Unit 4 – Systems of Equations and Inequalities Study Guide

Name _____ Period _____ Date _____

1. What value of y satisfies the system of equations below?

$$2x - y = -24$$
$$x + 2y = -2$$

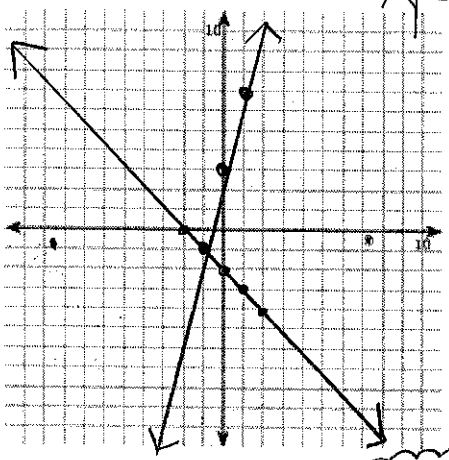
$2(x + 2y = -2)$

$2x - y = -24$
$2x + 4y = -4$
$-5y = -20$

$y = 4$

2. Graph the solution to the system of equations below?

$-4x + y = 3 \rightarrow y = 4x + 3$
$x + y = -2 \rightarrow y = -x - 2$



$(-1, -1)$

3. What is the solution to the system of equations shown below? Show all work.

$$3x + 5y = -9$$
$$2x + y = -34$$

$5(2x + y = -34)$

$3x + 5y = -9$
$10x + 5y = -170$
$-7x = 161$
$x = -23$

$2(-23) + y = -34$
$-46 + y = -34$
$y = 12$

$(-23, 12)$

4. What is the solution to the system of equations shown below? Show all work.

$$3x + 5y = -9$$
$$2x + y = -34$$

$-2x \quad -2x$

$y = -2x - 34$

$3x + 5(-2x - 34) = -9$
$3x - 10x - 170 = -9$
$-7x - 170 = -9$
$-7x = 161$
$x = -23$

$2(-23) + y = -34$
$-46 + y = -34$
$+46 \quad +46$
$y = 12$

$(-23, 12)$

5. A system of equations is shown below.

$$2x - y = 4$$
$$x - 2y = -1$$

Which operations on the system of equations could be used to ~~isolate~~ the x-variable?

ultimate

A. Divide the first equation by 2 and add the result to the first equation.
B. Divide the first equation by –4 and add the result to the first equation.
C. Multiply the second equation by 4 and add the result to the first equation.
D. Multiply the second equation by –2 and add the result to the first equation.

6. A movie theater sells small and large boxes of candy. x = # of small boxes, y = # of large boxes

- A small box of candy costs $4.00.
- A large box of candy costs $11.50.
- A total of 30 boxes of candy were sold totaling $225.
- $y =$

How many large boxes of candy were sold?

$4x + 11.50y = 225$
$x + y = 30$

$(-) \; 4x + 11.50y = 225$
$4x + 4y = 120$

$7.50y = 105$
$y = 14$

14 large boxes

7. A system of equations is shown below.

$$2(4x + 5y = 7)$$
$$16x + 10y = 18$$

What is the value of $x + y$?

$(-) \; 8x + 10y = 14$
$16x + 10y = 18$

$-8x = -4$
$\frac{-8}{-8} \quad \frac{-4}{-8}$
$x = \frac{1}{2}$

$4(\frac{1}{2}) + 5y = 7$
$2 + 5y = 7$
$5y = 5$
$y = 1$

$(\frac{1}{2} + 1 = \frac{1}{2})$

8.) Which system of equations has exactly one solution?

A. $y = x - 1$
$2x - 3y = -1$ → (4, 3)

$-3y = -2x - 1$

$y = \frac{2}{3}x + \frac{1}{3}$

B. $y = 4x - 16$
$4x - y = -5$

C. $x + 3y = 5$
$6x + 18y = 30$] inf. sol.

9.) Suzi is 24 years older than her cousin Adam. The sum of Suzi's and Adam's ages is 60 years old. How old is Adam?

X = Suzi's age
Y = Adam's age

X = 24 + y
X + y = 60

(24 + y) + y = 60
2y + 24 = 60
2y = 36 y = 18

Adam is 18 years old

10.) Mary is solving a system of linear equations by graphing. First, she graphed both equations on a coordinate plane. What should be her next step in solving the system of linear equations?

A. find the x-intercept of each line
B. find the y-intercept of each line
C. find the measure of the angles where the lines intersect
D. find the location of the point where the lines intersect

11.) Sandy paid $52 for 3 adult and 2 child tickets to a play. Kira paid $44 for 1 adult and 4 child tickets to the same play. What is the **cost of 2 adult and 1 child ticket**?

X = $ adult tix
Y = $ child tix

3X + 2y = 52
X + 4y = 44

10X + 4y = 104
(−) X + 4y = 44
5X = 60
5 5
X = 12

X + 4y = 44
12 + 4y = 44
4y = 32
y = 8

2 adult 1 child = $32

12.) John bought 8 hot dogs and 5 sodas for $25.50. Alicia bought 4 hot dogs and 3 sodas for $13.50. How much would 1 hot dog and 1 soda cost?

1 hd = $2.25
1 soda = $1.50
total = $3.75

X = cost per hotdog
Y = cost per soda

8X + 5y = 25.50 → 8X + 5y = 25.50
4X + 3y = 13.50 → (−) 8X + 6y = 27
−y = −1.50

4X + 3(1.50) = 13.50
4X + 4.50 = 13.50
X = 2.25 y = 1.50

13.) At the school store, 3 pens and 2 notebooks cost a total of $12, while 1 pen and 3 notebooks cost a total of $11. What is the **cost of one notebook?**

X = cost of pen
Y = cost of nb

3X + 2y = 12
3(X + 3y = 11)

3X + 2y = 12
(−) 3X + 9y = 33
−7y = −21
−7 −7
y = 3

14.) The sum of two positive numbers is 45. The difference between the numbers is 9. What is the value of the larger number?

X + y = 45
(−) X − y = 9
2y = 36
y = 18

X + 18 = 45
X = 27

larger # = 27

15.) What value of y satisfies the system of equations below?

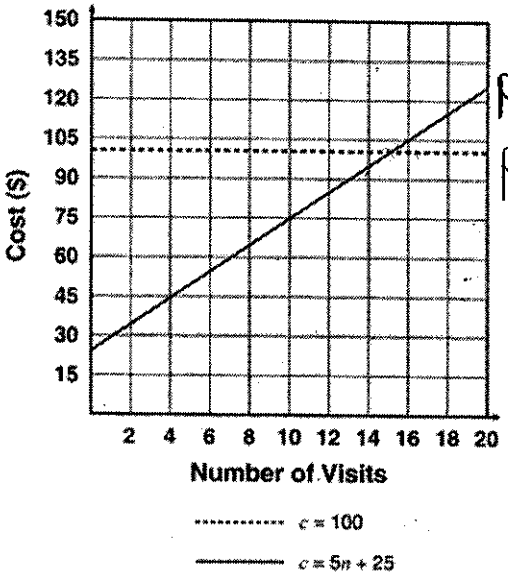
$2x - y = -24$
$2(x + 2y = -2)$

(−) 2X − y = −24
2X + 4y = −4
−5y = −20
−5 −5
y = 4

X + 2(4) = −2
X + 8 = −2
−8 −8
X = −10

(−10, 4)

16.) Tom wants to compare two different plans for gym membership. The first plan charges a sign-up fee of $25.00, then $5.00 for every visit. The second plan charges $100.00 per month with no sign-up fee. Tom creates a graph to find the solution to this pair of equations.



plan 1
plan 2

Which statement MOST accurately compares the two plans?

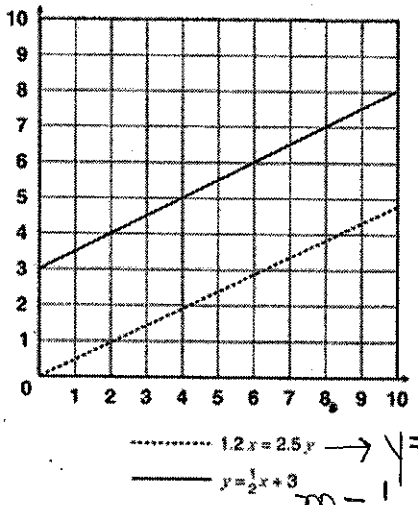
A. If Tom plans to go to the gym 14 or fewer times during the month, he will pay less with the second plan.

B. If Tom plans to go to the gym 14 or fewer times during the month, he will pay less with the first plan.

C. If Tom plans to go to the gym 14 or more times during the month, he will pay less with the second plan.

D. If Tom plans to go to the gym 14 or more times during the month, he will pay less with the first plan.

17.) Eli created the graph shown below of a system of two equations. From the graph, Eli determined that the system has no solution.



$1.2x = 2.5y \rightarrow y = .48x$ $m = .48$

$y = \frac{1}{2}x + 3$ $m = \frac{1}{2}$

Which choice BEST explains whether or not Eli is correct?

A. Eli is correct. The two lines appear to be parallel, so there is no solution to both equations.

B. Eli is correct. The two lines have the same slope, so there is no solution to both equations.

C. Eli is incorrect. The two lines appear to be parallel, so there are infinitely many solutions to the equations.

D. Eli is incorrect. The two lines have different slopes, so there is a solution that does not appear in the graph.

18). A system of equations is shown below.

$$8x - 6y = -12$$
$$4x - 9y = 5$$

Which operations on the system of equations will isolate the y quantity?

A. Multiply the second equation by 2 and add the result to the first equation.

B. Multiply the second equation by –2 and add the result to the first equation.

C. Multiply the first equation by 9 and the second equation by –6 and add the resulting equations.

D. Multiply the first equation by –9 and the second equation by –6 and add the resulting equations

elim. X

19). Michael has a jar of dimes and nickels. There are 152 dimes and nickels in the jar that total $11. If d represents the number of dimes and n represents the number of nickels, which system of equations below represents the situation?

A. $\begin{cases} d+n=11 \\ 0.05d+0.10n=152 \end{cases}$

B. $\begin{cases} d+n=11 \\ 0.10d+0.5n=152 \end{cases}$

C. $\begin{cases} d+n=152 \\ 0.05d+0.10n=11 \end{cases}$

D. $\begin{cases} d+n=152 \\ 0.10d+0.05n=11 \end{cases}$

20). Samuel is buying hamburger meat and hot dogs for a class picnic.

- He can spend up to $100.
- The hamburger meat costs $3.29 per pound, and a package of hot dogs costs $2.89.
- Samuel wants to buy at least 10 pounds of hamburger meat and at least 10 packages of hot dogs.

Which system of inequalities models the constraints on the number of pounds of hamburger meat, **x** and number of packages of hot dogs, **y**, Samuel can buy?

A. $3.29x + 2.89y \le 100$, $x \ge 10$, $y \ge 10$

B. $3.29x + 2.89y < 100$, $x > 10$, $y > 10$

C. $3.29x + 2.89y \le 100$, $x + y \ge 10$

D. $3.29x + 2.89y < 100$, $x + y > 10$

21.) What is the x-coordinate of the point of intersection for the two lines below?

$10(-6x + 8y = -6)$

$8(7x - 10y = 9)$

$-60x + 80y = -60$

$56x - 80y = 72$

$-4x = 12$

$x = -3$

22.) The sum of two numbers is 41.4. The difference between the two numbers is 7.6. What is the value of the larger of the two numbers?

$x + y = 41.4$

$x - y = 7.6$

$2y = 33.8$

$y = 16.9$

$x + 16.9 = 41.4$

$x = 24.5$

23.) Two functions are shown below.

$f(x) = 4x + 2$

$g(x) = -3x + 9$

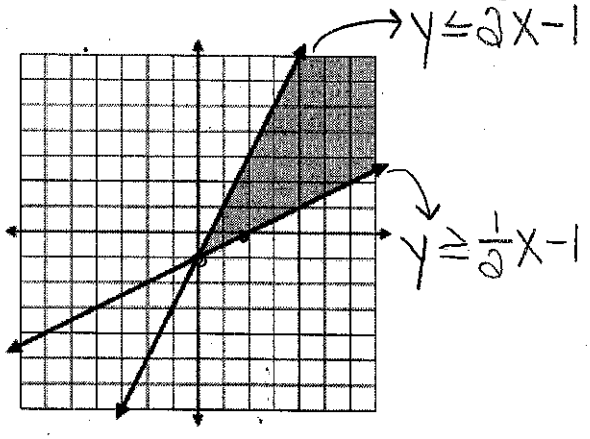
2nd trace 5, enter, enter

$x = 1$

What is the value of x where f(x) and g(x) intersect?

24.)

The graph represents which system of inequalities?



A. $y \le \frac{1}{2}x - 1$, $y \ge 2x - 1$

B. $y \ge \frac{1}{2}x - 1$, $y \le 2x - 1$

C. $y \le 2x - 1$, $y \le \frac{1}{2}x - 1$

D. $y \le \frac{1}{2}x + 1$, $y \ge 2x + 1$

25.) A.

Which point does not lie in the solution of the following system of inequalities:

$y < -x + 4$

$y \ge 2x + 1$

A. (0, 0)

B. (5, 2)

C. (−3, 3)

D. (1, −6)

B. In which quadrants is the solution set to the system?

Quads 2 + 3