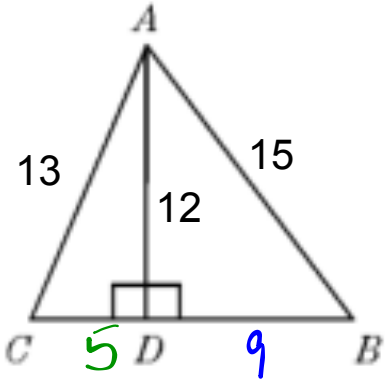
Warm Up



$\overline{CB} = 5 + 9$

$= 14$ units

What is the length of BC?

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

$12^2 + b^2 = 13^2$

$144 + b^2 = 169$

$-144 \quad -144$

$\sqrt{b^2} = \sqrt{25}$

$b = 5$

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

$12^2 + b^2 = 15^2$

$144 + b^2 = 225$

$-144 \quad -144$

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

$b = 9$

Homework Questions?

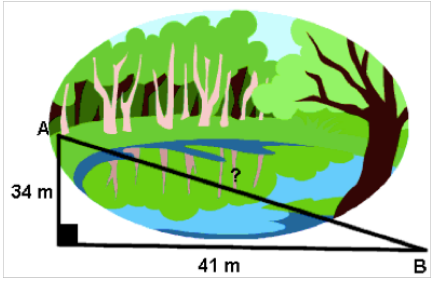
The Pythagorean Theorem - Real Life Problems

1. You will save ~~21.7~~ 22 meters
2. 127.3 feet
3. 26.9 inches
4. 9.4 miles
5. 4 feet
6. 26.9 feet
7. 11.2 feet
8. 412.3 meters
9. She CAN fit the table in the doorway.
10. 692.7 feet
11. 35.7 meters
12. The piece of wood is NOT square.

The Pythagorean Theorem – Real Life Problems

All the problems below can be solved using the Pythagorean Theorem. (Hint: It is helpful to draw a diagram of the situation to help determine which measurements refer to the legs and hypotenuse of the triangle.) Round all numbers to the nearest tenth.

1. To get from point A to point B you must avoid walking through a pond. To avoid the pond, you must walk 34 meters south and 41 meters east. To the *nearest meter*, how many meters would be saved if it were possible to walk through the pond?

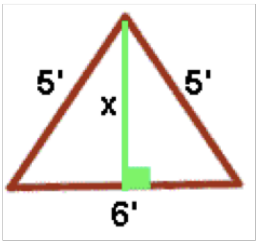


2. A baseball diamond is a square with sides of 90 feet. What is the shortest distance between first base and third base?

3. Best Buy is selling 55 inch HD TV's. This measurement is the **diagonal** distance across the screen. If the screen measures 48 inches in width, what is the actual height of the screen?

4. Two joggers run 8 miles north and then 5 miles west. What is the shortest distance they must travel to return to their starting point?

5. Oscar's dog house is shaped like a tent. The slanted sides are both 5 feet long and the bottom of the house is 6 feet across. What is the height of his dog house, in feet, at its tallest point?



6. You're locked out of your house and the only open window is on the second floor, 25 feet above the ground. You need to borrow a ladder from one of your neighbors. There's a bush along the edge of the house, so you'll have to place the base of the ladder 10 feet from the house. What length of ladder do you need to reach the window?

7. Mrs. Stevens is building a slide for her kids. The ladder is 10 feet tall and the slide is 15 feet long. What is the distance between the base of the ladder and the bottom of the slide?

8. Andrew wants to swim across a river that is 400 meters wide. He begins swimming perpendicular to the shore he started from but ends up 100 meters down river from where he started because of the current. How far did he actually travel from his starting point?

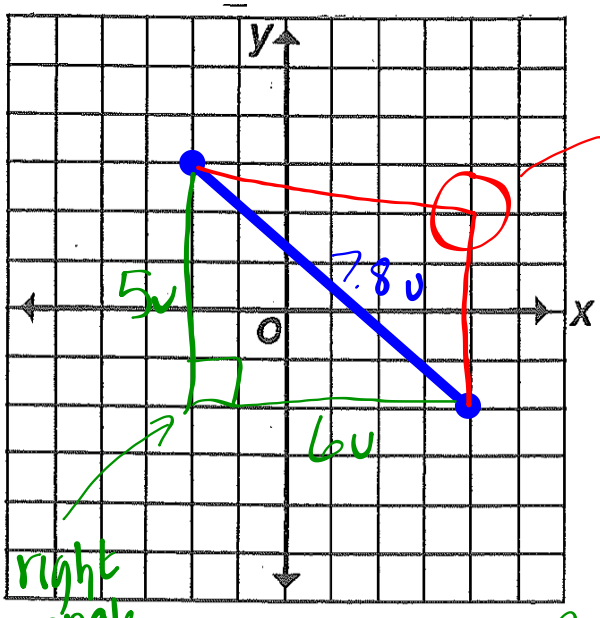
9. Jill's front door is 42" wide and 84" tall. She purchased a circular table that is 96 inches in diameter. Will the table fit through the front door? Explain.

10. The WBZ TV tower in Needham is almost 1300 ft. tall. One of the guy wires is 1385.6 feet long. It is attached to the tower 1200 ft. above the ground and is anchored to the ground. How far from the base of the tv tower is the guy wire attached to the ground?

11. Maggie has let out 50 meters of kite string when she notices that her kite is flying directly above her friend Emily. If Emily is 35 meters from Maggie, how high is the kite above the ground?

12. Mr. Kelly wants to make a small rectangular table. The sides of the piece of wood he wants to use for the table top are 36" and 18". If the diagonal of the piece of wood measures 43", is this piece of wood square? ("square" in this case means the piece of wood has right angles at the corners.)

Using the Pythagorean Theorem, how can we find the distance between the two points below?



no right angle. This triangle is worthless.

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

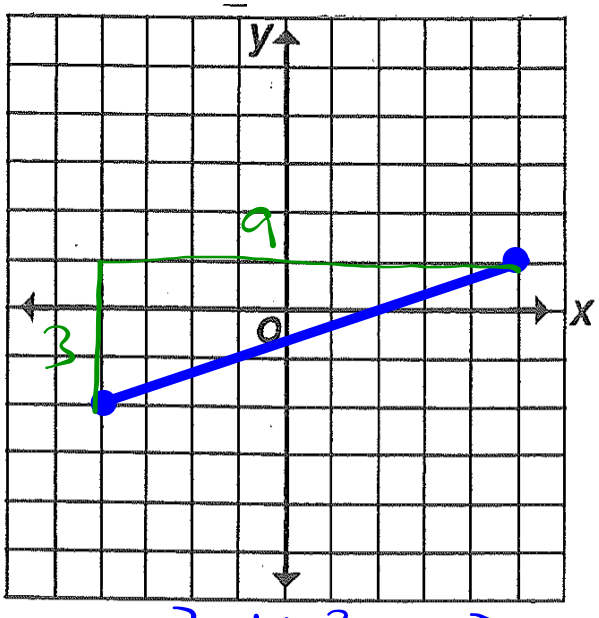
$5^2+6^2=c^2$

$25+36=c^2$

$61=c^2$

$\sqrt{61}=\sqrt{c^2}$

$7.8=c$



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

$3^2 + 9^2 = c^2$

$9 + 81 = c^2$

$\sqrt{90} = \sqrt{c^2}$

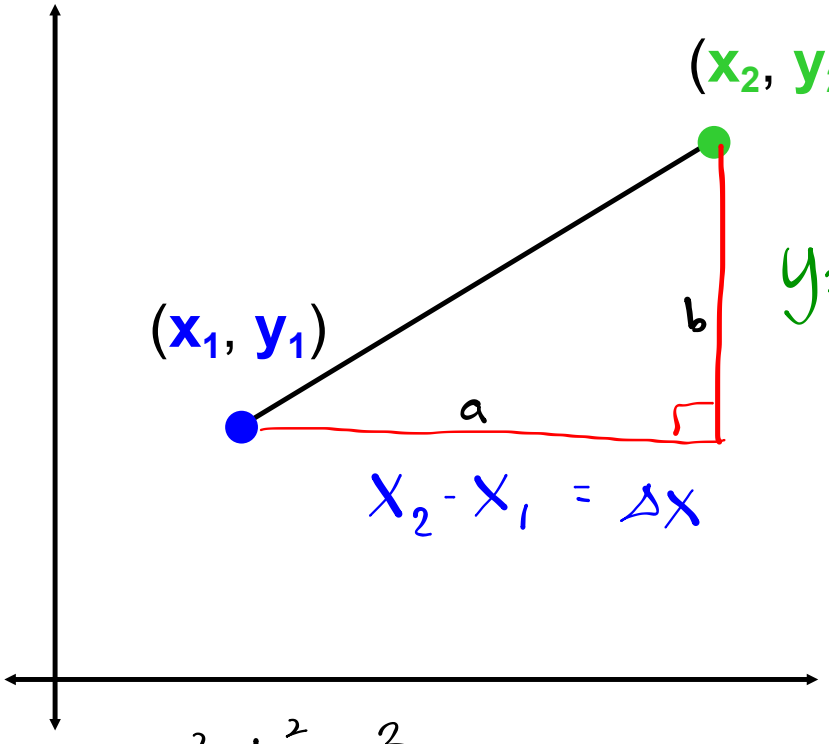
$9.5 = c$

What were we actually calculating to find the length of the legs?

Change in x

and

Change in y!!



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

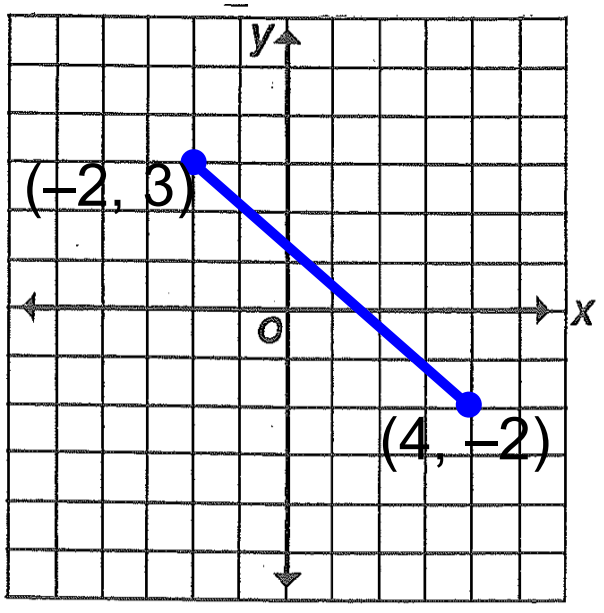
$$\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} = \sqrt{c^2}$$

$$\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} = c$$

This is the Distance Formula

You don't need to memorize this because you know how to find distances just using the Pythagorean Theorem!

So, what if we just had the coordinates?



$6 < \begin{matrix}(-2,3)\\(4,-2)\end{matrix} > 5$

Find Δy and Δx

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

$6^2+5^2=c^2$

$36+25=c^2$

$61=c^2$

$\sqrt{61}=\sqrt{c^2}$

$7.8=c$

Find the changes in x and y just like when calculating slope. We use positive values because we only care about length and not direction.

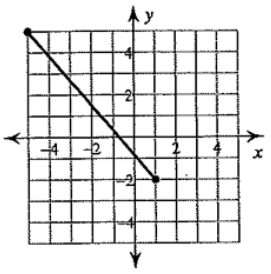
The Distance Formula

Date_____ Period__

Find the distance between each pair of points. Round your answer to the nearest tenth, if necessary.

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

1)



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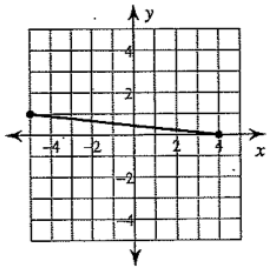

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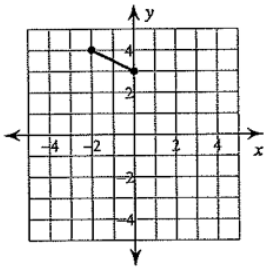
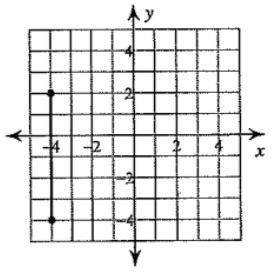


4)



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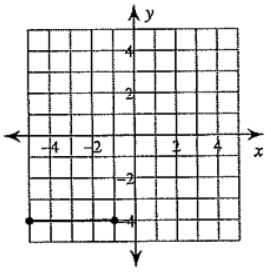

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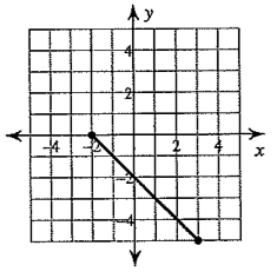


7) (–2, 3), (–7, –7)

8) (2, –9), (–1, 4)

9) (5, 9), (–7, –7)

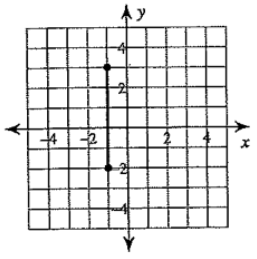
10) (8, 5), (–1, 3)

11) (–10, –7), (–8, 1)

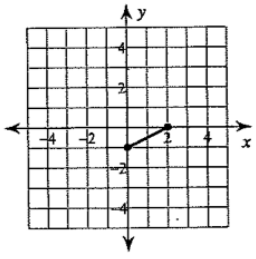
12) (–6, –10), (–2, –10)

Find the distance between each pair of points. Give exact distances, write answers in radical form.

13)



14)



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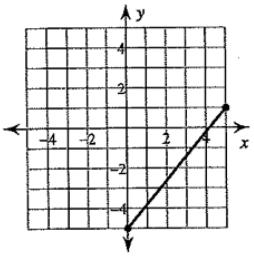

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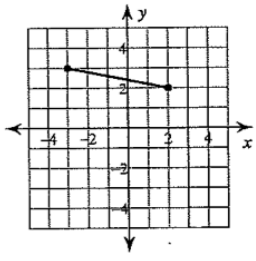
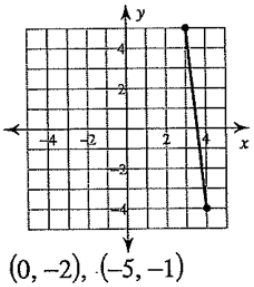
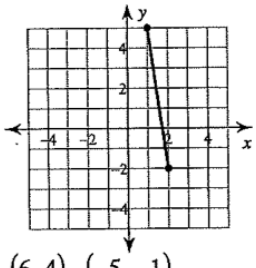


17)



18)



19) (0, –2), (–5, –1)

20) (6, 4), (–5, –1)

21) (3, 8), (9, 10)

22) (10, 1), (9, –4)

Homework

Finish Classwork