

Algebra 1
Review for Test – UNIT 2 PART 1

Name key
Date _____ Period _____

#1 - 5: Solve each equation and write the letter of the property that justifies it.

- A. Addition Property of Equality
S. Subtraction Property of Equality
M. Multiplication Property of Equality
D. Division Property of Equality
C. Combine Like Terms
F. Distributive Property of Equality
G. Given

$$1. \quad 4r - 8 = -32$$

$$\begin{array}{r} +8 \quad +8 \\ \hline 4r = -24 \\ \hline \frac{4r}{4} = \frac{-24}{4} \\ \hline r = -6 \end{array}$$

G
A
D

$$2. \quad \frac{x}{5} + 2 = 9$$

$$\begin{array}{r} -2 \quad -2 \\ \hline \frac{x}{5} = 7 \\ \hline 5 \cdot \frac{x}{5} = 7 \cdot 5 \\ \hline x = 35 \end{array}$$

G
S
M

$$3. \quad -3(4r - 8) = -36$$

$$\begin{array}{r} -12r + 24 = -36 \\ -24 \quad -24 \\ \hline -12r = -60 \\ -12 \quad -12 \\ \hline r = 5 \end{array}$$

G
F
S
D

$$4. \quad -2(5k - 6) = -3k$$

$$\begin{array}{r} -10k + 12 = -3k \\ +10k \quad +10k \\ \hline 12 = 7k \\ \frac{12}{7} = \frac{7k}{7} \\ \hline k = 12/7 \end{array}$$

G
F
A
D

$$5. \quad 3(1 - 5c) = -6(c - 8)$$

$$\begin{array}{r} 3 - 15c = -6c + 48 \\ +6c \quad +6c \\ \hline 3 - 9c = 48 \\ -3 \quad -3 \\ \hline -9c = 45 \\ -9 \quad -9 \\ \hline c = -5 \end{array}$$

G
F
A
S
D

#6 - 11: Write & solve an equation to represent each scenario.

6. Twice a number increased by eight is forty.

$$\begin{array}{r} 2x + 8 = 40 \\ -8 \quad -8 \\ \hline 2x = 32 \\ \frac{2x}{2} = \frac{32}{2} \\ \hline x = 16 \end{array}$$

7. Kelli has 12 more M&Ms than Katherine. If they have a total of 158 M&Ms, how many does Katherine have?

x: Katherine's M&Ms

$$\begin{array}{r} x + x + 12 = 158 \\ 2x + 12 = 158 \\ -12 \quad -12 \\ \hline 2x = 146 \\ \frac{2x}{2} = \frac{146}{2} \\ \hline x = 73 \end{array}$$

8. Jaqueline earns \$15 per hour as a math tutor on her college campus. In one week, she pays 12% of her earnings in state and federal taxes. Her take-home pay for the week is \$105.60. How many hours did she work?

*same set-up as:
cost-discount(cost)

$$\begin{array}{r} 15x - 0.12(15x) = 105.60 \\ 15x - 1.8x = 105.60 \\ 13.2x = 105.60 \\ \frac{13.2x}{13.2} = \frac{105.60}{13.2} \\ \hline x = 8 \text{ hours} \end{array}$$

9. The difference of three times a number and twelve is 72.

$$\begin{array}{r} 3x - 12 = 72 \\ +12 \quad +12 \\ \hline 3x = 84 \\ \frac{3x}{3} = \frac{84}{3} \\ \hline x = 28 \end{array}$$

10. The sum of three consecutive integers is 105. What are the integers?

$$\boxed{34, 35, 36}$$

$$\begin{array}{r} x + x + 1 + x + 2 = 105 \\ 3x + 3 = 105 \\ -3 \quad -3 \\ \hline 3x = 102 \\ \frac{3x}{3} = \frac{102}{3} \\ \hline x = 34 \end{array}$$

11. For her math class, Whitney has earned the following test grades for the semester: 87, 88, and 91. What grade must she earn on the last test to earn a test average of a 90 for the semester?

$$\frac{87+88+91+x}{4} = 90 \cdot 4$$

$$\begin{array}{r} 266+x = 360 \\ -266 \quad -266 \\ \hline x = 94 \end{array}$$

#12 - 15: Solve each equation for the indicated variable.

12. $ax + by = c$ (y)

$$\frac{-ax}{b} = \frac{c-ax}{b}$$

$$y = \frac{c-ax}{b} \text{ or } y = \frac{c}{b} - \frac{ax}{b}$$

13. $A = \frac{1}{2}bh$ (h)

$$\frac{2A}{b} = \frac{bh}{b}$$

$$h = \frac{2A}{b}$$

14. $P = IRT$ (R)

$$\frac{P}{IT} = \frac{IRT}{IT}$$

$$R = \frac{P}{IT}$$

15. $A = 2(L + W)$ (L)

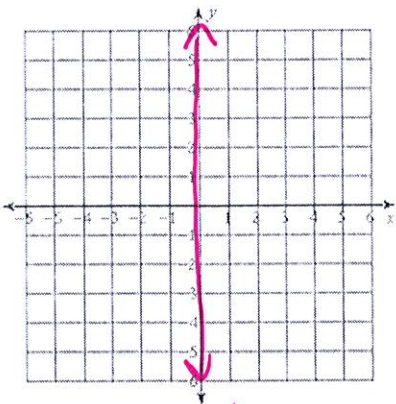
$$\frac{A}{2} = \frac{2L+2W}{2}$$

$$\frac{A-2W}{2} = \frac{2L}{2}$$

$$L = \frac{A-2W}{2} \text{ or } L = \frac{1}{2}A - W$$

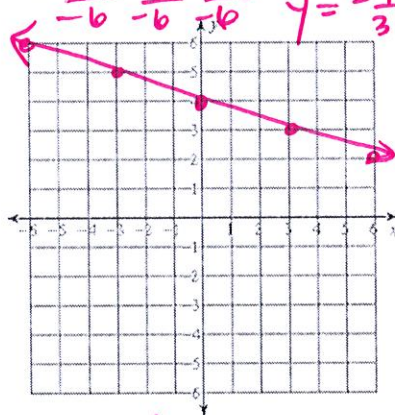
Graph the following equations.

16. $x = 0$



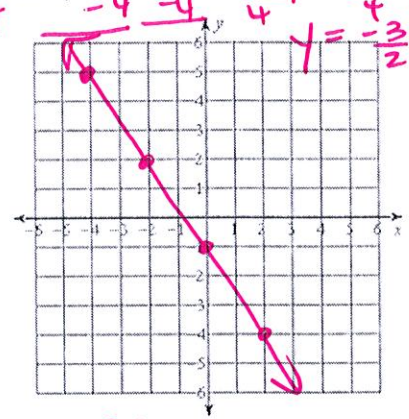
$m = \text{undefined}$ $b = \text{_____}$

17. $-6y = 2x - 24$



$m = -\frac{1}{3}$ $b = (0, 4)$

18. $4y + 4 = -6x$



$m = -\frac{3}{2}$ $b = (0, -1)$

Find the slope of the following points, equations, and graphs.

19. $(10, -1)$ & $(-2, 6)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-7}{12}$$

$$m = \frac{6 - (-1)}{-2 - 10} = \frac{7}{-12}$$

20. $4x + 6y = 10$

$$-4x - 6y = -10$$

$$-6y = -4x - 10$$

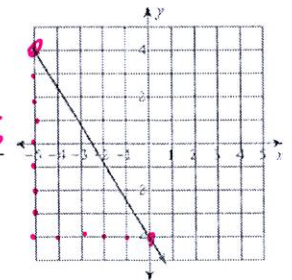
$$y = \frac{-4x - 10}{-6}$$

$$y = \frac{2}{3}x + \frac{5}{3}$$

$$y = \frac{2}{3}x + \frac{5}{3}$$

21.

$m = -\frac{8}{5}$



Remember → point-slope form: $(y - y_1) = m(x - x_1)$

CHANGE

22. through $(1, 5)$, $m = 8$

23. $(-4, -1)$ & $(5, 4)$

$$m = \frac{4 - (-1)}{-5 - (-4)} = \frac{5}{-1} = -5$$

Equation in point-slope:

$$y - 5 = 8(x - 1)$$

$$y - 5 = 8x - 8$$

$$y + 5 = 8x - 8 + 10$$

$$y = 8x - 3$$

Equation in point-slope:

$$y + 1 = -5(x + 4)$$

$$y + 1 = -5x - 20$$

$$y - 1 = -5x - 20 + 1$$

$$y = -5x - 21$$

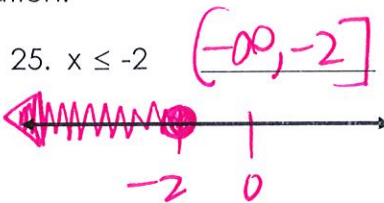
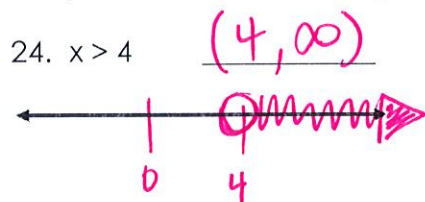
Equation in slope-int:

$$y = 8x - 3$$

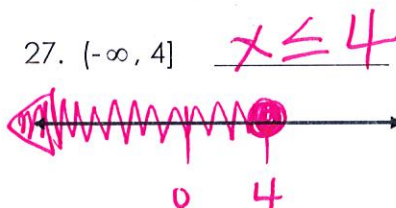
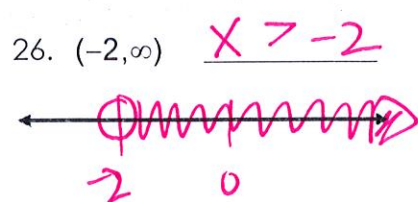
Equation in slope-int:

$$y = -5x - 21$$

Graph, then write the inequality in interval notation.



Graph, then write the interval in inequality notation.



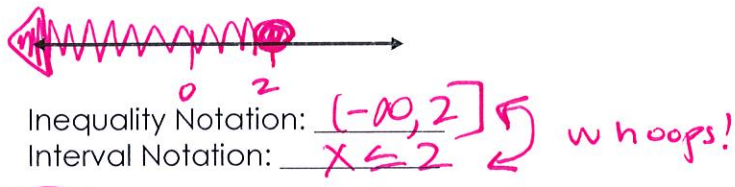
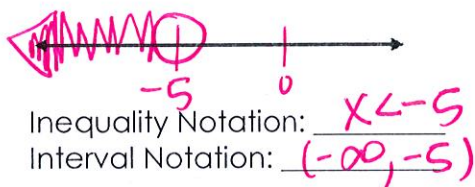
Solve the inequality. Write the answer in inequality and interval notations and graph the solution.

28. $2 > x + 7$

$$\begin{aligned} -7 & -7 \\ -5 & > x \\ \boxed{x < -5} \end{aligned}$$

29. $2(3 - x) + 8 \geq 10$

$$\begin{aligned} 6 - 2x + 8 & \geq 10 \\ -2x + 14 & \geq 10 \\ -14 & -14 \\ -2x & \geq -4 \\ \frac{-2x}{-2} & \geq \frac{-4}{-2} \\ \boxed{x \leq 2} \end{aligned}$$



30. Which of the following is a solution to $7 < -2(x + 4) - 3x$?

A. -10 $-10 < -3$ ✓

B. -3 $-3 < -3$ ✗

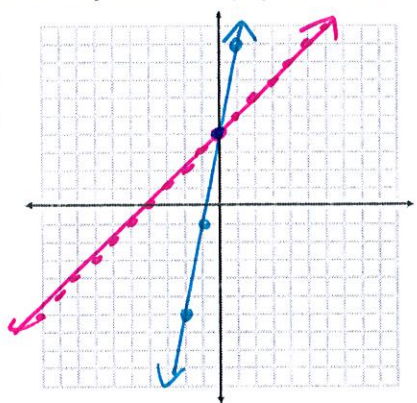
C. 3 $3 < -3$ ✗

D. 10 $10 < -3$ ✗

$$\begin{aligned} 7 & < -2x - 8 - 3x \\ 7 & < -5x - 8 \\ +8 & +8 \\ 15 & < -5x \\ -5 & -5 \\ -3 & \geq x \\ \boxed{x < -3} \end{aligned}$$

Solve the system of equations by graphing and state the solution.

31. $y = x + 4$
 $y = 5x + 4$

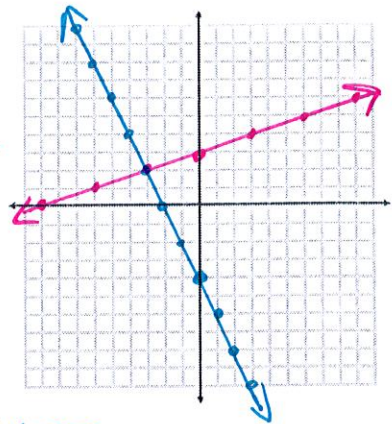


$(0, 4)$

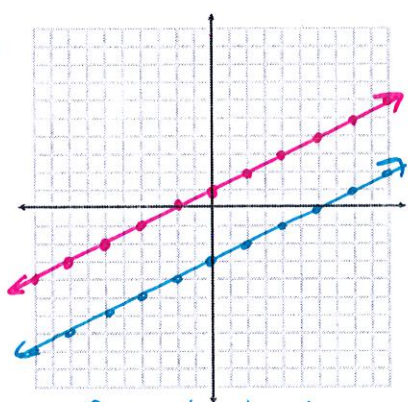
32. $y = -2x - 4$
 $x - 3y = -9$

$$\begin{array}{r} -x \quad -x \\ -3y = -x - 9 \\ \hline -3 \quad -3 \quad -3 \\ y = \frac{1}{3}x + 3 \end{array}$$

 $(-3, 2)$



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



NO solution

Parallel lines

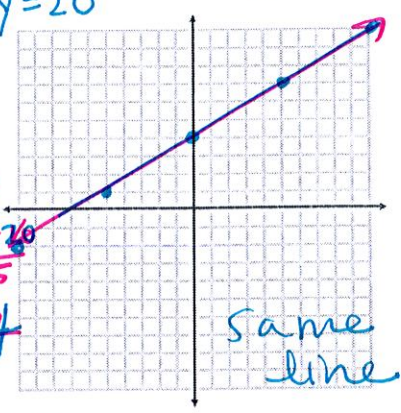
change $-3x + 5y = 20$
 34. $5y + 20 = 3x$

$$\begin{array}{r} 5y = 3x - 20 \\ \hline 5 \quad 5 \quad 5 \\ y = \frac{3}{5}x - 4 \end{array}$$

$$\begin{array}{r} 3x + 5y = 20 \\ +3x \quad +3x \\ \hline 5y = 20 - 3x \\ \hline 5 \quad 5 \quad 5 \\ y = \frac{20 - 3x}{5} \end{array}$$

 $y = \frac{20}{5} - \frac{3x}{5}$
 $y = 4 - \frac{3}{5}x$

infinitely many solutions



same line

Solve each system of equations algebraically.

35.
$$\begin{array}{r} 4x + 8y = 20 \\ + \quad -4x + 2y = -30 \\ \hline 10y = -10 \\ \hline 10 \quad 10 \\ y = -1 \end{array}$$

 $4x + 8(-1) = 20$
 $4x - 8 = 20$
 $+8 \quad +8$
 $\frac{4x}{4} = \frac{28}{4} \quad x = 7$

36.
$$\begin{array}{r} 8x + y = -16 \\ + \quad -3x - y = 11 \\ \hline 5x = -5 \\ \hline 5 \quad 5 \\ x = -1 \end{array}$$

 $8(-1) + y = -16$
 $-8 + y = -16$
 $+8 \quad +8$
 $y = -8$

37.
$$\begin{array}{r} y = 6x - 11 \\ -2x - 3y = -7 \\ 3(-6x + y = -11) \\ \hline -2x - 3y = -7 \\ \hline -18x + 3y = -33 \\ -2x - 3y = -7 \\ \hline -20x = -40 \\ \hline -20 \quad -20 \\ x = 2 \end{array}$$

 $y = 6(2) - 11$
 $y = 12 - 11 \quad y = 1$

38.
$$\begin{array}{r} -3x + 3y = 9 \\ 3(x + y = 7) \\ \hline -3x + 3y = 9 \\ + \quad 3x + 3y = 21 \\ \hline 6y = 30 \\ \hline 6 \quad 6 \\ y = 5 \end{array}$$

 $x + 5 = 7$
 $-5 \quad -5$
 $x = 2$

39.
$$\begin{array}{r} 2(2x + 8y = 6) \\ -4x - 16y = -12 \\ \hline 4x + 16y = 12 \\ + \quad -4x - 16y = -12 \\ \hline 0 = 0 \quad \checkmark \end{array}$$

 infinitely many solutions

40.
$$\begin{array}{r} 3(5x + 4y = -14) \\ -5(3x + 6y = 6) \\ \hline 15x + 12y = -42 \\ -15x - 30y = -30 \\ \hline -18y = -72 \\ \hline -18 \quad -18 \\ y = 4 \end{array}$$

 $3x + 6(4) = 6$
 $3x + 24 = 6$
 $-24 \quad -24$
 $\frac{3x}{3} = \frac{-18}{3}$
 $x = -6$

Write a system that could be used to solve each problem. Then, solve the system and answer the question.

41. Caroline and Rachel are selling flower bulbs for a school fundraiser. Customers can buy bags of windflower bulbs and bags of daffodil bulbs. Caroline sold 6 bags of windflower bulbs and 12 bags of daffodil bulbs for a total of \$324. Rachel sold 6 bags of windflower bulbs and 8 bags of daffodil bulbs for a total of \$244. What is the cost each of one bag of windflower bulbs and one bag of daffodil bulbs?

x: # windflower
y: # daffodil

$$\begin{array}{r} 6x + 12y = 324 \\ -1(6x + 8y = 244) \\ \hline 4y = 80 \\ y = 20 \end{array}$$

$$\begin{array}{r} 6x + 8(20) = 244 \\ 6x + 160 = 244 \\ -160 \quad -160 \\ \hline 6x = 84 \\ x = 14 \end{array}$$

\$14 for windflowers and \$20 for daffodils

42. A sold-out movie theater will seat 60 people. At a premiere, tickets were \$8 for adults and \$5 for children. If the theater made \$420 on premiere night, how many children bought a ticket?

x: # adult tickets
y: # children tickets

$$\begin{array}{r} 8x + 5y = 420 \\ -5(x + y = 60) \\ \hline 3x = 120 \\ x = 40 \end{array}$$

$$\begin{array}{r} 40 + y = 60 \\ -40 \quad -40 \\ \hline y = 20 \end{array}$$

40 adult tickets and 20 children tickets

43. A boat traveled downstream with the current at a speed of 48 meters per second. During the trip back, traveling against the current, the boat traveled at a speed of 32 meters per second. What is the speed of the boat in still water? What is the speed of the current?

x: speed of boat
y: speed of current

$$\begin{array}{r} x + y = 48 \\ + x - y = 32 \\ \hline 2x = 80 \\ x = 40 \end{array}$$

$$\begin{array}{r} 40 + y = 48 \\ -40 \quad -40 \\ \hline y = 8 \end{array}$$

The boat is going 40 mph and the current is going 8 mph

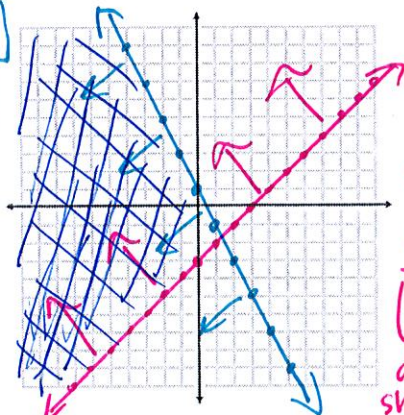
44. Without graphing the equations, is the point $(2, -1)$ the solution to the system $\begin{cases} y = x - 3 \\ y = -x + 1 \end{cases}$?
plug in $(2, -1)$ to BOTH equations! $-1 = 2 - 3$ $-1 = -2 + 1$
 $-1 = -1$ $-1 = -1$

YES! It is a solution

45. Without graphing the inequalities, is the point $(-1, 4)$ a solution to the system $\begin{cases} y \leq -2x + 3 \\ y \leq 4x - 3 \end{cases}$?
 $4 \leq -2(-1) + 3$ $4 \leq 4(-1) - 3$
 $4 \leq 2 + 3$ $4 \leq -4 - 3$
 $4 \leq 5$ $4 \leq -7$ NO!
It is not a solution

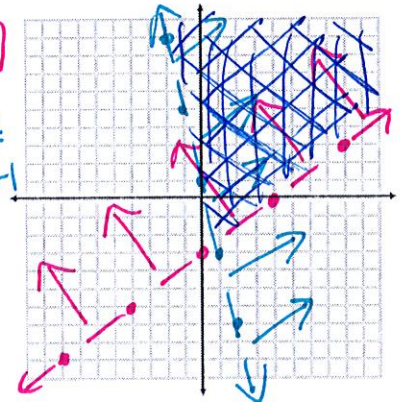
Graph the solution to the system of inequalities and name a possible solution.

46. $\begin{cases} y \leq -2x + 1 \\ y \geq x - 3 \end{cases}$
solid shade
solid shade



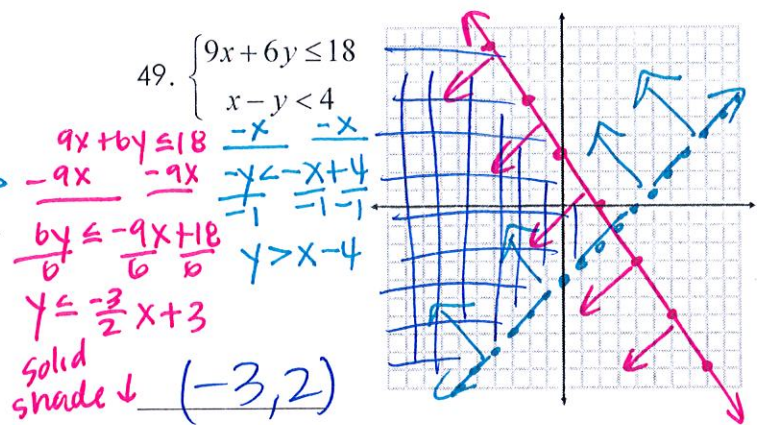
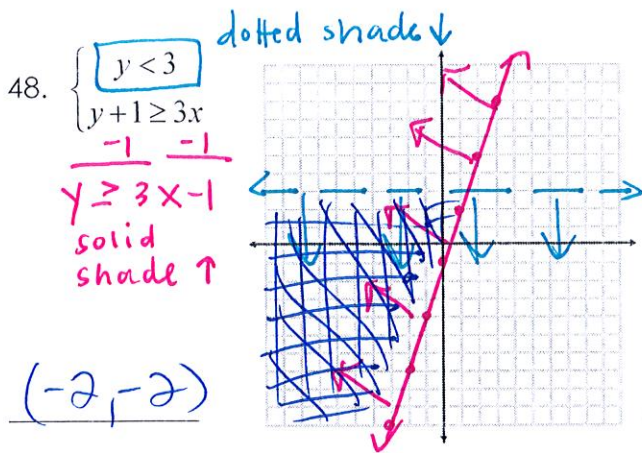
47. $\begin{cases} 3x - 4y < 12 \\ 4x + y > 1 \end{cases}$
dotted shade

$$\begin{array}{r} 3x - 4y < 12 \\ -3x \quad -3x \\ \hline -4y < -3x + 12 \\ -4 \quad -4 \quad -4 \\ \hline y > \frac{3}{4}x - 3 \end{array}$$



$(-5, 1)$
possible solution

$(2, 4)$
possible solution



50. Use the graph to the right to answer the following questions.

A. Name 3 possible solutions to the system of inequalities.

$(-3, -1), (-5, 2), (-4, -3)$

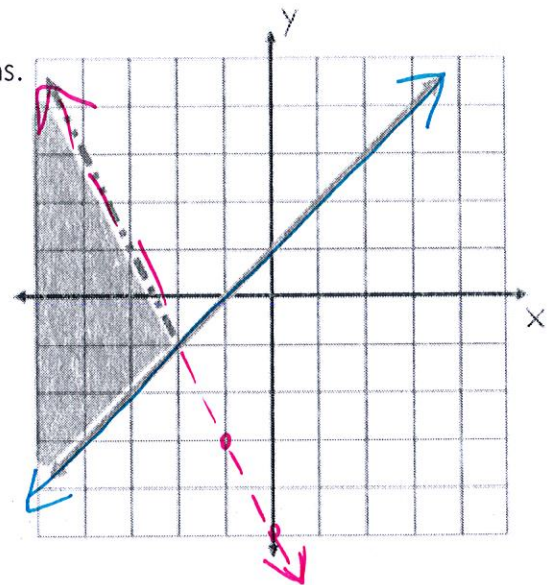
B. Name 3 points that are NOT solutions to the system.

$(-1, 0), (2, -2), (0, 0)$

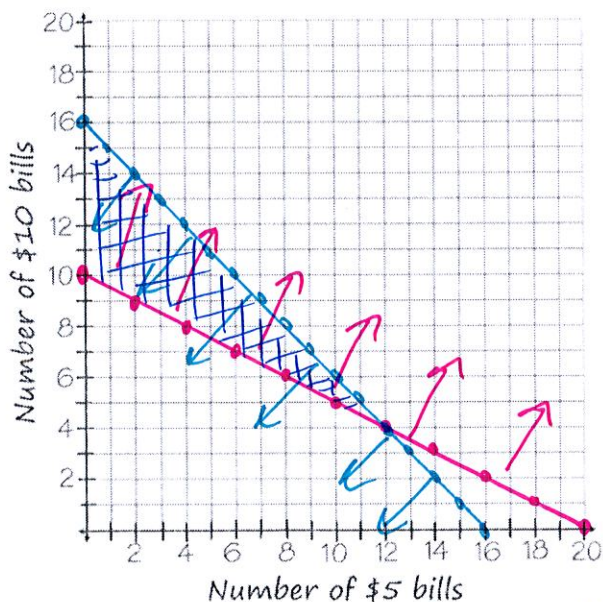
C. Write the two inequalities that are graphed in slope-intercept form.

$y \geq x + 1$

$y < -2x - 5$



51. Jordyn has at least \$100 in her wallet that consists of \$5 and \$10 bills. She has at most 16 bills in her wallet. Write a system of inequalities that could be used to describe the scenario. Then graph on the coordinate plane.



x represents # of \$5 bills

y represents # of \$10 bills

Equation 1: $5x + 10y \geq 100$

Equation 2: $x + y \leq 16$
 $\frac{-x}{-1} \frac{-x}{-1}$
 $y \leq -x + 16$

Equations in slope-int form ($y = mx + b$):

$y \geq -\frac{1}{2}x + 10$
 $y \leq -x + 16$

$5x + 10y \geq 100$
 $\frac{-5x}{10} \frac{-5x}{10}$
 $10y \geq \frac{-5x + 100}{10}$
 $y \geq \frac{-1}{2}x + 10$

Name one possible solution: $(3, 11)$

Write what this solution means in context:

Jordyn could have 3 \$5 bills and 11 \$10 bills in her wallet!

B

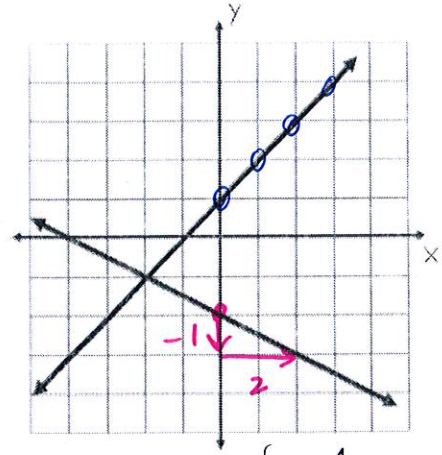
52. Which system of equations is graphed on the right?

A. $\begin{cases} y = x + 1 \checkmark \\ y = \frac{1}{2}x - 2 \end{cases}$

B. $\begin{cases} y = x + 1 \checkmark \\ y = -\frac{1}{2}x - 2 \checkmark \end{cases}$

C. $\begin{cases} y = x - 1 \\ y = \frac{1}{2}x + 2 \end{cases}$

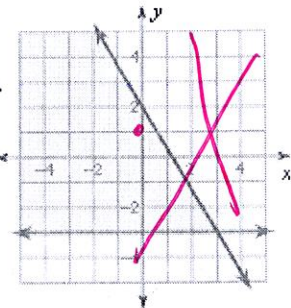
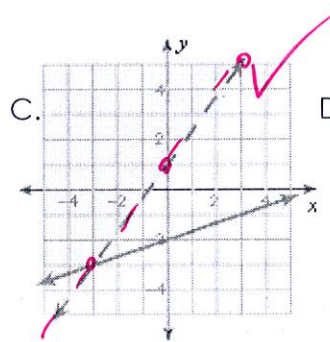
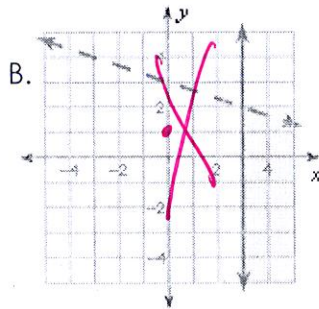
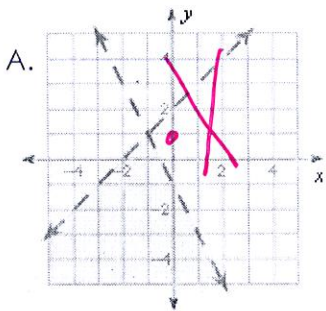
D. $\begin{cases} y = x - 1 \\ y = -\frac{1}{2}x + 2 \end{cases}$



C

53. Which of these shows the correct graph of this system of inequalities?

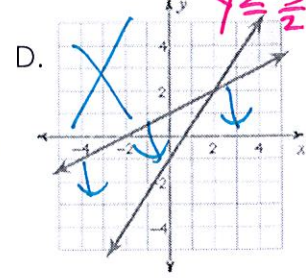
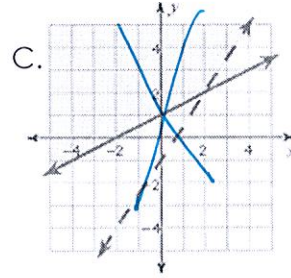
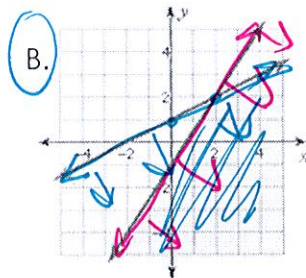
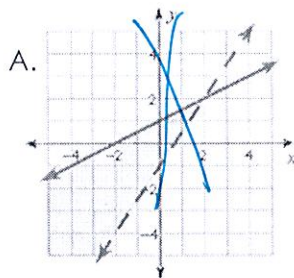
$\begin{cases} y > \frac{4}{3}x + 1 \text{ dotted} \\ y \geq \frac{1}{3}x - 2 \text{ solid} \end{cases}$



B

54. Which of these shows the correct graph of this system of inequalities?

$\begin{cases} x - 2y \geq -2 \Rightarrow \frac{x-2y}{-2} \leq \frac{-2}{-2} \Rightarrow \frac{x-2y}{-2} \leq 1 \Rightarrow \frac{x-2y}{2} \geq 1 \Rightarrow \frac{x-2y}{2} \geq \frac{x-2}{2} \Rightarrow x-2y \geq x-2 \Rightarrow -2y \geq -2 \Rightarrow y \leq 1 \end{cases}$
 $\begin{cases} 2y \leq 3x - 2 \Rightarrow \frac{2y}{2} \leq \frac{3x-2}{2} \Rightarrow y \leq \frac{3x-2}{2} \Rightarrow y \leq \frac{3}{2}x - 1 \end{cases}$



B

55. Which of these shows the correct graph of this system of inequalities?

$\begin{cases} y \leq 2x + 1 \text{ solid} \\ y \leq -2x - 3 \text{ solid} \end{cases}$

