

Key

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Teacher: \_\_\_\_\_ Date: \_\_\_\_\_

DHS Algebra I Fall Semester Exam Review

$$\frac{x-5}{3} \geq 5.9$$

$$\frac{23-5}{3} \geq 5.9$$

$$\frac{18}{3} \geq 5.9$$

$$6 \geq 5.9$$

yes

Check whether the given number is a solution of the equation or inequality. (yes or no)

1. NO  $6f - 7 = 29; 5$       2. Yes  $\frac{x-5}{3} \geq 5.9; 23$

$$6(5) - 7 = 29$$

$$30 - 7 = 29$$

$$23 \neq 29$$

3. Use the table below to answer the following questions.

→ Each input maps to exactly one output.

Input	Output
0	0
3	0.55
8	4.5
15	6.25
19	8.0

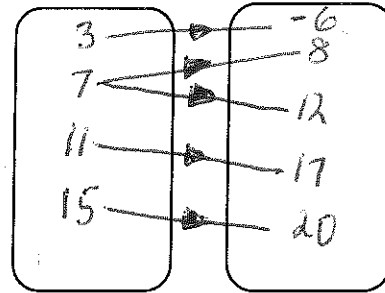
a) Function Is the pairing a function or a relation?

b) {0, 3, 8, 15, 19} Identify the domain.

c) {0, 0.55, 4.5, 6.25, 8} Identify the range.

4. Draw a mapping of the pairing in the boxes to the right.

x	y
3	-6
7	8
7	12
11	17
15	20



5. Make an input-output table to represent the function  $y = 8x - 6$ .

Use  $-6, -4, -\frac{1}{2}, \frac{3}{4},$  and  $3$  for your domain values.

-6	-54
-4	-38
$-\frac{1}{2}$	-10
$\frac{3}{4}$	0
3	18

Write a function rule for each of the following.

6.

Input	Output
2	4
3	6
4	8
9	18
10	20

$(2, 4) (3, 6)$   
 $x_1, y_1, x_2, y_2$   
 $m = \frac{6-4}{3-2} = 2$   
 $y - 4 = 2(x - 2)$   
 $y - 4 = 2x - 4$   
 $+4 \quad +4$   
 $y = 2x$

Function Rule:  $y = 2x$

23.

Input	Output
0	12
1	12.75
5	15.75
12	21
16	24

$$y = mx + b$$

$$(0, 12)$$

$$b = 12$$

$$y = mx + 12$$

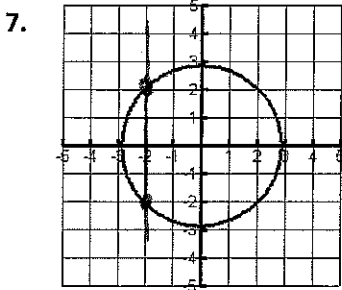
$$m = \frac{24-21}{16-12}$$

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

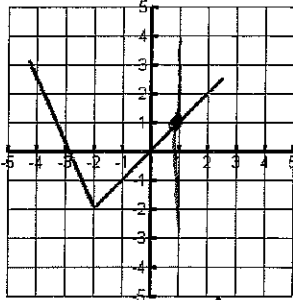
Function Rule:  $y = \frac{3}{4}x + 12$

(Vertical line test)

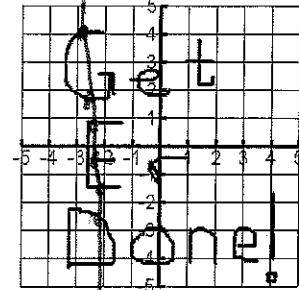
Does each graph represent a function? Why or why not?



7. NO  
because of  $(-2, -2)$  and  $(-2, 2)$   
Simplify each expression.



8. Yes



9. NO

10.  $7(w-5) + 3w$   $10w - 35$   
 $7w - 35 + 3w$   
 $10w - 35$

11.  $15t - (t-4)$   $14t + 4$   
 $15t - t + 4$   
 $14t + 4$

12.  $5(n+7) - 4(3+n) - 3$   $n + 20$   
 $5n + 35 - 12 - 4n - 3$   
 $n + 20$

13.  $-\frac{3}{4}(12m-8)$   $-9m + 6$   
 $-9m + 6$

Solve.

14.  $\frac{m}{2} - 6 = 22$   $2 \times \frac{m}{2} = 28 \times 2$   
 $\frac{m}{2} = 28$   $m = \boxed{56}$

15.  $7 \cdot 12 = \frac{4 \cdot 7}{7} a + 8 \cdot 7$   $a = \boxed{7}$   
 $84 = 4a + 56$   
 $28 = 4a$

16.  $8s + 4s = 168$   $s = \boxed{14}$   
 $12s = 168$   
 $s = 14$

17.  $42 = 18b - 4b + 7b$   $b = \boxed{2}$   
 $42 = 21b$

18.  $27 = 3c - 3(6-2c)$   $c = \boxed{5}$   
 $27 = 3c - 18 + 6c$   
 $27 = 9c - 18$

19.  $\frac{3}{4}(n+3) = 9$   $n = \boxed{9}$   
 $n+3 = 9 \cdot \frac{4}{3}$   
 $n+3 = 12$

20.  $11y - 4 = 6y + 1$   $y = \boxed{1}$   
 $11y - 6y = 1 + 4$   
 $5y = 5$

21.  $5(1+4m) = 2(3+10m)$  No solution  $\emptyset$   
 $5 + 20m = 6 + 20m$   
 $5 = 6$

22.  $5.4t + 14.6 - 10.1t = 12.8 - 3.5t - 0.6$   
 $-4.7t + 14.6 = 12.2 - 3.5t$   
 $+3.5t - 14.6 - 14.6 + 3.5t$   
 $-1.2t = -2.4$   $t = \boxed{2}$

23.  $2(3g+2) = \frac{1}{2}(12g+8)$   $\mathbb{R}$  (All real #s)  
 $6g+4 = 6g+4$   
 $4=4$

24.  $\frac{v}{20} = \frac{8}{4}$   $v = \boxed{40}$   
 $4v = 160$   
 $v = 40$

25.  $\frac{4.5}{x} = -\frac{1.8}{5}$   $x = \boxed{12.5}$   
 $1.8x = 22.5$   
 $x = \frac{22.5}{1.8}$

26.  $\frac{m+3}{8} = 40$   
 $m+3 = 320$   
 $m = \boxed{317}$

27.  $\frac{3}{11} = \frac{(5-h)}{(h+1.4)}$   
 $11(5-h) = 3(h+1.4)$   $h = \frac{50.8}{14}$   
 $55 - 11h = 3h + 4.2$   
 $-4.2 + 11h = 3h + 4.2$   
 $50.8 = 14h$

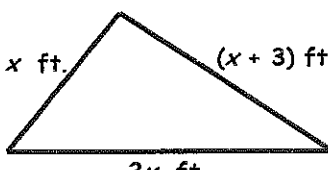
Write an equation for the function described. Then find the input.

28. The output of a function is fourteen less than six times the input. Find the input when the output is twenty-two.

Equation:  $y = 6x - 14$        $22 = 6x - 14$       Input:  $x = 6$   
 $36 = 6x$   
 $6 = x$

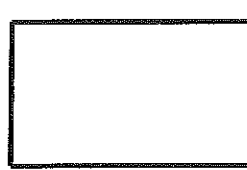
Determine the value of  $x$  for the triangle or rectangle.

29. Perimeter = 23 ft



$23 = x + 3 + 2x + x$   
 $23 = 4x + 3$   
 $20 = 4x$   
 $5 = x$

30. Perimeter = 24 m



$24 = 2(x+3) + 2(2x)$   
 $24 = 2x + 6 + 4x$   
 $24 = 6x + 6$   
 $18 = 6x$   
 $3 = x$

31. Abel has to save 15% of his monthly income. If his monthly income is \$2450, how much will he save? If he saved \$380 last month, what was his monthly income?

$V = lwh$        $\left(\frac{V}{lh}\right) = w$   
 32.  $V = lwh$  Solve for  $w$ .

$0.15 \times 2450 = \$367.50$  saved  
 $\frac{100}{15} \times 380 = \$2400$  monthly income  
 33.  $A = \frac{1}{2}bh$  Solve for  $b$ .

34.  $y = 2x + 3$        $6x - 3y = -9$ ; solve for  $y$ .

35.  $y = -4x + 5$        $8x + 2y = 10$ ; solve for  $y$ .


Solve each inequality and graph each solution.

36.  $9.4 \leq t - 3.5$   
 $+3.5 \quad +3.5$   
 $12.9 \leq t$  or  $t \geq 12.9$



36.  $t \geq 12.9$

37.  $\frac{g}{-6} > 20$        $g < -120$



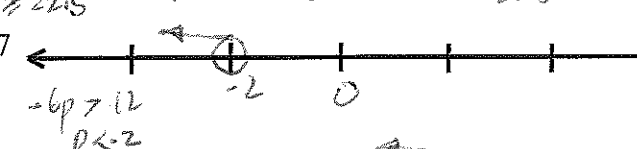
37.  $t \geq 12.9$

38.  $-90 \geq -4t$   
 $\frac{-90}{-4} \leq \frac{-4t}{-4}$   
 $22.5 \leq t$  or  $t \geq 22.5$



38.  $g < -120$

39.  $-5 - 3p > 2p + p + 7$   
 $-5 - 3p > 3p + 7$   
 $-5 - 3p - 3p > 3p + 7 - 3p + 7$   
 $-6p > 12$   
 $p < -2$



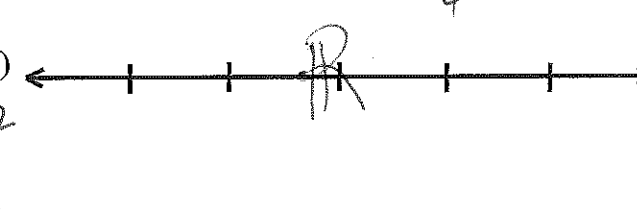
39.  $t \geq 22.5$

40.  $2(a+4) \leq 16$   
 $2a + 8 \leq 16$   
 $2a \leq 8$   
 $a \leq 4$



40.  $p < -2$

41.  $3(2v-4) \leq 2(3v-6)$   
 $6v - 12 \leq 6v - 12$   
 $-6v \quad -6v$   
 $-12 \leq -12$



41. All real  $\mathbb{R}$

$v =$  All real  $\mathbb{R}$

42. Find the next three terms in each of the arithmetic sequence, find the common difference, write the explicit rule and find the 100<sup>th</sup> term of each sequence.

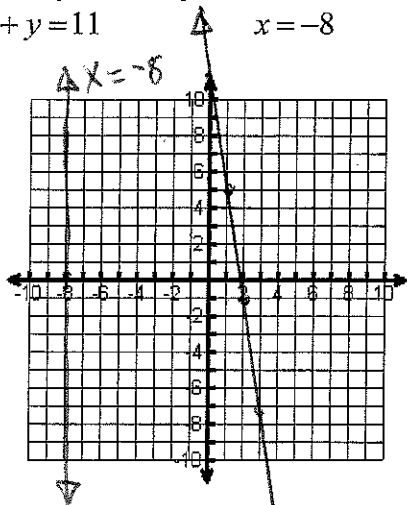
	Sequence	Common Difference	Rule	100 <sup>th</sup> Term
a)	2, 8, 14, 20, <u>26</u> , <u>32</u> , <u>38</u>	6	$f(n) = f_1 + d(n-1)$ $f(n) = 2 + 6(n-1)$	$f(100) = 2 + 6(99) = 596$
b)	90, 80, 70, 60, <u>50</u> , <u>40</u> , <u>30</u>	-10	$f(n) = 90 - 10(n-1)$	$f(100) = 90 - 10(99) = -900$
c)	-1, -5, -9, -13, <u>-17</u> , <u>-21</u> , <u>-25</u>	-4	$f(n) = -1 - 4(n-1)$	$f(100) = -1 - 4(99) = -397$
d)	1, 6, 11, 16, <u>21</u> , <u>26</u> , <u>31</u>	5	$f(n) = 1 + 5(n-1)$	$f(100) = 1 + 5(99) = 496$
e)	$\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , 1, ... <u><math>\frac{5}{4}</math></u> , <u>2</u> , <u><math>\frac{9}{4}</math></u>	$\frac{1}{2}$	$f(n) = \frac{1}{4} + \frac{1}{2}(n-1)$	$f(100) = \frac{1}{4} + \frac{1}{2}(99) = 49\frac{3}{4}$

43. Graph both equations on the same graph.

$-6x + y = 11$

$x = -8$

$y = 6x + 11$

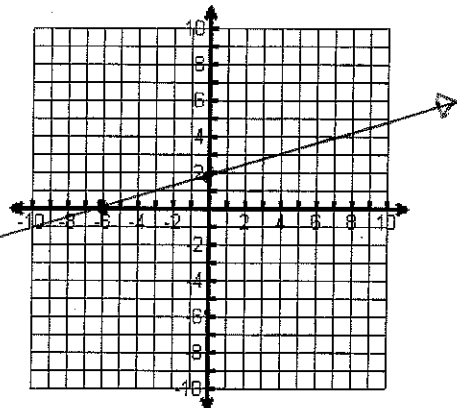


$m = \frac{y_2 - y_1}{x_2 - x_1}$

44. Find the x and y intercepts and graph.

$-3x + 9y = 18$

X-int (x, 0) | Y-int (0, y)  
 $-3x + 9(0) = 18$  |  $-3(0) + 9y = 18$   
 $-3x = 18$  |  $9y = 18$   
 $x = -6$  |  $y = 2$   
 X-int (-6, 0) | Y-int (0, 2)



Slope formula: \_\_\_\_\_

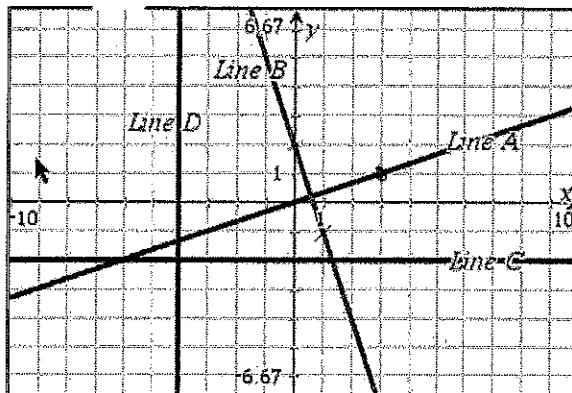
Determine the slope for each of the following.

45.  $m = \frac{4-1}{8-2} = \frac{3}{6} = \frac{1}{2}$  (2, 1) and (8, 4)

46.  $m = \frac{5-14}{3-3} = \frac{-9}{0} = \text{Undefined}$  (3, 14) and (3, 5)

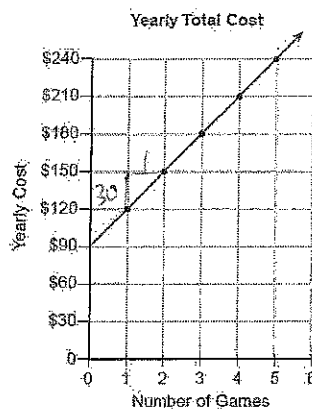
Find the slope and write an equation for each line.

47. Line A:  $\frac{1}{3}$   $y = \frac{1}{3}x$   
 Line B: -3  $y = -3x + 2$   
 Line C: 0  $y = 2$   
 Line D: Undefined  $x = -4$



Find the rate of change for the data graphed on the line.

48. \$ 30 per Game



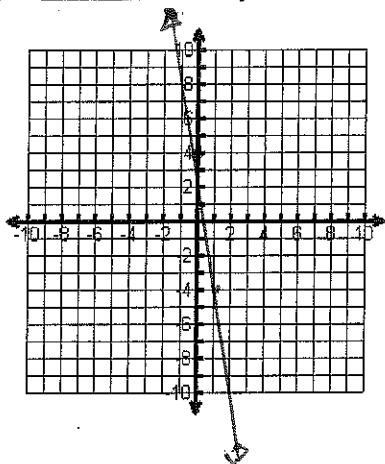
rate =  $\frac{30}{1} = \$30/\text{Game}$

Graph Using Slope & y-intercept

Re-write each equation in slope-intercept form. Then, identify the slope and the y-intercept of the line and graph the equation.

49.  $y = 4 - 8x \rightarrow y = -8x + 4$

Slope: -8 y-intercept: 4

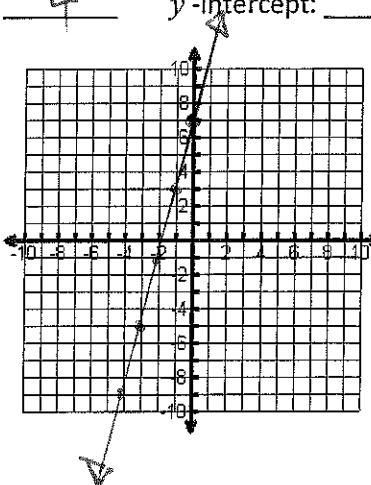


50.  $-8x + 2y = 14$

$+8x$   $+8x$

$2y = 8x + 14$   
 $y = 4x + 7$

Slope: 4 y-intercept: 7



Direct Variation

51. Tell whether the table represents a direct variation. If so, write the direct variation equation.

Direct variation: Yes / No

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

x	-3	6	-9	12	-15
y	-2	4	-6	8	-10

9 -15 21 -27  
6 -10 14 -18

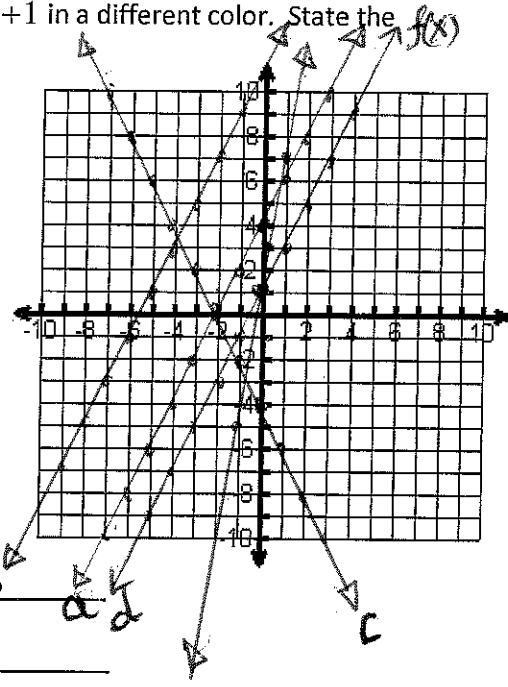
$\frac{6}{9} = \frac{-10}{-15} = \frac{14}{21} = \frac{-18}{-27}$   
 $= \frac{2}{3}$   
 $y + 2 = \frac{2}{3}(x + 3)$   
 $y + 2 = \frac{2}{3}x + 2$   
 $y = \frac{2}{3}x$

52. Given that y varies directly with x and y = 15 when x = 7. Find the value of y when x = -5.

$\frac{15}{7} = \frac{y}{-5}$   
 $7y = -75$   
 $y = -\frac{75}{7}$

53. Graph the each transformation,  $g(x)$ , of the function,  $f(x) = 2x + 1$  in a different color. State the transformation(s) for each.

- a)  $g(x) = f(x) + 3$  \_\_\_\_\_
- b)  $g(x) = f(x + 5)$  \_\_\_\_\_
- c)  $g(x) = -f(x) - 3$  \_\_\_\_\_
- d)  $g(x) = f(3x)$  \_\_\_\_\_



Slope-Intercept form of a linear equation:  $y = mx + b$

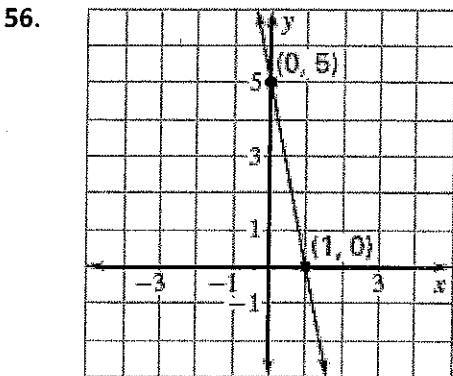
Point-Slope form of a linear equation:  $y - y_1 = m(x - x_1)$

Standard Form of a linear equation:  $Ax + By = C$

Write the equation of the line in slope-intercept form with the given slope and  $y$ -intercept.

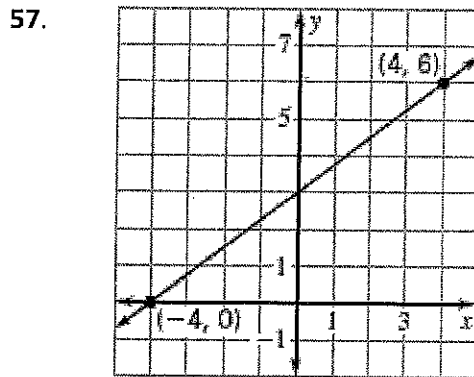
- 54.  $y = 7x + 4$  slope: 7;  $y$ -intercept: 4
- 55.  $y = -3x + 5$  slope: -3;  $y$ -intercept: 5

Write the equation of the line shown.



$$m = \frac{0 - 5}{1 - 0} = -5$$

$$y = -5x + 5$$



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

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

Write an equation of the line that passes through the given points.

58.  $y = -4x - 24$   $(-6, 0), (0, -24)$

$$\frac{(-24) - (0)}{0 - (-6)} = \frac{-24}{6} = -4$$

59.  $y = 2x - 7$   $(-1, -9), (6, 5)$

$$m = \frac{(5) - (-9)}{(6) - (-1)} = \frac{14}{7} = 2$$

$$\begin{aligned} y + 9 &= 2(x + 1) \\ y + 9 &= 2x + 2 \\ y &= 2x - 7 \end{aligned}$$

Write an equation of the line that passes through the given point and has the given slope  $m$ .

60.  $y = 2x - 9$  (5, 1),  $m = 2$

$$\begin{aligned} y - 1 &= 2(x - 5) \\ y - 1 &= 2x - 10 \\ y &= 2x - 9 \end{aligned}$$

61.  $y = -2x + 23$  (10, 3),  $m = -2$

$$\begin{aligned} y - 3 &= -2(x - 10) \\ y - 3 &= -2x + 20 \\ y &= -2x + 23 \end{aligned}$$

Write an equation in point-slope form of the line that passes through the given point and has the given slope  $m$ .

62.  $y - 2 = 5(x + 8)$  (-8, 2),  $m = 5$

$$\begin{aligned} y - 2 &= 5(x + 8) \\ y - 2 &= 5x + 40 \end{aligned}$$

63. Which equation represents the line that passes through the point (-6, 2) and has a slope of -1.

A)  $y + 2 = -(x + 6)$

B)  $y + 2 = -(x - 6)$

C)  $y - 2 = -(x + 6)$

D)  $y + 1 = -2(x + 6)$

64. Which equation in standard form ( $Ax + By = C$ ) represents line that passes through the two given points

(3, 9), (1, 1).  $m = \frac{1 - 9}{1 - 3} = \frac{-8}{-2} = 4$   $y - 1 = 4(x - 1)$   $-4x + y = -3$

$$\begin{aligned} y - 1 &= 4x - 4 \\ y &= 4x - 3 \end{aligned}$$

$$\boxed{4x - y = 3}$$

65. Two lines are parallel if the slopes of the lines are the same, while two lines are

considered Perpendicular if the slopes are opposite Reciprocal

Tell whether the equations of the two lines below are parallel.

66. No  $y = 8x - 3$ ;  $8x + y = 3$   
 $y = -8x + 3$

67. NO  $2x + y = 5$ ;  $6y + 12x = 30$   
 $y = -2x + 5$   $6y = -2x + 30$   
 $y = -\frac{1}{3}x + 5$

Determine which lines, if any are parallel or perpendicular.

68. a)  $y = 4x - 2$  b)  $y = -\frac{1}{4}x$  c)  $y = -4x + 1$

(a) is perpendicular to (b)

69. a)  $y = \frac{3}{5}x + 1$  b)  $5y = 3x - 2$  c)  $10x - 6y = -4$   
 $y = \frac{3}{5}x - \frac{2}{5}$   $-6y = -10x - 4$   
 $y = \frac{5}{3}x + \frac{2}{3}$

(a) is parallel to (b)

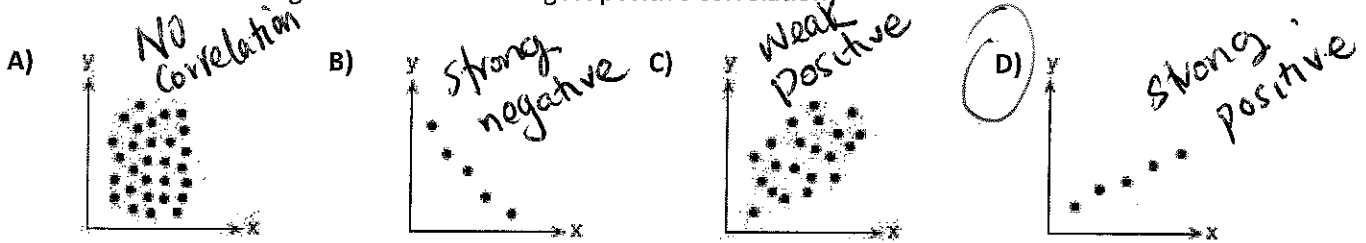
70. Write the equation of the line that is parallel to  $y = -\frac{4}{5}x + 7$  and passes through the point (10, -2).

$$y + 2 = -\frac{4}{5}(x - 10)$$

71. Write the equation of the line that is perpendicular to  $y = -\frac{4}{5}x + 7$  and passes through the point (-2, 10).

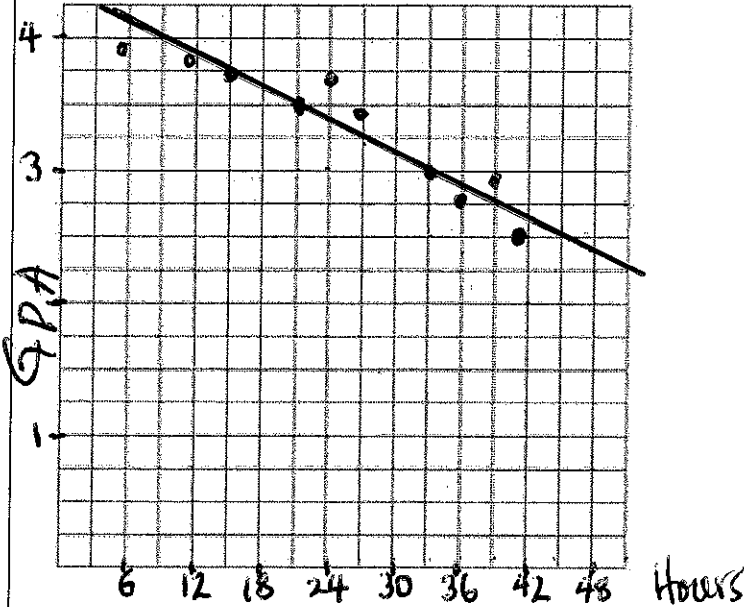
$$y - 10 = \frac{5}{4}(x + 2)$$

72. Which scatter diagram shows the strongest positive correlation?



73.

The following chart gives information on 10 high school students. The data shows how many hours per week each student watched and what their GPA is. Use the chart to answer questions a - e below.



Student	Hours per week watching tv	GPA
1	41	2.5
2	22	3.5
3	32	3.0
4	35	2.8
5	16	3.7
6	26	3.4
7	39	2.9
8	24	3.6
9	11	3.8
10	5	3.9

a) Create a scatter plot using the data in the chart above, and then draw the line of best fit.

b). Estimate the correlation coefficient, and use words to describe the direction and the strength.

$$y = -0.4x + 4.3 \quad -0.95$$

c) We used technology to find the equation of the line to be  $y = -0.05x + 4$ . Using the equation what GPA would you expect someone to have if they watched TV for 40 hours?

$$y = -0.4(40) + 4.3 = 2.7$$

d) In the equation what does the  $-0.4$  value for slope mean? What does the  $4.3$  value for y-intercept mean?

a) GPA decreases by 0.4 each hour of watching TV. b) If you watch NO TV your GPA would be 4.3

e) Describe the relationship (if any) between number of hours watching TV and GPA.

A strong negative correlation (relationship). 4.3

**Review Systems of Equations**

a) What does it mean to be a solution to a system of equations? How can you verify a solution to a system?

b) What does it mean when a system of equations has no solution? What does that look like graphically? algebraically?

c) Be prepared to solve a system of equations by graphing, substitution or elimination. See your systems review.