

Section 10.4 - Systems of Equations

Name: _____ Class: _____

Video Notes

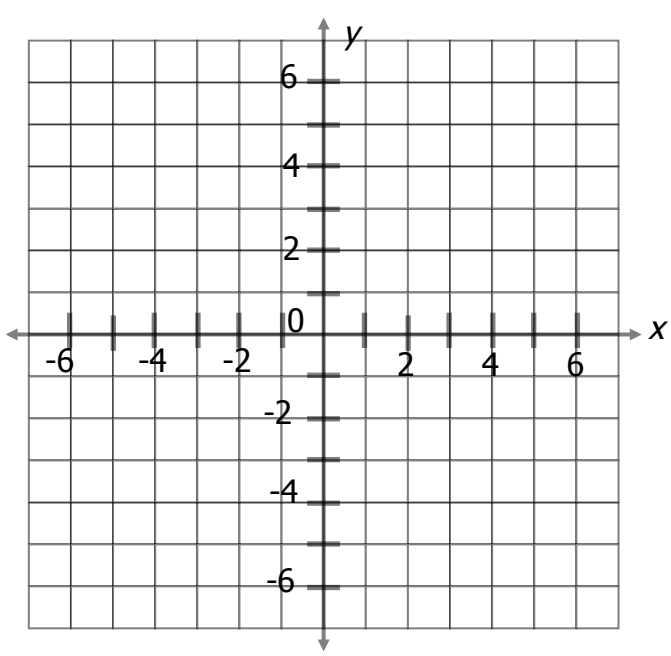
Ways to Solve Systems of Equations

<i>Graphing</i>	<i>Substitution</i>	<i>Elimination</i>
Graph both lines and see where they intersect. Make sure to put each line in $y = mx + b$ format.	Isolate the easiest variable in one equation and substitution the equivalent expression into the other equation. Solve for both variables.	Make the coefficients of one variable additive inverses (same number, different signs) of each other by finding a common multiple. Combine both equations to eliminate the variable. Solve.

Example of a System of Equations

$$-x - \frac{y}{2} = -5$$

$$5x - 2y = -2$$

<p><i>Graphing</i></p> 	<p>Substitution</p>
	<p>Elimination</p>

Special Cases of Systems of Equations

<i>One Unique Solution</i>	<i>No Solution</i>	<i>Infinite Solutions</i>
When the lines intersect (the slopes will be different).	When the lines are parallel (same slopes, different y-intercepts).	When the lines are the same (same slopes, same y-intercepts)
Examples:	Examples:	Examples:

Example question of special cases

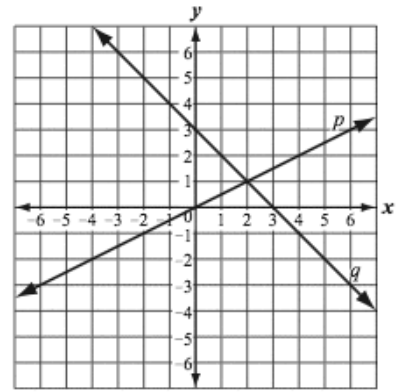
Consider the equation $\frac{x}{4} + \frac{y}{3} = 1$.

a.) How many solutions will $3x + 4y = 15$ have with the original equation? **Explain.**

b.) How many solutions will $\frac{3x}{4} + y = 3$ have with the original equation? **Explain.**

- Which of the following represents the solution to a system of linear equations on graphs?
 - The slopes of the lines
 - The x-intercepts of the lines
 - The y-intercepts of the lines
 - The point at which the lines intersect

2. The system of equations represented by lines p and q is shown on the graph below. Based on the graph, what is the solution of the system of equations?



- A** (0,0) **C** (2,1)
B (0,3) **D** (4,2)

3. What is the solution to this system of linear equations?

$$3x + y = 2$$

$$x - 2y = 10$$

- A** (2,-4) **C** (3,-7)
B (-4,2) **D** (-7,3)

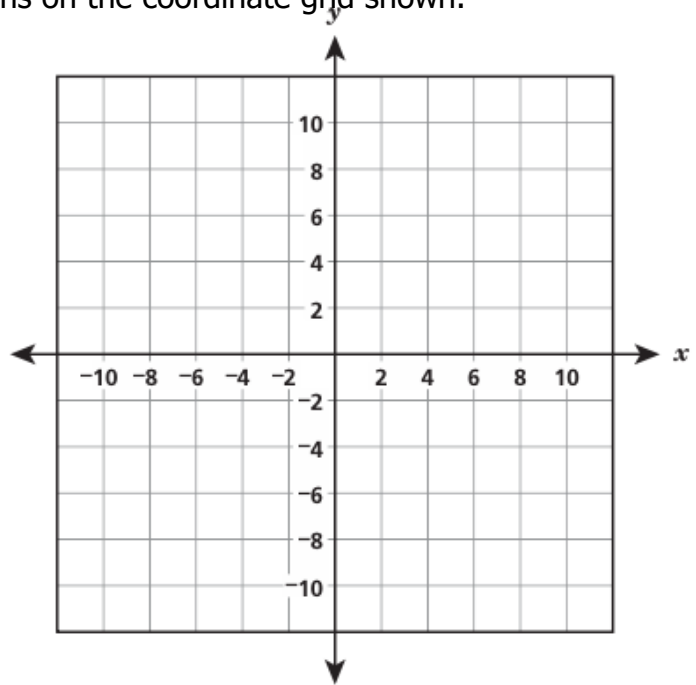
4. Do the equations $y = \frac{5}{6}x + 2$ and $y = \frac{15}{18}x + 2$ represent two different lines? **Explain.**

5. Graph and label the given system of equations on the coordinate grid shown.

$$y = \frac{1}{2}x + 2$$

$$y = x - 1$$

What is the solution to the system of equations? _____



6. Bettina and Jenna are both house painters and each charges an hourly rate for a painting job. The equation $y = 13x$ shows the total charge, y , in dollars for hiring Jenna to paint a house for x hours. The table below shows the same information for Bettina.

Bettina's Charges

x	2	4	6	8
y	26	52	78	104

Which statement is true?

- A Jenna's hourly rate is \$1.00 cheaper.
 - B Bettina's hourly rate is \$1.00 cheaper.
 - C Bettina's hourly rate is \$13.00 cheaper.
 - D Jenna and Bettina work for the same hourly rate.
7. Solve the following system of equations.

$$7q + 2r = 31$$

$$5q + 2r = 25$$

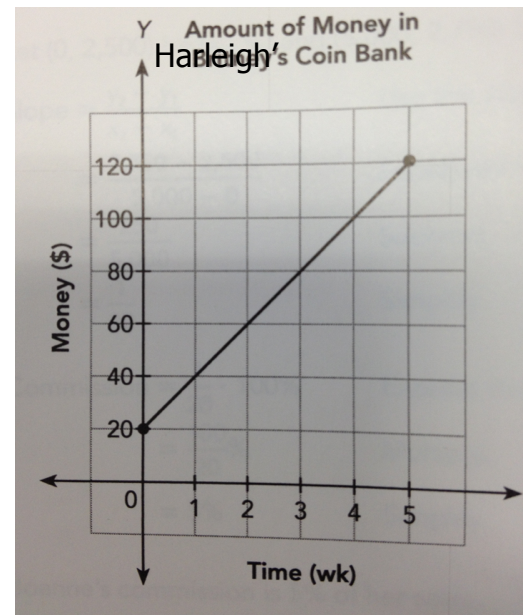
8. Harleigh and Sarah each have bank accounts. Harleigh starts with a certain amount of money and adds money each week, as shown in the diagram. Sarah's equation can be modeled by $y = -30x + 120$.

a.) How much money did Harleigh start with? How much money did Sarah start with?

b.) What is Harleigh's rate of change? What is Sarah's rate of change?

c.) What is Harleigh's equation?

d.) When will Harleigh and Sarah have the same amount of money?



9. Consider the equation $\frac{x}{2} + \frac{y}{3} = 5$.

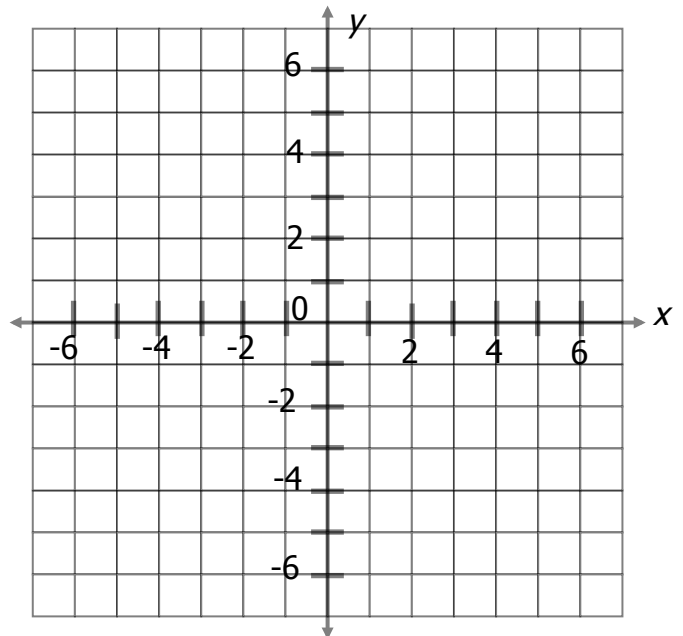
a.) How many solutions will $3x + 2y = 30$ have with the original equation? **Explain.**

b.) How many solutions will $x + \frac{2y}{3} = 4$ have with the original equation? **Explain.**

10. Solve the following system of equations by graphing.

$$y = 3 - 2x$$

$$6x + 3y = -12$$



11. Solve the following system of equations using any method you would like.

$$2x + y = 7$$

$$8x + 4y = 28$$

12. Bert's cab company charges \$1.00 plus an additional \$3.00 per mile for a ride. Madeline's cab company charges \$3.00 plus an additional \$2.00 per mile for a ride. Write a system of linear equations that shows the cost in dollars, y , for a cab ride of x miles for each cab driver.

Bert's _____

Madeline's _____

At what distance, in miles, will the cost be the same for both companies?

Show your work.

Answer _____ miles

Which cab driver's charge will be less for a ride that is 10 miles in distance?

Answer _____

Use words and numbers to explain how you determined your answer.

13. Lina and Ariel decide to spend the afternoon at an amusement park. They are charged for each ride and their favorite rides are the water slide and the roller coaster. Lina rode each ride three times and paid \$17.70. Ariel rode the water slide twice and the roller coaster three times and paid \$15.55. How much is each ride?