Algebra Semester 1 Review: Part 1 **Name**_____

In order to earn full credit, ALL WORK must be shown on ALL problems.

1.) A shipping service charges a $4.00 flat rate delivery fee and $0.29 for each ounce a package weighs. Write an equation to represent the price *P* of shipping a package that weighs *x* ounces.

2.) A store that sells gift baskets is having a promotional sale. Customers can make their own fruit baskets to use as gifts. Customers pay $3.00 for a basket and add $0.20 per pound for all types of fruit. The cost for a basket containing *p* pounds of fruit is $4.30. Which equation could be used to find *p*, the number of pounds of fruit in this basket?

A.) $3.00 + 0.20p = 4.30$ B.) $(0.20 + 4.30)p = 3.00$

C.) $3.00(4.30 + p) = 3.00$ D.) $0.20 + 3.00p = 4.30$

3.) Write an equation equivalent to the verbal statement: "three times the sum of a number *n* and 7 is 16."

4.) Bill wants to simplify the following expression: $5(3x – 2y) + 2(x + 2y) – 3(3x – 2y)$
Which of the following expressions is equivalent to the expression above?

A.) $8x$ B.) $8x – 12y$ C.) $8xy$ D.) $8x – 8y$

5.) A college student has set aside $240 for the rest of the school year to use the coin-operated laundry facility in his dormitory. Each time he uses the machines, it costs $7.50. Choose the equation that represents the amount remaining in his fund, *f*, after he has done laundry *x* times. Find the amount remaining in the fund after 12 trips to the laundry facility.

A.) $f(x) = 240 – 7.50x$; $90.00 B.) $f(x) = 240 – 7.50x$; $150.00

C.) $f(x) = 7.50 – 240x$; $150.00 D.) $f(x) = 7.50 – 240x$; $90.00

6.) The temperature was $x°$ F. It rose 15° F and is now 39° F.
Write and solve an equation to find the original temperature.

7.) You are going to varnish a floor that is 9 yards by 21 yards. One pint of varnish covers 23 yd^2 of space. How many pints of varnish do you need?

8.) John works as a salesman for a cellular telephone service. He is paid $250 per week plus $15 for each contract a customer signs. He needs to earn at least $450 per week in order to meet his living expenses. What is the fewest number of contracts he needs to sell each week to meet his living expenses?

9.) Michelle wants to earn $900 selling 22 knit scarves. She wants to sell each scarf for $4 less than her competitor. If x is the price charged by her competitor, which equation models the situation?

A.) $2(22) + 2x = 900$ B.) $22x = 900$ C.) $22(x - 4) = 900$ D.) $22 + 4x = 900$

10.) A rental car agency charges a $14 rental fee plus $0.14 per mile to rent a certain car. Another agency charges a $18 rental fee plus $0.07 per mile to rent the same type of car. How many miles per day will have to be driven for the cost of a car from the first agency to equal the cost of a car from the second agency?

11.) Solve the equation.

a.) $\frac{4}{10}y + 28 = 0$ b.) $\frac{x}{2} + \frac{x}{4} = 5$ c.) $7n + 23 + 5n = 59$

d.) $\frac{25x}{5} - 7x = 12$ e.) $\frac{1}{4}(y + 3) = 7$ f.) $5n - 2(n - 2) = -11$

11.) Solve the equation.

g.) $3-4z=-5+8z$ h.) $3x-3=x+4$ i.) $5x+14-2x=9-(4x+2)$

12.) The clearing house has resistors that sell for \$3.50 each and circuit boards that sell for \$2.25 each. Write an inequality that represents how many of each type of electronic equipment can be bought with at most \$7.

13.) Madison solved the following equation: $\frac{2}{5}(2x-5)=6$.

As a first step, she rewrote the equation as $2x-5=15$

a.) By what number did Madison multiply both sides of the equation? Why did she choose this number?

b.) What is the solution of the equation?

14.) Solve $y = \frac{5}{8}b + 10$ for b.

For problems 15-20, Solve each absolute value equation, if possible.

15.) $|x| = 6.5$ 16.) $|x-3|-4=7$

For problems 15-20, Solve each absolute value equation, if possible.

17.) $4|3x - 1| = 12$

18.) $\frac{1}{4}|2x - 6| + 1 = 9$

19.) $|2x + 1| = |4x - 7|$

20.) $-\frac{1}{5}|1 + 13x| = 7$

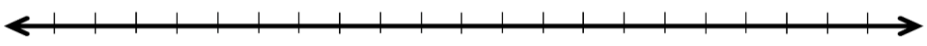
21.) The average price of the brand of toothpaste that you buy is \$2.69 for an 13.4-ounce tube. Depending on where you shop, the prices vary by as much as \$0.18.

a.) Write an absolute value equation that represents the minimum and maximum prices of the tooth paste.

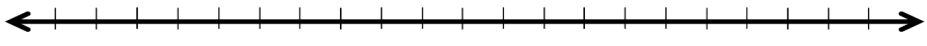
b.) Find the minimum and maximum prices of the toothpaste.

For problems 22-31, Solve and graph the inequality.

22.) $3x - 4 \leq 7$



23.) $4x - 9 - 10x < 9$

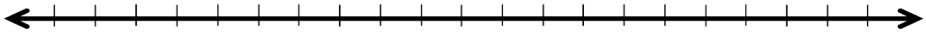


24.) $3(x + 7) \geq 15$

25.) $x + 3 \geq 4$ or $-2x \geq 10$

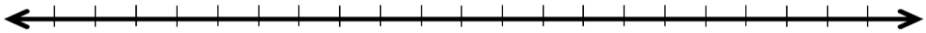
26.) $3x - 4 > 2$ or $8x - 5 \leq 6x + 1$

27.) $22 > 6x - 2 \geq 4$



28.) $|y - 3| > 10$

29.) $|2z + 1| \leq 3$



30.) $4|x-8| \geq 24$

31.) $3|2x-5|-7 < 8$

Algebra Semester 1 Review: Part 2 **Name**_____

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32.) Determine whether the relation is a function. **Explain why or why not.**

a.)

Input, *x*	8	4	2	4	8
Output, *y*	−4	−2	0	2	4

b.) (1, –2), (2, 1), (3, 6), (4, 13), (5, 22)

33.) Does the following data represent wind speed as a function of lift? **Explain why or why not.**

Wind speed (mi/h)	10	20	30	40
Lift (ft/s)	4.6	22	40	32

34.) Which of the functions represents the input-output table? **Explain.**

a.)

Functions
$y = 2x - 3$
$y = 2x + 3$
$y = 2x - 4$
$y = 3x + 3$

b.)

Input	Output
0	3
1	5
2	7
3	9

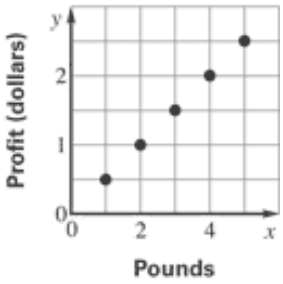
35.) Find the domain and range of the function.

Input	Output
1	11
9	6
4	5

Domain: _____ Range: _____

36.) List a value of *x* so that the relation is **not** a function. {(6, 2), (5, 3), (1, 0), (***x*** , 4)}

37.) Heather is selling fruit as a fundraiser for the soccer team. She has sold 5 pounds so far. The graph shows the profit related to the amount of fruit sold.



a.) Write a function rule for the graph. Use the function rule to find the profit if Heather sells a total of 30 pounds of fruit.

b.) Another student claims that Heather must sell 5 pounds of fruit to make a profit of $2. Is this true? Why or why not?

c.) Is the function shown in the graph discrete or continuous? **Explain.**

d.) Describe the domain and range of the function.

Domain: _____

Range: _____

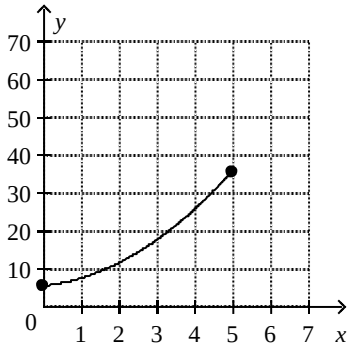
38.) Find the value of x so that $f(x) = 13$.

$f(x) = x - 10$

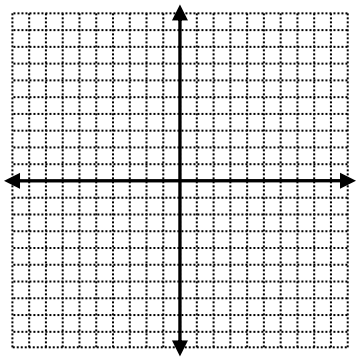
39.) Describe the domain and range of the function in the graph below.

Domain: _____

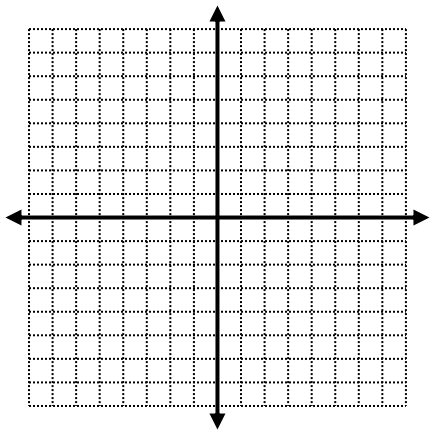
Range: _____



40.) Graph the equation $x = -5$.



41.) Sketch the graphs of $x = -2$ and $y = -4$.
Find the point at which the two graphs intersect.

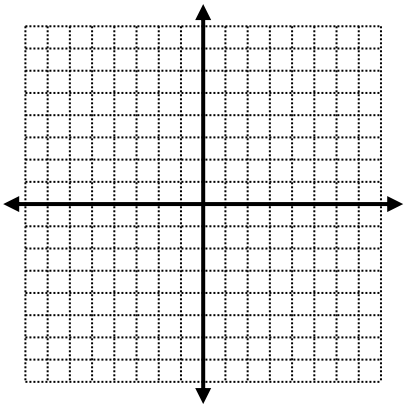


42.) Find the slope of the line that contains the points (–8, 2) and (7, –4).

43.) Find the slope of the line passing through the points (8, 1) and (–3, –6).

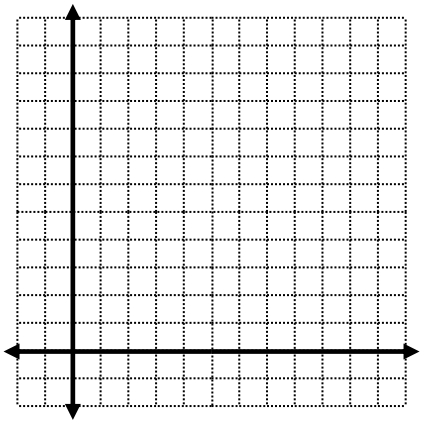
44.) Explain the difference between positive slope and negative slope.

45.) Graph the function $g(x) = \frac{3}{4}x$.



46.) A monthly phone bill, *b(m)*, consists of a $28 service fee plus $0.13 per minute, *m*, of long distance calls, given by the function *b(m)* = 28 + 0.13*m*.

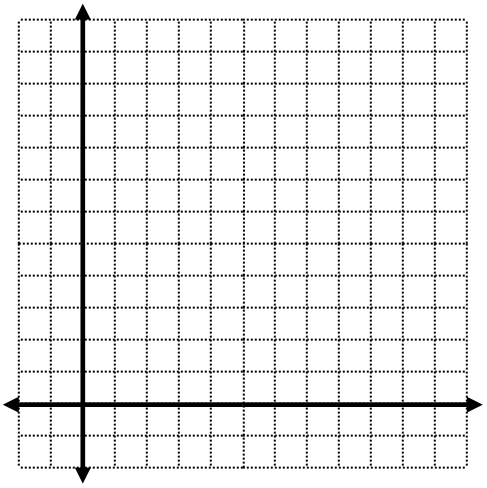
Draw a graph for up to and including 120 minutes of long distance calls made in a month. Estimate the bill if 84 minutes of long distance calls are made.



47.) When Aidan had his picture taken, the photographer charged a $10 sitting fee and $6 for each sheet of pictures purchased.

a.) Write the function for the situation, where *x* is the number of sheets purchased.

b.) Graph this function.



48.) Choose an equation, in slope-intercept form, of a line with a slope 7 and a *y*-intercept of –9.

A.) $y = 7x - 9$ B.) $y = 7x + 9$ C.) $x = 7y - 9$ D.) $y = \frac{1}{7}x - 9$

49.) The cost of a school banquet is \$95 plus \$15 for each person attending. Write an equation that gives total cost as a function of the number of people attending. What is the cost for 77 people?

A.) $y = 16x - 95$; \$1060

B.) $y = 95x + 15$; \$7330

C.) $y = 15x + 95$; \$1250

D.) $y = 95x + 15$; \$7300

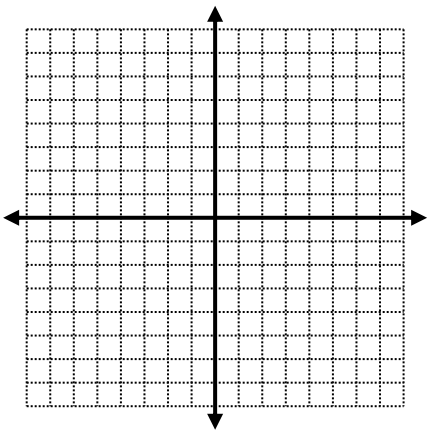
50.) Write an equation of the line in slope-intercept form with slope $\frac{1}{3}$ and y-intercept –4.

51.) Write an equation of the line in slope-intercept form that passes through the point (–7, –6) with slope $m = 4$.

52.) Find the x- and y- intercepts of the graph of $3x + 6y = 24$

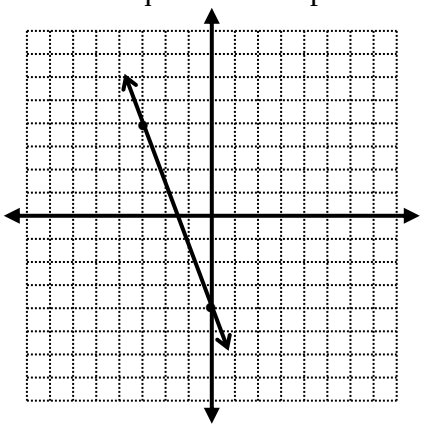
53.) Find the x- and y- intercepts of the graph of $-4x + 8y = -16$.

54.) Sketch the line given by $3x - 4y = -12$ by finding the x - and y -intercepts.

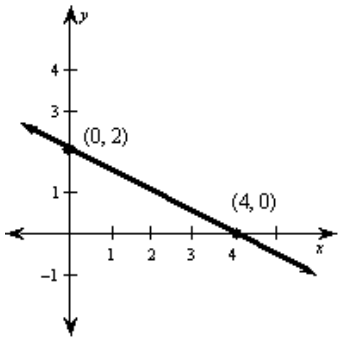


55.) Write the equation in slope-intercept form of the line that passes through the points (7, –1) and (2, 9).

56.) Write an equation in slope intercept form of the line shown below



57.) Write an equation in slope intercept form of the line shown below.



58.) Write an equation for the function in the form, $f(x) = mx + b$.

$f(-4) = -33,\ f(0) = -5$

59.) Write an equation, in point-slope form, of the line that passes through the point (6, –5) and has the slope $\frac{1}{2}$.

60.) Write an equation in point-slope form of the line that passes through the points (–5, –4) and (6, 3).

A.) $y+4=\frac{7}{11}(x+5)$ B.) $y+4=\frac{11}{7}(x+5)$

C.) $y+5=\frac{7}{11}(x+4)$ D.) $y+5=\frac{11}{7}(x+4)$

61.) Write an equation in point-slope form of the line that passes through the points (–2, –5) and (–6, 4).

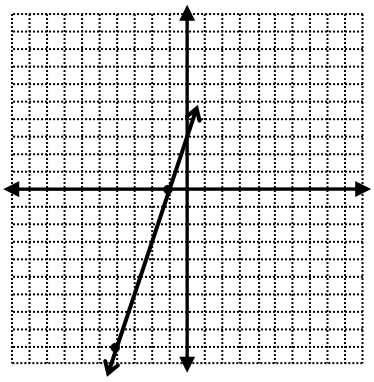
62.) Write the equation of the horizontal line passing through the point (7, 4).

63.) Write the equation of the vertical line passing through the point (–5, 2).

64.) Write an equation of the line with undefined slope that passes through the point (8, –1).

65.) Write an equation of the line that passes through (–18, –4) and is parallel to the line $y=\frac{1}{3}x+3$.

66.) Which of the following lines is NOT parallel to the line shown in the graph?



A.) $3x+y=3$ B.) $y-3x=9$

C.) $-12x+4y=9$ D.) $3x-y=3$

67.) Find the slope and *y*-intercept of the line $y = -\frac{1}{6}x + 6$. Is the line parallel to $y = -6x + 6$?

68.) Write an equation of the line that passes through (4, 0) and is perpendicular to the line $y = \frac{1}{5}x + 1$.

69.) The graph for a stable that charges a $20 flat fee plus $10 per hour for horseback riding is shown. How will the graph change if the stable changes its charges to a flat fee of $30 plus $15 per hour?

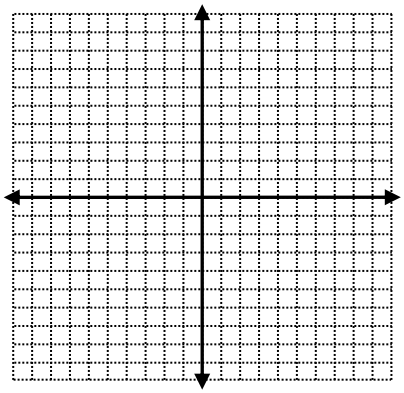
70.) Describe all transformations from the graph of $f(x) = |x|$ to the graph of the given function.

a.) $g(x) = \frac{1}{2}|x - 3| + 2$

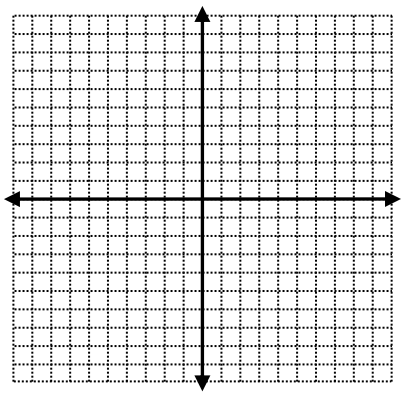
b.) $h(x) = -2|x| - 1$

71.) Graph the function

a.) $y = 2|x + 1| - 3$



b.) $f(x) = -\frac{2}{3}|x - 3|$



Algebra Semester 1 Review: Part 3 **Name**_____

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72.) Use the function $h(x)$ to answer the following questions.

$$h(x) = \begin{cases} -x - 1, & if\ x < -2 \\ x, & if\ -2 \le x < 1 \\ \frac{2}{3}x + 2, & if\ x \ge 1 \end{cases}$$

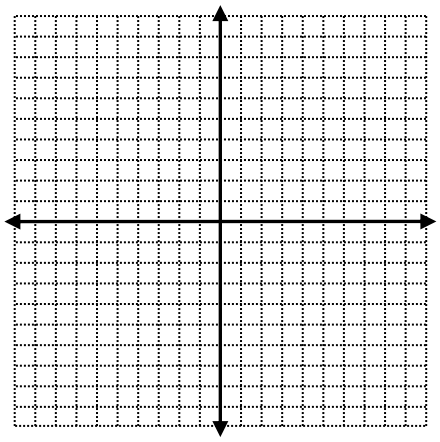
a.) $h(-5)$ b.) $h(-2)$ c.) $h(6)$

73.) Graph the function and describe the domain and range.

$$f(x) = \begin{cases} -x - 2, & x \le 1 \\ x + 1, & x > 1 \end{cases}$$

Domain: _____

Range: _____



74.) Mr. Frankel bought 7 tickets to a puppet show and spent $43. He bought a combination of child tickets for $4 each and adult tickets for $9 each. Which system of equations below will determine the number of adult tickets "*a*" and the number of child tickets "*c*" he bought?

A.) $\begin{cases} a = c - 9 \\ 9a + 4c = 43 \end{cases}$ B.) $\begin{cases} 9a + 4c = 43 \\ a + c = 7 \end{cases}$ C.) $\begin{cases} a + c = 7 \\ a + c = 301 \end{cases}$ D.) $\begin{cases} 4a + 4c = 50 \\ a + c = 7 \end{cases}$

75.) The length of a rectangle is 8 cm more than four times the width. If the perimeter of the rectangle is 46 cm, what are the dimensions?
Express the problem as a system of linear equations and solve using the method of your choice.

76.) Use the substitution method to solve the system of equations. $\begin{cases} x + 4y = -1 \\ 2x - y = 7 \end{cases}$

77.) Solve the system of equations using the elimination method. $\begin{cases} 3x + 6y = 9 \\ x - 6y = 11 \end{cases}$

78.) Solve the linear system by any method.

a.) $\begin{cases} x - y = 1 \\ x + y = 3 \end{cases}$ b.) $\begin{cases} y = \frac{2}{3}x + 2 \\ y = -x - 3 \end{cases}$ c.) $\begin{cases} 5x + 2y = 32 \\ x - 4 = 2y \end{cases}$

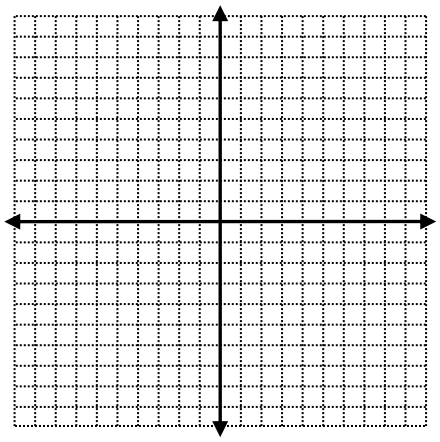
79.) Solve the system for the value of *x*. $\begin{cases} x + y = 0 \\ 2x - y = -9 \end{cases}$

80.) A rental car agency charges a $15 rental fee plus 11 cents per mile to rent a certain car. Another agency charges an $18 rental fee plus 8 cents per mile to rent the same car. How many miles will have to be driven for the cost of a car from the first agency to equal the cost of a car from the second agency?
Express the problem as a system of linear equations and solve using the method of your choice.

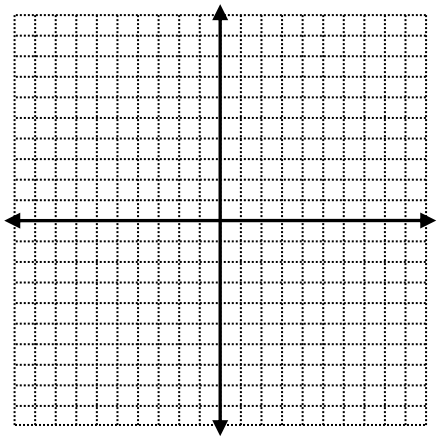
81.) The sum of the ages of Petra and her mother is 53. Her mother is 11 years more than twice as old as Petra. How old are Petra and her mother?
Express the problem as a system of linear equations and solve using the method of your choice.

82.) Graph the inequalities.

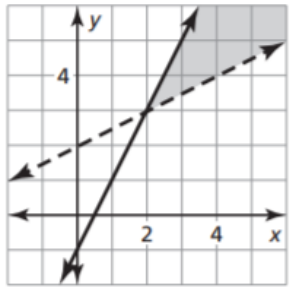
a.) $x \leq -7$



b.) $y < \frac{3}{7}x - 2$

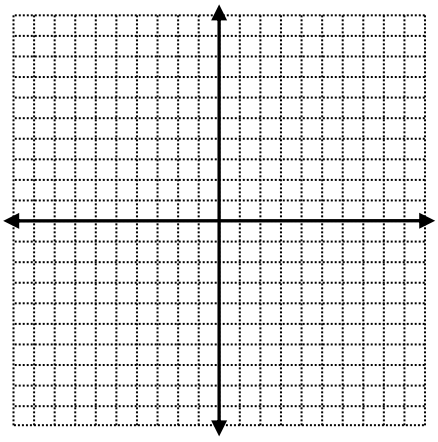


83.) Write a system of linear inequalities represented by the graph.



84.) Graph the linear system of inequalities.

$$\begin{cases} y < \frac{-1}{2}x + 5 \\ y \geq 3x - 1 \end{cases}$$

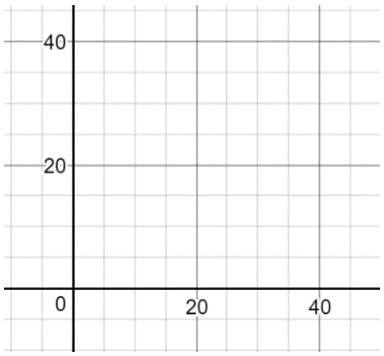


85.) You can spend at most \$60 on beads. A bag containing red beads costs \$2 per bag. A bag containing blue beads costs \$3 per bag. You need more bags of blue heads than bags of red beads.

a.) Write and graph a system of linear inequalities that represents the situation.

b.) Identify and interpret a solution of the system.

c.) Use the graph to determine whether you can buy 9 more bags of blue beads than bags of red beads.



86.) Simplify the following using properties of exponents.

a.) $8^1 \cdot 8^6$ b.) $r^4 \cdot r^5 \cdot r^6$ c.) $(-3c^4) \cdot (2c^3d^6)$ d.) $(x^2)^5$

e.) $(2qr^5)^3(qr)^6$ f.) $(3x^4y^2)^3$ g.) $(-4 \cdot 3)^2$ h.) $\left(\frac{x^3}{y^8}\right)^2$

i.) $\frac{5^4 \cdot 5^5}{5^6}$ j.) $\frac{1}{x^{-2}y^{-4}}$ k.) $(-2)^0(3x^{-2}y^{-2})^{-1}$ l.) $\frac{7^4}{7^6}$

87.) Rewrite the expression in rational exponent form.

a.) $\sqrt[4]{13}$ b.) $\left(\sqrt[5]{110}\right)^{7}$

88.) Rewrite the expression in radical form.

a.) $(-34)^{4/9}$ b.) $41^{7/4}$

89.) Evaluate the following.

a.) $\sqrt[3]{27}$ b.) $\sqrt[4]{256}$ c.) $9^{3/2}$ d.) $49^{1/2}$