Algebra 1
First Semester Final Exam Review

Name Ammar

Date _____ Hour _____

1. If u = {1, 3, 5, 7, 9, 11, 13}, then which of the following are subsets of U?

B = {2, 4}

A = {0}

C = {1, 9, 5, 13}

D = {5, 11, 1}

E = {13, 7, 9, 11, 5, 3, 1}

F = {2, 3, 4, 5}

2. What makes a number rational?

Fractions

2 $\frac{2}{1}$ $\frac{1}{2}$

3. What is the solution of the equation $\frac{3}{4}x - 6 = -12$?

$+6 \quad +6$

$\left(\frac{4}{3}\right)\frac{3}{4}x = -6\left(\frac{4}{3}\right)$

$x = -8$

4. Solve: $-5b + 24 = -8(b - 6) + 6b$

$-5b + 24 = -8b + 48 + 6b$

$-5b + 24 = -2b + 48$

$+5b \quad +5b$

$24 = 3b + 48$

$-48 \quad -48$

$\frac{-24}{3} = \frac{3b}{3}$

$-8 = b$

5. Describe two ways to solve the equation: $3(2x - 1) = 21$

(A) Distribute the 3 first.

(B) Divide both sides by 3 first.

6. What is the solution of the equation $-(1 - 5x) + 8 = -17 + 2x$

$-1 + 5x + 8 = -17 + 2x$

$5x + 7 = -17 + 2x$

$-2x \quad -2x$

$3x + 7 = -17$

$-7 \quad -7$

$\frac{3x}{3} = \frac{-24}{3}$

$x = -8$

7. Solve: $-9 + 4r = 4r - 3 - 6$

$-9 + 4r = 4r - 9$

$+9 \quad +9$

$4r = 4r - \phi$

$0 = \phi$

Infinitely many

8. Solve $z = b + ma$, for a

$-b \quad -b$

$\frac{z - b}{m} = \frac{ma}{m}$

$a = \frac{z - b}{m}$

9. Given the formula for the perimeter of rectangle, $P = 2l + 2w$, solve the literal equation for l.

$P = 2l + 2w$

$-2w \quad -2w$

$\frac{P - 2w}{2} = \frac{2l}{2}$

$l = \frac{P - 2w}{2}$

OR

$l = \frac{P}{2} - w$

10. What is the solution to the inequality $-3x + 2 \leq 2x + 22$

$+3x \quad +3x$

$2 \leq 5x + 22$

$-22 \quad -22$

$\frac{-20}{5} \leq \frac{5x}{5}$

$-4 \leq x$

11. Graph the solution to $-3 - 6(4x + 6) > -111$ on the number line below.

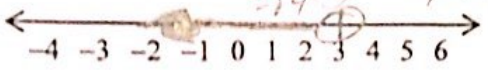
$-3 - 24x - 36 > -111$

$-24x - 39 > -111$

$+39 \quad +39$

$\frac{-24x}{-24} > \frac{-72}{-24}$

$x < 3$



12. What is the solution to: $3(1 - 2x) > 3 - 6x$

$3 - 6x > 3 - 6x$

$0 > \phi$ No soln

ϕ is not greater than ϕ

13. Graph the compound inequality $x \geq -3$ and $x < 5$ on the number line below.

14. Graph the solution to the compound inequality $5x - 5 > -7x - 5$ or $3x + 5 \leq x - 1$ below.

$-5x \quad -5x$

$-5 > -12x - 5$

$+5 \quad +5$

$\frac{0}{-12} > \frac{-12x}{-12}$

$0 > x$

$x < \phi$

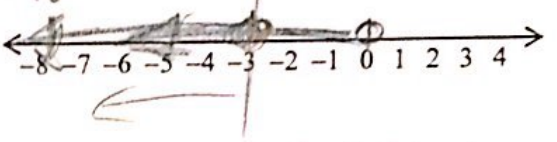
$-x \quad -x$

$2x + 5 \leq -1$

$-5 \quad -5$

$\frac{2x}{2} \leq \frac{-6}{2}$

$x \leq -3$



15. The absolute value equation for the range in temperatures, t, on Wednesday is expressed as $|t - 25| = 40$. The high and low temps on Wednesday were:

$t - 25 = 40 \quad t - 25 = -40$

$+25 \quad +25 \quad +25 \quad +25$

$t = 65 \quad t = -15$

16. Find all real solutions to the absolute value equation: $2|x + 3| = 18$

$\frac{2|x+3|}{2} = \frac{18}{2}$

$|x + 3| = 9$

$x + 3 = 9 \quad x + 3 = -9$

$-3 \quad -3 \quad -3 \quad -3$

$x = 6 \quad x = -12$

17. Solve the absolute value inequality: $|x - 3| \geq 5$

$x - 3 \geq 5 \quad x - 3 \leq -5$

$+3 \quad +3 \quad +3 \quad +3$

$x \geq -2 \quad x \leq -2$

18. Solve the absolute value inequality: $-3|x - 7| < -21$

$\frac{-3|x-7|}{-3} < \frac{-21}{-3}$

$|x - 7| > 7$

$x - 7 > 7 \quad x - 7 < -7$

$x > \phi$

$x < -14$

19. What is the slope-intercept form of an equation for a line with a y-intercept of -3 and a slope of 4?

$y = mx + b$

$y = 4x - 3$

20. What is the slope in the equation $3y = -4x + 6$:

$\frac{3y}{3} = \frac{-4x}{3} + \frac{6}{3}$

$y = -\frac{4}{3}x + 2$

$m = -\frac{4}{3}$

$y = 2.67x - 0.67$

21. What is the equation written in slope-intercept form that represents the line that passes through the points (-2, -6) and (1, 2)?

$m = \frac{2 - -6}{1 - -2} = \frac{8}{3}$ $y = mx + b$

point (1, 2) $2 = \frac{8}{3}(1) + b$

$2 = \frac{8}{3} + b$

22. What is the equation written in slope-intercept form that is shown in the table?

X	Y
2	12
3	20
4	28

$m = \frac{8}{1}$ $y = mx + b$

$12 = 8(2) + b$

$12 = 16 + b$

$-16 \quad -16$

$-4 = b$

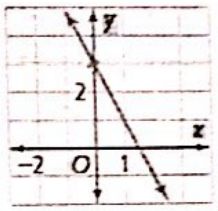
$y = 8x - 4$

23. What is the equation written is slope-intercept form that represents the linear function.

$b = 3$

$m = -2$

$y = -2x + 3$

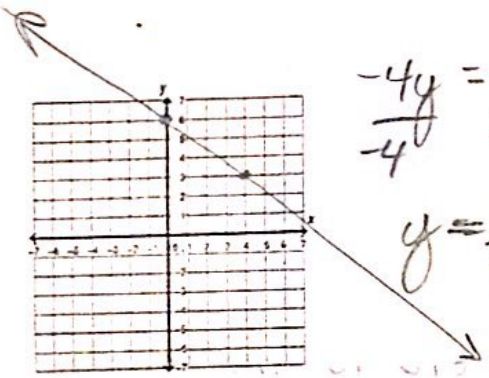


24. Graph $3x - 4y = -24$.

$-4y = -3x - 24$

$\frac{-4y}{-4} = \frac{-3x}{-4} - \frac{24}{-4}$

$y = \frac{3}{4}x + 6$



25. Given the equation $y = 4x + 3$, tell whether Each statement is true of false.

The y- intercept is (3,0). True

The slope of the line is 4. True

26. A plumber use the equation $y = \$50x + \$125$ to calculate his customers' bills. Y represents the total charged and x represents the hours spent on job. What does the y-intercept represent?

Initial cost (Like showing up @ house)

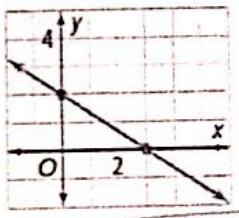
27. What is the point-slope equation of a line passing through the point (-4, 3) with a slope of m = 2:

x y

$y - y_1 = m(x - x_1)$

$y - 3 = 2(x + 4)$

28. What is the equation written in point-slope form for the graphed line?



x y

(3, 0)

(0, 2)

x y

$m = -\frac{2}{3}$

$y = -\frac{2}{3}(x - 3)$ OR

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

29. What is the equation in point-slope form For a line that passes through points (3, -5) and (1. -8).

$x_1 \; y_1 \quad x_2 \; y_2$

$\frac{-8 + 5}{1 - 3} = \frac{-3}{-2} = \frac{3}{2}$

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

OR

$y + 8 = \frac{3}{2}(x - 1)$

30. Write the equation in slope intercept form of the line that passes through the points (3,-1) and (-2,9).

$x_1 y_1 \quad x_2 y_2$

$m = \frac{9-(-1)}{-2-3} = \frac{10}{-5} = -2$

$y = mx + b$

$-1 = -2(3) + b$

$-1 = -6 + b$

$+6 \quad +6$

$5 = b$

$\boxed{y = -2x + 5}$

31. Write the equation in standard form of the line that passes through the points (4,2) and (6,-2).

$x_1 y_1 \quad x_2 y_2$

$m = \frac{-2-2}{6-4} = \frac{-4}{2} = -2$

$y = mx + b$

$2 = -2(4) + b$

$2 = -8 + b$

$+8 \quad +8$

$b = 10$

$y = -2x + 10$

$+2x \quad +2x$

$\boxed{2x + y = 10}$

32. What is the x-intercept and y-intercept of the equation $4x - 5y = -20$?

x	y
0	4
-5	0

$4(0) - 5y = -20$

$\frac{-5y}{-5} = \frac{-20}{-5}$

$y = 4$

Plug in zero to find each

$\frac{4x}{4} - \frac{5(0)}{4} = \frac{-20}{4}$

$x = -5$

x-inter: -5
y-inter: 4

33. Sue needs to buy 180 beverages for a party. Write an equation, in standard form, to determine the number x of 6-packs of juice and the number y of 10-packs of water that Sue can buy?

$6x + 10y = 180$

34. Find the x intercept in question #33. What does it represent?

That's when $y = 0$.

$6x + 10(0) = 180$

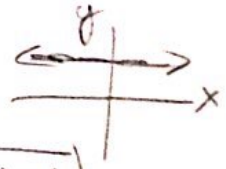
$\frac{6x}{6} = \frac{180}{6}$

$\boxed{x = 30}$

35. When sketching the graph for the linear equation $-4y = -20$, what type of line is drawn?

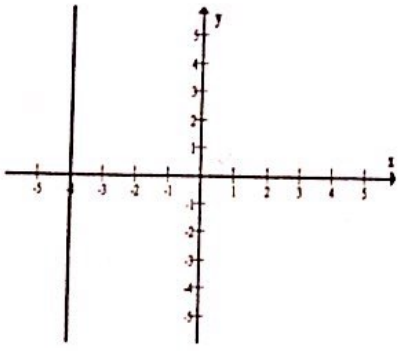
$\frac{-4y}{-4} = \frac{-20}{-4}$

$y = 5$



horizontal

36. Write the equation and identify the slope of the line graphed.



$\boxed{x = -4}$

$\boxed{m = \text{undefined}}$

37. Write the equation of the line that goes through the point (-2, 3) and is perpendicular to the graph of $y = \frac{1}{2}x + 5$

x y

$m = \frac{1}{2}$

perp slope opp recip $m = -2$

$y = mx + b$

$3 = -2(-2) + b$

$3 = 4 + b$

$-4 \quad -4$

$b = -1$

$y = -2x - 1$

38. What is the slope of a line that is parallel to $-6y + 4x = -8$?

$-4x \quad -4x$

$\frac{-6y}{-6} = \frac{-4x}{-6} \frac{-8}{-6}$

$y = \frac{2}{3}x + \frac{4}{3}$

parallel lines have same slope.

$m = \frac{2}{3}$

39. Are the graphs of the two equations parallel, perpendicular or neither?

$3x - 2y = 6$ and $y = \frac{2}{3}x + 5$

$m = \frac{2}{3}$

$-3x \quad -3x$

$\frac{-2y}{-2} = \frac{-3x}{-2} + \frac{6}{-2}$

$y = \frac{3}{2}x - 3$

$m = \frac{3}{2}$

Neither

40. Write the equation of the line that passes through the point (2, 1) and is parallel to the graph of $y = -3x + 8$.

x y

$m = -3$

$y = mx + b$

$1 = -3(2) + b$

$1 = -6 + b$

$+6 \quad +6$

$7 = b$

$y = -3x + 7$

For questions 41 and 42, state the domain and range. Also determine whether each represents a function or not a function. If it is not a function, state the reason why.

41.

x	-2	1	-2	4	7
y	8	0	-1	3	7

Domain $\{-2, 1, 4, 7\}$

Range $\{-1, 0, 3, 7, 8\}$

Function?

not one-to-one

x's repeat (-2)

42. $\{(0,2),(5,-2),(3,-1),(-4,2)\}$.

Domain $\{-4, 0, 3, 5\}$

Range $\{-2, -1, 2\}$

Function? yes.

43. a) Find the value of $f(2)$ for the function $f(x) = -5x + 7$.

$f(2) = -5(2) + 7$

$= -10 + 7$

$f(2) = -3$

$(2, -3)$

x, y

b) Find the value of $f(-6)$ for the function $f(x) = \frac{2}{3}x + 8$

$f(-6) = \frac{2}{3}(-6) + 8$

$= \frac{2}{3} \cdot \frac{-6}{1} + 8$

$= \frac{-12}{3} + 8$

$= -4 + 8$

$f(-6) = 4$

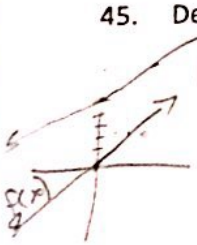
44. Describe how the graph of the function $g(x) = -4x + 3$ compares to the graph of the function $f(x) = -4x$.

(Use the descriptor "shift left/right/up/down")

up 3

45. Describe how the function $g(x) = \frac{2}{3}x - 5$ compares to the parent function $f(x) = x$.

(Use the descriptors "vertical stretch or shrink by a scale factor" and "shift left/right/up/down")



shrink by factor $\frac{2}{3}$ (page 105)

down 5

46. Jonathan charges a certain amount of money to tutor per hour. He earns an addition amount if he the student he is tutoring receives an "A" on their test. Use the table to determine a linear function Jonathan can use to determine his pay if his student always gets an "A". Write your answer using function notation.

$f(x) = 18x$

Hours	1	2	3	4	5
Total Pay	28	46	64	82	100

18 18 18 18

$m = 18$

$y = mx + b$

$x \quad y$

$(1, 28)$

$28 = 18(1) + b$

$28 = 18 + b$

$-18 \quad -18$

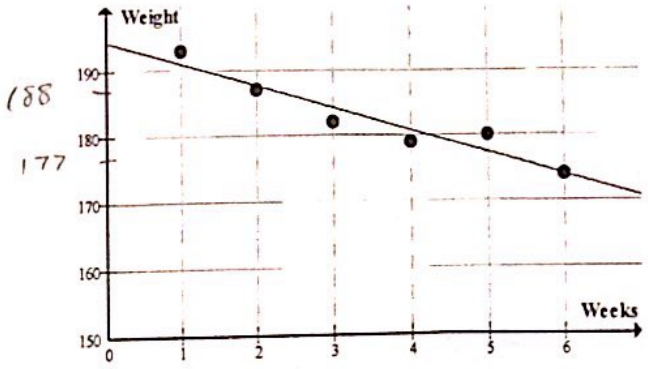
$10 = b$

47. What is a reasonable domain for the function in question 46 ?

D: $0 < x < 8$ (No more than probably 8 hours in a day, usually)

For questions 48 -50:

To meet his New Year's resolution for losing weight, Greg starts an exercise program. He plots his new weight at the end of each week as shown.



48. What type of correlation (positive, negative, none) does the scatter plot show? If there is a correlation, is it strong or weak?

Strong negative

49. Use the graph to estimate a line of best fit.

(2,188) (5,177)

$m = \frac{177-188}{5-2} = \frac{-11}{3}$

$y - y_1 = m(x - x_1)$

$y - 188 = -\frac{11}{3}(x-2)$

$y - 188 = -\frac{11}{3}x + \frac{22}{3}$

$y - 188 = -3.67x + 7.33$

$+188 \quad +188$

$y = -3.67x + 195.3$

50. What does the y-intercept of the line represent?

How much he weighed the first day, before he started exercising.

51. Use a graphing calculator to determine the equation of the line of best fit for the data in the table.

x	11	17	26	28	40
y	51	39	29	23	7

$y = -1.49x + 66.09$

52. Give an example of an r-value that would represent a :

Strong Postitive 0.8

Weak Positive 0.3

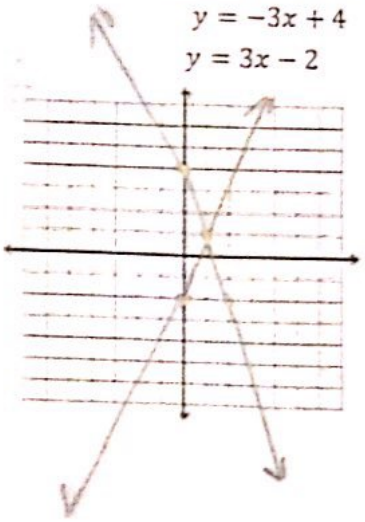
Strong Negative -0.7

Weak Negative -0.1

53. Solve the system by graphing.

$y = -3x + 4$

$y = 3x - 2$

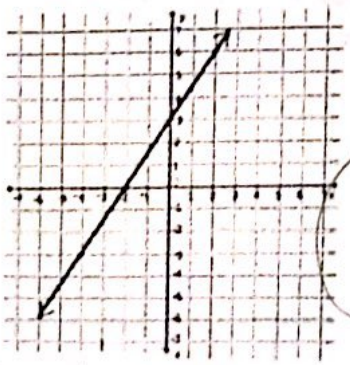


(1,1)

54. How many solutions are there to this system?

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

$-3x + 2y = 6$



Inf many

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

$-3x + 2y = 6$

$+3x \quad +3x$

$2y = 3x + 6$

55. Find the solution to the system of equations.

$y = 4x - 9$

$y = x - 3$

$4x - 9 = x - 3$

$-x \quad -x$

$3x - 9 = -3$

$+9 \quad +9$

$\frac{3x}{3} = \frac{6}{3}$

$x = 2$

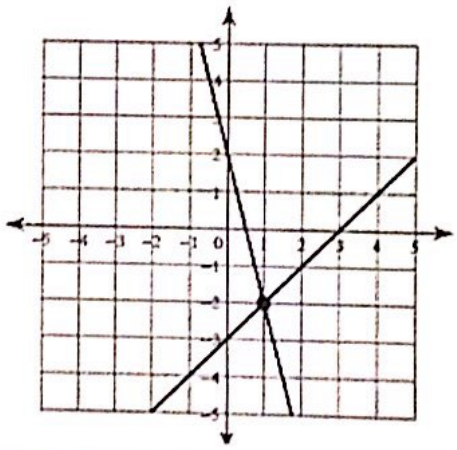
$y = x - 3$

$y = 2 - 3$

$y = -1$

(2, -1)

56. Write the system of equations (in standard form) that is represented by the graph.



57. How many solutions does the following system of equations have?

$y = -4x - 1$

$8x + 2y = 5$

$-8x \quad -8x$

$\frac{2y}{2} = \frac{-8x}{2} + \frac{5}{2}$

$y = -4x + \frac{5}{2}$

None.

Have same slope so parallel.

58. Solve the system of equations by any method.

I used elimination. $\begin{matrix} 5x + 4y = -30 \\ 3x - 9y = -18 \end{matrix}$ $\begin{matrix})-3 \\ )5 \end{matrix}$

$+15x - 12y = +90$

$15x - 45y = -90$

$\frac{-57y}{-57} = \frac{0}{-57}$

$y = 0$

$5x + 4y = -30$

$5x + 4(0) = -30$

$\frac{5x}{5} = \frac{-30}{5}$

$x = -6$

(-6, 0)

59. A girl has a collection of dimes and nickels worth four dollars. If she has 60 coins, how many of each coin does she have?

x = dimes
y = nickels

$x + y = 60$

$0.1x + 0.05y = 4.00$

$x = -y + 60$

$0.1(-y + 60) + 0.05y = 4.00$

$-0.1y + 6 + 0.05y = 4.00$

$-0.05y + 6 = 4.00$

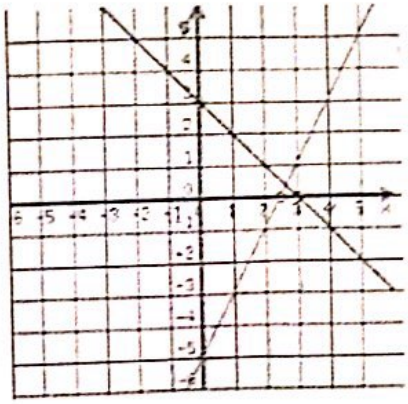
$-0.05y = -2$

$\frac{-0.05y}{-0.05} = \frac{-2}{-0.05}$

$y = 40$

40 nickels
20 dimes

60. Estimate the solution to the system graphed below.



(2.7, 0.3)

61. A sightseeing boat charges \$5 for children and \$8 for adults. On its first trip of the day, it collected \$439 from 71 passengers. How many children were on the boat?

x = children y = adults

$5x + 8y = 439$

$x + y = 71$

$x = -y + 71$

$5(-y + 71) + 8y = 439$

$-5y + 355 + 8y = 439$

$3y + 355 = 439$

$-355 \quad -355$

$\frac{3y}{3} = \frac{84}{3}$

$y = 28$

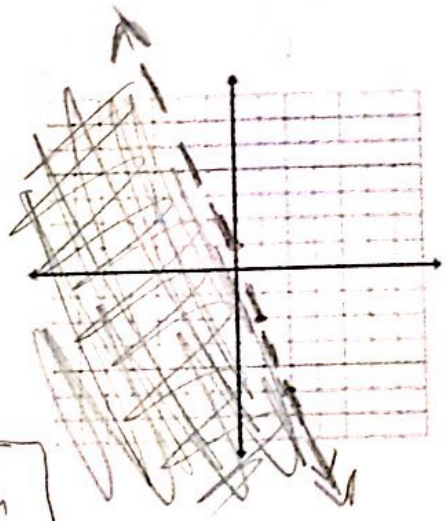
$x + y = 71$

$x + 28 = 71$

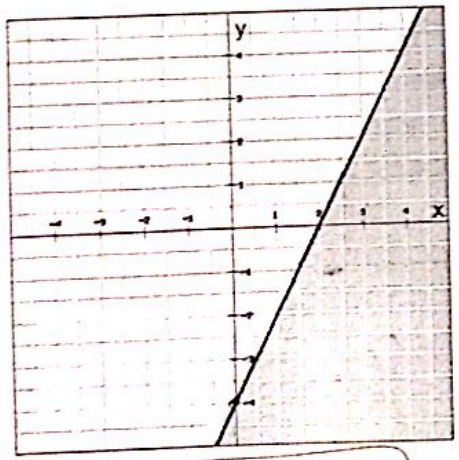
$-28 \quad -28$

$x = 43$ children

62. Graph $y < -3x + 1$

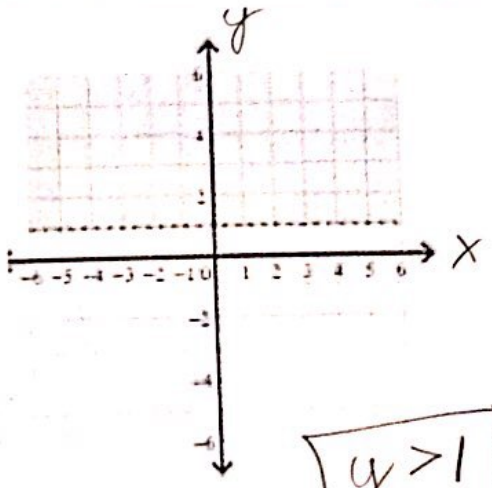


63. Write the linear inequality for the graph shown.



$y \leq 2x - 4$

64. Write the linear inequality for the graph shown.

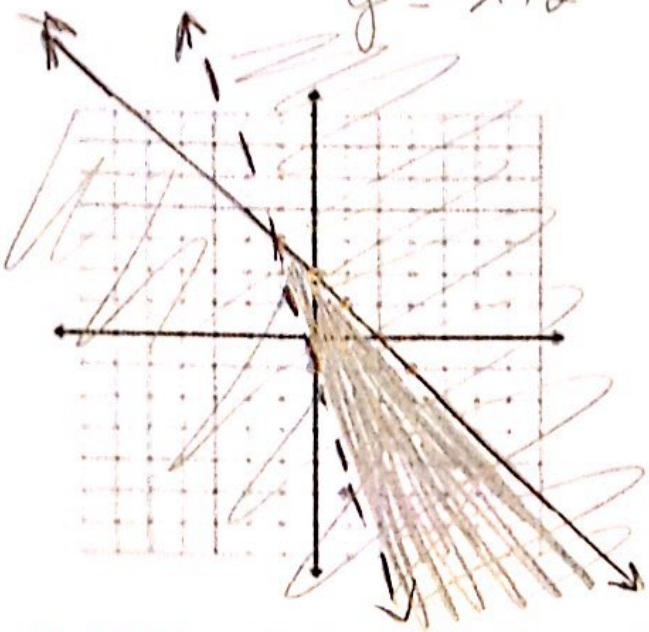


$y > 1$

65. Graph the solutions to the system.

$4x + y > -1$
$x + y \geq 2$

$y > -4x - 1$
$y \geq -x + 2$



66. Is the ordered pair a solution to the system?

$3x + 2y \geq -2$
$x - y < 3$

a. (4, 1)

x y

$4 - 1 < 3?$

$3 < 3$

NO

b. (-1, 2)

x y

$-1 - 2 < 3$

$-3 < 3$ yes

$3(-1) + 2(2) \geq -2$

$-3 + 4 \geq -2$

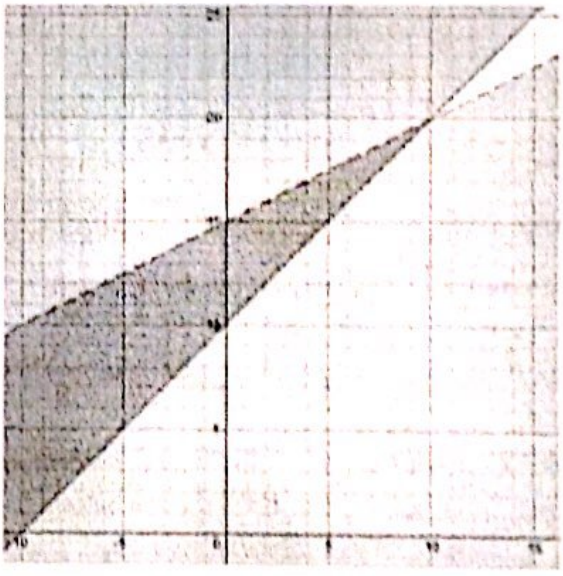
$1 \geq -2$ yes

yes

67. Josh can spend no more than $25 at the arcade today. Air hockey costs $1.25 per game, and video games cost $0.75 per game. If x is the number of games of air hockey and y is the number of video games, write the inequality that describes the situation.

$1.25x + 0.75y \leq 25$

68. Write a system of linear inequalities for the graph.



#1 $y \geq x + 10$

#2 $y < \frac{1}{2}x + 15$