Name _____ Algebra 1 Final

Review 1

Seeing Structure in Expressions A-SSE.1, A-SSE.2

1. The "Bulbs on the Bay" Holiday drive-through attraction charges $12 per car plus $1 for every individual, (p), in the car. Which choice represents the total cost (c) per car?

(1) $c = p + 12$

(2) $c = 12(p + 1)$

(3) $c = 12p + 1$

(4) $c = 1 \bullet (12p)$

2. In the expression $5x^3 - 4x^2 + 2x + 3$, what is the coefficient of the cubic term?

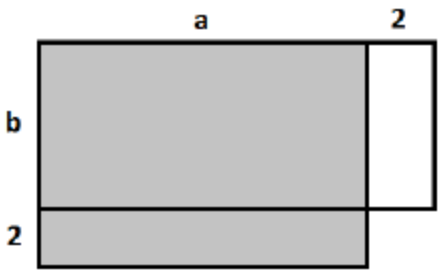
(1) –4 (2) –3

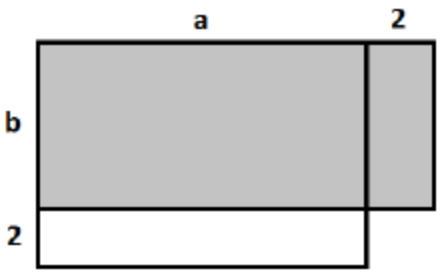
(3) 2 (4) 5

3. Maria thinks $(a + b)^2 = a^2 + b^2$. Is she correct? Justify your reasoning.

4. Use the distributive property to write an expression equivalent to $(x + y + 3)(y + 1)$.

5. Given that $a > b$, which of the shaded regions is larger. Justify your reasoning.


a
2
b
2


a
2
b
2

6. Write a mathematical proof of the algebraic equivalence of $(pq)r$ and $(qr)p$.

7. Express the total weight, (p), of a filled watering pail, if the pail weighs 12 pounds and the water weighs 8.3 pounds per gallon? Let g represent the total number of gallons.

(1) $p = (8.3)(12)$

(2) $8.3g + 12$

(3) $8.3g - 12$

(4) $p = 12g + 8.3$

8. Assume b represents the number of boys and g represents the number of girls in a classroom. We know that there is at least one boy and one girl, and there are more girls than boys. Which expression would have a larger value?

(1) $\frac{g-b}{2}$

(2) $\frac{g+b}{2}$

(3) There is not enough information.

(4) Both expressions are equal

9. Factor: $m^2 - 12m + 36$

10. Factor: $x^2 - 2x - 15$

11. The expression of $64 - x^4$ is equivalent to which other expression?

(1) $(8 - x^2)(8 - x^2)$

(2) $(8 - x^2)(8 + x^2)$

(3) $(x^2 - 8)(x^2 - 8)$

(4) $(x^2 - 8)(x^2 + 8)$

12. $6x^2 - 5x - 4$ is equivalent to:

(1) $(6x - 1)(x + 4)$

(2) $(3x - 1)(2x - 4)$

(3) $(x - 1)(6x - 4)$

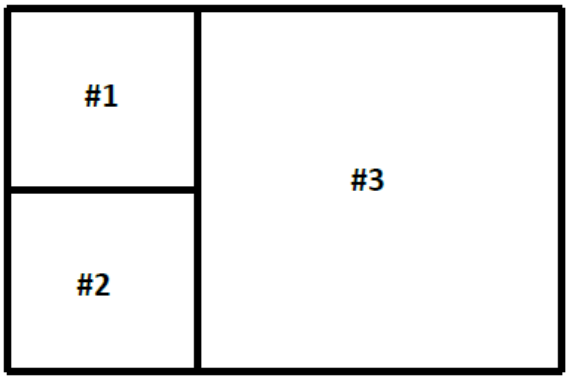
(4) $(2x + 1)(3x - 4)$

Name _____ Algebra 1 Final Review 2

Arithmetic with Polynomials A-APR.1

1. A rectangle with positive area has length represented by the expression $3x^2 + 2x - 4$ and width by $x^2 + 1$. Write expressions in terms of x for the perimeter and area of the rectangle. Give your answers in standard polynomial form and show your work.

2. The figure below is divided into three squares and the area of square #1 is equal to the area of square #2. If the area of square #1 is represented by the expression $x^2 + 4x + 4$. Determine the area of square #3.



3. What is the sum of $3a^2 + 4a - 2$ and $a^2 - 5a + 3$?

4. Simplify the expression $(3x^2 + 2xy + 7) - (6x^2 - 4xy + 3)$

5. Determine the result when $3m^2 - 2m + 5$ is subtracted from $m^2 + m - 1$?

6. Given the polynomials P(x) and Q(x) below

   $P(x) = x^3 + 3x^2 - 1$
   $Q(x) = -2x^2 - x + 4$

   R(x) = P(x) + Q(x) is equivalent to which of the following?

   1. $R(x) = x^3 + x^2 - 2 + 3$
   2. $R(x) = x^3 + x^2 - x + 5$
   3. $R(x) = x^3 + x^2 - x + 3$
   4. $R(x) = x^3 + x^2 + x$

7. Find the product of $\frac{2}{3}x$ and $\left(\frac{1}{2}x^2 + 6x - 3\right)$

8. Simplify: $(x + 5)(x - 6)$

9. Which expression represents $(3x^2y^4)(4xy^2)$ in simplest form?

(1) $12x^2y^8$ (3) $12x^3y^8$

(2) $12x^2y^6$ (4) $12x^3y^6$

10. Which equation represents $\frac{27x^{18}y^5}{9x^6y}$ in simplest form?

(1) $3x^{12}y^4$ (3) $18x^{12}y^4$

(2) $3x^3y^5$ (4) $18x^3y^5$

11. Which expression is equivalent to $(3x^2)^3$?

(1) $9x^5$ (3) $27x^5$

(2) $9x^6$ (4) $27x^6$

12. What is the quotient $\frac{8xy+6xy}{2x}$ of in simplest form

(1) $\frac{14xy}{2x}$ (3) $4y+3y$

(2) $7y$ (4) $7xy$

13. The expression $(x-6)^2$ is equivalent to

(1) x^2-36 (3) $x^2-12x+36$

(2) x^2+36 (4) $x^2+12x+36$

14. What is the product of $\frac{1}{3}x^2y$ and $\frac{1}{6}xy^3$?

(1) $\frac{1}{2}x^2y^3$ (3) $\frac{1}{18}x^2y^3$

(2) $\frac{1}{9}x^3y^4$ (4) $\frac{1}{18}x^3y^4$

Name _____ Algebra 1 Final

Review 3

Creating Equations A-CED.1, A-CED.2

1. What equation could be used to solve the problem below?

If three times a number is increased by 24, the result is 4 less than seven times the number.

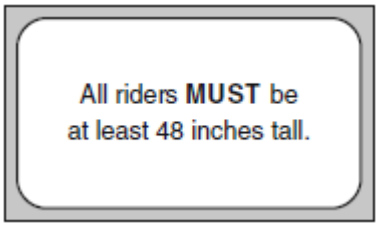
(1) $3x + 24 = 4 - 7x$ (3) $3x + 24 = 7x - 4$

(2) $3(x + 24) = 7x - 4$ (4) $27x = 7x - 4$

2. Mrs. Smith wrote "Eight less than three times a number is greater than fifteen" on the board. If x represents the number, which inequality is a correct translation of this statement?

(1) $3x - 8 > 15$
(2) $3x - 8 < 15$
(3) $8 - 3x > 15$
(4) $8 - 3x < 15$

3. The sign shown below is posted in front of a roller coaster ride at the Wadsworth County Fairgrounds.



If h represents the height of a rider in inches, what is a correct translation of the statement on this sign?

(1) $h < 48$
(2) $h > 48$
(3) $h \leq 48$
(4) $h \geq 48$

4. The length of the shortest side of a right triangle is 8 inches. The lengths of the other two sides are represented by consecutive odd integers. Which equation could be used to find the lengths of the other sides of the triangle?

(1) $8^2 + (x + 1) = x^2$
(2) $x^2 + 8^2 = (x + 1)^2$
(3) $8^2 + (x + 2)^2 = x^2$
(4) $x^2 + 8^2 = (x + 2)^2$

5. Donna wants to make trail mix made up of almonds, walnuts and raisins. She wants to mix one part almonds, two parts walnuts, and three parts raisins. Almonds cost $12 per pound, walnuts cost $9 per pound, and raisins cost $5 per pound.

Donna has $15 to spend on the trail mix. Determine how many pounds of trail mix she can make. [Only an algebraic solution can receive full credit.]

6. Jack is 27 years older than Susan. In 5 years time he will be 4 times as old as her. Find the present ages of Jack and Susan.

7. Sabrina and Raj go together to a local video store. Sabrina rents two movies and three games for a total cost of $24.30. Raj rents three movies and one game for a total cost of $18.25. How much does it cost to rent one movie? How much does it cost to rent one game?

8. The table shows the average sale price p of a house in New York City, for various years t since 1960. Write a function to represent the data.

Years since 1960, t	0	1	2	3	4	5	6
Average sale price (in thousands of dollars), p	45	36	29	24	21	20	21

9. Peculiar Purples are unusual types of bacteria. They multiply through a mechanism in which each single bacterial cell splits into four. Peculiar Purples split every 12 minutes.

A. If the multiplication rate remains constant throughout the hour and we start with three bacterial cells, after one hour, how many bacterial cells will there be? Show your work

Number of Splits (n)	Time (minutes)	Number of Bacteria P(n)
0		
1		
2		
3		
4		
5		

B. Write a function to model the growth of Peculiar Purples and explain what the variable and parameters represent in the context.

C. Use your model from part (B) to determine how many Peculiar Purples there will be after three
splits, i.e., at time 36 minutes. Do you believe your model has made an accurate prediction? Why or why not?

10. The tables below represent values for two functions, *f* and *g*, one absolute value and one quadratic.

a. Label each function as either absolute value or quadratic. Then explain mathematically how you
identified each type of function.

$f(x)$: _____

x	$f(x)$
−3	1.5
−2	1
−1	0.5
0	0
1	0.5
2	1
3	1.5

$g(x)$: _____

x	$g(x)$
−3	4.5
−2	2
−1	0.5
0	0
1	0.5
2	2
3	4.5

b. Represent each function algebraically.

Name _____ Algebra 1 Final Review 4

Creating Equations A-CED.3, A-CED.4

1. The formula for the volume of a right circular cylinder is $V = \pi r^2 h$. The value of *h* can be expressed as

(1) $\frac{V}{\pi} r^2$ (3) $\frac{\pi r^2}{V}$

(2) $\frac{V}{\pi r^2}$ (4) $V - \pi r^2$

2. If $bx - 2 = K$, then *x* equals

1) $\frac{K}{b} + 2$ 3) $\frac{2 - K}{b}$

2) $\frac{K - 2}{b}$ 4) $\frac{K + 2}{b}$

3. If $3ax + b = c$, then *x* equals

4. In the equation $A = p + prt$, *t* is equivalent to

5. Shoe sizes and foot length are related by the formula $S = 3F - 24$, where *S* represents the shoe size and *F* represents the length of the foot, in inches.

a Solve the formula for *F*.

b To the *nearest tenth of an inch,* how long is the foot of a person who wears a size $10\frac{1}{2}$ shoe?

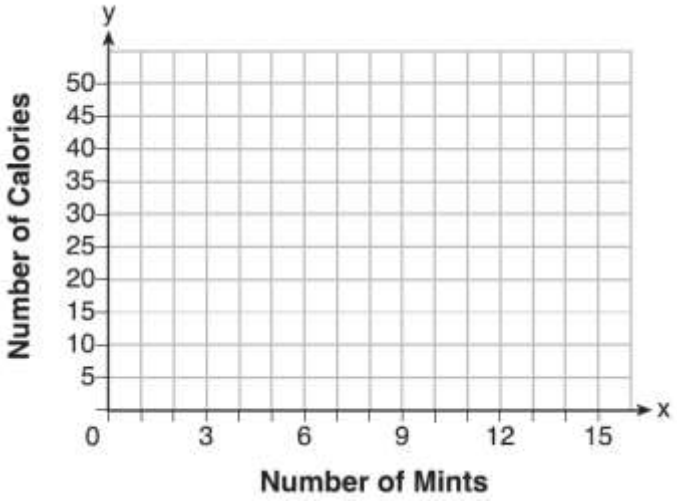
6. A high school drama club is putting on their annual theater production. There is a maximum of 800 tickets for the show. The costs of the tickets are $6 before the day of the show and $9 on the day of the show. To meet the expenses of the show, the club must sell at least $5,000 worth of tickets.

a) Write a system of inequalities that represent this situation.

b) The club sells 440 tickets before the day of the show. Is it possible to sell enough additional tickets on the day of the show to at least meet the expenses of the show? Justify your answer.

7. Max purchased a box of green tea mints. The nutrition label on the box stated that a serving of three mints contains a total of 10 Calories.

A. On the axes below, graph the function, C, where $C(x)$ represents the number of Calories in x mints.



B. Write an equation that represents $C(x)$.

C. A full box of mints contains 180 Calories. Use the equation to determine the total number of mints in the box.

8. David has two jobs. He earns $8 per hour babysitting his neighbor's children and he earns $11 per hour working at the coffee shop.

A. Write an inequality to represent the number of hours, *x*, babysitting and the number of hours, *y*, working at the coffee shop that David will need to work to earn a minimum of $200.

B. David worked 15 hours at the coffee shop. Use the inequality to find the number of full hours he must babysit to reach his goal of $200.

Name _____ Algebra 1 Final Review 5

Reasoning with Equations and Inequalities A-REI.1, A-REI.3, A-REI.4

1. Solve for x and name the properties used:

$$\frac{3}{4}(x+2) = 6(x+12)$$

2. Solve for x and name the properties used:

$$3(5-5x) > 5x$$

3. The equation $A = P + Prt$ relates the amount of money in an account, *A*, with the principal amount invested *P*, simple interest rate *r*, and length of the investment, *t*.
Solve this literal equation for P.

4. The formula $F = \frac{9}{5}C + 32$ gives the temperature in degrees Fahrenheit if you know the temperature in degrees Celsius. What is the formula for *C* in terms of *F*? Use the formula to convert 86° F to Celsius.

5. Brian correctly used a method of completing the square to solve the equation $x^2 + 7x - 11 = 0$. Brian's first step was to rewrite the equation as $x^2 + 7x = 11$. He then added a number to both sides of the equation. Which number did he add?

(1) $\frac{7}{2}$

(2) $\frac{49}{4}$

(3) $\frac{49}{2}$

(4) 49

6. If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be

(1) $(x + 3)^2 = 7$

(2) $(x - 3)^2 = 7$

(3) $(x - 3)^2 = 11$

(4) $(x - 6)^2 = 34$

7. Solve $8m^2 + 20m = 12$ for *m* by factoring.

8. Solve: $6x^2 - 6 = 9x$.

9. Solve for x: $x + 6x + 49 = 2(5x + 59)$

10. The equation $3x + 4 = 5x - 4$ has the solution set $\{4\}$.
Explain why the equation $(3x + 4) + 4 = (5x - 4) + 4$ also has the solution set $\{4\}$.

11. Which ordered pair is *not* in the solution set of $y > -\frac{1}{2}x + 5$ and $y \leq 3x - 2$?

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

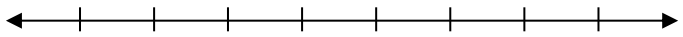
12. Write the equation $y = x^2 - 10x + 4$ in vertex form.

13. If the quadratic formula is used to find the roots of the equation $x^2 - 6x - 19 = 0$, the correct roots are

(1) $3 \pm 2\sqrt{7}$
(2) $-3 \pm 2\sqrt{7}$
(3) $3 \pm 4\sqrt{14}$
(4) $-3 \pm 4\sqrt{14}$

14. The surface area of an object is the total area of its surfaces. For example, a cylinder has a top, bottom, and sides. The top and bottom are circles and the side is a rectangle when opened up. The formula to find the surface area, *S*, of a cylinder is $S = 2\pi r^2 + 2\pi rh$. Solve the equation for h.

15. Valley Video charges a $15 annual membership fee plus $3 for each movie rental. Tanya puts aside $100 for renting movies for the year. How many movies can Tanya rent from Valley Video? Use an inequality to solve this problem. Graph your solution on the number line and explain the meaning of your graph in a sentence.



16. What is the larger root of the equation $x^2 - 10x + 21 = 0$.

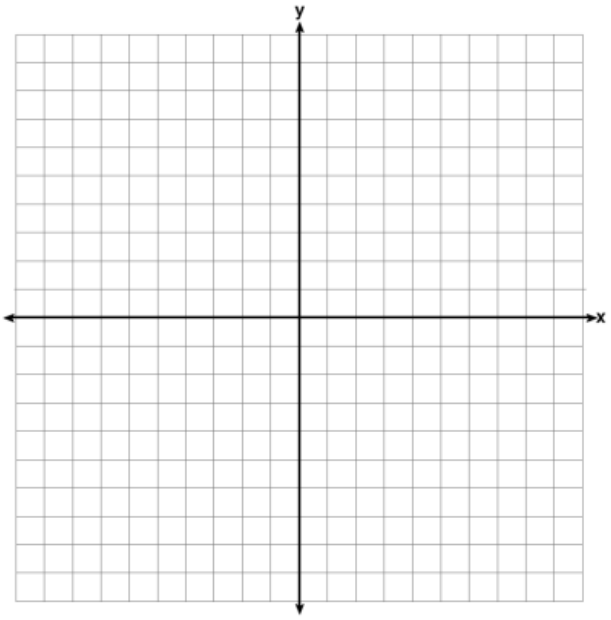
Name _____ Algebra 1 Final Review 6

Reasoning with Equations and Inequalities A-REI.10, A-REI.11, A-REI.12

1. On the set of axes below, solve the following system of inequalities graphically. State the coordinates of a point in the solution set.

$y < 2x + 1$

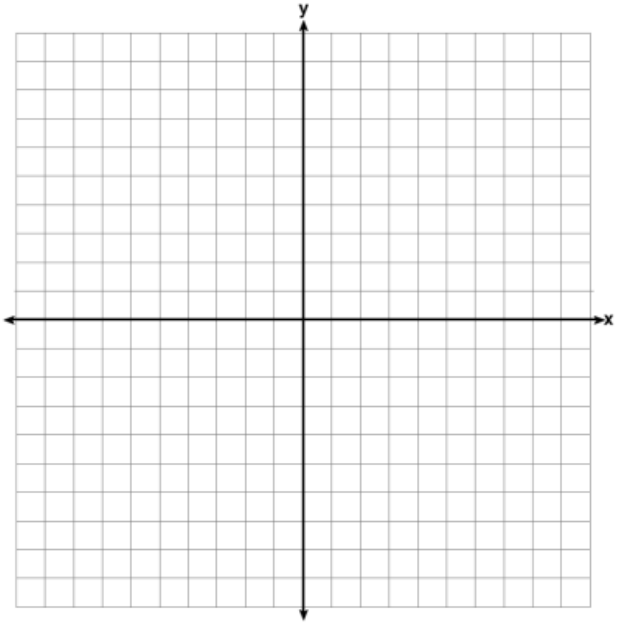
$y \geq -\frac{1}{3}x + 4$



2. On the set of axes below, graph the following system of inequalities and state the coordinates of a point in the solution set.

$2x - y \geq 6$

$x > 2$

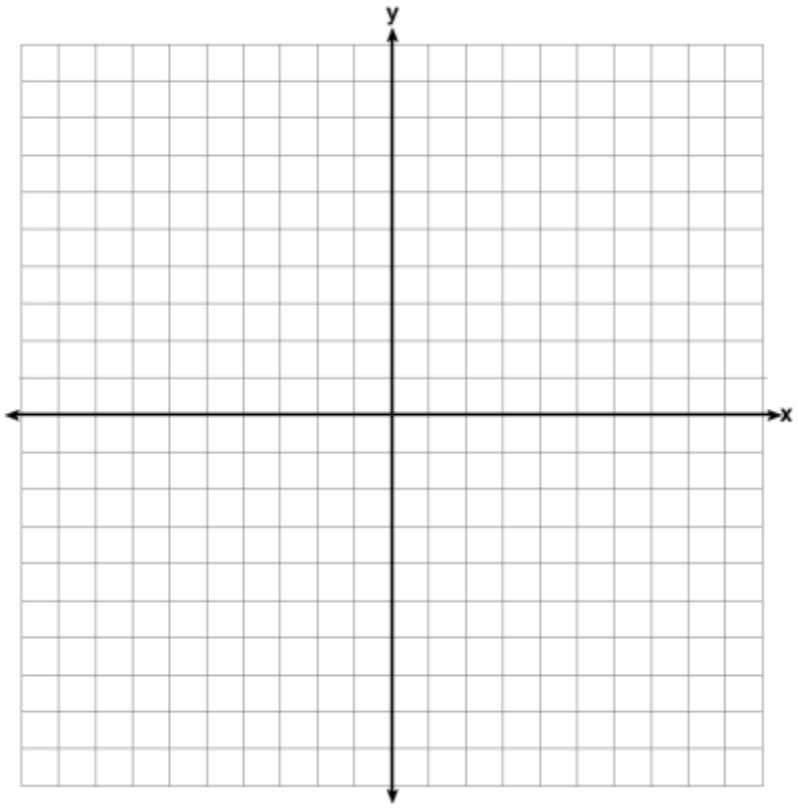


3. The sum of two numbers is 25. What are the numbers?

   a. **Create an equation using two variables to represent this situation. Be sure to explain the meaning of each variable**.

   b. List at least 3 solutions to the equation you created in part (a).

   c. Create a graph that represents the solution set to the equation.



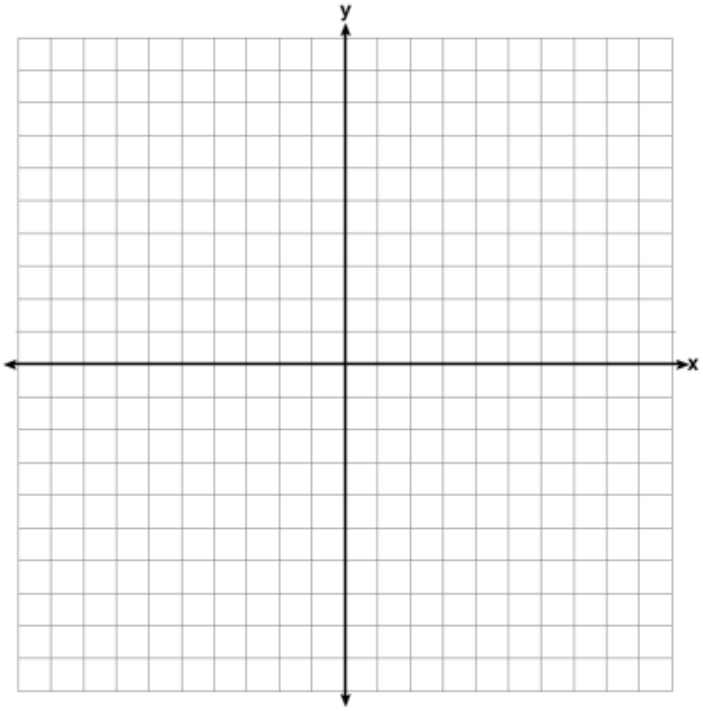
4. a. The Math Club sells hot dogs at a school fundraiser. The club earns $108 and has a combination of five-dollar and one-dollar bills in its cash box. Complete the table below to verify that these are possible combinations of bills totaling $108.

Number of five-dollar bills	Number of one-dollar bills	Total = $108
19	13	$5(19) + 1(13) = 108$
16	28	
11	53	
4	88	

b. Find one more combination of ones and fives that totals $108 .

c. Write **an equation using two variables to represent this situation. Be sure to explain the meaning of each variable.**

d. Create a graph that represents the solution set to the equation.

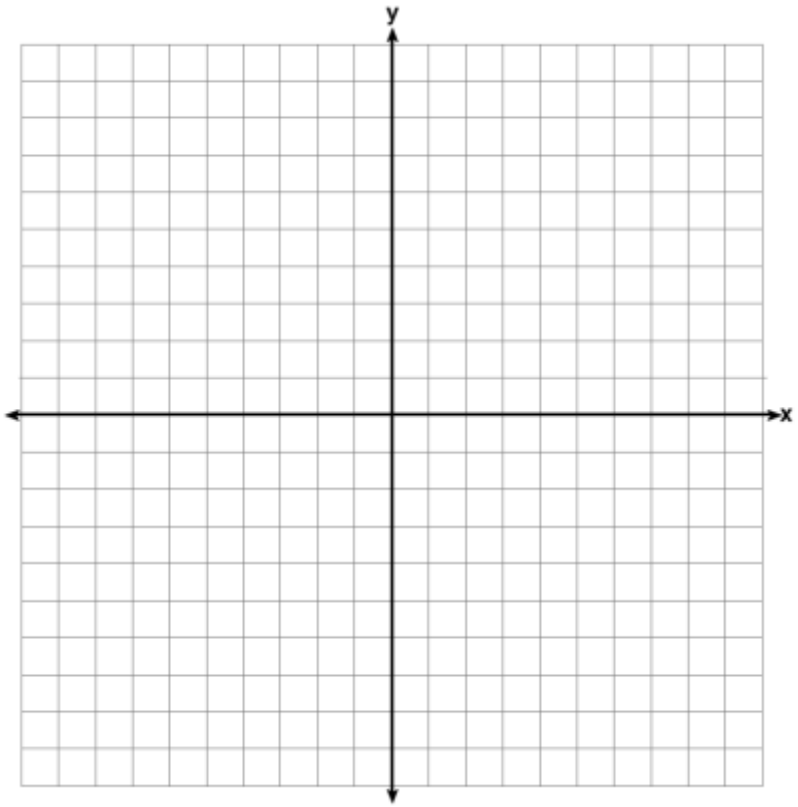


5. Next weekend Marnie wants to attend either carnival *A* or carnival *B*. Carnival *A* charges $6 for admission and an additional $1.50 per ride. Carnival *B* charges $2.50 for admission and an additional $2 per ride.

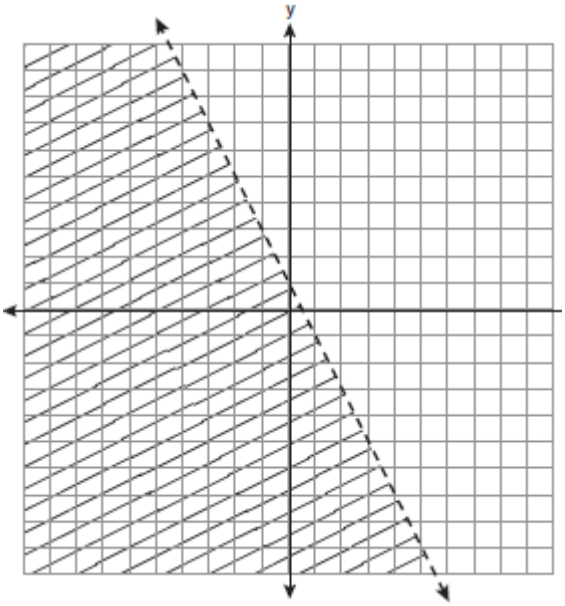
a) In function notation, write A(x) to represent the total cost of attending carnival *A* and going on x rides. In function notation, write B(x) to represent the total cost of attending carnival *B* and going on x rides.

b) Determine the number of rides Marnie can go on such that the total cost of attending each carnival is the same. [Use of the set of axes below is optional.]

c) Marnie wants to go on five rides. Determine which carnival would have the lower total cost. Justify your answer.

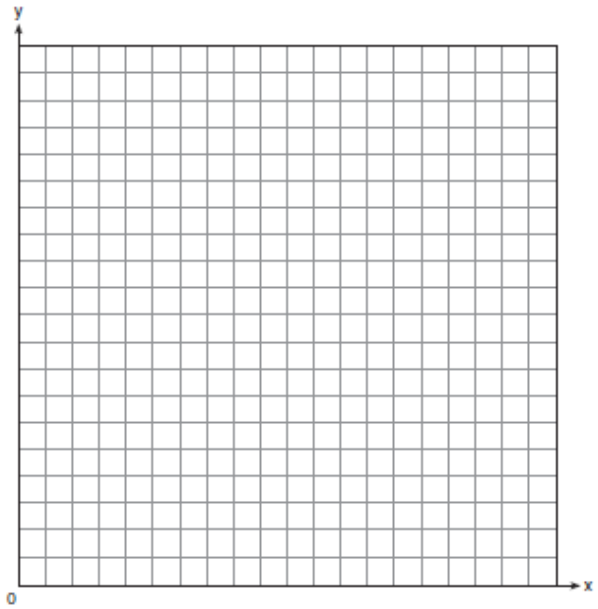


6. Which inequality is represented by the graph below?

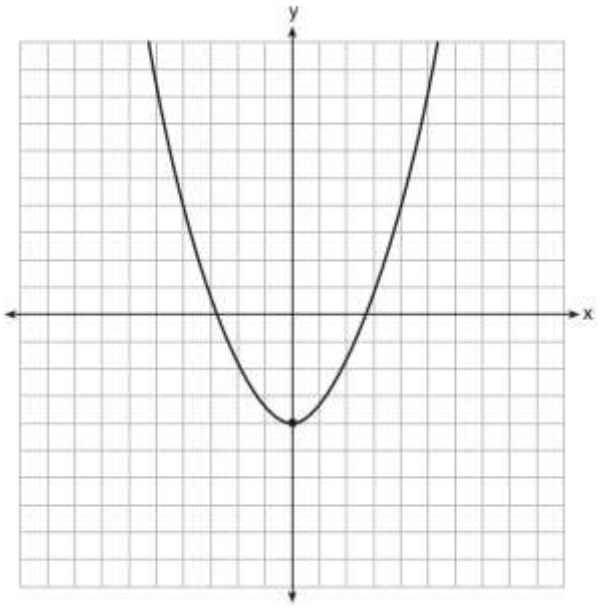


1) $y < 2x + 1$
2) $y < -2x + 1$
3) $y < \frac{1}{2}x + 1$
4) $y < -\frac{1}{2}x + 1$

7. An architect is designing a museum entranceway in the shape of a parabolic arch represented by the equation $y = -x^2 + 20x$, where $0 \leq x \leq 20$ and all dimensions are expressed in feet. On the accompanying set of axes, sketch a graph of the arch and determine its maximum height, in feet.



8. Ryker is given the graph of the function $y = \frac{1}{2}x^2 - 4$. He wants to find the zeros of the function, but is unable to read them exactly from the graph.



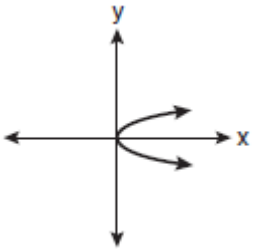
Find the zeros in simplest radical form.

Name _____ Algebra 1 Final Review 7

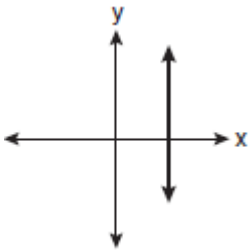
Interpreting Functions F-IF.1, F-IF.2, F-IF.3

1. Which graph represents a function? Justify your reasoning.

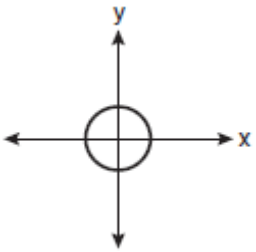
(1)



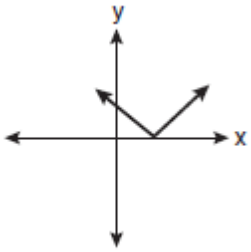
(2)



(3)



(4)



2. Which set of ordered pairs is *not* a function? Justify your reasoning.

(1) {(3, 1), (2, 1), (1, 2), (3, 2)}
(2) {(4, 1), (5, 1), (6, 1), (7, 1)}
(3) {(1, 2). (3. 4), (4, 5), (5, 6)}
(4) {(0, 0), (1, 1), (2, 2), (3, 3)}

3. What are the domain and range of this relation?

{(-3, 14), (0, 7), (2, 0), (9, -18), (23, -99)}

4. If $f(x) = -2x + 5$, determine the value of each of the following:

$f(-3) =$

$f(0) =$

$f\left(\frac{1}{4}\right) =$

5. Regard the solid dark equilateral triangle as figure 0. Then, the first figure in this sequence is the one composed of three dark triangles, the second figure is the one composed of nine dark triangles, and so on.

Figure 0 **Figure 1** **Figure 2** **Figure 3** **Figure 4**

a. How many dark triangles are in each figure? Make a table to show this data.

n (Figure Number)					
T (# of dark triangles)					

b. Describe in words how, given the number of dark triangles in a figure, to determine the number of dark triangles in the next figure.

c. Create a function that models this sequence. What is the domain of this function?

6. What is a formula for the *n*th term of sequence *B* shown below?

$$B = 10, 12, 14, 16, \ldots$$

(1) $b_n = 8 + 2n$
(2) $b_n = 10 + 2n$
(3) $b_n = 10(2)^n$
(4) $b_n = 10(2)^{n-1}$

7. Which arithmetic sequence has a common difference of 4?

(1) 4, 16, 64, 256
(2) 8, 4, 0, –4
(3) 6, 10, 14, 18
(4) 4, 8, 14, 18

8. Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$
$$a_n = a_{(n-1)} - 6$$

9. A sequence has the following terms: $a_1 = 4$, $a_2 = 10$, $a_3 = 25$, $a_4 = 62.5$. Which formula represents the *n*th term in the sequence?

(1) $a_n = 4 + 2.5n$
(2) $a_n = 4 + 2.5(n - 1)$
(3) $a_n = 4(2.5)^n$
(4) $a_n = 4(2.5)^{n-1}$

10. What is the common ratio of the geometric sequence 2, 8, 32 ?

11. What are the first 4 terms of a sequence with an explicit formula $a_n = 6 \cdot (2)^{n-1}$?

12. Let f and g be the functions given by $f(x) = x^2$ and $g(x) = x|x|$.

a. $f\left(\frac{1}{3}\right) =$

b. $g(4) =$

c. $g(-\sqrt{3}) =$

d. What is the domain of f?

e. What is the range of g?

f. Evaluate $f(-67) + g(-67)$.

g. Compare and contrast f and g. How are they alike? How are they different?

h. Is there a value of x, such that $f(x) + g(x) = -100$? If so, find x. If not, explain why no such value exists.

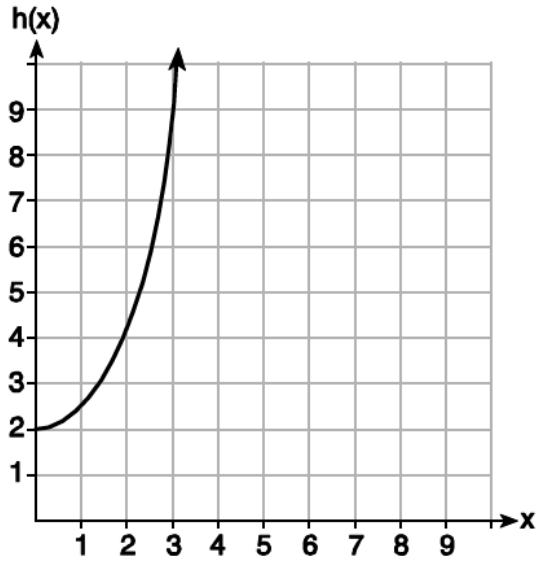
i. Is there a value of x such that $(x) + g(x) = 50$? If so, find x. If not, explain why no such value exists.

Name _____ Algebra 1 Final Review 8
Interpreting Functions F-IF.4, F-IF.5, F-IF.6

1. Given the functions g(x), f(x), and h(x) shown below:

$g(x) = x^2 - 2x$

x	f(x)
0	1
1	2
2	5
3	7



The correct list of functions ordered from greatest to least by average rate of change over the interval $0 \leq x \leq 3$ is

(1) f(x), g(x), h(x)
(2) h(x), g(x), f(x)
(3) g(x), f(x), h(x)
(4) h(x), f(x), g(x)

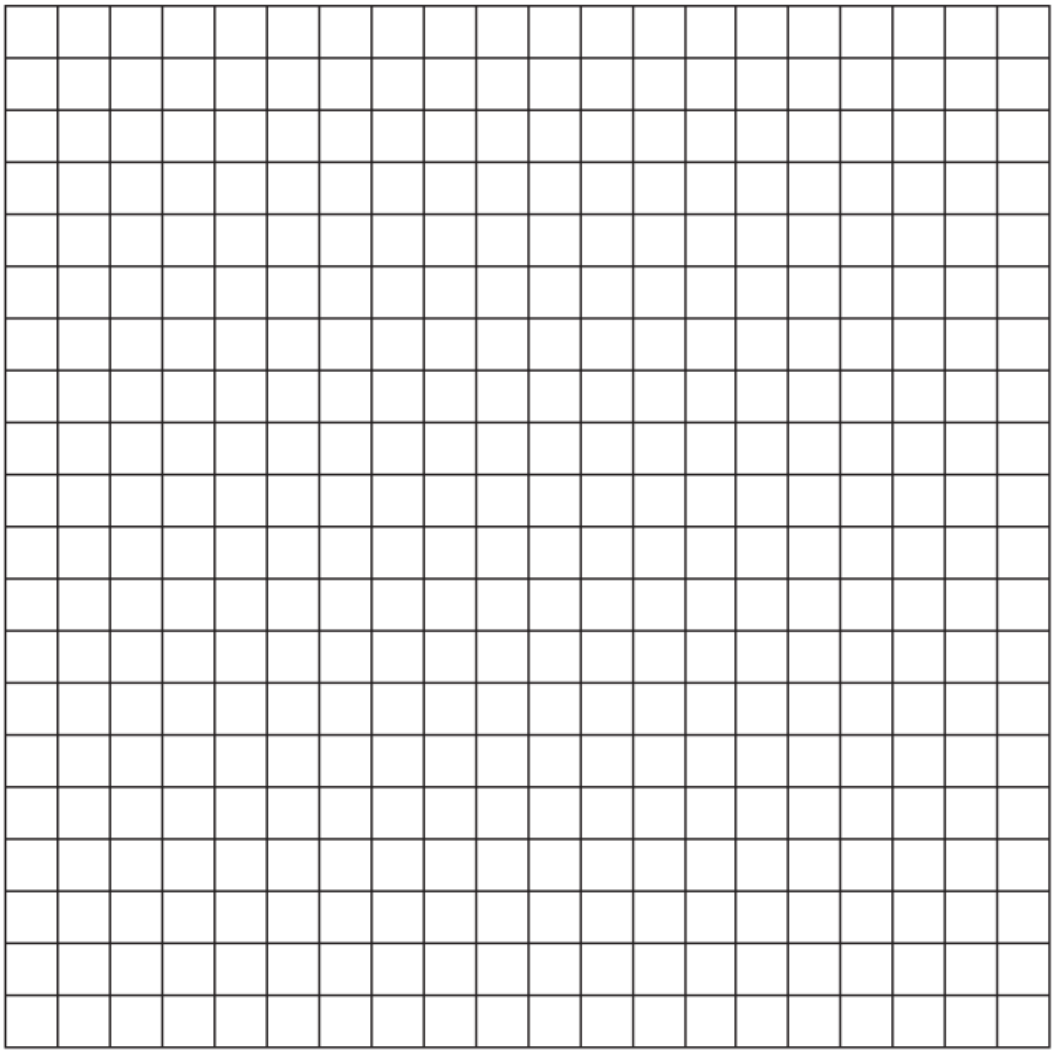
2. For which quadratic equation is the axis of symmetry $x = 3$?

(1) $y = -x^2 + 3x + 5$ (3) $y = x^2 + 6x + 3$

(2) $y = -x^2 + 6x + 2$ (4) $y = x^2 + x + 3$

3. During a snowstorm, a meteorologist tracks the amount of accumulating snow. For the first three hours of the storm, the snow fell at a constant rate of one inch per hour. The storm then stopped for two hours and then started again at a constant rate of one-half inch per hour for the next four hours.

a) On the grid below, draw and label a graph that models the accumulation of snow over time using the data the meteorologist collected.



b) If the snowstorm started at 6 p.m., how much snow had accumulated by midnight?

4. The table shows the average sale price p of a house in New York City, for various years t since 1960.

Years since 1960, t	0	1	2	3	4	5	6
Average sale price (in thousands of dollars), p	45	36	29	24	21	20	21

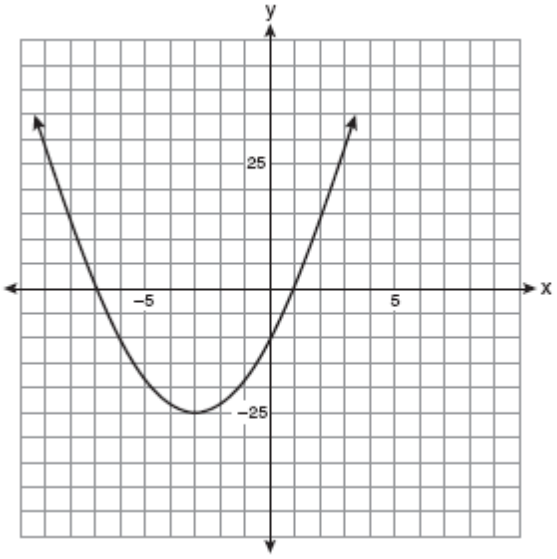
j. What type of function most appropriately represents this set of data? Explain your reasoning.

k. In what year is the price at the lowest? Explain how you know.

l. Write a function to represent the data. Show your work.

m. Can this function ever be equal to zero? Explain why or why not.

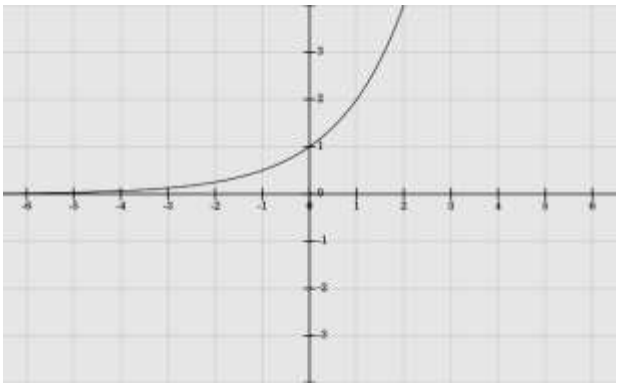
5. Which equation represents the axis of symmetry of the graph of the parabola below?



(1) $y = -3$
(2) $x = -3$
(3) $y = -25$
(4) $x = -25$

6. Compare the following three functions:

i. A function f is represented by the graph below:



ii. A function g is represented by the following equation:

$$g(x) = (x - 6)^2 - 36$$

iii. A linear function h is represented by the following table:

x	–1	1	3	5	7
$h(x)$	10	14	18	22	26

a. Evaluate each of the following.

$f(0) =$

$g(0) =$

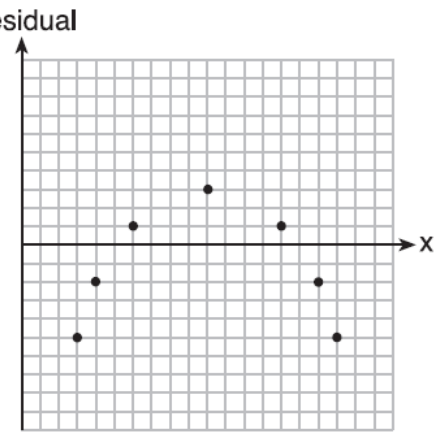
$h(0) =$

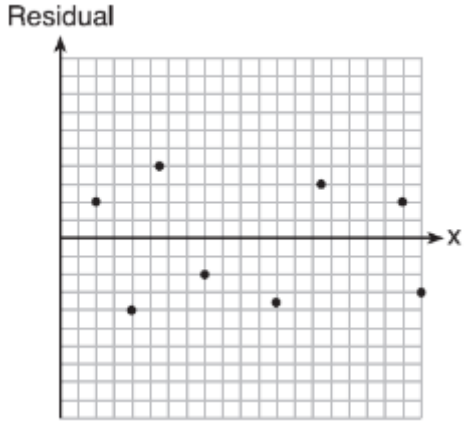
b. Calculate the average rate of change of $f, g, and\ h$ over the interval [2, 4]

Name _____ Algebra 1 Final Review 9
Statistics S.ID-6, S.ID-7, S.ID-8

1. Which statistic would indicate that a linear function would *not* be a good fit to model a data set?

(1) $r = -0.93$ (2) $r = 1$

(3) 

(4) 

2. Emma recently purchased a new car. She decided to keep track of how many gallons of gas she used on five of her business trips. The results are shown in the table below. Write the linear regression equation for these data where miles driven is the independent variable. (Round all values to the *nearest hundredth*.)

Miles Driven	Number of Gallons Used
150	7
200	10
400	19
600	29
1000	51

3. Which situation describes a negative correlation?

(1) the amount of gas left in a car's tank and the amount of gas used from it

(2) the number of gallons of gas purchased and the amount paid for the gas

(3) the size of a car's gas tank and the number of gallons it holds

(4) the number of miles driven and the amount of gas used

4. About a year ago, Joey watched an online video of a band and noticed that it had been viewed only 843 times. One month later, Joey noticed that the band's video had 1708 views. Joey made the table below to keep track of the cumulative number of views the video was getting online.

Months Since First Viewing	Total Views
0	843
1	1708
2	forgot to record
3	7124
4	14,684
5	29,787
6	62,381

a) Write a regression equation that best models these data. Round all values to the *nearest hundredth*. Justify your choice of regression equation.

b) As shown in the table, Joey forgot to record the number of views after the second month.
Use the equation from part *a* to estimate the number of full views of the online video that Joey forgot to record.

5. Which set of data describes a situation that could be classified as qualitative?

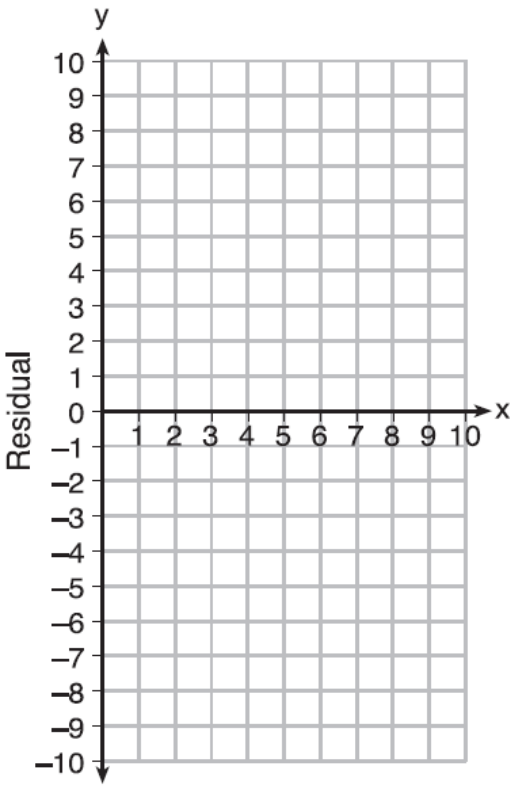
(1) the colors of the birds at the city zoo
(2) the shoe size of the zookeepers at the city zoo
(3) the heights of the giraffes at the city zoo
(4) the weights of the monkeys at the city zoo

6. Use the data below to write the regression equation ($y = ax + b$) for the raw test score based on the hours tutored. Round all values to the *nearest hundredth*.

Tutor Hours, x	Raw Test Score	Residual (Actual – Predicted)
1	30	1.3
2	37	1.9
3	35	–6.4
4	47	–0.7
5	56	2.0
6	67	6.6
7	62	–4.7

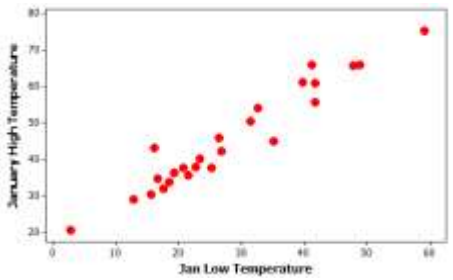
Equation: _____

Create a residual plot on the axes below, using the residual scores in the table above.

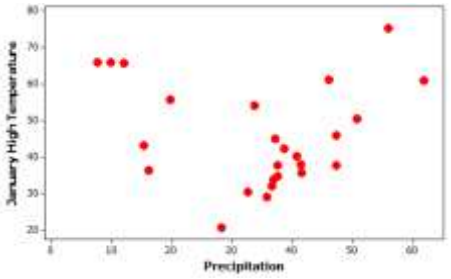


Based on the residual plot, state whether the equation is a good fit for the data. Justify your answer.

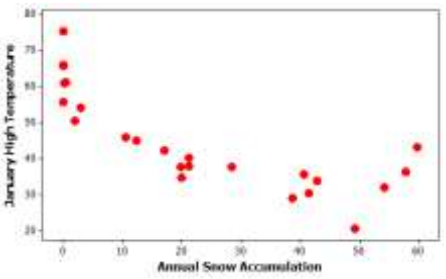
7. Weather data were recorded for a sample of 25 American cities in one year. Variables measured included January high temperature (in degrees Fahrenheit), January low temperature, annual precipitation (in inches), and annual snow accumulation. The relationships for three pairs of variables are shown in the graphs below (Jan Low Temperature – Graph A; Precipitation – Graph B; Annual Snow Accumulation – Graph C).



Graph A



Graph B



Graph C

a. Which pair of variables will have a correlation coefficient closest to 0?

A. Jan high temperature and Jan low temperature
B. Jan high temperature and Precipitation
C. Jan high temperature and Snow accumulation

Explain your choice:

b. Which of the above scatterplots would be best described as a strong nonlinear relationship? Explain your choice.

c. Suppose we fit a least squares regression line to Graph A. Circle one word choice for each blank that best completes this sentence based on the equation:

If I compare a city with a January low temperature of 30°F and a city with a higher January low temperature, then the _____*(1)*_____ *January high temperature of the second city will* _____*(2)*_____ *be* _____*(3)*_____.

(1) actual, predicted.

(2) probably, definitely.

(3) smaller, larger, the same, equally likely to be higher or lower.

d. For the city with a January low temperature of 30°F, what do you predict for the annual snow accumulation? Explain how you are estimating this based on the three graphs above.

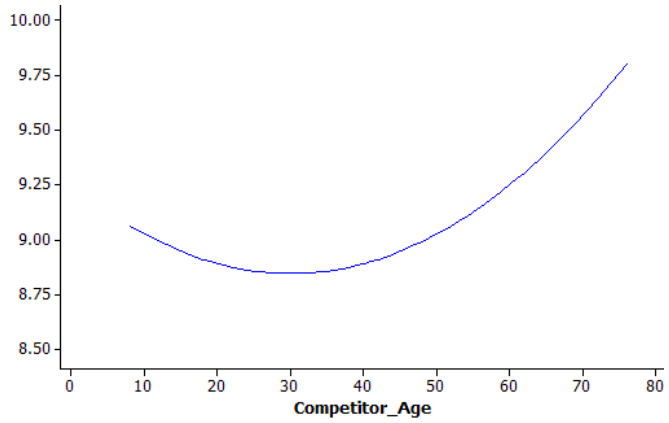
8. Suppose times (in minutes) to run one mile were recorded for a sample of 100 runners, ages 16-66 years and the following least squares regression line was found:

Predicted time in minutes to run one mile = 5.35 + 0.25 x (*age)*

a. Provide an interpretation in context for this slope coefficient.

b. Explain what it would mean in the context of this study for a runner to have a negative residual.

c. Suppose instead someone suggests using the following curve to predict time to run one mile. Explain what this model implies about the relationship between running time and age, and why that relationship might make sense in this context.



d. Based on the results for these 100 runners, explain how you could decide whether the first model or the second model provides a better fit to the data.

e. The sum of the residuals is always equal to zero for the least squares regression line. Which of the following must also always be equal to zero?

A. The mean of the residuals
B. The median of the residuals
C. Both the mean and the median of the residuals
D. Neither the mean nor the median of the residuals

Name _____ Algebra 1 Final Review 10

Multiple Choice Mixed Review

1 An example of an equation is

1) $2x^2 - 4x + 12$
2) $|x - 6|$
3) $4(x + 6)(x - 2)$
4) $2x = x^2 + 3$

2 The greatest common factor of $3m^2n + 12mn^2$ is?

1) $3n$
2) $3m$
3) $3mn$
4) $3mn^2$

3 Jeremy is hosting a Halloween party for 80 children. He will give each child *at least* one candy bar. If each bag of candy contains 18 candy bars, which inequality can be used to determine how many bags, *c*, Jeremy will need to buy?

1) $18c \geq 80$
2) $18c \leq 80$
3) $\frac{c}{18} \geq 80$
4) $\frac{c}{18} \leq 80$

4 Which statement regarding biased sampling is *false*?

1) Online sampling is biased because only the people who happen to visit the web site will take the survey.
2) A radio call-in survey is biased because only people who feel strongly about the topic will respond.
3) A survey handed to every third person leaving a library is biased because everyone leaving the library was not asked to participate.
4) Asking for experts to take a survey is biased because they may have particular knowledge of the topic.

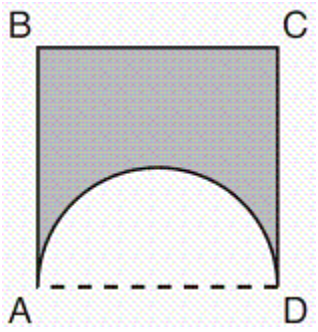
5 Which relation is *not* a function?

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

6 What is an equation of the line that passes through the point $(-2,-8)$ and has a slope of 3?

1) $y = 3x - 2$
2) $y = 3x - 22$
3) $y = 3x + 2$
4) $y = 3x + 22$

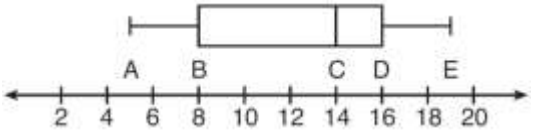
7 A figure consists of a square and a semicircle, as shown in the diagram below.



If the length of a side of the square is 6, what is the area of the shaded region?

1) $36 - 3\pi$
2) $36 - 4.5\pi$
3) $36 - 6\pi$
4) $36 - 9\pi$

8 The box-and-whisker plot shown below represents the number of magazine subscriptions sold by members of a club.



Which statistical measures do points *B*, *D*, and *E* represent, respectively?

1) minimum, median, maximum
2) first quartile, median, third quartile
3) first quartile, third quartile, maximum
4) median, third quartile, maximum

9 What is the slope of a line represented by the equation $2y = x - 4$?

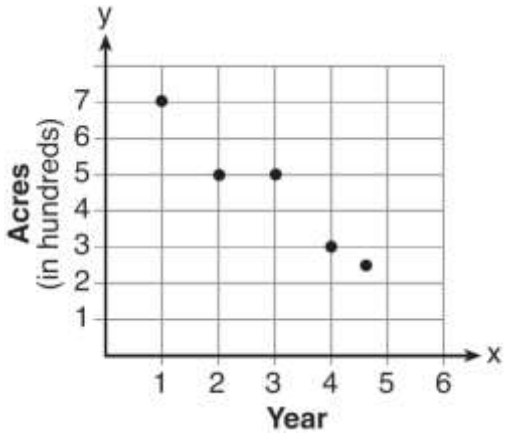
1) 1
2) $\frac{1}{2}$
3) -1
4) $-\frac{1}{2}$

10 What is the solution of the system of equations below?

$$2x + 3y = 7$$
$$x + y = 3$$

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

11 The graph below illustrates the number of acres used for farming in Smalltown, New York, over several years.



Using a line of best fit, approximately how many acres will be used for farming in the 5th year?

1) 0
2) 200
3) 300
4) 400

12 When $16x^3 - 12x^2 + 4x$ is divided by $4x$, the quotient is

1) $12x^2 - 8x$
2) $12x^2 - 8x + 1$
3) $4x^2 - 3x$
4) $4x^2 - 3x + 1$

13 The width of a rectangle is 4 less than half the length. If ℓ represents the length, which equation could be used to find the width, *w*?

1) $w = \frac{1}{2}(4 - \ell)$
2) $w = \frac{1}{2}(\ell - 4)$
3) $w = \frac{1}{2}\ell - 4$
4) $w = 4 - \frac{1}{2}\ell$

14 Which data can be classified as quantitative?

1) favorite stores at which you shop
2) U.S. Representatives and their home states
3) sales tax rate in each New York county
4) opinion of a freshman on the color of Paul's shirt

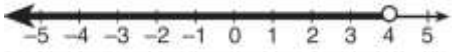
15 What is the vertex of the graph of the equation $y = 3x^2 + 6x + 1$?

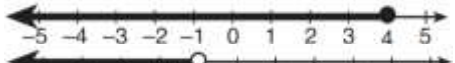
1) $(-1,-2)$
2) $(-1,10)$
3) $(1,-2)$
4) $(1,10)$

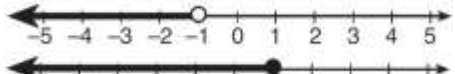
16 The length and width of a rectangle are 48 inches and 40 inches. To the *nearest inch*, what is the length of its diagonal?

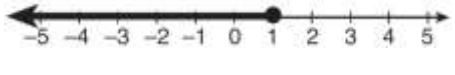
1) 27
2) 62
3) 88
4) 90

17 Which graph represents the solution set of $2x - 5 < 3$?

1) 

2) 

3) 

4) 

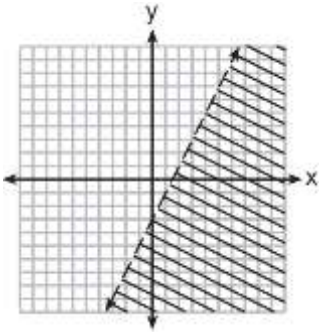
18 Jonathan drove to the airport to pick up his friend. A rainstorm forced him to drive at an average speed of 45 mph, reaching the airport in 3 hours. He drove back home at an average speed of 55 mph. How long, to the nearest tenth of an hour, did the trip home take him?

1) 2.0 hours
2) 2.5 hours
3) 2.8 hours
4) 3.7 hours

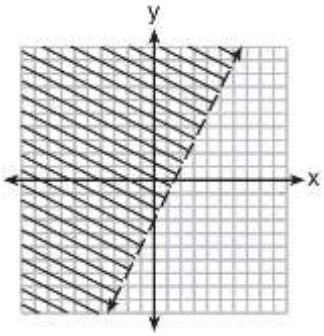
19 When $x = 4$, the value of $2x^0 + x!$ is
1) 24
2) 25
3) 26
4) 28

20 Which graph represents the solution of $2y + 6 > 4x$?

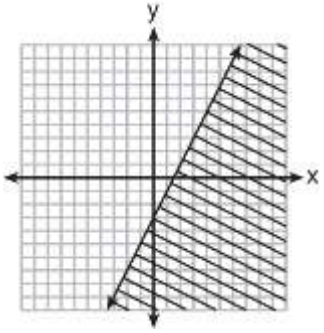
1)



3)



2)



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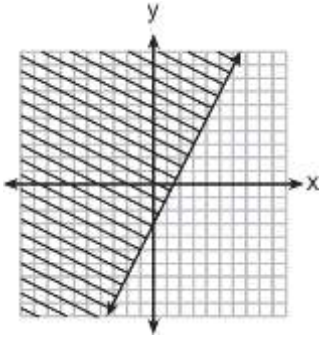
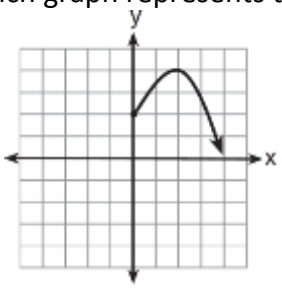
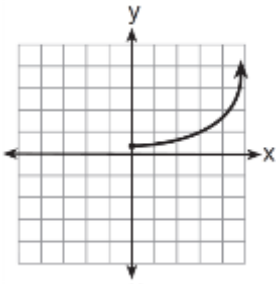
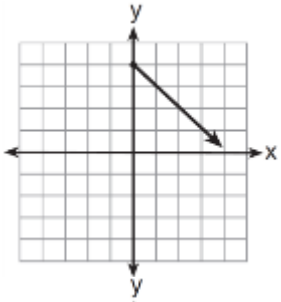
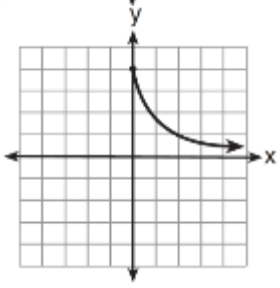


21 Which graph represents the exponential decay of a radioactive element?

1) 

2) 

3) 

4) 

22 Which fraction represents $\frac{x^2 - 25}{x^2 - x - 20}$ expressed in simplest form?

1) $\frac{5}{4}$

2) $\frac{x - 5}{x - 4}$

3) $\frac{x + 5}{x + 4}$

4) $\frac{25}{x + 20}$

23 If $abx - 5 = 0$, what is *x* in terms of *a* and *b*?

1) $x = \frac{5}{ab}$
2) $x = -\frac{5}{ab}$
3) $x = 5 - ab$
4) $x = ab - 5$

24 The roots of the equation $2x^2 - 8x = 0$ are

1) -2 and 2
2) $0, -2$ and 2
3) 0 and -4
4) 0 and 4

25 Which equation illustrates the multiplicative inverse property?

1) $a \cdot 1 = a$
2) $a \cdot 0 = 0$
3) $a\left(\frac{1}{a}\right) = 1$
4) $(-a)(-a) = a^2$

26 What is the result when $4x^2 - 17x + 36$ is subtracted from $2x^2 - 5x + 25$?

1) $6x^2 - 22x + 61$
2) $2x^2 - 12x + 11$
3) $-2x^2 - 22x + 61$
4) $-2x^2 + 12x - 11$

27 Julie has three children whose ages are consecutive odd integers. If *x* represents the youngest child's age, which expression represents the sum of her children's ages?

1) $3x + 3$
2) $3x + 4$
3) $3x + 5$
4) $3x + 6$