

Systems of Equations

agenda

Warm-Up

(Kahoot)

Notes - 5

Activity -
Parallel
Modeling

HW: Practice
#1-9

ReminderS

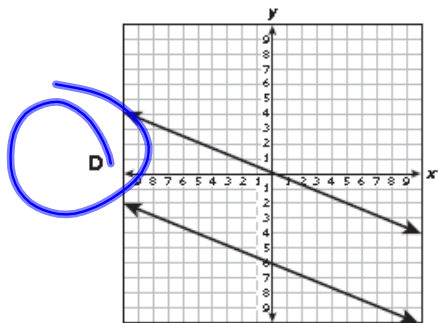
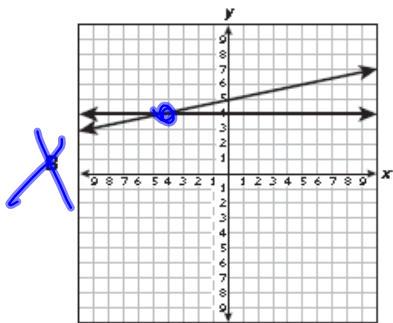
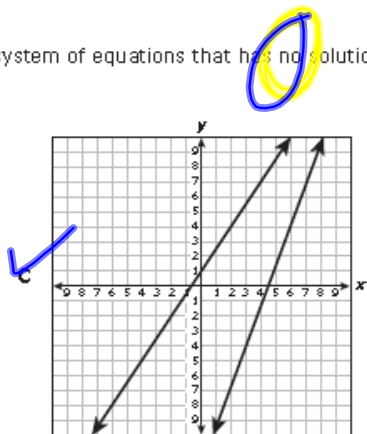
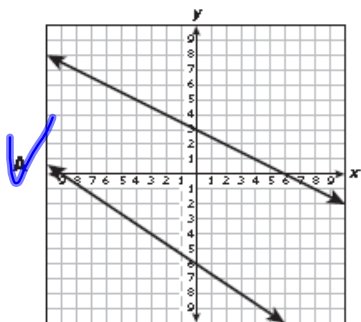
Unit 10 Test
Corrections
due Friday
9AM

Warmup

Have out your HW &
Defeat the EOC book.

Get out your internet
capable device!!

Which of the following graphs best represents a system of equations that has no solution?



There are 9 books stacked on a shelf. The thickness of each book is either 1 inch or 2 inches. The height of the stack of 9 books is 14 inches. Which system of equations can be used to determine x , the number of 1-inch-thick books in the stack, and y , the number of 2-inch-thick books?

~~F~~ $x + y = 14$
 $2x + y = 9$

G $x + y = 14$
 $x + 2y = 9$

H $x + y = 9$
 $x + 2y = 14$ ←

~~J~~ $x + y = 9$
 $2x + y = 14$

$$1x + 2y = 14$$

$$x + y = 9$$

What is the value of x in the solution to the system of equations below?

$$\begin{aligned} 6x + 3y &= 13 \\ 3(3x - y) &= 4 \end{aligned}$$

~~F 1~~

G $\frac{5}{3}$

H $\frac{8}{3}$

J $\frac{7}{3}$

A high school band held a bake sale. The number of cupcakes sold was four more than twice the number of cookies sold. The band sold a total of 52 cupcakes and cookies. How many cupcakes were sold?

~~F~~ 28

G 16

H 36

J 24

$$\begin{array}{cc} x & y \\ x + y = & 52 \end{array}$$

$$x = 4 + 2y$$

$$\begin{aligned} 28 + y &= 52 \\ y &= 24 \end{aligned}$$

$$\begin{aligned} 28 &= 4 + 2y \\ 24 &= 2y \\ 12 &= y \end{aligned}$$

$$\begin{aligned} 36 + y &= 52 \\ y &= \end{aligned}$$

The sophomore class needs a combined total of 216 medium and large T-shirts for field day. The number of medium T-shirts needed is three times the number of large T-shirts needed. Based on this information, would it be reasonable for the sophomore class to order 72 large T-shirts and 144 medium T-shirts?

$$144 \neq 3(72) \quad m = 3L$$

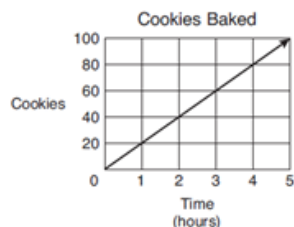
- A** No, because the number of medium T-shirts is not 3 times the number of large T-shirts
- B** No, because the number of large T-shirts is not 3 times the number of medium T-shirts
- C** Yes, because the total number of T-shirts is 216
- D** Yes, because the number of large T-shirts is $\frac{1}{3}$ of the total number of T-shirts

Practice

1. The business manager at Affordable Plumbing calculates the total cost, c , to a customer by using the equation $c = 62h + 38$, where h is the number of hours of work performed. The business manager at Leak Free Plumbing calculates the total cost, c , to a customer by using the equation $c = 58h + 45$, where h is the number of hours of work performed. How does the graph of the equation used by Affordable Plumbing compare to the graph of the equation used by Leak Free Plumbing?

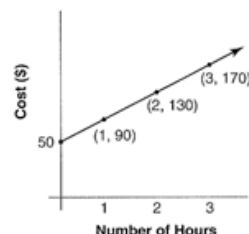
- A The slope is the same, and the y -intercept is greater.
- B The slope is greater, and the y -intercept is smaller.
- C The slope is smaller, and the y -intercept is the same.
- D The slope is greater, and the y -intercept is greater.

2. Mark and his friends are baking cookies for a bake sale. The graph below shows the total number of cookies they have compared to the number of hours they bake. How would the graph change if Mark and his friends were given 20 cookies when they started baking?



- A The y -value of the y -intercept would increase.
 - B The slope would increase.
 - C The y -value of the y -intercept would decrease.
 - D The slope would decrease.
3. Find the x - and y -intercepts of $2x + y = -5$.

An electrician charges a flat fee of \$50 plus an hourly rate to make a house call. The graph shows the total cost for a job based on the flat fee and the number of hours to complete the job.



- 4. If the electrician changed his flat fee to \$60, but kept his hourly rate the same, what would be the total charge for a job that took 3 hours?
- 5. If the electrician left his flat fee at \$50, but changed his hourly rate to \$45, what would be the total charge for a job that took 3 hours?
- 6. If the electrician changed his flat fee to \$60 and changed his hourly rate to \$45, what would be the total charge for a job that took 3 hours?
- 7. Which best describes the change in the graph of the function $f(x) = 5x + 4\frac{1}{4}$ if the y -intercept is changed to $7\frac{1}{2}$, while the slope remains constant?
 - A The line shifts up $2\frac{1}{2}$ units
 - B The line shifts to the right $3\frac{1}{4}$ units
 - C The line shifts up $3\frac{1}{4}$ units
 - D The line shifts down $2\frac{1}{2}$ units.

Systems of Equations

A system is a set of 2 equations with the same 2 variables. Our goal is to find where the 2 lines touch!

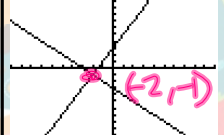
Types of Systems

How many times do the lines cross?

	(SAME SLOPE)	"SAME"
		
one solution	no solution	infinite solutions

Methods to Solve

intersection point (x,y)

Substitution <i>replacing</i> when one equation is solved for variable $4x - 3y = 24$ $y = 2x - 10$ $4x - 3(2x - 10) = 24$	Elimination <i>get rid of</i> variables lined up equal but opposite $x + 2y = 5$ $+ \quad -x + y = 4$ $3y = 9$ $y = 3$ $x + 2(3) = 5$ $x + 6 = 5$ $-6 \quad -6$ $(-1, 3)$	Graphing <i>calculator</i> solve for y $y = -x - 3$ $y = 2x + 3$  End TRACE 5: intersect
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Setup

PROBLEM 1: A truck is carrying 1500 pounds of cargo that occupies 138 cubic feet of space. A television weighs 50 pounds and occupies a space of 4 cubic feet. A microwave oven weighs 30 pounds and occupies a space of 3 cubic feet.

Let t be televisions
 Let m be microwaves

$$\text{WEIGHT: } 50t + 30m = 1500$$

$$\text{SPACE: } 4t + 3m = 138$$

Set up

PROBLEM 2: Mark has \$4.95 in quarters and dimes. He has 3 times as many dimes as quarters.

$$.25q + .10d = 4.95$$

$$d = 3q$$

$$y = mx + b$$

PROBLEM 3:

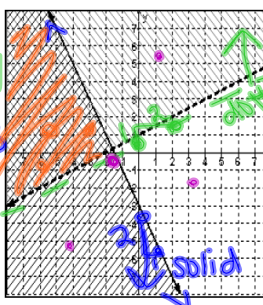
$$\text{INEQUALITY 1: } y > \frac{1}{2}x + 1$$

$$\text{INEQUALITY 2: } y \leq -2x - 3$$

GIVE 3 SOLUTIONS

in double shaded
 GIVE 3 NON SOLUTIONS

on dotted lines



INEQUALITY

UP DOWN
 dotted $> <$
 solid $\geq \leq$

$$\text{slope} = \frac{\text{RISE}}{\text{RUN}}$$

Systems of Equations

Parallel Modeling

With your shoulder partner....

Directions: Using any method (Elimination, Substitution, or Graphing), find the intersection of the two lines on your side of the paper. Be sure to show your work. Your answer should match your partner's answer! If not, check your work!

Due by the end of the period.

Student 1 Name _____

Student 2 Name _____

Directions: Using any method (Elimination, Substitution, or Graphing), find the intersection of the two lines on your side of the paper. Be sure to show your work. Your answer should match your partner's answer! If not, check your work!

Question 1:
$$\begin{cases} y = 2x - 1 \\ 3x - 2y = 0 \end{cases}$$

Answer:

Question 2:
$$\begin{cases} 3x - y = -7 \\ x - 2y = -4 \end{cases}$$

Answer:

Question 3:
$$\begin{cases} y = 3x + 3 \\ y = -2x + 5.5 \end{cases}$$

Answer:

Question 1:
$$\begin{cases} y = \frac{1}{2}x + 2 \\ 3x - y = 3 \end{cases}$$

Answer:

Question 2:
$$\begin{cases} 2x + y = -3 \\ 3x - 2y = -8 \end{cases}$$

Answer:

Question 3:
$$\begin{cases} y = 7x + 1 \\ y = 10x - 0.5 \end{cases}$$

Answer:

write equations

Practice

1. Which ordered pair is the solution to the system of equations below?

$$\frac{2y}{2} = \frac{10-x}{2}$$

$$\begin{aligned} x+3y &= 7 \\ x+2y &= 10 \end{aligned}$$

$$\frac{3y}{3} = \frac{7-x}{3}$$

~~A $(\frac{7}{2}, \frac{13}{4})$~~

~~B $(\frac{7}{5}, -3)$~~

~~C $(-2, 3)$~~

D $(16, -3)$

2. Members of a senior class held a car wash to raise funds for their senior prom. They charged \$3 to wash a car and \$5 to wash a pick-up truck or a sport utility vehicle. If they earned a total of \$275 by washing a total of 75 vehicles, how many cars did they wash?

- A 25
B 34
C 45
D 50

3. Manuel and Felicia are comparing how much money they have. Manuel states that he has \$250 and saves \$150 per week. Felicia states that she has \$1,650 and spends \$200 per week. Which system of equations can be used to determine x , the number of weeks, and y the amount of money at the end of the week?

A $y = 250x + 150$
 $y = 1650x - 200$

B $y = 250 + 150x$
 $y = 1650 - 200x$

C $y = 250 - 150x$
 $y = 1650 + 200x$

D $y = 250 - 150x$
 $y = 1650 - 200x$

4. Given the two equations $2x + 3y = 12$ and $2x - y = 4$, what is the value of $x + y$?

- A -5 B -1 C 1 D 5

5. To solve the linear system below, which substitution of unknowns is proper?

$$3x - 7y = 12$$

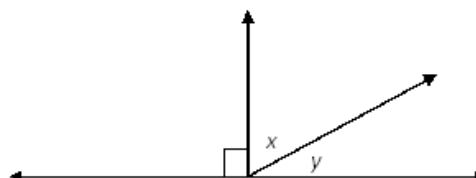
$$5x - y = -16$$

- A Substitute $5x - 16$ for y in the first equation.
B Substitute $5x + 16$ for y in the first equation.
C Substitute $5x + 12$ for y in the first equation.
D Substitute $7y - 4$ for x in the second equation.

solve for y

$$\begin{aligned} y_1 &= y \\ y_2 &= \end{aligned}$$

6. The measure of angle x is 15° less than twice the measure of angle y .



Which system of equations will determine the measure of each angle?

A $x + y = 90$
 $x = y - 15$

C $x + y = 90$
 $x = 2y - 15$

B $x + y = 90$
 $x = 15 - 2y$

D $2x = 90$
 $x = 2y - 15$

7. Which point is a solution of the system of linear inequalities?

$$y < -2x$$

$$y > 3x + 5$$

- A (2, -1) B (-4, 1)
C (-1, 4) D (1, -2)

8. At what point do the lines represented by the equations $2x + y + 1 = 0$ and $4x + y - 3 = 0$ intersect?

- A (2, 5)
B (2, -5)
C (-1, 1)
D (1, -1)

9. Julie is planning to put a fence around a rectangular garden. The length of the garden is 3 feet more than 1.5 times its width. If Julie uses a total of 36 feet of fencing around the edge of the garden, what is the length of the garden?

- A 6 ft
B 13.2 ft
C 12 ft
D 10.5 ft

