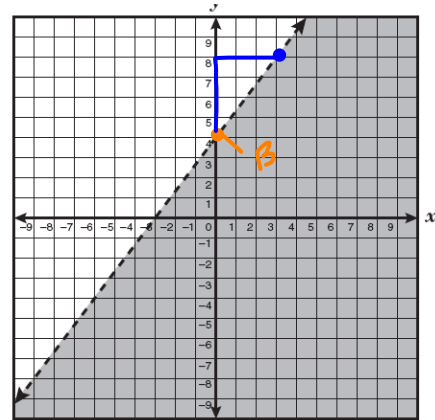Algebra 1 Fall Review 2013-2014

1. Write an inequality to best represent the graph shown at right. *(A.1.D.)*

m: $\frac{4}{3}$ b: 4

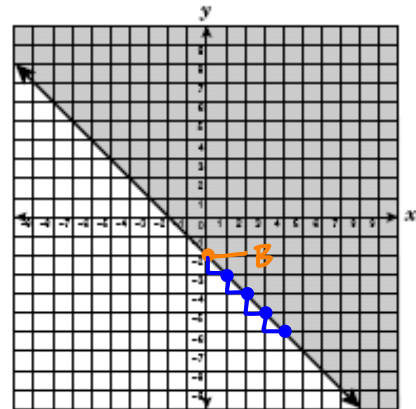inequality: $y < \frac{4}{3}x + 4$

dotted $\lessgtr$ below

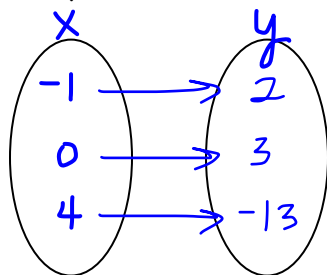2. Write an inequality to best describe the graph shown at right. *(A.1.D)*

m: $-\frac{1}{1}$ or -1 b: -2

inequality: $y \geq -x - 2$

solid $\gtreqless$ above

3. Draw a map to best represent the function $f(x) = -x^2 + 3$ when the x-values are {-1, 0, 4}. *(A.1.D.)*

X → Y

-1 → 2
0 → 3
4 → -13

Hint: Plug the equation into the calculator!

$-1(-1)^2 + 3$ $-1(0)^2 + 3$
$-1(1) + 3$ $-1(0) + 3$
$-1 + 3$ $0 + 3$
2 3

$-1(4)^2 + 3$
$-1(16) + 3$
$-16 + 3$
-13

4. Complete the table below by filling in the missing information *(A.1.D)*.

| List	Table	Mapping	Graph
{(-3, 5), (6, 8), (1,-4)} x y x y x y	X | Y -3 | 5 1 | -4 6 | 8	X → Y -3 → 5 1 → -4 6 → 8	(-3,5) (6,8) (1,-4)

5. The graph below best represents which of the following relationships between temperature and time? *(A.1.E)*

A Oven temperature while a cake is baking *constant*

B Temperature of water that is heated on a stove, removed, and then allowed to cool *increase → decrease to constant*

C Temperature of a container of hot tea after placing several cubes of ice in it *decrease to constant*

D Room temperature of a gym after the air conditioner is turned on *increase*

(handwritten on graph: peaks, increases, decreases to constant)

Temperature vs. Time
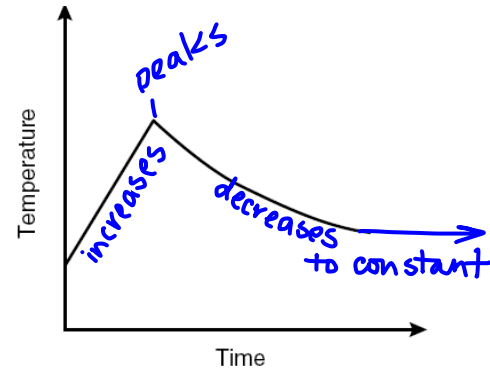
6. The graph below represents Lynne's car trip from her house to the mall and then back to her house. If each section of the graph represents part of Lynne's trip, which part of the trip took the *least* amount of time? *(A.1.E)*

Part Q only took 2 minutes

Lynne's Car Trip

Distance from Lynne's House (miles) vs. Time (minutes)

(points labeled: p, q, r, s, t)
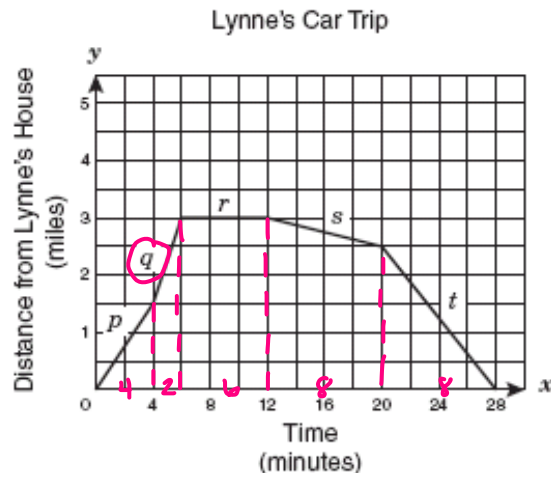
7. Gina did a research project on how age affects sleep patterns. She concluded that as people age, they sleep fewer hours until a point in adulthood when the number of hours remains constant. Gina also found that after the age of 70 the amount of time spent sleeping increases slightly. Which graph best shows Gina's results? *(A.1.E)* *The graph should decrease to a constant then increase*
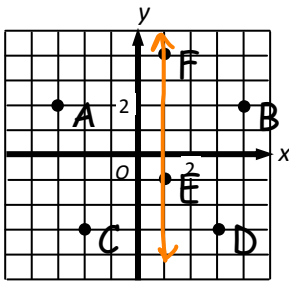
A

B

C

D

Amount of Sleep vs. Age (graphs A, B, C, D)
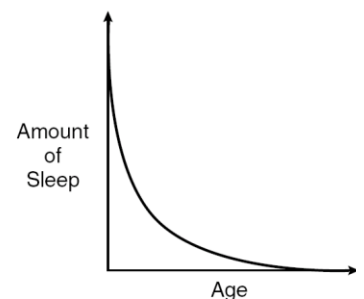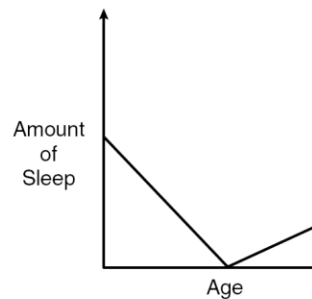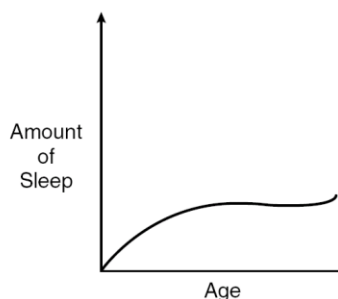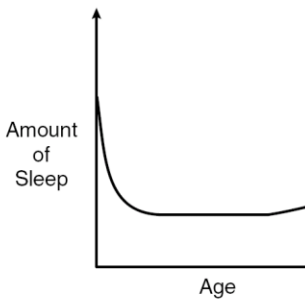
8. What point, when deleted from the coordinate grid, will result in a relationship that represents a function? *(A.1.E)*

F or E should be deleted

* To be a function no x can repeat — the line must pass the vertical line test!

9. The sales tax rate at a clothing store is 8.75%. <u>Sales tax</u> on an item is a function of its <u>price</u>. What are the independent and the dependent quantities in this function? *(A.1.A)*

Independent Variable: ___Price of the item___

Dependent Variable: ___Amount of sales tax on the item.___

10. Which of the following does not represent a function? *(A.1.B)*

A {(–6, 4), (3, –5), (0, –2), (–1, –1)}

B $y = 3x^2 - 2$

C

x	y
–2	15
6	9
–5	–10
–2	–6
3	4

D $y = \dfrac{4x - 3}{5}$

* x's cannot repeat!

11. Mitesh is *m* years old, and his brother Hiren is *h* years old. Write an inequality to best describe the statement; <u>Mitesh is</u> at least <u>three years</u> <u>older</u> than <u>Hiren</u>. *(A.1.C)*

greater than or equal to   add

$$M \geq 3 + H$$

12. Which of these are characteristics of the parent function of a linear equation? *(A.2.A)*

✓ I. The parent function of a linear equation has a y-intercept at 0.
✓ II. The parent function of a linear equation has a positive correlation.
✓ III. The parent function of a linear equation has a slope of 1.

A   I and II only
B   I and III only
C   II and III only
(D)   I, II, and III

Parent Function $y = 1x$
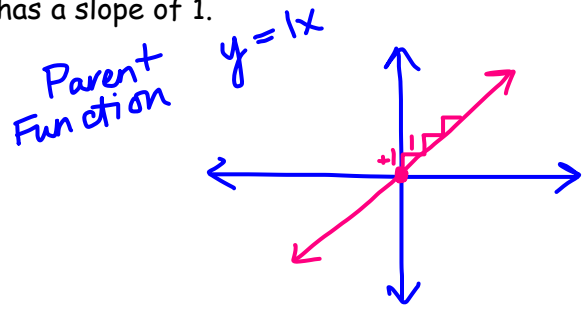
13. What is the domain and range of the function shown on the graph? *(A.2.B)*

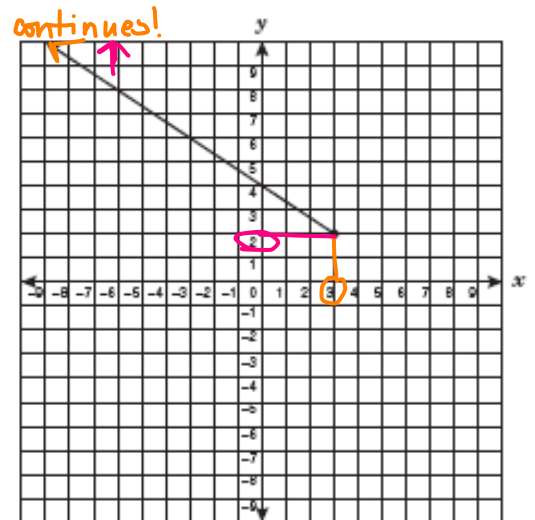x values   y-values

Domain: $3 < x < 3$

Range: $-5 \le y < 4$
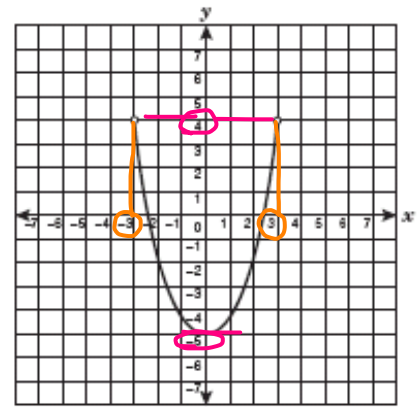
14. What is the domain and range of the function represented by this graph? *(A.2.B)*

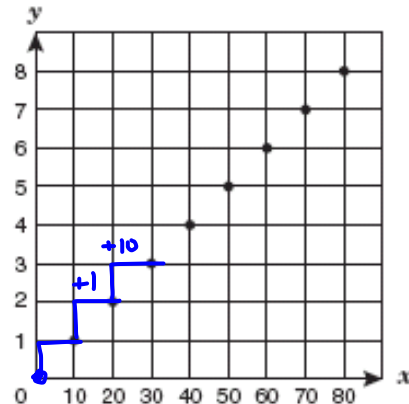x values   y values

continues!

Domain: $x \le 3$

Range: $2 \le y$ OR $y \ge 2$

15. Look at the graph below. Which is the best interpretation of this graph? *(A.2.C)*

A ~~Jorge earns $20 for each hour worked.~~
B For every 10 pieces of candy Stacey buys, she pays $1.
C ~~For every 10 students at a dance, 2 teachers are needed as chaperones.~~
D ~~A runner runs at a constant rate of 2 miles every 30 minutes.~~

slope: $\frac{1}{10}$

The energy output from a chemical reaction is dependent on the amount of chemicals used. The table shows this relationship. Use the table to answer questions 16 – 17.

16. What is a reasonable amount of energy output from the reaction of 32 moles of the chemicals? *(A.2.D.)*

$32 \times 4 = \boxed{128 \text{ joules}}$

Amount of Chemicals (moles)		Energy Output (joules)
5	× 4	20
8	× 4	32
12	× 4	48
15	× 4	60

17. What type of correlation does the data represent? *(A.2.D)*

<u>positive</u> – As the amount of moles increases, the amount of joules increases.

18. Ben left from college to come home for spring break. The graph below shows a portion of Ben's journey from college to his home. If Ben made no additional stops for the remainder of the trip, about how many hours did it take Ben to travel from college to his home? *(A.2.D)*

* Draw a line of best fit!

Between 5 and 6 hours

Distance from Home (miles)
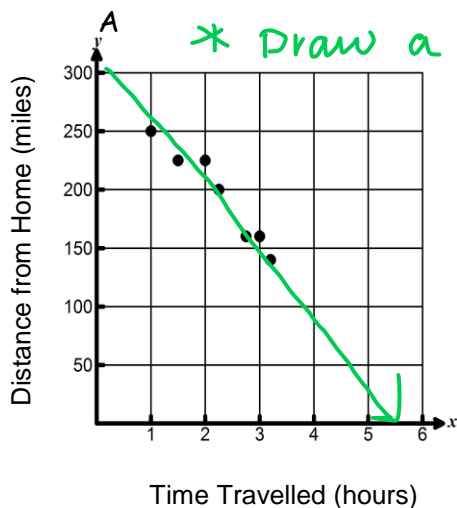
Time Travelled (hours)

19. Write an algebraic expression that is equivalent to the phrase "5 less than the <u>sum</u> of x and y is less than 5 more than x"? (A.3.A)

(-5) *(add)*
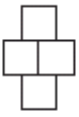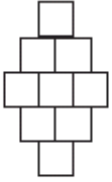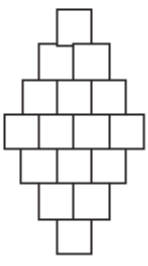
(<) *($5+x$)*

$$(x + y) - 5 < 5 + x$$

20. The blocks below are arranged in sequence to show a pattern.

Write an expression that can be used to determine the number of blocks at Stage *n*? (A.3.B)

start with a table!

Stage 1 Stage 2 Stage 3 Stage 4

Stage	block
1^2	1
2^2	4
3^2	9
4^2	16

Expression:

$$\boxed{B = s^2}$$

★ B = Block
S = stage

21. A function is described by the equation $y = 2x^2 - 5x - 3$, in which y is dependent on x. If a value for the independent variable is selected from the set $\{-4, -1, 0, 2, 5\}$, what would be the corresponding dependent values? (A.4.A) *★ Hint: plug into the calculator!*

$2(-4)^2 - 5(-4) - 3$
$2(16) + 20 - 3$
$32 + 20 - 3$
$52 - 3$
$\boxed{49}$

$2(-1)^2 - 5(-1) - 3$
$2(1) + 5 - 3$
$2 + 5 - 3$
$7 - 3$
$\boxed{4}$

$2(0)^2 - 5(0) - 3$
$2(0) - 0 - 3$
$0 - 0 - 3$
$0 - 3$
$\boxed{-3}$

$2(2)^2 - 5(2) - 3$
$2(4) - 10 - 3$
$8 - 10 - 3$
$-2 - 3$
$\boxed{-5}$

$2(5)^2 - 5(5) - 3$
$2(25) - 25 - 3$
$50 - 25 - 3$
$25 - 3$
$\boxed{22}$

y values
$\left[49, 4, -3, -5, 22\right]$

22. If $(-3.5, y)$ is a solution to the equation $2x - 5y = 10$, what is the value of y? (A.4.A)

x

$$2(-3.5) - 5y = 10$$
$$-7 - 5y = 10$$
$$+7 \qquad +7$$
$$\frac{-5y}{-5} = \frac{17}{-5}$$

$$\boxed{y = \frac{-17}{5}} \text{ or } -3.3\overline{9}$$

23. Simplify the algebraic expression $2(5x + 4) + 3x - (7 - x)$. (A.4.B)

$$2(5x + 4) + 3x - 1(7 - x)$$
$$10x + 8 + 3x - 7 + x$$

$$\boxed{14x + 1}$$

24. Given the function $f(x) = 3x^2 - 7$, what is the value of $f(-2)$? *(A.4.C)*

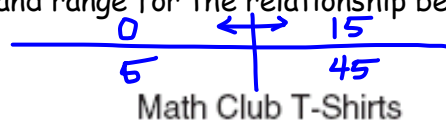$$f(-2) = 3(-2)^2 - 7$$
$$y = 3(4) - 7$$
$$y = 12 - 7$$
$$\boxed{y = 5}$$ ✗

25. Chanté bought a package of 36 tickets for carnival rides. Each ride requires 4 tickets per person. Write a linear function to represent the relationship between x, the number of carnival rides Chanté went on, and y, the number of tickets remaining? *(A.5.A)*

$$y = 36 - 4x$$
↑ starting amount
← 4 tickets per ride

26. A math club decided to buy T-shirts for its members. A clothing company quoted the following prices for the T-shirts. What would be a reasonable domain and range for the relationship between the total cost, c, and the number of T-shirts, s? *(A.5.B)*

$$0 \longleftrightarrow 15$$
$$5 \qquad 45$$

Domain: ___ $x \geq 0$ ___ you will buy 0 or more shirts.
# of shirts

Range: ___ $y \geq 15$ ___ starting cost
cost

Math Club T-Shirts

Number of T-Shirts	Total Cost (dollars)
10	75
15	105
20	135

) +30

27. What is the equation for the line graphed at right? *(A.5.C)*

$$M = \frac{3}{1} \text{ or } 3$$
$$B = -6$$
$$\boxed{y = 3x - 6}$$
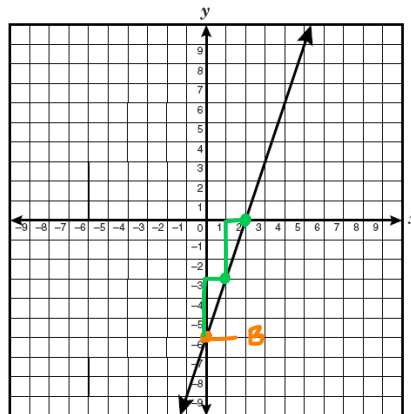
28. Which of the following is a correct description of the graph of the function $y = -2x - 7$? *(A.5.C)*
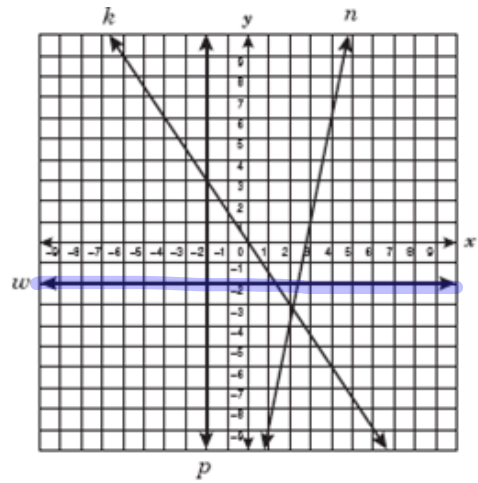
      m   *b*

    ✓ I.   The slope of the line is -2
    ✓ II.   The line passes through the points (-2, -3) and (1, -9)
    ~~III.   The line has a positive correlation~~   negative

A I only   **B** II and III only

C I, II, and III   (**D**) I and II only

**29.** Which line appears to have a slope of zero? *(A.6.A)*

Line W

---

30. The cost of renting a car for 1 day at Cars Plus is \$20 plus 10 cents per mile driven. The cost of renting a car for 1 day at Need-A-Car is \$20 plus 15 cents per mile driven. In a graph of the cost of a car rental, what does the cost per mile driven represent? *(A.6.B)*

Cars Plus: $y = 20 + .10x$
Need-A-Car: $y = 20 + .15x$

\$.10 and \$.15 are the m.
The _slope_ of the line.

---

31. Some employees of Ace Corporation left their office building and drove separately on the same road to a convention. The graph shows the distance traveled by each employee after 5 hours of nonstop driving at 4 different speeds. Which employee drove at the slowest rate to the convention? *(A.6.B)*

Ms. Ruiz is the slowest - her line is the least steep.

Trip to Convention
Ms. Woo
Mr. Hill
Mr. Able
Ms. Ruiz
Distance (miles)
Time (hours)
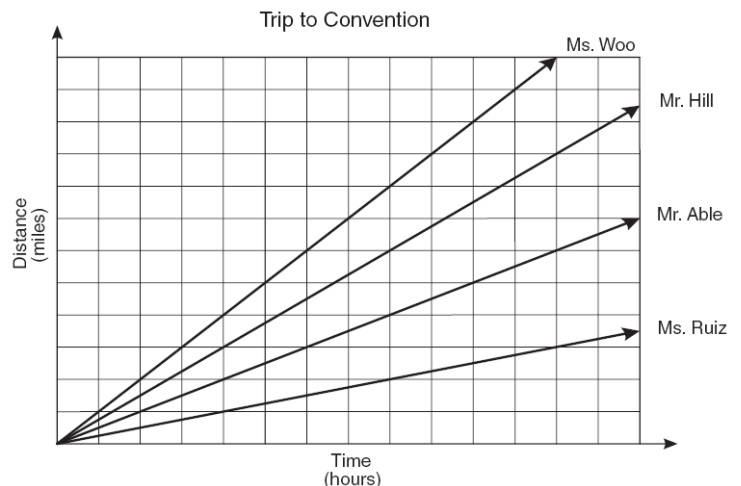
32. The graph shows the distance a certain motorbike can travel at a constant speed with respect to time. What is the slope representing this situation? *(A.6.B)*

$$\frac{5 \text{ miles}}{.5 \text{ hours}} \quad \text{or} \quad \boxed{10 \text{ mph}}$$

Motorbike
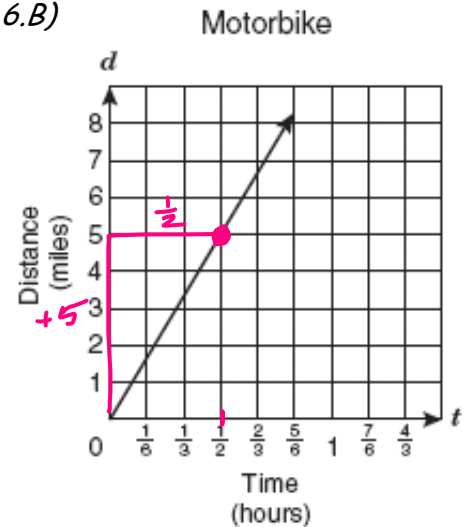
33. What will happen to the slope of line *p* if the line is shifted so that the *y*-intercept increases and the *x*-intercept remains the same? *(A.6.C)*

The line will become **steeper**.
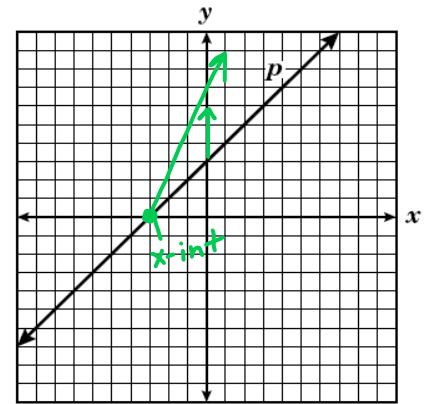
34. If the slope of the function $y = -3.5x + 12.8$ is changed to 1.5, which of the following best describes the graph of the new function? *(A.6.C)*

$$y = 1.5x + 12.8$$

✓ I. The graph of the new function intercepts the *y*-axis at the same point as the original function.

~~II. The graph of the new function intercepts the *x*-axis at the same point as the original function.~~

~~III. The graph of the new function has a negative slope.~~

✓ IV. The graph of the new function has a positive *x*-intercept.

A IV only

B II and IV only

C I and IV only

D II and III only

35. Write the linear equation that represents the line passing through points R and S? *(A.6.D)*
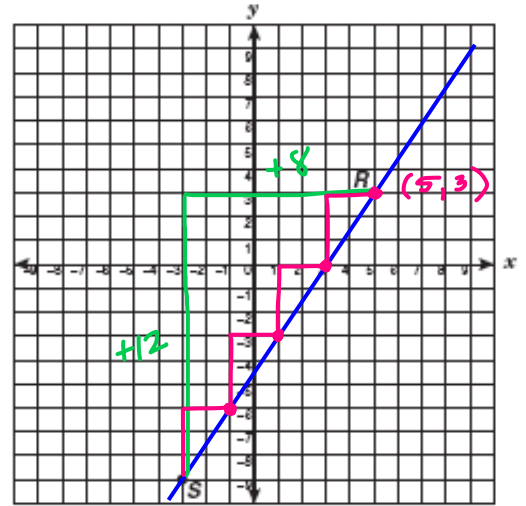
$$M = \frac{12}{8} = \frac{3}{2}$$

$$R\ (5, 3) \quad \overset{x\ y}{}$$

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

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

$$y - 3 = \frac{3}{2}x - \frac{15}{2} \qquad -\frac{15}{2} + \frac{6}{2}$$
$$+3 \qquad\qquad +3$$

$$y = \frac{3}{2}x - \frac{9}{2}$$

$$\boxed{y = \frac{3}{2}x - \frac{9}{2}}$$
OR
$$\boxed{y = \frac{3}{2}x - 4.5}$$

36. Write an equation that describes the line containing the points $(0, 4)$ and $(3, -2)$? *(A.6.D)*

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 4}{3 - 0} = -\frac{6}{3} = \boxed{-2}$$

$$y - y_1 = m(x - x_1)$$
$$y - 4 = -2(x - 0)$$
$$y - 4 = -2x + 0$$
$$+4 \qquad\qquad +4$$
$$y = -2x + 4$$

$$\boxed{y = -2x + 4}$$

37. What is the y-intercept of the function $f(x) = 3(x - 2)$? *(A.6.E)*

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

y-intercept
-6

$$y = 3x - 6$$

38. Find the x- and y-intercepts of $-4x + 7y = -28$. *(A.6.E)*

x-intercept : $(7, 0)$

y-intercept : $(0, -4)$

$$-4x + 7y = -28$$
$$+4x \qquad\qquad +4x$$
$$\frac{7y}{7} = \frac{4x}{7} - \frac{28}{7}$$
$$\boxed{y = \frac{4}{7}x - 4}$$

39. Kirk repairs computers. He charges an hourly rate plus a base fee for his services. The table below shows the relationship between h, the number of hours of labor, and c, the total cost for Kirk's services. If Kirk decides to keep his base fee the same, how would his hourly rate change if the new total cost for 8 hours of work is $157? *(A.6.F)*

(handwritten: X above total cost, Y above $157)

Base Rate, y-int = (0, $45)

Hours, h	Total Cost, c
1	$57
2	$69
4	$93
6	$117

(handwritten:) +12)

(handwritten work:)
$M = \$14\ hr$
$B = 45$

His hourly rate increases by $2

$y = mx + b$
$157 = m(8) + 45$
$-45 \qquad -45$
$\dfrac{112}{8} = \dfrac{m(8)}{8}$
$14 = m$

40. The amount an appliance repairman charges for each job is represented by the function $T = 25h + 50$, where h represents the number of hours he spent on the job and T represents the total amount he charges in dollars for the job. The repairman plans to change the amount he charges for each job. How would the rate change if the new total cost for 3 hours of work is $155? *(A.6.F)*

(handwritten: X above hours, Y above $155)

$M = 25$ $M = 35$
$B = 50$ $B = 50$
OLD NEW

His rate would increase $10 per hour

$y = mx + b$
$155 = m(3) + 50$
$155 = m(3) + 50$
$-50 \qquad\qquad -50$
$\dfrac{105}{3} = \dfrac{m(3)}{3}$
$35 = m$

41. The amount of chlorine, y, needed for a swimming pool varies directly with the amount of water, x, needed to fill the pool. If 16 units of chlorine are needed for every 1250 gallons of water, write an equation to represent the direct variation? *(A.6.G)*

(handwritten: X above 16, Y above 1250)

$\dfrac{1250}{16} = 78.125$ units per gallon

$y = 78.125x$

42. The amount of money Kate earns, A, varies directly with the number of cars she washes, c. Kate earned $120 for 12 cars she washed. If the amount Kate earns varies directly with the number of cars she washed, how much will she earn for 5 cars? *(A.6.G)*

she would earn $50.

$\dfrac{120}{12} \cancel{\times} \dfrac{x}{5}$

$120(5) = 12x$
$\dfrac{600}{12} = \dfrac{12x}{12}$ $x = 50$

43. A weather balloon is launched from a height of 475 feet above sea level. If the balloon rises at a constant rate of 85 feet per minute, write an equation that could be used to determine t, the time in minutes it will take the balloon to reach a height of 9245 feet above sea level? *(A.7.A)*

$9245 = 475 + 85x$

44. Brandon has a budget of $58 to spend on clothes. The shirts he wants to buy are on sale for $9 each, and the pair of pants he wants costs $21. All prices include tax. Write an inequality which could be used to determine s, the maximum number of shirts Brandon can buy if he also buys the pair of pants? *(A.7.A)*
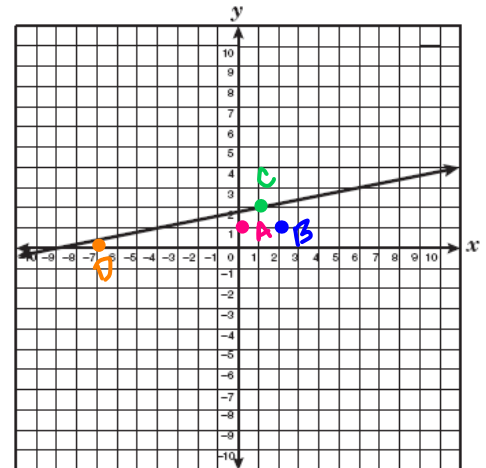
$$58 \le 21 + 9s$$

45. Use the grid to graph $y \ge x - 2$. Determine whether or not the coordinate point represents a solution of this inequality. *(A.7.B)*

I.   Point A (4, 0)   __NO__

II. Point B (-3, -5)   __YES__

III. Point C (7, 9)   __YES__

IV. Point D (-2, 3)   __YES__
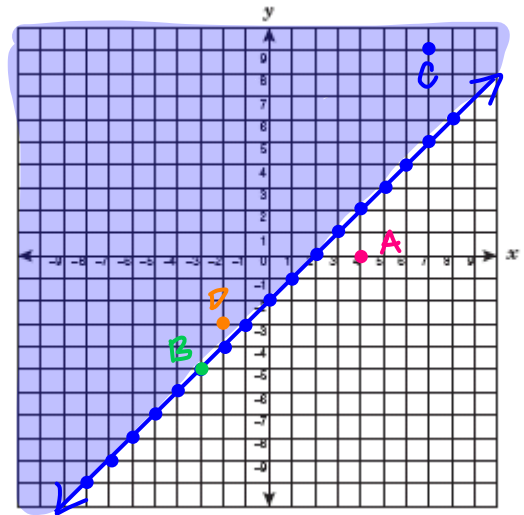
46. The graph of $-x + 5y = 9$ is shown below. Which point represents a solution to this equation? *(A.7.B)*

A   (0, 1)

B   (2, 1)

C   (1, 2)

D   (-7, 0)

47. What is the value of y if (3, y) is a solution to the equation $5x - 3y = 18$? *(A.7.B)*

$$5(3) - 3y = 18$$
$$15 - 3y = 18$$
$$\underline{-15 \qquad\quad -15}$$
$$\frac{-3y}{-3} = \frac{3}{-3}$$
$$y = -1$$

$$\boxed{y = -1}$$

48. A recycling center pays $0.35 per pound of glass that it receives. If students at Falcon High School want to raise $500 in a glass-recycling project, what is a reasonable number of pounds of glass they must collect? *(A.7.C)*

$$\frac{500}{.35} \le \frac{.35x}{.35}$$

$$1428.57 \le x$$

more than 1,428 lbs

49. In 1998 the enrollment at a community college was approximately 2500 students. In 2002 the enrollment had increased to 3250 students. If the enrollment continues to increase at this rate, what is a reasonable projection of enrollment for 2010? *(A.7.C)*

year	pop.
1998	2500
2002	3250
2010	4750

+4
+12
+750

$$\frac{750 \text{ people}}{4 \text{ years}} = 187.5 \text{ per year}$$

$$y = 187.5x + 2500$$
$$y = 187.5(12) + 2500$$
$$y = 2250 + 2500$$
$$y = 4750 \text{ people}$$

The population would be around 4,750

50. Josh earns money by washing cars in his neighborhood. He spent $215 on supplies and charges $15 for each car washed. Josh's profit, *p*, can be represented by the function $p = 15n - 215$, where *n* represents the number of cars that Josh washes. What is the minimum number of cars Josh must wash to make a profit? *(A.7.C)*

profit ≥ 1

$$1 \le 15n - 215$$
$$+215 \qquad\qquad +215$$
$$\frac{216}{15} \le \frac{15n}{15}$$
$$14.4 \le n$$

He would have to wash more than 15 cars