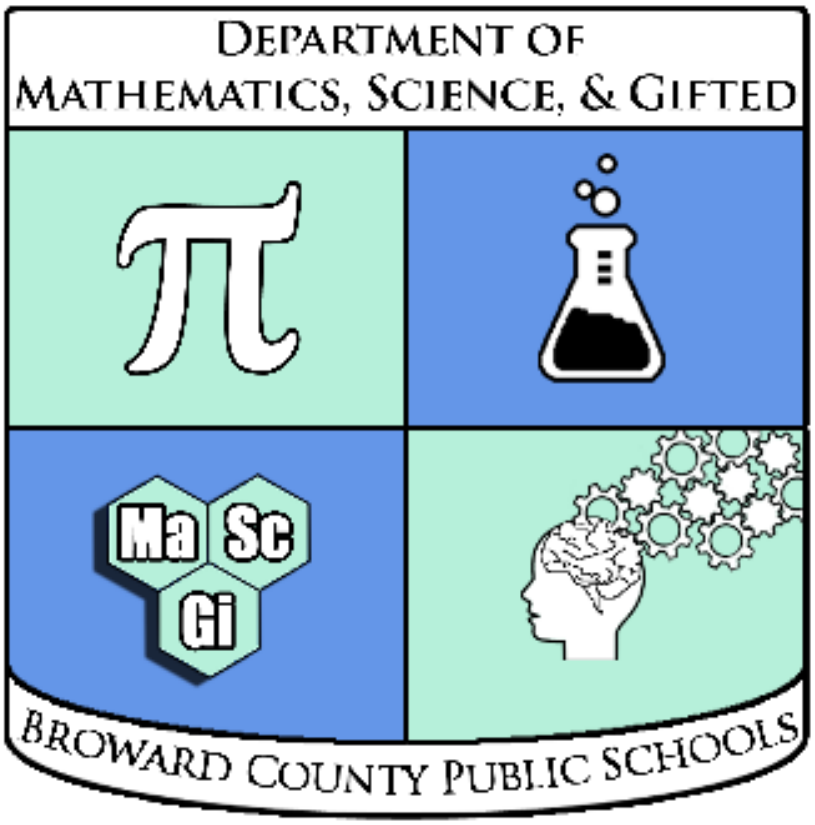
Name: _____

EOC FSA

Warm-ups



Algebra 1

Compiled by the Broward County Public Schools
Office of Instruction and Intervention
Mathematics, Science, & Gifted Department

Algebra 1 EOC FSA Mathematics Reference Sheet

Customary Conversions

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions

1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters

1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 year = 365 days
1 year = 52 weeks

Broward County Public Schools
Algebra 1 Countdown

Algebra 1 Warm-Ups

Day 1

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1. If $f(x) = -\frac{1}{8}x + 5$ which of the following statements about $g(x)$, the inverse of $f(x)$, are true?

   A) $g(-2.125) = 57$
   B) $g(-0.5) = 44$
   C) $g(-0.375) = 37$
   D) $g(0.125) = 39$
   E) $g(0.625) = 45$
   F) $g(1.125) = 40$

2. The function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory. What is a reasonable domain for $h(n)$?

   A) The nonnegative rational numbers
   B) The real numbers
   C) The nonnegative integers
   D) The nonnegative real numbers

3. Susan measures her son Jeremy's height at various ages. The results are shown below. Which of the following is a statement of causation?

Age (years)	**Height (inches)**
8	44
9	48
10	52
11	55
12	58
13	62

   A) When Jeremy was 13 years old, he was 62 inches tall.
   B) There appears to be a relationship between Jeremy's age and height.
   C) As Jeremy's age increases, his height also increases.
   D) Jeremy's age affects his height.

Day 2

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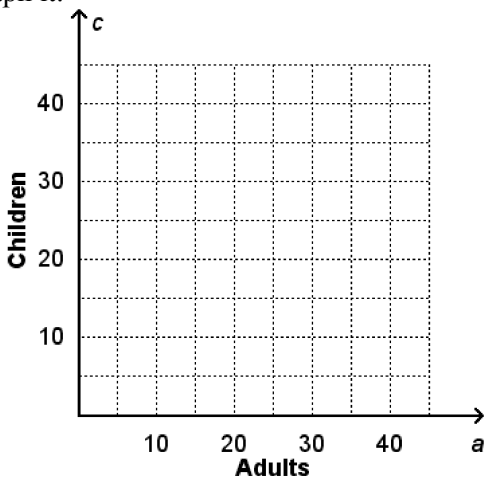
4. A company provides bus trips to various events for *a* adults and *c* children. The company charges \$15 for each adult and \$8 for each child for a trip to an upcoming play. The bus has a maximum capacity of 40 people, and the company needs to earn a minimum of \$400 from this event to make a profit. Write a system of inequalities that represents this situation and graph it.



5. Solve $\dfrac{7\left(-4-\frac{8}{3}x\right)}{-5} = 28$. Show your work.

Day 3

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6. Which values are in the domain of the function $f(x) = -6x + 11$ with a range $\{-37, -25, -13, -1\}$? ***Select all that apply.***

A) 1
B) 2
C) 3
D) 4
E) 5
F) 6
G) 7
H) 8

7. Write the radical expression in rational exponent form.

$$\sqrt[3]{k^7}$$

A) $k^{\frac{7}{3}}$
B) $k^{\frac{3}{7}}$
C) k^4
D) k^{10}

8. Which of the following correlation coefficients indicate a strong linear correlation? ***Select all that apply.***

A) –0.872691
B) –0.658799
C) –0.125866
D) 0.568962
E) 0.798264
F) 0.989862

Day 4

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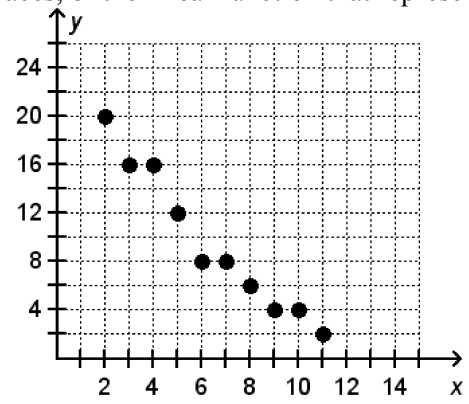
9. The ideal gas law, $PV = nRT$, is a well-known equation in science that describes the behavior of gases. P is the pressure of the gas, V is the volume of the gas, n is the amount of the gas, R is a constant, and T is the temperature of the gas. Which of the following statements about the ideal gas law are true?

A) Dividing both sides of the equation by V results in an equation solved for P.
B) Dividing both sides of the equation by R results in an equation solved for T.
C) Subtracting P from both sides of the equation results in an equation solved for V.
D) Dividing both sides of the equation by RT results in an equation solved for n.
E) Subtracting PV from both sides of the equation and then dividing both sides of the equation by $nT - PV$ results in an equation solved for R.

10. Determine whether each function's average rate of change on the interval $x = 0$ to $x = 2$ is equal to 2.

a.	$f(x) = x + 2$	○ Yes	○ No
b.	$f(x) = 2x$	○ Yes	○ No
c.	$f(x) = \frac{x}{2}$	○ Yes	○ No
d.	$f(x) = x^2$	○ Yes	○ No
e.	$f(x) = 2^x$	○ Yes	○ No

11. The scatter plot shown suggests the association between the values of x with the values of y is linear. What is the y-intercept, rounded to two decimal places, of the linear function that represents the line of best fit?



A) -1.96
B) 11.15
C) 11.41
D) 22.36

Day 5

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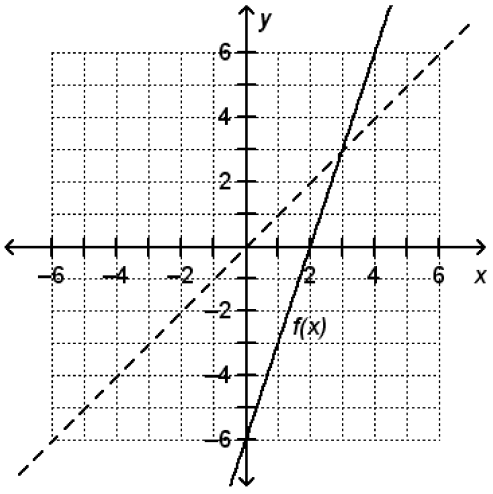
12. The graph of $f(x) = 3x - 6$ is shown, along with the dashed line $y = x$.



Find $g(x)$, the inverse of $f(x)$. Show your work.

13. Simplify each of the following expressions to determine which are linear.

A) $(x^2 + 6x + 9) + (x^2 - 4x + 4)$
B) $2(2x^2 + x - 10) - (5x^2 - 3x + 1)$
C) $4(3x^2 + 5x - 4) - 6(2x^2 + 2x - 1)$
D) $3(x^2 - x + 1) + (-2x^2 + 4x - 5)$
E) $4(2x^2 - 6x + 7) - 8(x^2 - 3x + 4)$

14. A department store offers a frequent-buyers reward card. Every time a customer earns 100 or more points, the customer receives a gift certificate. Each purchase is worth 12 points, and customers automatically earn 25 points when they sign up. Which inequalities could be used to find the number p of purchases a customer needs to make to earn the first gift certificate?

A) $12p + 25 < 100$
B) $12p \geq 100 - 25$
C) $12p + 25 \geq 100$
D) $12p - 25 \leq 100$
E) $12p \geq 100$

Day 6

---

15. Simplify each expression. Does the x in the result have a positive coefficient?

	Yes	No
a. $(5x + 10) + (x - 100)$		
b. $\left(\frac{11}{4}x - 2\right) - \left(8x - \frac{13}{2}\right)$		
c. $(4x - 3.2)(x + 0.5)$		
d. $\left(-3x + 4\sqrt{5}\right) - \left(-2x - \sqrt{13}\right)$		
e. $(-1.7x - 4.2) + \left(\frac{20x}{7} - \sqrt{7}\right)$		

16. In a factory, the cost of producing n items is $C(n) = 25n + 150$. Which function describes the average cost of producing one item when n items are produced?

A) $A(n) = 25n + 150$
B) $A(n) = 25 + \frac{150}{n}$
C) $A(n) = 25n^2 + 150n$
D) $A(n) = \frac{25}{n} + \frac{150}{n^2}$

17. Marcello is tiling his kitchen floor with 45 square tiles. The tiles come in whole-number side lengths of 6 to 12 inches. The function $A(s) = 45s^2$, where s is the side length of the tile, represents the area that Marcello can cover with the tiles. What is the domain of this function?

    A) All real numbers between 6 and 12, inclusive
    B) All rational numbers between 6 and 12, inclusive
    C) {6, 7, 8, 9, 10, 11, 12}
    D) {6, 12}

Day 7

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18. Which of the following systems of equations has a solution in which the x-value is greater than the y-value?

    A) $\begin{cases} x + 3y = -1 \\ 5x + 4y = 6 \end{cases}$

    B) $\begin{cases} 3x + 2y = -19 \\ -2x - 3y = 21 \end{cases}$

    C) $\begin{cases} 6x - y = -10 \\ -2x - 2y = -6 \end{cases}$

    D) $\begin{cases} 3x + 5y = 16 \\ 4x - y = 6 \end{cases}$

    E) $\begin{cases} 5x - 2y = 12 \\ -10x + 4y = -20 \end{cases}$

19. Let $f(x) = x^2 + x - 6$ and $g(x) = x^2 - 4$. Find $f(x) + g(x)$ and $f(x) - g(x)$. Simplify your answers.

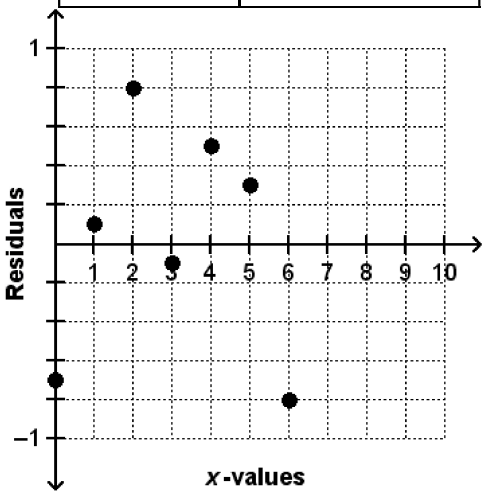
20. Gwendolyn has already read 130 pages of her 400-page summer reading book. If she reads at an average rate of 45 pages per hour, how long will she need to finish the book? Write and solve an equation to find the answer. Show your work.

Day 8

---

21. The table shows the median weight, in pounds, of babies born at a particular hospital for the first 6 months after they are born. The line $y = 1.7x + 8.1$ is fit to the data in the table, resulting in the residual plot below. Which of the following are true? ***Select all that apply.***

Age (months)	Median weight (pounds)
0	7.4
1	9.9
2	12.3
3	13.1
4	15.4
5	16.9
6	17.5



A) The residuals do not appear to follow a pattern.
B) The residuals are mostly below the x-axis.
C) The residuals are relatively small compared to the data values.
D) The residuals are relatively large compared to the data values.
E) The line is a good fit to the data.

22. A local supermarket sells chicken for \$2.49/lb and pork for \$3.19/lb. Todd buys c pounds of chicken and p pounds of pork. Which of the following inequalities represents that Todd only has \$40 to spend?

A) $2.49c \leq 40$
B) $3.19p \leq 40$
C) $c + p \leq 40$
D) $2.49c + 3.19p \leq 40$

23. Which inequality and solution represent keeping the area of a triangle under 36 square feet if the height is twice the length of the base b?

A) $2b < 36;\ b < 18$
B) $\frac{1}{2}b^2 < 36;\ b < 6\sqrt{2}$
C) $b^2 < 36;\ b < 6$
D) $2b^2 < 36;\ b < 3\sqrt{2}$

Day 9

---

24. The domain of the function $f(x) = 13x - x^2$ is given as $\{-2, -1, 0, 1, 2\}$. What is the range? Show your work.

Each activity will be graphed, with time on the horizontal axis. Match the activities with appropriate scales for the horizontal axis.

A) 0 days to 60 days
B) 0 seconds to 2 seconds
C) 0 minutes to 10 minutes
D) 0 hours to 24 hours
E) 0 hours to 10 hours
F) 0 minutes to 60 minutes
G) 0 seconds to 30 seconds
H) 0 days to 3 days

25. Graphing the amount of weight lost against the time spent on a new diet and exercise regimen
26. Graphing the distance traveled against the time taken to drive to work 30 miles away during rush hour
27. Graphing the length of a signature against the time spent writing it
28. Graphing the remaining amount of a sandwich against the time taken to eat it
29. Graphing the distance traveled against the time taken to fly from the east coast of the United States to the west coast

Day 10

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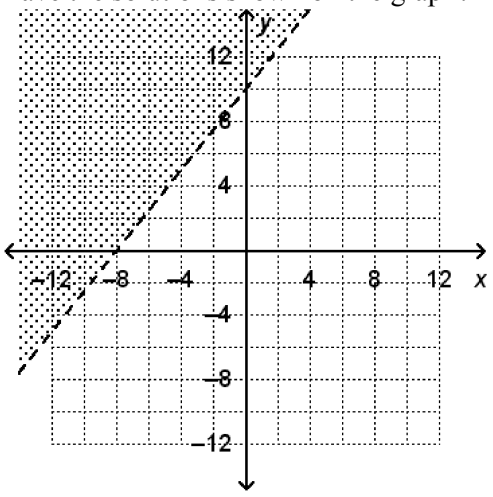
30. Which of the following inequalities have the solutions shown on the graph?



A) $5x - 4y < -40$

B) $5x + 4y > 40$

C) $y \geq \frac{5}{4}x + 10$

D) $y > \frac{5}{4}x + 10$

E) $-10x + 8y \leq 80$

F) $-10x + 8y > 80$

31. What must be done to the graph of $f(x) = |x|$ to obtain the graph of the function $g(x) = 0.5|x + 4| - 10$?

A) The graph of $f(x)$ is shifted left 4 units, horizontally shrunk by a factor of 0.5, and shifted down 10 units.

B) The graph of $f(x)$ is shifted right 4 units, vertically shrunk by a factor of 0.5, and shifted down 10 units.

C) The graph of $f(x)$ is shifted left 4 units, vertically shrunk by a factor of 0.5, and shifted down 10 units.

D) The graph of $f(x)$ is shifted left 4 units, vertically shrunk by a factor of 0.5, and shifted up 10 units.

32. Which of the following systems of equations has the same solution as the given system?
$-2x + 2y = -2$
$3x - y = 9$

A) $4x = 16$

B) $3x - y = 9$
$-2x + 2y = -2$

C) $6x - 2y = 9$
$-3x - 7y = 3$

D) $3x - y = 9$
$-2x + 2y = -2$

$x + y = 11$

Day 11

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33. Which of the following are equal to $\left(p^{-3}\right)^{\frac{2}{5}}$? Assume that p is positive. ***Select all that apply.***

A) $\sqrt[5]{p^{-6}}$

B) $\dfrac{1}{\sqrt{p^{15}}}$

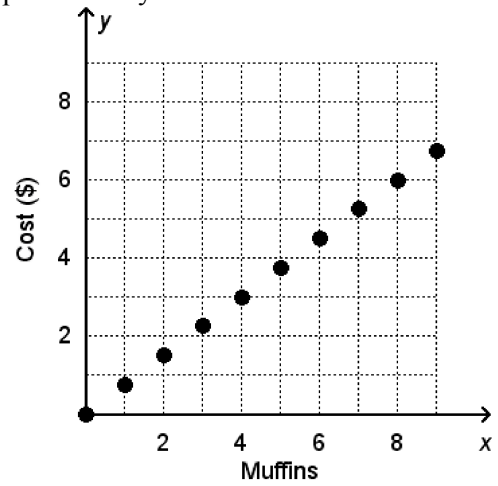
C) $\dfrac{1}{p^{30}}$

D) $\sqrt[5]{p^{-13}}$

E) $\dfrac{1}{p\sqrt[5]{p}}$

F) $\sqrt[10]{p^{-1}}$

34. A local store sells muffins for \$0.75 each. The graph below shows a customer's total bill C as a function of m muffins purchased, which can be represented by the function $C = 0.75m$.



Explain what the point at the origin represents.

Day 12

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35. What is the resulting polynomial when $3x + 7$ is multiplied by $2x - 6$?

A) $5x + 1$
B) $6x - 42$
C) $6x^2 - 4x - 42$
D) $6x^2 + 9x - 42$

36. The data set below shows 15 students' scores on a test. Describe the shape of the data distribution if the student who scored 100 is not included in the data set.

70	72	73	74	74
75	75	75	75	76
77	77	78	80	100

A) The data distribution is skewed right.
B) The data distribution is symmetric.
C) The data distribution is skewed left.
D) It is impossible to determine the shape of the data distribution.

37. Jewelers consider weight, cut grade, color, and clarity when pricing diamonds. In researching jewelry prices, Yvonne makes the following statements based on her observations. Which of the statements are statements of causation? ***Select all that apply.***

A) Heavier diamonds tend to be sold at higher prices.
B) A particular diamond costs $264.
C) Higher clarity drives up the price of a diamond.
D) There appears to be a relationship between color and price.
E) A darker color decreases a diamond's clarity.
F) Diamonds with lower cut grades seem to sell at lower prices.

Day 13

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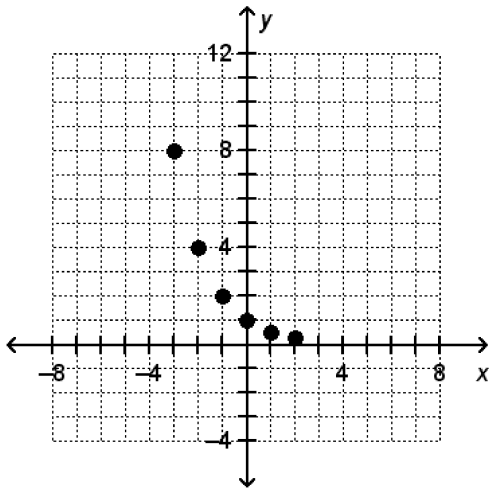
38. What are the domain and range of the function $y = f(x)$ as shown on the graph?



A) The domain is $\{0.25, 0.5, 1, 2, 4, 8\}$, and the range is $\{-3, -2, -1, 0, 1, 2\}$.
B) The domain is $\{-3, -2, -1, 0, 1, 2\}$ and the range is $\{0.25, 0.5, 1, 2, 4, 8\}$.
C) The domain is all real numbers between −3 and 2, and the range is all real numbers between 0.25 and 8.
D) The domain is all real numbers between 0.25 and 8, and the range is all real numbers between −3 and 2.

39. Determine whether each of the following are rational or irrational.

	Rational	Irrational
a. The product of $\sqrt{2}$ and 5		
b. $f(x) = x^2 + 2$ evaluated at $x = \sqrt{7}$		
c. The sum of $\sqrt{10}$ and $\sqrt{16}$		
d. $f(r) = \pi r^2$ evaluated at $r = 3$		

40. Which of the following is equal to $\sqrt[15]{\left(j^{-3}\right)^{-2}}$? Assume that j is positive.

A) $j^{-\frac{2}{5}}$
B) $j^{-\frac{1}{3}}$
C) $j^{\frac{5}{2}}$
D) $j^{\frac{2}{5}}$

Day 14

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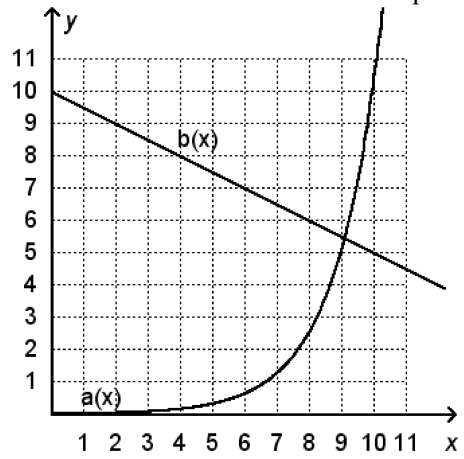
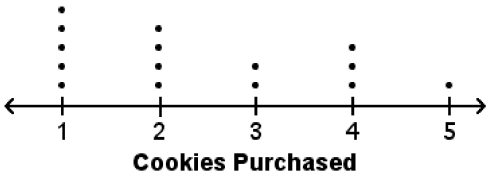
41. Which of the following is the best approximation of the solution of the equation $a(x) = b(x)$?



A) $x = 0$
B) $x = 5.5$
C) $x = 9$
D) x = 10

42. The data sets below show the numbers of cookies purchased by students at a bake sale. Which of the data sets is represented by the dot plot?



A) 2 2 4 4 1 1 5 1 3 2 1
B) 2 4 4 2 3 3 2 1 1 3 5 1 2 2 1
C) 1 2 1 1 2 1 2 2 3 4 5 1 3 4 4
D) 3 2 2 3 1 3 1 4 4 5 1 1 1 2 2

43. The function $f(x)$ is defined for only the values given in the table. Which function has the same x-intercepts as $f(x)$?

x	*f(x)*
-2	2.5
-1	0
0	-1.5
1	-2
2	-1.5
3	0
4	2.5

A) $g(x) = 2x + 2$

B) $h(x) = -\frac{1}{3}x + 2$

C) $j(x) = x^2 + 2x - 3$

D) $k(x) = |x - 1| - 2$

Day 15

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44. What is the solution to the following system of equations?

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

The surface area A of a rectangular prism with a given length l, width w, and height h is $A = 2lw + 2lh + 2wh$. Match each task with the resulting formula.

A) $w = \frac{A}{2h + 2l} - \frac{lh}{h + l}$

B) $l = \frac{hw - 0.5A}{w - h}$

C) $h = \frac{0.5A - lw}{l + w}$

D) $w = \frac{lh - 0.5A}{h - l}$

E) $h = \frac{A + 2lw}{2(l + w)}$

F) $l = \frac{-wh + \frac{1}{2}A}{h + w}$

45. Solving for the length of a rectangular prism with a given width, height, and surface area

46. Solving for the width of a rectangular prism with a given length, height, and surface area

47. Solving for the height of a rectangular prism with a given length, width, and surface area

Day 16

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48. A minor league baseball team wants to sell ad space on their outfield wall to local businesses. The team originally thinks about charging \$250 per ad. However, the local businesses know that the more ads there are, the less focus each individual ad will get, so they're not willing to pay as much per ad if they know there will be more of them. The team does market research and finds that they can get \$250 for one ad, \$245 per ad for two ads, \$240 per ad for three ads, and so on. The total revenue from all the outfield banners is calculated using the expression $a(250 - 5(a - 1))$. Interpret what the expression $250 - 5(a - 1)$ represents, and explain your reasoning.

49. Which of the following expressions can be rewritten as a sum of cubes, a difference of cubes, or a difference of squares? ***Select all that apply.***

A) $81 - x^4$
B) $n^6 + 64$
C) $y^5 - 9$
D) $25 - 4c^{16}$
E) $5p^3 + 27$
F) $216 - t^{18}$

50. Which of the following do not have integer exponents when rewritten in rational exponent form and simplified? Assume that s is nonnegative. ***Select all that apply.***

A) $\sqrt{s^4}$
B) $\sqrt[6]{s^3}$
C) $\sqrt[4]{s^6}$
D) $\sqrt[3]{s^9}$
E) $\sqrt[5]{s^{15}}$
F) $\sqrt[8]{s^2}$

Day 17

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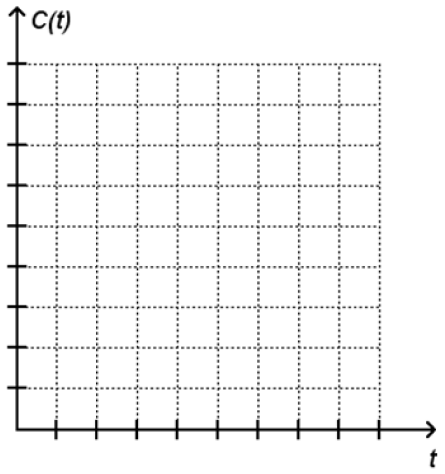
51. Will the simplified form of the sum of two quadratic polynomials with x^2 terms always have an x^2 term? Explain.

52. Martha's text message plan costs \$15.00 for the first 1000 text messages sent plus \$0.25 per text over 1000 sent. Let $C(t)$ represent the cost of sending t text messages over 1000. Sketch a graph of this relationship, and find and interpret the $C(t)$ -intercept.



53. In which quadrant is the solution to this system of equations?

$$\begin{cases} 2x + 5y = 1 \\ 3x - 4y = 13 \end{cases}$$

A) Quadrant I
B) Quadrant II
C) Quadrant III
D) Quadrant IV

Day 18

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54. The linear equation $c = 6.5n + 1500$ models cost c, in dollars, to produce n toys at a toy factory. What is the c-intercept, and what does it mean in this context?

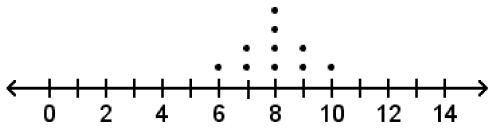
A) The c-intercept is 6.5. The cost increases by \$6.50 for each toy produced.
B) The c-intercept is 6.5. The number of toys produced increases by about 6.5 for each \$1 increase in cost.
C) The c-intercept is 1500. It costs \$1500 to run the factory if no toys are produced.
D) The c-intercept is 1500. The factory can produce 1500 toys at no cost.

55. Tucker is planting corn and tomatoes. He has 100 acres of farmland and wants to plant no less than 20 acres of each crop. Determine if each of the following inequalities are meaningful constraints on whether Tucker can plant c acres of corn and t acres of tomatoes.

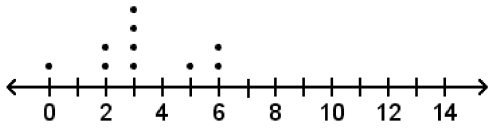
	Yes	No
a. $c \geq 20$		
b. $t < 20$		
c. $c + t \geq 100$		
d. $c + t \leq 100$		
e. $100 - c \geq 80$		

56. What is the best measure of center to use to compare the two data sets?

Grams of sugar per serving in cereal brand A:



Grams of sugar per serving in cereal brand B:



A) Median
B) Either the mean or the median
C) Interquartile range
D) Either the standard deviation or the interquartile range

Day 19

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57. The table shows the population of two cities. Which city's population is changing at a constant rate per year?

Year	City A	City B
2009	700,000	570,000
2010	697,500	580,000
2011	694,500	590,000
2012	690,500	600,000

A) A
B) B
C) Both A and B
D) Neither A nor B

58. A theme park costs \$25.00 to enter. One of the food stands within the park sells hot dogs for \$2.50 each and hamburgers for \$3.50 each. If Paul enters the park, walks to the food stand, and purchases d hot dogs and b hamburgers, the amount of money m he spends can be modeled by the equation $m = 2.5d + 3.5b + 25$. Which of the following are correct interpretations for parts of this equation? ***Select all that apply.***

A) $2.5d$ represents the cost of entering the park.
B) $2.5d$ represents the cost of purchasing d hot dogs.
C) $2.5d$ represents the cost of purchasing d hamburgers.
D) $3.5b$ represents the cost of entering the park.
E) $3.5b$ represents the cost of purchasing b hot dogs.
F) $3.5b$ represents the cost of purchasing b hamburgers.
G) 25 represents the cost of entering the park.
H) 25 represents the cost of purchasing d hot dogs and b hamburgers.

59. Which of the following properties would ***not*** be used to justify any of the steps below?

$$\frac{7}{2}n = 3n + 4$$

$$2\left(\frac{7}{2}n\right) = 2(3n + 4)$$

$$7n = 6n + 8$$

$$7n - 6n = 6n + 8 - 6n$$

$$n = 8$$

A) Subtraction Property of Equality
B) Multiplication Property of Equality
C) Distributive Property
D) Zero Product Property

Day 20

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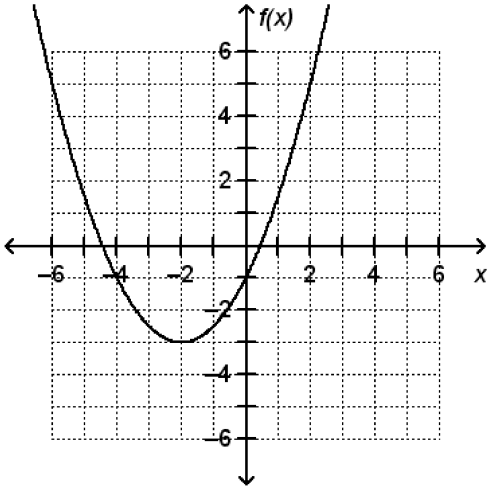
60. Classify $\left(5 - \sqrt{2}\right)\left(10 + \sqrt{8}\right)$ as rational or irrational. Explain your reasoning.

61. A theater has 18 rows of seats. There are 22 seats in the first row, 26 seats in the second row, 30 seats in the third row, and so on. Which of the following is a recursive formula for the arithmetic sequence that represents this situation?

A) $f(0) = 18, f(n) = f(n - 1) + 4$ for $1 \le n \le 18$
B) $f(1) = 22, f(n) = f(n - 1) + 4$ for $2 \le n \le 18$
C) $f(n) = 18 + 4n$
D) $f(n) = 22 + 4(n - 1)$

62. The graph of the quadratic function $f(x)$ is shown below. What is the domain of $f(x)$?



A) The integers greater than −3.
B) The real numbers greater than −3.
C) The integers
D) The real numbers

Day 21

---

63. What is the type and strength of the linear correlation in the following data, using x as the dependent variable?

x	*y*
1.2	5.3
3.2	6.7
3.3	3.3
4.5	4.3
6.1	5.5
6.3	2.1
7.1	0.5
9.6	0.75
9	4.1

A) Strong negative correlation
B) Weak negative correlation
C) Weak positive correlation
D) Strong positive correlation

64. Emile is saving money to buy a bicycle. The amount he has saved is shown in the table. Which of the functions below describe the amount A, in dollars, Emile has saved after t weeks? ***Select all that apply.***

Weeks	Amount
1	\$30
2	\$45
3	\$60
4	\$75
5	\$90
6	\$105

A) $A(t) = 15 + 15(t - 1)$
B) $A(t) = 30 + 15(t - 1)$
C) $A(t) = 15 + 15t$
D) $A(t) = 30 + 15t$
E) $A(t) = 30(1.5)^t$
F) $A(t) = 15(2)^t$

Day 22

---

65. The table shows the batting averages of 12 professional baseball players last season. If the value 0.360 is removed from the data set, how do each of the following statistics change?

0.360	0.325	0.325	0.319
0.305	0.296	0.296	0.291
0.285	0.279	0.279	0.277

	Decreases	No Change	Increases
a. Mean			
b. Median			
c. Standard deviation			
d. Interquartile range			
e. Range			

66. Students at a bake sale sell bags of cookies for \$2.25 each and bags of miniature muffins for \$1.50 each. While selling their baked goods, the students also received a \$25 donation. The amount of money the students make from selling c bags of cookies and m bags of muffins can be modeled by the expression $2.25c + 1.5m + 25$. Interpret the expression $2.25c + 1.5m$ in this context.

A) The expression $2.25c + 1.5m$ represents the money earned from selling c bags of cookies.
B) The expression $2.25c + 1.5m$ represents the money earned from selling m bags of muffins.
C) The expression $2.25c + 1.5m$ represents the money earned from selling c bags of cookies and m bags of muffins.
D) The expression $2.25c + 1.5m$ represents the money earned from selling one bag of cookies and one bag of muffins.

Day 23

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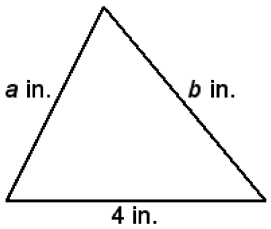
67. The perimeter of the triangle below is an irrational number.



Which of the following are possible values of a and b?

A) $a = 3 + \sqrt{7}, b = 5 - \sqrt{7}$
B) $a = 4, b = \frac{1}{5}$
C) $a = \sqrt{3}, b = 5$
D) $a = 3, b = \sqrt{5}$
E) $a = 13.\overline{3}, b = 16.\overline{6}$
F) $a = \frac{8}{3}, b = \frac{5}{3}$

68. The linear equation $c = 0.1998s + 76.4520$ models the number of calories c in a beef hot dog as a function of the amount of sodium s, in milligrams, in the hot dog. What is the slope, and what does it mean in this context?

A) The slope is 0.1998. The number of calories is increased by 0.1998 for each 1 milligram increase in sodium.
B) The slope is 0.1998. The amount of sodium, in milligrams, is increased by 0.1699 for each increase of 1 calorie.
C) The slope is 76.4520. This is the number of calories in a beef hot dog with no sodium.
D) The slope is 76.4520. This is the amount of sodium, in milligrams, in a beef hot dog with no calories.

Day 24

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69. The formula for passing efficiency P in NCAA football is $P = \frac{8.4Y + 330T + 100C - 200I}{A}$

where Y is the number of passing yards, T is the number of passing touchdowns, C is the number of completed passes, I is the number of interceptions, and A is the number of attempts. Write an equation that will calculate the completed passes for a quarterback with a given passing efficiency, number of passing yards, number of passing touchdowns, number of interceptions, and number of attempts. Show your work.

70. Shawn jogs n blocks, each of which are d meters long, in t minutes. What are the units for the expression $\frac{nd}{t}$, Shawn's average speed for his jog?

A) blocks
B) meters
C) minutes
D) meters per minute

71. Write $\left(c^{-9}d^{12}\right)^{-\frac{5}{6}}$ using only positive exponents. Assume c and d are both positive. Show all work.

Day 25

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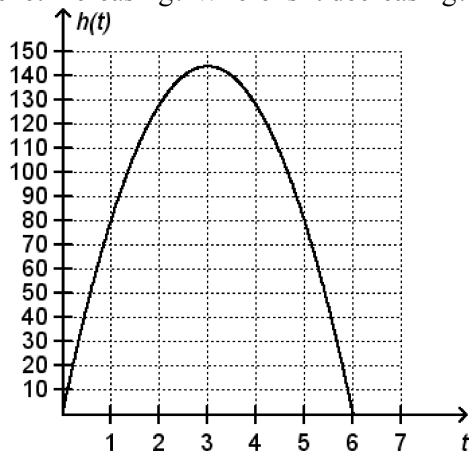
72. The graph shows the height $h(t)$ of a model rocket t seconds after it is launched from the ground at 48 feet per second. Where is the height of the rocket increasing? Where is it decreasing?



A) The height of the rocket is always increasing.
B) The height of the rocket is always decreasing.
C) The height of the rocket is increasing when $0 < t < 3$ and decreasing when $3 < t < 6$.
D) The height of the rocket is increasing when $3 < t < 6$ and decreasing when $0 < t < 3$.

73. Susie's Clothing Store sells sweatshirts for \$30 and sweatpants for \$25. The Drama Club buys a total of 100 sweatshirts and sweatpants and spends \$2825. Which model describes this situation?

A) $\begin{cases} \$30(\text{the number of sweatshirts}) + \$25(\text{the number of sweatpants}) = \$2825 \\ \text{the number of sweatshirts} + \text{the number of sweatpants} = 100 \end{cases}$

B) $\begin{cases} \$30(\text{the number of sweatshirts}) + \$25(\text{the number of sweatpants}) = \$2825 \\ \text{the number of sweatshirts} - \text{the number of sweatpants} = 100 \end{cases}$

C) $\begin{cases} \$25(\text{the number of sweatshirts}) + \$30(\text{the number of sweatpants}) = \$2825 \\ \text{the number of sweatshirts} + \text{the number of sweatpants} = 100 \end{cases}$

D) $\begin{cases} \$30(\text{the number of sweatshirts}) + \$30(\text{the number of sweatpants}) = \$2825 \\ \$25(\text{the number of sweatshirts}) + \$25(\text{the number of sweatpants}) = \$2825 \end{cases}$

74. What is the best measure of spread to use to compare the two data sets?

Income of ten recent graduates from college A (in thousands of dollars per year):
0 35 38 39 45 47 50 51 52 52
Income of ten recent graduates from college B (in thousands of dollars per year):
29 35 36 37 38 39 41 42 46 400

A) Median
B) Either the mean or the median
C) Interquartile range
D) Either the standard deviation or the interquartile range

Day 26

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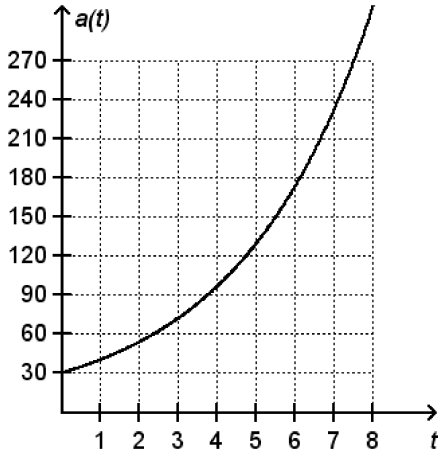
75. The linear equation $p = 2376t + 73,219$ estimates the number of college seniors p who graduated with a bachelor's degree in psychology t years after 2000. The linear equation $b = 2,376t + 56,545$ models the number of college seniors b who graduated with a bachelor's degree in biology t years after 2000. ***Select all the true statements.***

A) The number of psychology degrees increases by about 73,219 each year.
B) The number of biology degrees increases by about 2376 each year.
C) About 73,000 students graduated with degrees in psychology in 2000.
D) About 57 students graduated with degrees in biology in 2000.
E) In 2000, more students graduated with psychology degrees than biology degrees.

76. A website allows its users to submit and edit content in an online encyclopedia. The graph shows the number of articles $a(t)$ in the encyclopedia t months after the website goes live. How many articles were in the encyclopedia when it went live?



A) 0
B) 30
C) 60
D) 180

77. Factor the expression $4x^2 + 4x - 15$. What are the zeros of $f(x)$?

Day 27

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78. Which of the following are equivalent to $f(x) = 16^x$? ***Select all that apply.***

A) $g(x) = 8 \cdot 2^x$
B) $g(x) = 4096 \cdot 16^{x-3}$
C) $g(x) = 4 \cdot 4^x$
D) $g(x) = 0.0625 \cdot 16^{x+1}$
E) $g(x) = 32 \cdot 16^{x-2}$
F) $g(x) = 2 \cdot 8^x$

79. The population A of town A and the population B of town B t years after 2000 is described in the table.

Time, t (years)	Town A population, $A(t)$	Town B population, $B(t)$
0	1500	1500
1	1800	1725
2	2100	1984
3	2400	2281
4	2700	2624
5	3000	3017
6	3300	3470
7		
8		

Write functions for $A(t)$ and $B(t)$.

Day 28

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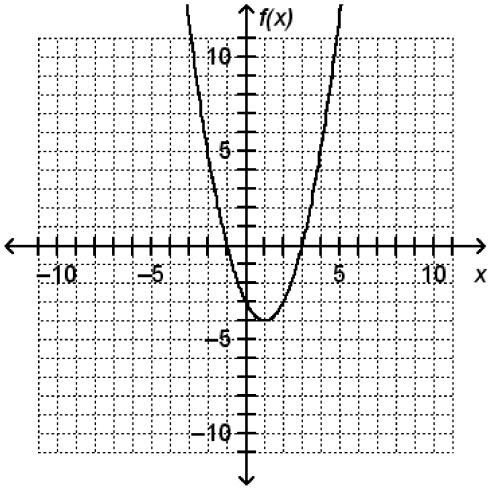
80. Zach earns \$10 for every lawn he rakes and \$15 for every lawn he mows. He deposits \$500 into his college fund at the end of the summer. Which model describes the relationship between work and money earned?

A) \$15(lawns raked) + \$10(lawns mowed) = \$500
B) \$10(lawns raked) + \$15(lawns mowed) = \$500
C) (lawns raked) + (lawns mowed) = \$500
D) \$10(lawns raked) + \$15(lawns mowed) = \$25

81. A ball is thrown up into the air. Its height h above the ground in feet is modeled by the equation $h = -16t^2 + 24t + 5$, where t is the time in seconds after the ball is thrown. Complete the square to determine the ball's maximum height and the amount of time the ball takes to reach that height. Could this ball land on the roof of a 20-foot-tall building? Show your work.

82. What is the vertex of the quadratic function $f(x)$? Is it a maximum or a minimum?



A) (1, –4); minimum
B) (0, –3); minimum
C) (–1, 0); minimum
D) (3, 0); maximum

Day 29

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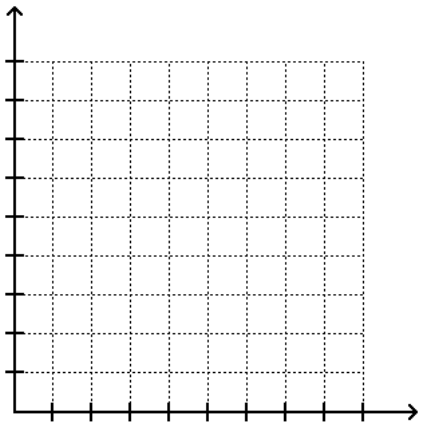
83. Which of the following polynomial functions have graphs that intersect the horizontal axis at least twice?

A) $f(x) = x^2 + 10x + 9$
B) $f(x) = x^2 - 10x + 25$
C) $f(x) = x^2 - 81$
D) $f(x) = (x - 1)(x^2 + 9x + 20)$
E) $f(x) = (x - 4)(x^2 - 8x + 16)$
F) $f(x) = (x + 2)(x^2 - 4x + 4)$

84. The height above the ground in feet of an object h with an initial upward velocity in feet per second v_0 and an initial height in feet h_0 is $h = -16t^2 + v_0t + h_0$, where t is the time in seconds. A baseball player hits a ball 3 feet above the ground with an initial upward velocity of 96 feet per second. Write an equation for the height of the ball above the ground in feet h in terms of time in seconds t, graph the equation, choosing appropriate axis labels and scales, and then determine the maximum height of the ball. Show your work.



Day 30

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85. Rewrite $4x^2 - 16x - 21 = 12$ in the form $(x - p)^2 = q$ by completing the square. Show your work.

86. Denise wants to burn at least 5000 calories a week through running. Based on her running speed, she estimates that she can burn 550 calories per hour. Write an inequality that represents Denise's goal in terms of the number of hours spent running h. If Denise runs for one half hour each week day and one hour each weekend day, will she meet her goal? Justify your answer.

87. Which of the following statements present(s) valid reasoning? ***Select all that apply.***

A) $x^6 + 81$ can be rewritten as $(x^2)^3 + (3)^3$ and factored as a sum of two cubes.
B) $49c^2 - 154c + 121$ can be rewritten as $(7c)^2 - 2(7c)(11) + 11^2$ and factored as a perfect square trinomial.
C) $36p^4 + 96p + 64$ can be rewritten as $(6p^2)^2 + 2(6p^2)(8) + 8^2$ and factored as a perfect square trinomial.
D) $x^4 + 16$ can be rewritten as $(x^2)^2 - (-4)^2$ and factored as a difference of squares.
E) $x^{18} - 8$ can be rewritten as $(x^6)^3 - 2^3$ and factored as a difference of cubes.
F) $x^9 + 64$ cannot be factored as the sum of two cubes because x^9 is a perfect cube and 64 is a perfect square.

Day 31

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88. The table below shows the balance b, in dollars, of Daryl's savings account t years after he made an initial deposit. What is an explicit formula for the geometric sequence that represents this situation?

Time, t (years)	Balance, b (dollars)
1	\$1218
2	\$1236.27
3	\$1254.81
4	\$1273.64

A) $b(t) = 1.015(1218)^{t-1}$
B) $b(t) = 1218(1.015)^{t}$
C) $b(t) = 1218 + 1.015(t - 1)$
D) $b(t) = 1218(1.015)^{t-1}$

89. Each bacterium in a petri dish splits into 2 bacteria after one day. The function $b(d) = 600 \cdot 2^{d}$ models the number of bacteria b in the petri dish after d days. What is the initial number of bacteria in the petri dish?

A) 2
B) 300
C) 600
D) 1200

90. Determine which functions have a minimum value that is greater than zero.

A) $f(x) = x^2 - 6x + 5$
B) $f(x) = x^2 + 4x + 7$
C) $f(t) = t^2 + 8t - 10$
D) $f(n) = n^2 + 10n + 11$
E) $f(p) = p^2 - 2p + 8$

Day 32

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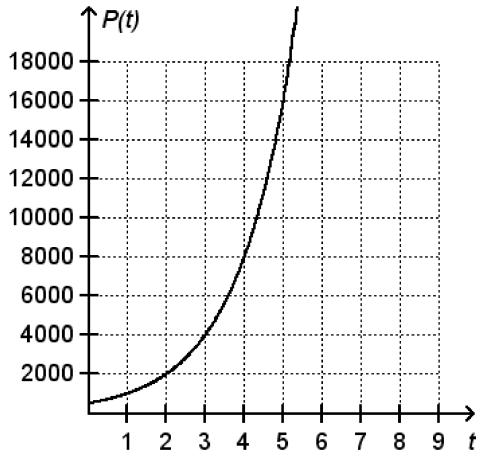
91. The growth of a population of bacteria can be modeled by an exponential function. The graph models the population of the bacteria colony $P(t)$ as a function of the time t, in weeks, that has passed. The initial population of the bacteria colony was 500. What is the domain of the function? What does the domain represent in this context?



A) The domain is the real numbers greater than 500. The domain represents the time, in weeks, that has passed.
B) The domain is the real numbers greater than 500. The domain represents the population of the colony after a given number of weeks.
C) The domain is the nonnegative real numbers. The domain represents the time, in weeks, that has passed.
D) The domain is the nonnegative real numbers. The domain represents the population of the colony after a given number of weeks.

92. Determine the number of solutions for each system of equations.

		Zero	One	Infinitely Many
a.	$\begin{cases} 2x - y = 1 \\ x + 5y = 6 \end{cases}$			
b.	$\begin{cases} 2x + 3y = 12 \\ 4x + 6y = 24 \end{cases}$			
c.	$\begin{cases} -x + 4y = -17 \\ 2x - 3y = 6 \end{cases}$			
d.	$\begin{cases} 5x + 8y = 6 \\ -3x - 4y = -4 \end{cases}$			
e.	$\begin{cases} 4x - 6y = 15 \\ -6x + 9y = 12 \end{cases}$			

93. The function $A(d) = 0.45d + 180$ models the amount A, in dollars, that Terry's company pays him based on the round-trip distance d, in miles, that Terry travels to a job site. How much does Terry's pay increase for every mile of travel?

A) \$0.45
B) \$180.00
C) \$180.45
D) \$180.90

Day 33

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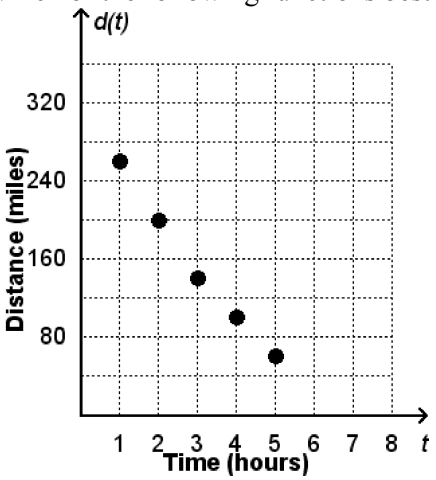
94. After t days, the mass m, in grams, of 100 grams of a certain radioactive element is given by the function $m(t) = 100(0.97)^t$. To the nearest percent, what is the weekly decay rate of the element?

A) 3%
B) 19%
C) 21%
D) 81%

95. The data for the distance d, in miles, remaining for a train to travel to its destination t hours after it departs a station are shown in the scatter plot. Which of the following functions best fits the data?

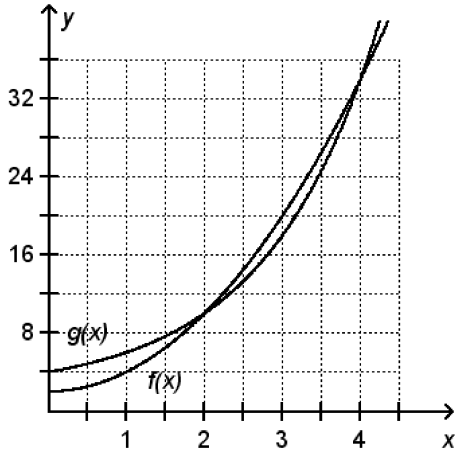


A) $d(t) = 50t + 300$
B) $d(t) = 50t$
C) $d(t) = -50t + 300$
D) $d(t) = -50t$

96. Find the average rate of change of the function $f(x) = 2\sqrt{x-5} + 3$ from $x = 9$ to $x = 21$.

A) -3
B) $-\frac{1}{3}$
C) $\frac{1}{3}$
D) 3

97. $f(x) = 2x^2 + 2$ and $g(x) = 2^{x+1} + 2$ are graphed on the grid below. For what x-values is $g(x) > f(x)$?



A) $x > 4$
B) $x > 2$
C) $0 < x < 2$ and $x > 4$
D) $2 < x < 4$

Day 34

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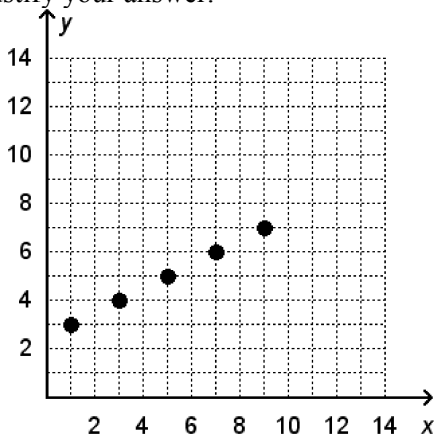
98. A linear equation has a graph that goes through the points shown below and extends infinitely in both directions. Is (13, 9) a solution of this equation? Justify your answer.



99. Which of the following statements are supported by the survey data in the two-way frequency table? ***Select all that apply.***

	Right-handed	**Left-handed**	**Total**
Males	82	23	105
Females	79	16	95
Total	161	39	200

A) The joint relative frequency that a person surveyed is female and left-handed is about 0.168, or 16.8%.
B) The conditional relative frequency that a person surveyed is female, given that the person is right-handed, is about 0.4907, or 49.07%.
C) The joint relative frequency that a person surveyed is male and is right-handed is about 0.41, or 41%.
D) The conditional relative frequency that a person surveyed is right-handed, given that the person is male, is about 0.5093, or 50.93%.
E) The marginal relative frequency that a person surveyed is left-handed is about 0.195, or 19.5%.

100. Which of the functions below could be used to generate the sequence 1, 2, 4, 8, 16, 32, …?

A) $f(n) = 2^n$, where $n \geq 0$ and n is an integer.
B) $f(n) = 2^n$, where $n \geq 1$ and n is an integer.
C) $f(1) = 1, f(n) = 2(f(n-1))$, where $n \geq 2$ and n is an integer.
D) $f(n) = 2(n-1)$, where $n \geq 1$ and n is an integer.
E) $f(n) = n^2$, where $n \geq 1$ and n is an integer.

Day 35

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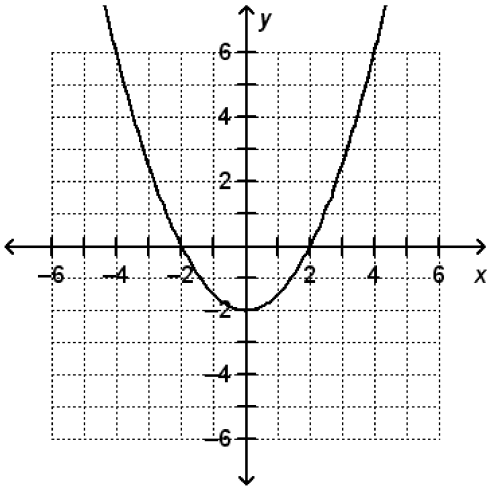
101. Which of the following inequalities have solution sets that only include positive numbers? ***Select all that apply.***

A) $3g - 7 < -2g + 3$
B) $-5h + 1 < -2h - 17$
C) $8 < -2k + 12$
D) $7m + 15 < 8m + 12$
E) $2n + 7 - 6n < -10n - 11 + 3n$

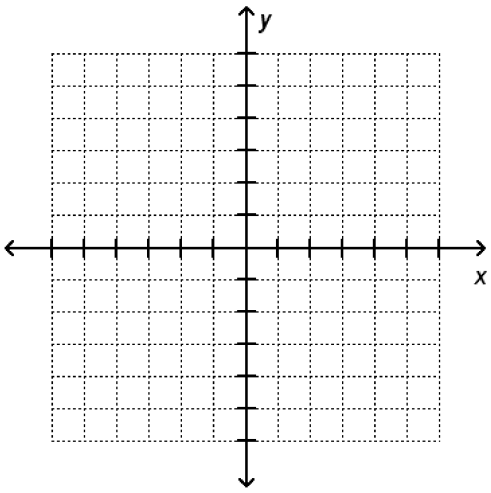
102. A quadratic function is shown below. Which function has the same domain?



A) $f(x) = \sqrt{x-2}$
B) $g(x) = \sqrt{x} - 2$
C) $h(x) = |x - 2|$
D) $k(x) = 3^x, x \geq -2$

103. Graph the solution set of the system.

$$\begin{cases} 8x + 5y > 40 \\ -6x + 2y \geq -18 \end{cases}$$



Day 36

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104. Let $n = 4m$. Rewrite $\sqrt[3n]{a^{2m}}$ in rational exponent form and simplify. Assume that m is positive.

105. If the mean of a data set is 20, the standard deviation is 1.5, and the distribution of the data values is approximately normal, about 95% of the data values fall in what interval centered on the mean?

A) 18.5 to 21.5
B) 17 to 23
C) 15.5 to 24.5
D) 14 to 26

106. The math club is having a fundraiser, selling mugs for \$5 each and T-shirts for \$10 each. The club raised \$1000. Which model describes the relationship between sales and money raised?

A) \$5(the number of mugs sold) + \$10(the number of T-shirts sold) = \$15
B) \$10(the number of mugs sold) + \$5(the number of T-shirts sold) = \$1000
C) \$5(the number of mugs sold) + \$10(the number of T-shirts sold) = \$1000
D) \$5(the number of mugs sold) − \$10(the number of T-shirts sold) = \$1000

Day 37

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107. The domain of the function $f(x)$ is the set of integers greater than −5. Which of the following values represent elements of the range of f?

A) $f(4.8)$
B) $f(-2)$
C) $f(-5)$
D) $f(8)$
E) $f\left(\frac{1}{2}\right)$
F) $f(0)$
G) $f(14)$
H) $f(-18)$

108. Which of the following data sets are **NOT** likely to be normally distributed? ***Select all that apply.***

A) The day of the month on which randomly selected students were born
B) The final exam scores of all students taking the same class and given the same final exam in a large school district
C) The number of wheels on the next 100 vehicles that pass by a point along a highway
D) The heights of tenth-grade male students at a large high school
E) The IQs of the students at a large high school

109. Which of these functions describe exponential growth?

A) $f(t) = 1.25^t$
B) $f(t) = 2(0.93)^{0.5t}$
C) $f(t) = 3(1.07)^{3t}$
D) $f(t) = 18(0.85)^t$
E) $f(t) = 0.5(1.05)^t$
F) $f(t) = 3(1.71)^{5t}$
G) $f(t) = 0.68^{2t}$
H) $f(t) = 8(1.56)^{1.4t}$

Day 38

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110. The solution to the system of equations $x + y = 1$ and $x - y = -7$ is $(-3, 4)$. This solution is NOT a solution to which of the following equations?

A) $x + y - 2(x - y) = 1 - 2(-7)$
B) $3(x + y) + x - y = 3(1) - 7$
C) $x + y + 5(x - y) = 5(1) - 7$
D) $-4(x + y) + x - y = 1 - 4(-7)$
E) $x + y - x + y = 1 + 7$

111. What is the inverse of $f(x) = -2x + 6$?

A) $g(x) = \frac{1}{2}x - 3$
B) $g(x) = -\frac{1}{2}x + 3$
C) $g(x) = 2x - 6$
D) $g(x) = -\frac{1}{2}x + 6$

112. Carly surveyed some of her fellow students to determine whether they are more afraid of spiders or snakes, are equally afraid of both, or are afraid of neither. She organized the data into the two-way relative frequency table below. What is the joint relative frequency of the students surveyed who are boys and are equally afraid of both snakes and spiders?

	Spiders	**Snakes**	**Both**	**Neither**	**Total**
Boys	0.23	0.17	0.06	0.04	0.49
Girls	0.21	0.19	0.09	0.02	0.51
Total	0.43	0.36	0.15	0.06	1

(Note: Rounding may cause the totals to be off by 0.01.)

A) 0.06
B) 0.09
C) 0.15
D) 0.40

Day 39

Match each sequence with a function that generates it.

A) $f(n) = 3n$, $n \geq 1$ and n is an integer.
B) $f(n) = 2n(n + 1)$, $n \geq 1$ and n is an integer.
C) $f(n) = 2(n + 2)$, $n \geq 0$ and n is an integer.
D) $f(n) = \frac{n-1}{n}$, $n \geq 1$ and n is an integer.
E) $f(n) = n^2 + 2$, $n \geq 1$ and n is an integer.
F) $f(1) = 48$ and $f(n) = \frac{1}{2}f(n-1)$, $n \geq 2$ and n is an integer.
G) $f(1) = 48$ and $f(n) = 2f(n-1)$, $n \geq 2$ and n is an integer.
H) $f(n) = \frac{n}{n+1}$, $n \geq 1$ and n is an integer.

113. 4, 12, 24, 40, 60,…
114. 3, 6, 11, 18, 27, …
115. 3, 6, 9, 12, 15, …
116. 48, 24, 12, 6, 3, …
117. $0, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots$

Day 40

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118. The manager of a factory tested 50 items produced during each of the three work shifts. The data are summarized in the two-way frequency table below.

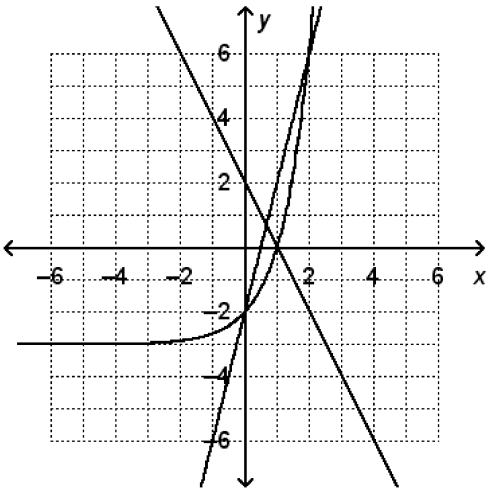
	1st shift	2nd shift	3rd shift	Total
Not defective	48	49	41	138
Defective	2	1	9	12
Total	50	50	50	150

What is the conditional relative frequency that a tested item is defective, given that it was produced during the first shift? during the second shift? during the third shift?

119. Identify which of the following functions have at least one zero greater than 4.

A) $w(c) = c^2 + 11c + 30$
B) $f(x) = x^2 - 5x - 14$
C) $g(x) = x^2 + 5x - 24$
D) $v(a) = a^2 - 5a + 6$
E) $s(t) = t^2 - 3t - 54$
F) $h(x) = x^2 - 2x - 24$

120. Based on the graph, Bryce says that (1, 0) is the solution of $y = 3^x - 3$ and $-4x + y = -2$ because their graphs intersect at that point.



What was Bryce's error?

121. Graph the equations $y = 2^x$ and $y = 4x$. Use the graph to estimate the solution(s) of the equation $2^x = 4x$.