8. What value do you get in the first set of parentheses?

9. How is that related to the picture you drew in #6?

10. What value do you get in the second set of parentheses?

11. How is that related to the picture you drew in #6?

12. What is the distance between C and D?

13. Use the distance formula to find the distance between (-3, 5) and (8,1).

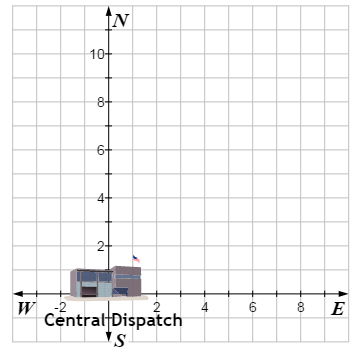
14. Use the distance formula to find the distance between (23, 18) and (5, 60).

**CCSS Mathematics 8 - #4 Pythagorean Theorem –**

**EXPLORING –** *“Calculating Distance”*

**SLIDE #1: *Play the animation!***

1) A surveillance helicopter reports a grass fire to the central dispatcher. The dispatcher locates the fire on a grid map and determines that the fire is **8 miles EAST** and **11 miles NORTH** from the central dispatch office.



a) Plot the location of the **FIRE.**

b) What is the coordinate of the **FIRE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

2) The dispatcher determines that the fire station located

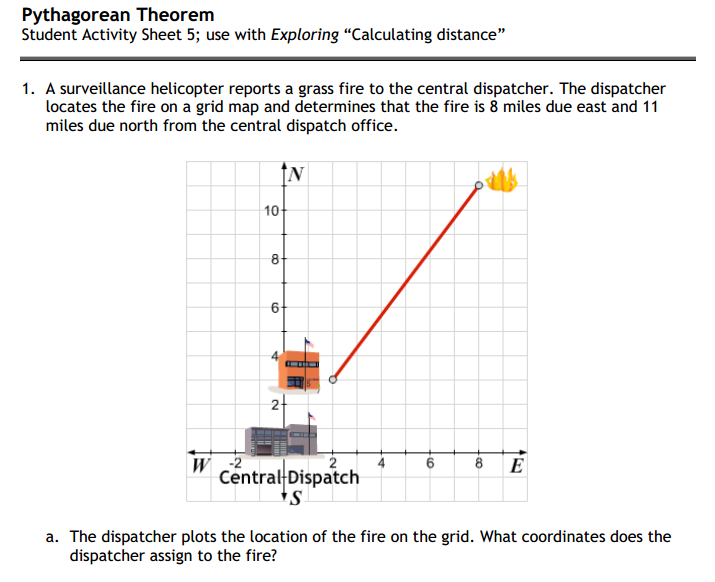
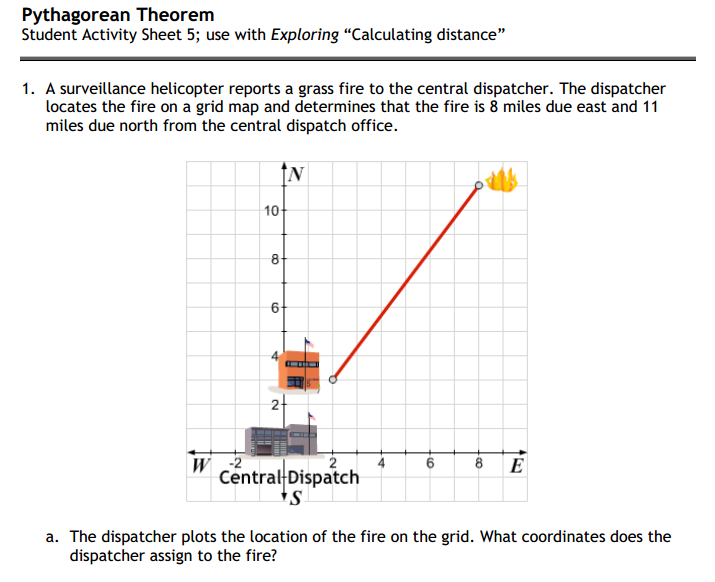
at coordinates ( \_\_\_\_\_\_, \_\_\_\_\_\_\_ ) is closest to the fire and

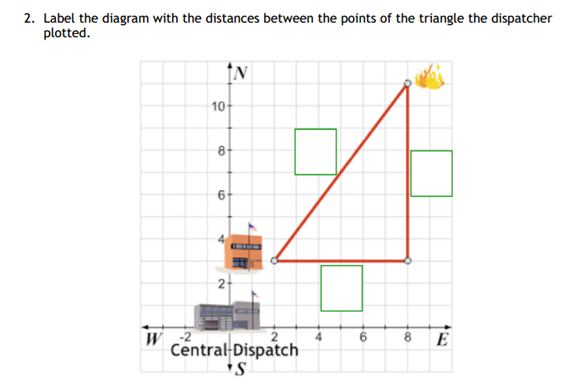
calls that station to send out a truck.

a) Plot the location of the **STATION:**

3) Sketch the two different right triangles, one of each graph below.

**Vertex: \_\_\_\_\_\_\_\_\_\_\_\_ Vertex: \_\_\_\_\_\_\_\_\_\_\_\_\_**

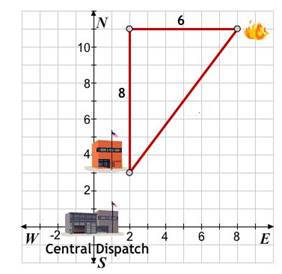


**SLIDE #2:**

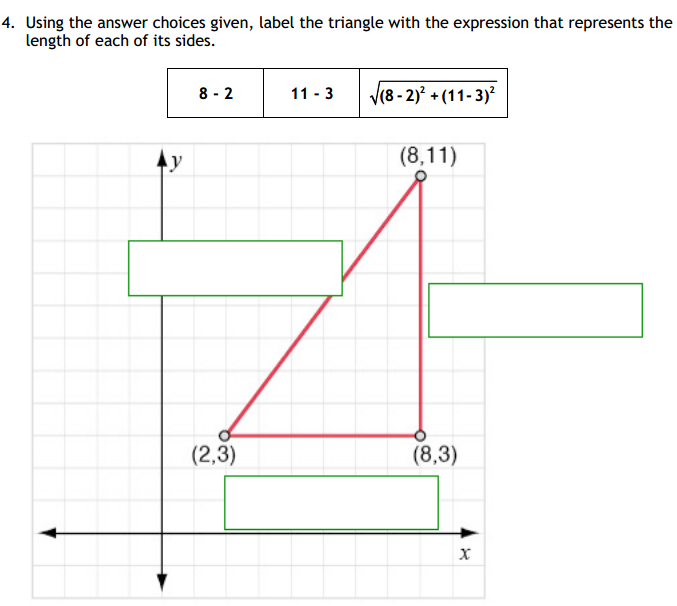
4) Label the **legs** of the triangle by counting.

5) Label the **hypotenuse** of the triangle. ***Show your work below!***

**SLIDE #3:**

6) What if you use the right triangle with the vertex at (2,11)? Will you get the same distance (**hypotenuse**)? ***Show your work!***

**SLIDE #4:**

7) Fill in the blanks in the picture.

 Plug in the values from the answer bank:

\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_ = c2

Get c alone! Square root **both** sides of the equation

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = c

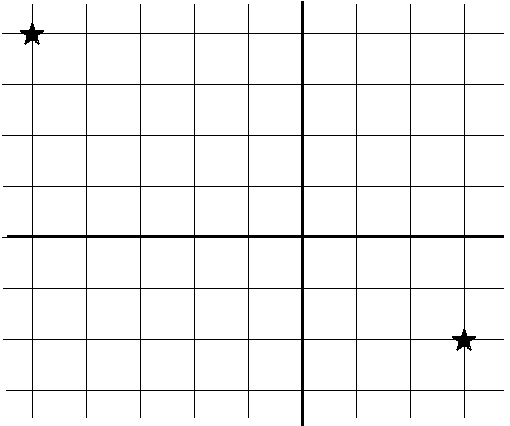
**MIDPOINT**

1. Find a definition for the word MIDPOINT \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Connect the two locations.



3. What intersection (streets) represents the **MIDPOINT**?

How to find it on the graph:

a) Draw in the triangle represented by the two points.

b) put your pencil on the top left point.

c) Instead of moving down 6 units, move down 3 units (half of 6)

d) Instead of moving right 8 units, move right 4 units (half of 8)

e) you should now be at the midpoint.

4. What are the coordinates of the midpoint in the graph above?

Just like with distance, if this information is put into a graph, we can find the exact location of the midpoint by using a formula:

**MIDPOINT** Formula: 

5. Find the **midpoint** between the two points: (-1, -2) and (7, 4)

6. Find the **midpoint** between the two points: (4, 7) and (-8, 8)

**SQUARE ROOTS II**

Sometimes we cannot use decimals for square roots, and instead must *reduce* them. Reduce each of the following square roots:

**Simplify (reduce) each of the following square roots:**

1.  2.  3.  4. 

5.  6.  7.  8. 

**Part 2** Multiplying square roots

EXAMPLEs PROBLEMS

A.  13.  14.  15. 

B.  16.  17.  18. 

**Part 3** Square roots and exponents

C.  19.  20.  21. 

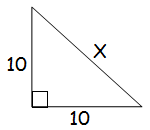
D.  22.  23.  24. 

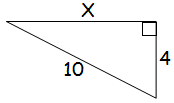
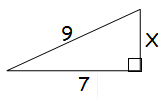
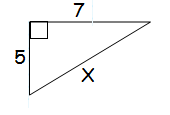
**Part 4** Rationalize the denominator

E.  25.  26. 

27.  28. 

Find X. Leave your answer as a reduced square root:

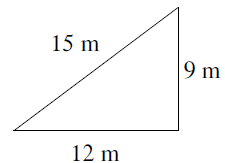
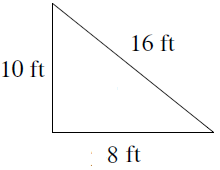
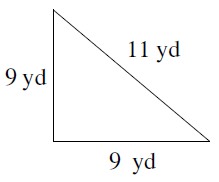
1. 2. 3. 4.



**CONVERSE**

Since the PYTHAGOREAN THEOREM only works for RIGHT TRIANGLES, we can use it to test if a triangle is a right triangle or not.

Decide if the PYTHAGOREAN THEOREM works for each of the following triangles:

1. 2. 3.

Is this a right triangle? Is this a right triangle? Is this a right triangle?

The Hypotenuse is … The Hypotenuse is … The Hypotenuse is …

Big Small Equal Big Small Equal Big Small Equal

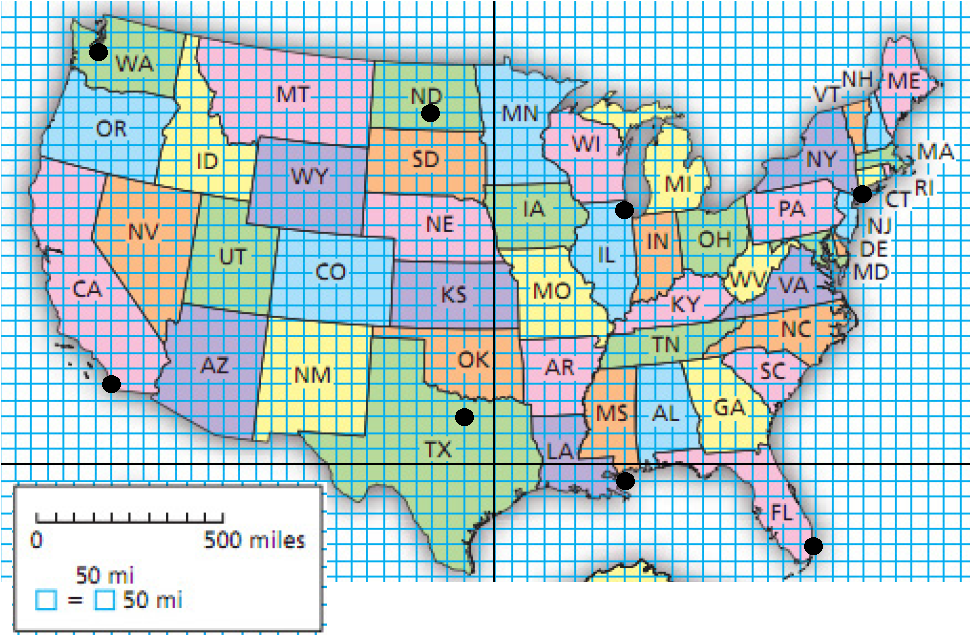
Use the PYHTAGOREAN THEOREM to decide if a triangle with the given sides is…

ACUTE, OBTUSE or RIGHT

4. 18, 20, 28 5. 12, 16, 20 6. 4, 5, 6 7. 8, 15, 17

**Application**

Use google maps if necessary to identify the cities:



Find the coordinates for Chicago, San Diego, New Yor, and New Orleans.

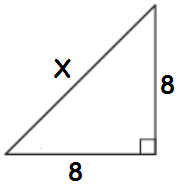
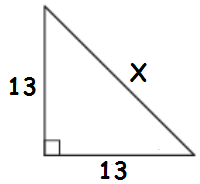
1. What is the distance from Chicago to LA?

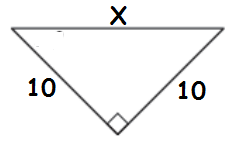
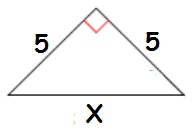
2. What is the distance from New York to New Orleans?

**SPECIAL RIGHT TRIANGLES**

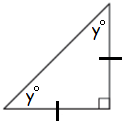
Solve for X in each of the following right triangles:

**Leave answers as reduced square roots!!**

1. 2. 3. 4.



Use the following triangle to answer questions 5-7:



5. This triangle has 2 congruent sides.

What do we call that kind of triangle?

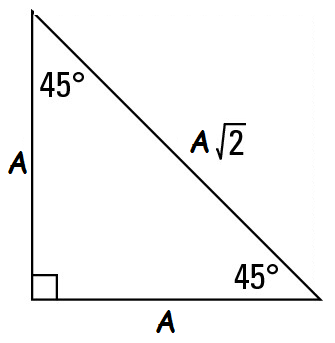
6. If two sides are congruent, then what do we

know about the angles?

7. If the angles have to add to 180, and one of them is 90,

and the other two are equal, what do those angles

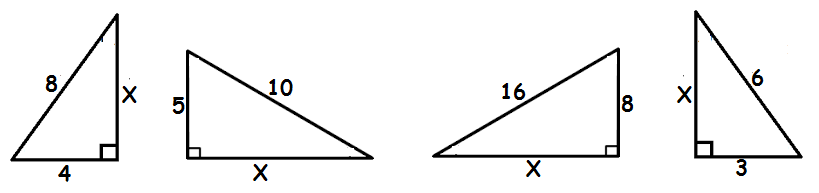
measure?



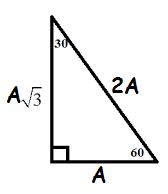
The 45º-45º-90º triangle

Solve for X in each of the following right triangles:

**Leave answers as reduced square roots!!**

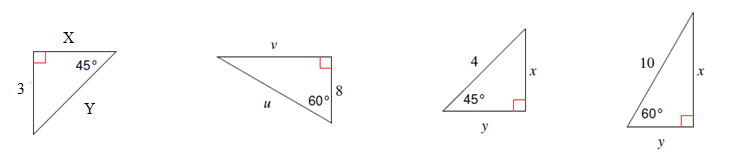


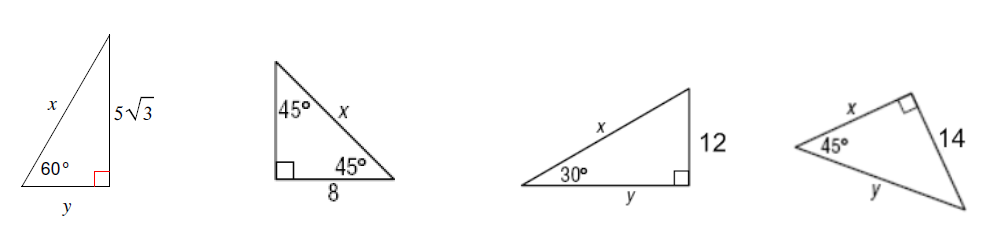
8. 9. 10. 11.



The 30º-60º-90º triangle

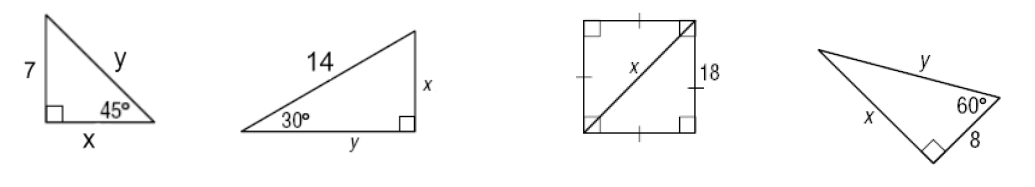
Find the missing sides. Use the shortcut triangles. Give exact answers only, no decimals!

12. 13. 14. 15.

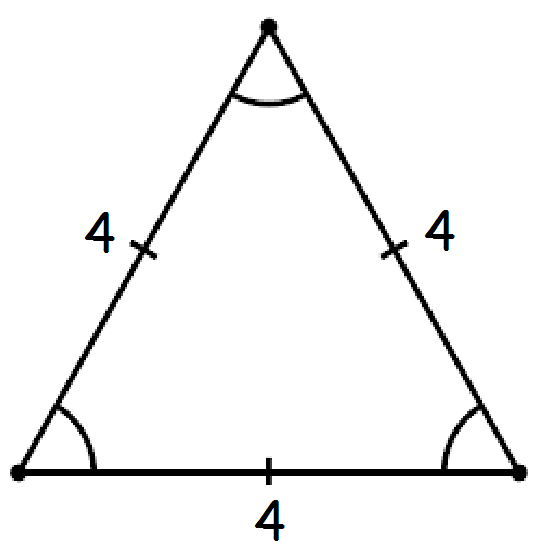


16. 17. 18. 19.

20. 21. 22. 23.



**Equilateral Triangles & the Pythagorean Theorem**



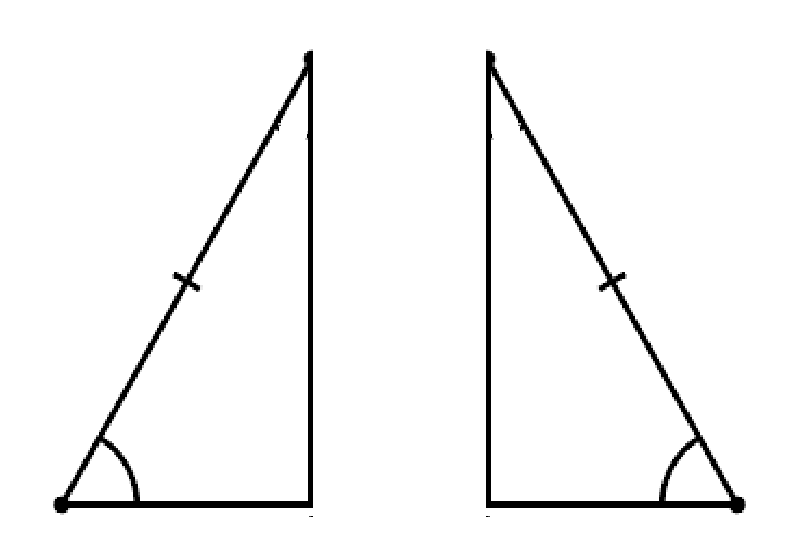
This is an EQUILATERAL TRIANGLE

1. That means all the angles are \_\_\_\_\_\_\_\_\_\_

2. And all the sides are \_\_\_\_\_\_\_\_\_\_.

3. Write the measures for all 3 angles in the picture

Now that equilateral triangle is cut into two congruent triangles.



4. You should be able to figure out the measure of all 3 angles

in both triangles, write the measures of all the angles in the picture.

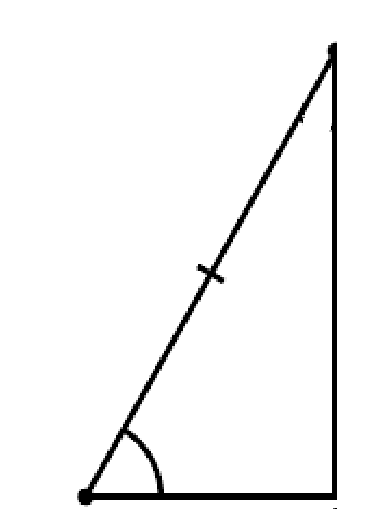
5. One of the sides in each triangles is still 4 units. Write the

measures of the of those sides in the picture.

6. One of the sides in each triangle is now 2 units

(the side was cut in half).

Write the measures of those sides in the picture.

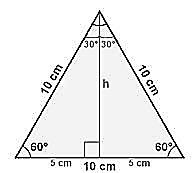


Each triangle is now a 30º-60º-90º triangle.

7. In this picture write in the measures of

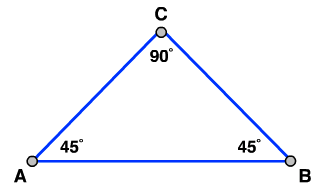
ALL ANGLES and ALL SIDES of the triangle created when an

equilateral triangle is cut in half.

[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwiN26bnm6LKAhWCwiYKHZilBbsQjRwIBw&url=http://rasmus.is/uk/t/F/Su55k01.htm&bvm=bv.111396085,d.dmo&psig=AFQjCNHklwdb4axQnM3IfWsxKp1ynjxdGQ&ust=1452617431854691)

8. The picture shows an equilateral triangle. Use what you learned above to find the measure of the height (altitude) of the triangle.

**AM🡪 Geometry 🡪 15 Right Triangle & Trig 🡪EXPLORING 🡪** *Special Right Triangles*

**SLIDE #1:**

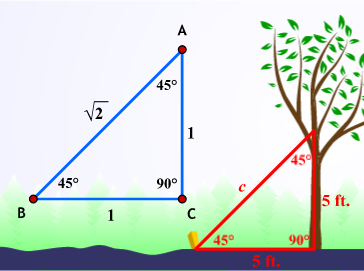
1. Label any facts you know about this triangle.

**SLIDE #2:**

Watch the animation. Then, label the side lengths for the triangle above. The side lengths of a 45-45-90 triangle always have that ratio.

**SLIDE #3:**

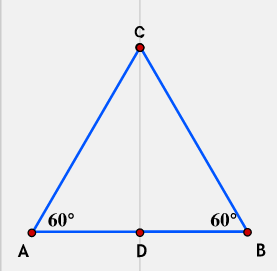
Watch the animations. These two triangles are similar. 2.) Why?



3.) Set up a ratio between the two triangles to solve for the unknown side c.

**SLIDE #4 & SLIDE #5:** Do these slides.

**SLIDE #6:** Watch the animations.

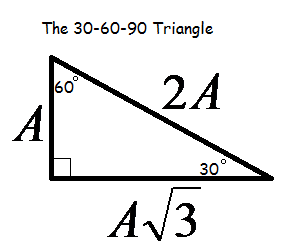
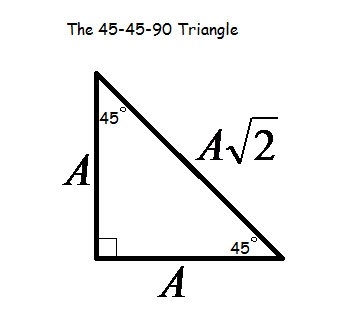


4.) This is an equilaterial triangle, so <ACB = \_\_\_\_\_\_\_\_

5.) By spliting the triangle down the middle, <ACB is cut in half. This means that <ACD = <DCB = \_\_\_\_\_\_\_\_

6.) If we say segment AC is 2 units long, segment AD = \_\_\_\_\_\_\_\_

7.) Triangle ACD is a right triangle, so use the pythagorean theorem to solve for side CD.

****SPECIAL RIGHT TRIANGLE PRACTICE:

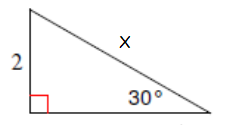
1. A) 

B) 

C) 

D) 

2. A) 

 B) 

C) 

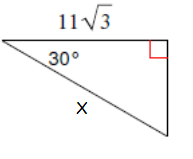
D) 

3. A) 

B) 

C) 

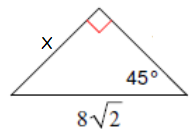
D) 

4. A) 

B) 

C) 

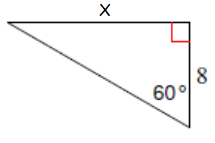
D) 

5. A) 

B) 

C) 

D) 



6. A) 

B) 

C) 

D) 