

Welcome to class! Please turn in your test corrections.

Graph the following on your graphing calculator. Tell if each has a positive, negative, 0, or undefined slope. Do you notice any similarities between all 4 graphs?

1. $y = 3x$

2. $y = -2x$

3. $y = \frac{1}{4}x$

4. $y = x$

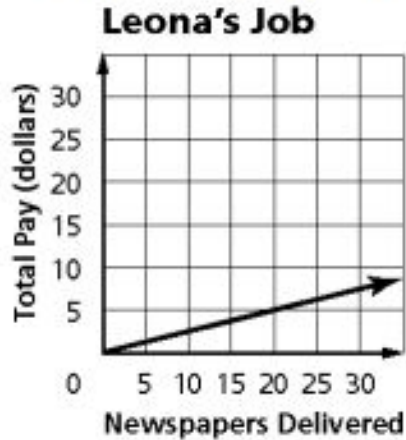
Announcements

- Today is the last day of the quarter!
- Unit 5
 - ~~Slope~~
 - **Direct Variation**
 - Slope Intercept Form
 - Standard Form
 - Point Slope Form

Mini Lesson: Interpreting Slope

10/30/2018

5. The graph below shows the number of newspapers delivered and total pay for Leona's newspaper delivery job.

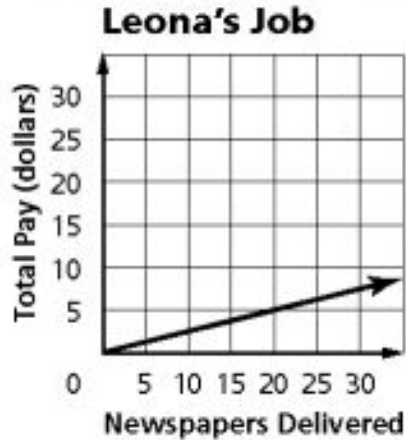


What is the slope of the graph?



Students, write your response!

5. The graph below shows the number of newspapers delivered and total pay for Leona's newspaper delivery job.



What does the slope of the graph represent?



Students, write your response!

6. Dionne pays a fixed fee plus an hourly rate to rent a boat. The table below shows how much Dionne paid for the boat. What was Dionne's hourly rate to rent the boat?

Dionne's Boat Rental					
Hours Rented	1	2	3	4	5
Amount Paid	\$27	\$39	\$51	\$63	\$75



Students, write your response!

Direct Variation

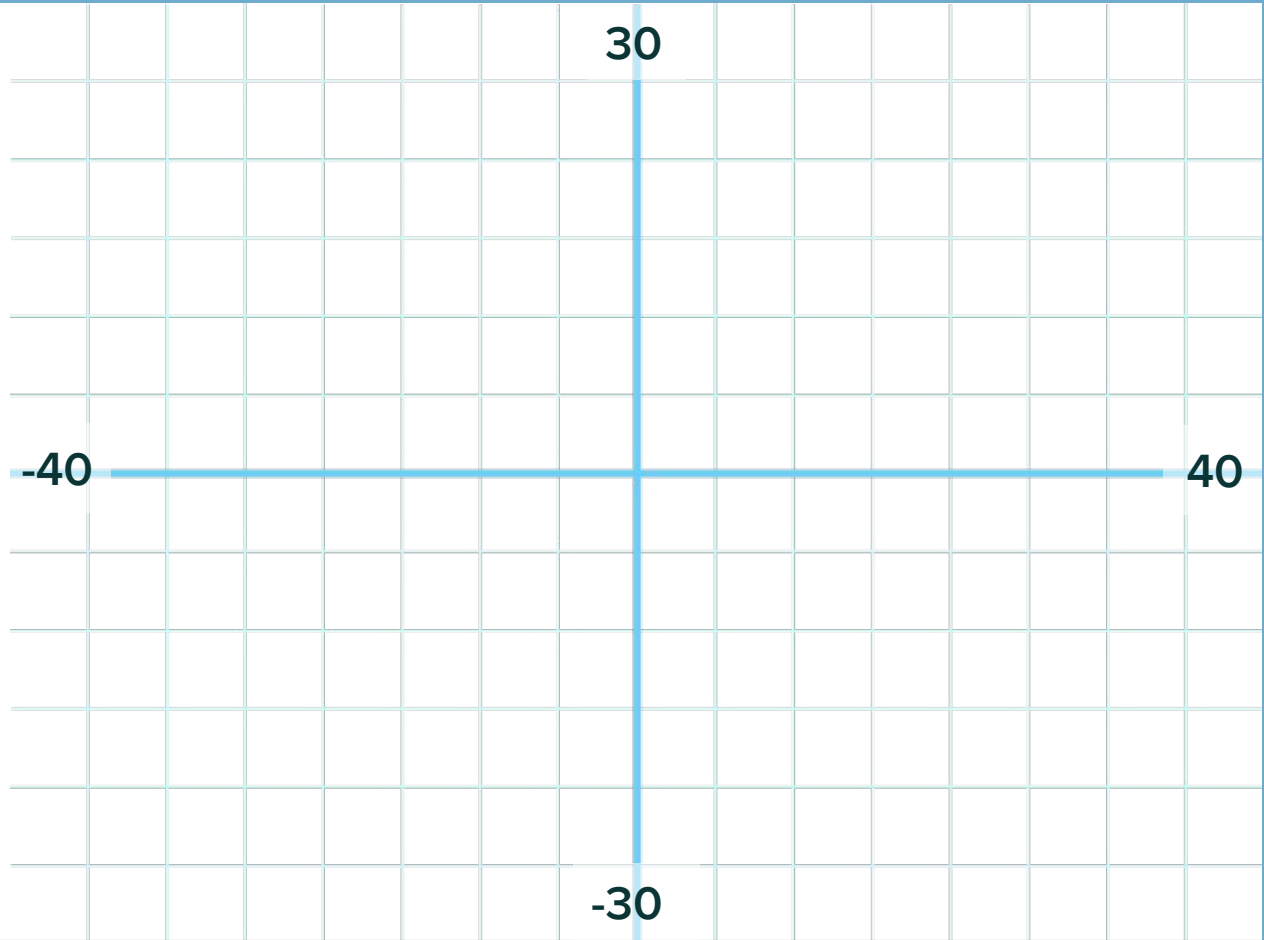
10/30/2018

Direct Variation

1. What is it
 - a. A linear equation that crosses through $(0, 0)$
 - b. You may see it in problems written as: “y varies directly with or as x”

Sketch a graph
that is a direct
variation.

There are lots
of right
answers!



Students, draw anywhere on this slide!

Direct Variation

1. What is it
 - a. A linear equation that crosses through $(0, 0)$
 - b. You may see it in problems written as: “y varies directly with or as x”
2. Equation
 - a. $y=kx$
 - b. “k” represents the constant of variation → this is a fancy word for slope of direct variations

You can solve an equation for y and see if it is in the form for a direct variation.

Remember, direct variation looks like “_____” where k represents the _____.

Example

Problem

Does the equation $6x + 3y = 9$ represent a direct variation? If so, find the constant of variation.

If the equation represents a direct variation, the equation can be rewritten in the form $y = kx$. So, solve the equation for y to determine whether the equation can be written in this form.

$$6x + 3y = 9$$

$$3y = 9 - 6x$$

Subtract $6x$ from each side.

$$y = 3 - 2x$$

Divide each side by 3.

You cannot write the equation in the form $y = kx$. So $6x + 3y = 9$ does not represent a direct variation.

As a Class

You can solve an equation for y and see if it is in the form for a direct variation.

Does the equation represent a direct variation? If so, find the constant of variation.

1. $7y = 2x$

2. $3y + 4x = 8$

On Your Own - Record your answers... we will use them on the next slide.

Exercises

Determine whether each equation represents a direct variation. If it does, find the constant of variation.

1. $2y = x$

2. $3x + 2y = 1$

3. $-4y = 8x$

4. $2x = y - 5$

5. $4x - 3y = 0$

6. $5x = 2y$

Draw lines to match the image to the answer:

No

Yes,
 $k=4/3$

Yes,
 $k=1/2$

$$2y=x$$

$$3x+2y=1$$

$$-4y=8x$$

$$2x=y-5$$

$$4x-3y=0$$

$$5x=2y$$

Yes,
 $k=5/2$

No

Yes,
 $k=-2$



Students, draw anywhere on this slide!

How well do you understand what we just covered?



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Students choose an option

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When given that the relationship between two quantities is direct, you can write the equations by substituting the known values into the equation $y=kx$.

Example

Problem

Suppose y varies directly with x , and $y = 24$ when $x = 8$. What direct variation equation relates x and y ? What is the value of y when $x = 10$?

You are given that x and y vary directly. This means that the relationship between x and y can be written in the form $y = kx$, where k is a constant.

$$y = kx$$

Start with the direct variation equation.

$$24 = k(8)$$

Substitute the given values: 8 for x and 24 for y .

$$3 = k$$

Divide each side by 8 to solve for k .

$$y = 3x$$

Write the direct variation equation that relates x and y by substituting 3 for k in $y = kx$.

The equation $y = 3x$ relates x and y . When $x = 10$, $y = 3(10)$ or 30.

As a Class

When given that the relationship between two quantities is direct, you can write the equations by substituting the known values into the equation $y=kx$.

Suppose y varies directly with x , and $y = 35$ when $x = 5$.

What direct variation equation relates x and y ? What is the value of y when $x = 9$?

On Your Own - Record your answers... we will use them on the next slide.

Exercises

Suppose y varies directly with x . Write a direct variation equation that relates x and y . Then find the value of y when $x = 6$.

7. $y = 14$ when $x = 2$.

8. $y = 3$ when $x = 9$.

9. $y = 12$ when $x = -24$.

10. $y = -81$ when $x = 9$.

11. $y = -16$ when $x = -4$.

12. $y = 5$ when $x = 20$.

Draw lines to match the image to the answer:

$$y=7x$$
$$f(6)=42$$

$$y=\frac{1}{4}x$$
$$f(6)=1\frac{1}{2}$$

$$y=-9x$$
$$f(6)=-54$$

$$y=14 \text{ when } x=2$$

$$y=3 \text{ when } x=9$$

$$y=12 \text{ when } x=-24$$

$$y=-81 \text{ when } x=9$$

$$y=-16 \text{ when } x=-4$$

$$y=5 \text{ when } x=20$$

$$y=4x$$
$$f(6)=24$$

$$y=\frac{1}{3}x$$
$$f(6)=2$$

$$y=-\frac{1}{2}x$$
$$f(6)=-3$$



Students, draw anywhere on this slide!

How well do you understand what we just covered?



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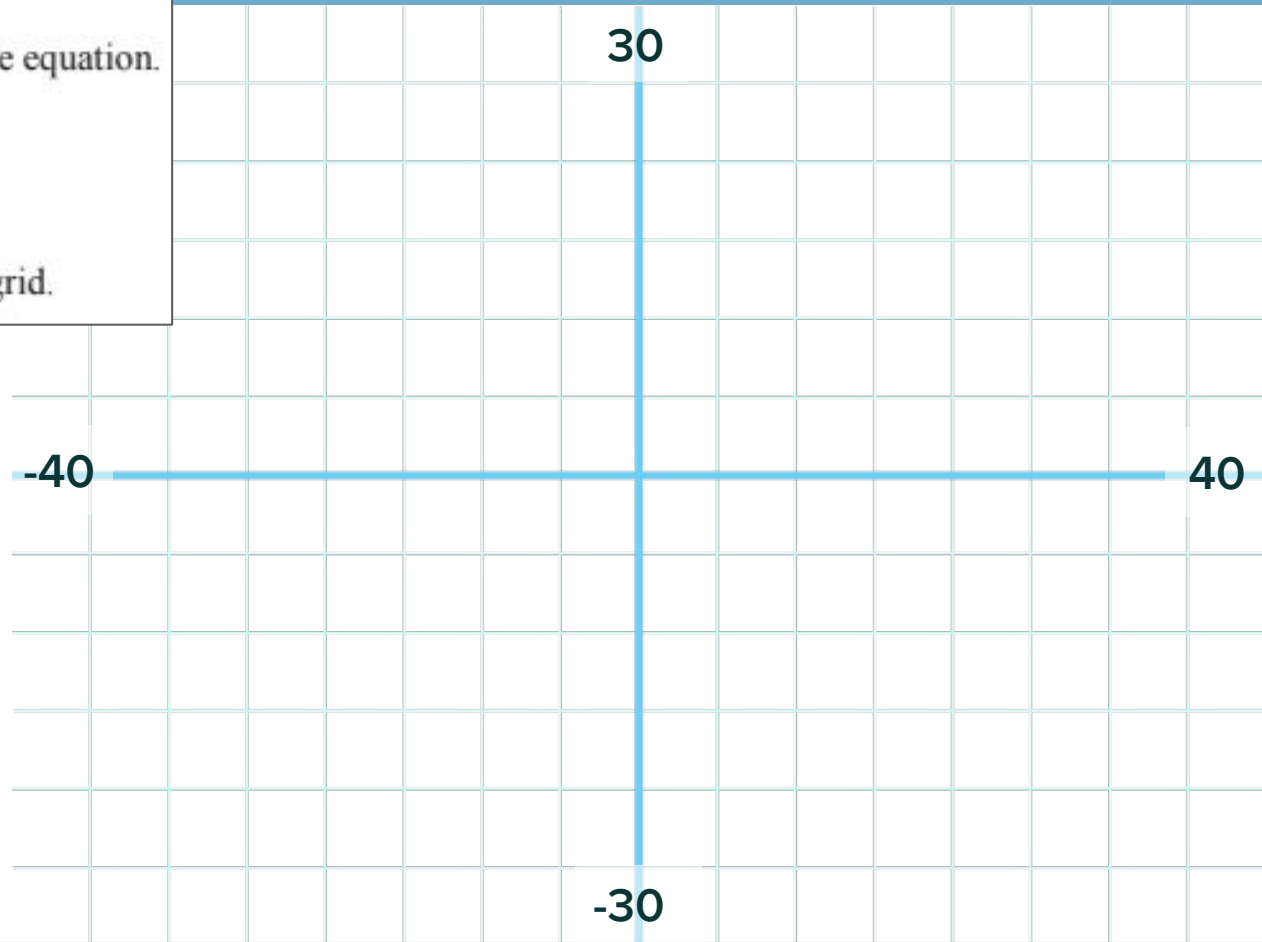


Students choose an option

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Consider the direct variation $y = 3x$.

- List three ordered pairs that satisfy the equation.
- Plot your three ordered pairs from part (a) on a coordinate grid.
- Complete the graph of $y = 3x$ on the grid.



Students, draw anywhere on this slide!

Pretend your friend was absent from class today...

Write what you would say if you had to explain the lesson to your friend.



Students, write your response!

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Homework

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Determine whether each equation represents a direct variation. If it does, find the constant of variation.

◀ See Problem 1.

9. $2y = 5x + 1$

10. $8x + 9y = 10$

11. $-12x = 6y$

12. $y + 8 = -x$

13. $-4 + 7x + 4 = 3y$

14. $0.7x - 1.4y = 0$

Suppose y varies directly with x . Write a direct variation equation that relates x and y . Then find the value of y when $x = 12$.

◀ See Problem 2.

15. $y = -10$ when $x = 2$.

16. $y = 7\frac{1}{2}$ when $x = 3$.

17. $y = 5$ when $x = 2$.

18. $y = 125$ when $x = -5$.

19. $y = 10.4$ when $x = 4$.

20. $y = 9\frac{1}{3}$ when $x = -\frac{1}{2}$.

Graph each direct variation equation.

◀ See Problem 3.

21. $y = 2x$

22. $y = \frac{1}{3}x$

23. $y = -x$

24. $y = -\frac{1}{2}x$

25. **Travel Time** The distance d you bike varies directly with the amount of time t you bike. Suppose you bike 13.2 mi in 1.25 h. What is an equation that relates d and t ? What is the graph of the equation?

26. **Geometry** The perimeter p of a regular hexagon varies directly with the length ℓ of one side of the hexagon. What is an equation that relates p and ℓ ? What is the graph of the equation?