

JMAP REGENTS BY TYPE

The NY Algebra 1 CCSS Regents Exams Questions
from Fall 2013 to August 2015 Sorted by Type

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Algebra 1 Common Core State Standards Multiple Choice Regents Exam Questions

1 Which table of values represents a linear relationship?

1)

x	f(x)
-1	-3
0	-2
1	1
2	6
3	13

2)

x	f(x)
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8

3)

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

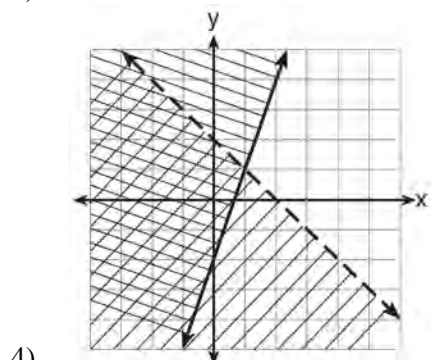
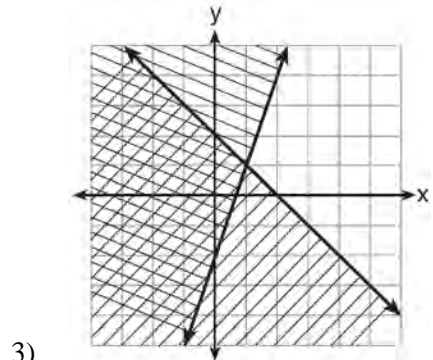
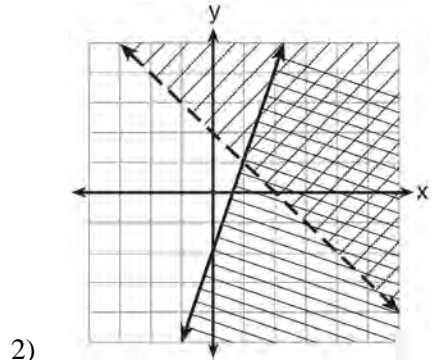
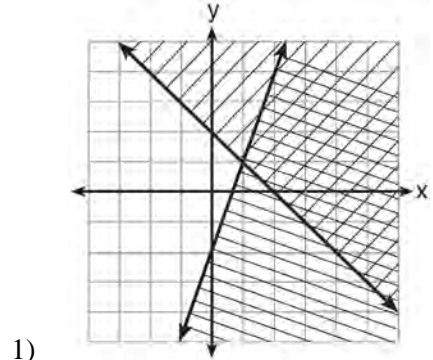
4)

x	f(x)
-1	-1
0	0
1	1
2	8
3	27

2 Given: $y + x > 2$

$$y \leq 3x - 2$$

Which graph shows the solution of the given set of inequalities?



3 If $f(x) = \frac{\sqrt{2x+3}}{6x-5}$, then $f\left(\frac{1}{2}\right) =$

- 1) 1
- 2) -2
- 3) -1
- 4) $-\frac{13}{3}$

4 Rowan has \$50 in a savings jar and is putting in \$5 every week. Jonah has \$10 in his own jar and is putting in \$15 every week. Each of them plots his progress on a graph with time on the horizontal axis and amount in the jar on the vertical axis. Which statement about their graphs is true?

- 1) Rowan's graph has a steeper slope than Jonah's.
- 2) Rowan's graph always lies above Jonah's.
- 3) Jonah's graph has a steeper slope than Rowan's.
- 4) Jonah's graph always lies above Rowan's.

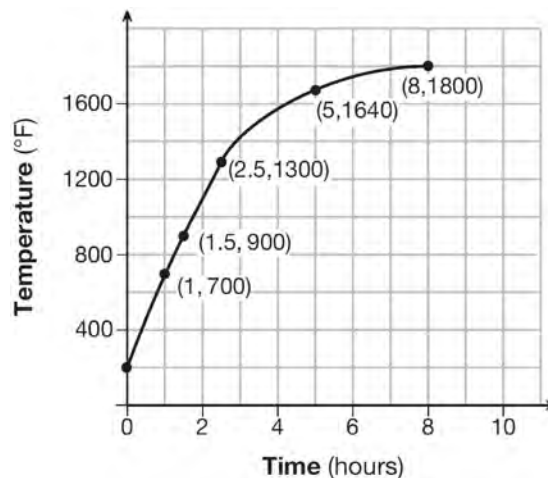
5 During the 2010 season, football player McGee's earnings, m , were 0.005 million dollars more than those of his teammate Fitzpatrick's earnings, f . The two players earned a total of 3.95 million dollars. Which system of equations could be used to determine the amount each player earned, in millions of dollars?

- 1) $m + f = 3.95$
 $m + 0.005 = f$
- 2) $m - 3.95 = f$
 $f + 0.005 = m$
- 3) $f - 3.95 = m$
 $m + 0.005 = f$
- 4) $m + f = 3.95$
 $f + 0.005 = m$

6 The cost of airing a commercial on television is modeled by the function $C(n) = 110n + 900$, where n is the number of times the commercial is aired. Based on this model, which statement is true?

- 1) The commercial costs \$0 to produce and \$110 per airing up to \$900.
- 2) The commercial costs \$110 to produce and \$900 each time it is aired.
- 3) The commercial costs \$900 to produce and \$110 each time it is aired.
- 4) The commercial costs \$1010 to produce and can air an unlimited number of times.

7 Firing a piece of pottery in a kiln takes place at different temperatures for different amounts of time. The graph below shows the temperatures in a kiln while firing a piece of pottery after the kiln is preheated to 200°F.



During which time interval did the temperature in the kiln show the greatest average rate of change?

- 1) 0 to 1 hour
- 2) 1 hour to 1.5 hours
- 3) 2.5 hours to 5 hours
- 4) 5 hours to 8 hours

- 8 The zeros of the function $f(x) = (x + 2)^2 - 25$ are
- 1) -2 and 5
 - 2) -3 and 7
 - 3) -5 and 2
 - 4) -7 and 3

- 9 If Lylah completes the square for $f(x) = x^2 - 12x + 7$ in order to find the minimum, she must write $f(x)$ in the general form $f(x) = (x - a)^2 + b$. What is the value of a for $f(x)$?
- 1) 6
 - 2) -6
 - 3) 12
 - 4) -12

- 10 What are the solutions to the equation $x^2 - 8x = 24$?
- 1) $x = 4 \pm 2\sqrt{10}$
 - 2) $x = -4 \pm 2\sqrt{10}$
 - 3) $x = 4 \pm 2\sqrt{2}$
 - 4) $x = -4 \pm 2\sqrt{2}$

- 11 The equation for the volume of a cylinder is $V = \pi r^2 h$. The positive value of r , in terms of h and V , is
- 1) $r = \sqrt{\frac{V}{\pi h}}$
 - 2) $r = \sqrt{V\pi h}$
 - 3) $r = 2V\pi h$
 - 4) $r = \frac{V}{2\pi}$

- 12 Isaiah collects data from two different companies, each with four employees. The results of the study, based on each worker's age and salary, are listed in the tables below.

Company 1

Worker's Age in Years	Salary in Dollars
25	30,000
27	32,000
28	35,000
33	38,000

Company 2

Worker's Age in Years	Salary in Dollars
25	29,000
28	35,500
29	37,000
31	65,000

Which statement is true about these data?

- 1) The median salaries in both companies are greater than \$37,000.
- 2) The mean salary in company 1 is greater than the mean salary in company 2.
- 3) The salary range in company 2 is greater than the salary range in company 1.
- 4) The mean age of workers at company 1 is greater than the mean age of workers at company 2.

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13 If $A = 3x^2 + 5x - 6$ and $B = -2x^2 - 6x + 7$, then $A - B$ equals

- 1) $-5x^2 - 11x + 13$
- 2) $5x^2 + 11x - 13$
- 3) $-5x^2 - x + 1$
- 4) $5x^2 - x + 1$

14 Given the graph of the line represented by the equation $f(x) = -2x + b$, if b is increased by 4 units, the graph of the new line would be shifted 4 units

- 1) right
- 2) up
- 3) left
- 4) down

15 Joey enlarged a 3-inch by 5-inch photograph on a copy machine. He enlarged it four times. The table below shows the area of the photograph after each enlargement.

Enlargement	0	1	2	3	4
Area (square inches)	15	18.8	23.4	29.3	36.6

What is the average rate of change of the area from the original photograph to the fourth enlargement, to the nearest tenth?

- 1) 4.3
- 2) 4.5
- 3) 5.4
- 4) 6.0

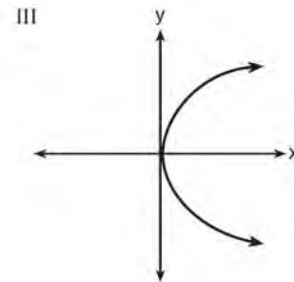
16 Keith determines the zeros of the function $f(x)$ to be -6 and 5 . What could be Keith's function?

- 1) $f(x) = (x + 5)(x + 6)$
- 2) $f(x) = (x + 5)(x - 6)$
- 3) $f(x) = (x - 5)(x + 6)$
- 4) $f(x) = (x - 5)(x - 6)$

17 Which representations are functions?

I

x	y
2	6
3	-12
4	7
5	5
2	-6



II $\{(1,1), (2,1), (3,2), (4,3), (5,5), (6,8), (7,13)\}$ IV $y = 2x + 1$

- 1) I and II
- 2) II and IV
- 3) III, only
- 4) IV, only

18 Which situation could be modeled by using a linear function?

- 1) a bank account balance that grows at a rate of 5% per year, compounded annually
- 2) a population of bacteria that doubles every 4.5 hours
- 3) the cost of cell phone service that charges a base amount plus 20 cents per minute
- 4) the concentration of medicine in a person's body that decays by a factor of one-third every hour

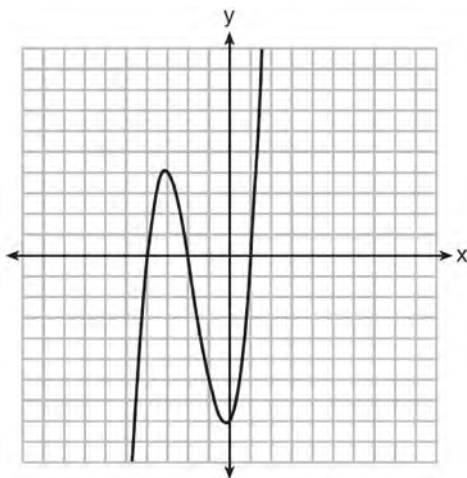
19 The length of the shortest side of a right triangle is 8 inches. The lengths of the other two sides are represented by consecutive odd integers. Which equation could be used to find the lengths of the other sides of the triangle?

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

20 Alicia has invented a new app for smart phones that two companies are interested in purchasing for a 2-year contract. Company A is offering her \$10,000 for the first month and will increase the amount each month by \$5000. Company B is offering \$500 for the first month and will double their payment each month from the previous month. Monthly payments are made at the end of each month. For which monthly payment will company B's payment first exceed company A's payment?

- 1) 6
- 2) 7
- 3) 8
- 4) 9

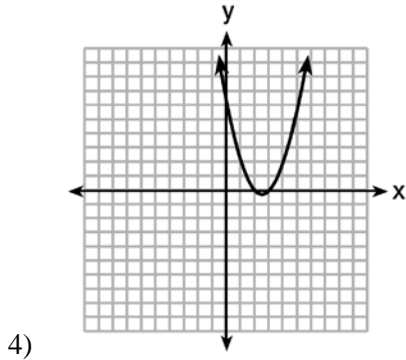
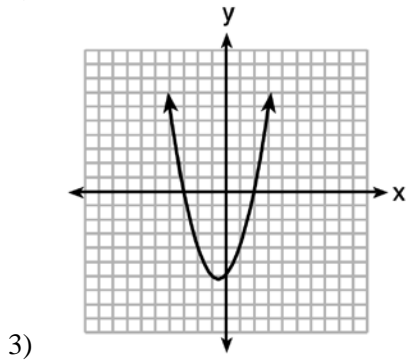
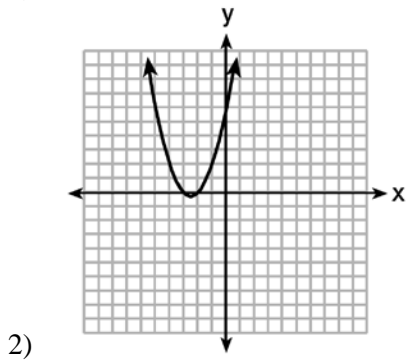
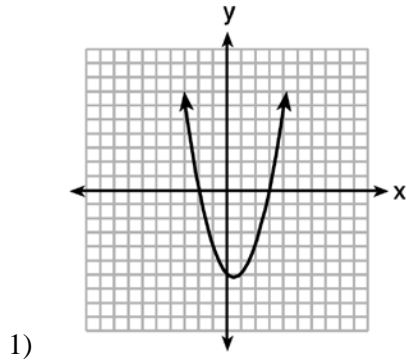
21 The graph of $f(x)$ is shown below.



Which function could represent the graph of $f(x)$?

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

22 The graphs below represent functions defined by polynomials. For which function are the zeros of the polynomials 2 and -3 ?



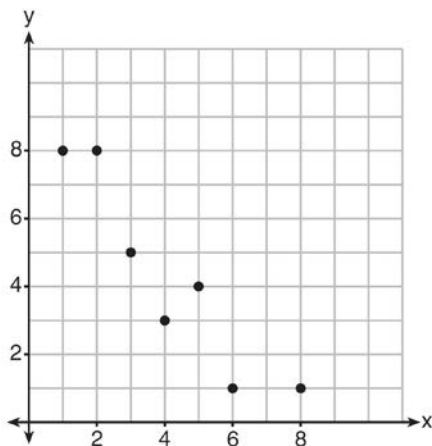
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- 23 Let f be a function such that $f(x) = 2x - 4$ is defined on the domain $2 \leq x \leq 6$. The range of this function is
- 1) $0 \leq y \leq 8$
 - 2) $0 \leq y < \infty$
 - 3) $2 \leq y \leq 6$
 - 4) $-\infty < y < \infty$

- 24 John has four more nickels than dimes in his pocket, for a total of \$1.25. Which equation could be used to determine the number of dimes, x , in his pocket?
- 1) $0.10(x + 4) + 0.05(x) = \1.25
 - 2) $0.05(x + 4) + 0.10(x) = \1.25
 - 3) $0.10(4x) + 0.05(x) = \$1.25$
 - 4) $0.05(4x) + 0.10(x) = \$1.25$

- 25 What is the correlation coefficient of the linear fit of the data shown below, to the *nearest hundredth*?



- 1) 1.00
- 2) 0.93
- 3) -0.93
- 4) -1.00

- 26 If $4x^2 - 100 = 0$, the roots of the equation are
- 1) -25 and 25
 - 2) -25, only
 - 3) -5 and 5
 - 4) -5, only

- 27 Which domain would be the most appropriate set to use for a function that predicts the number of household online-devices in terms of the number of people in the household?
- 1) integers
 - 2) whole numbers
 - 3) irrational numbers
 - 4) rational numbers

- 28 A company produces x units of a product per month, where $C(x)$ represents the total cost and $R(x)$ represents the total revenue for the month. The functions are modeled by $C(x) = 300x + 250$ and $R(x) = -0.5x^2 + 800x - 100$. The profit is the difference between revenue and cost where $P(x) = R(x) - C(x)$. What is the total profit, $P(x)$, for the month?
- 1) $P(x) = -0.5x^2 + 500x - 150$
 - 2) $P(x) = -0.5x^2 + 500x - 350$
 - 3) $P(x) = -0.5x^2 - 500x + 350$
 - 4) $P(x) = -0.5x^2 + 500x + 350$

- 29 When solving the equation $4(3x^2 + 2) - 9 = 8x^2 + 7$, Emily wrote $4(3x^2 + 2) = 8x^2 + 16$ as her first step. Which property justifies Emily's first step?
- 1) addition property of equality
 - 2) commutative property of addition
 - 3) multiplication property of equality
 - 4) distributive property of multiplication over addition

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30 Sam and Jeremy have ages that are consecutive odd integers. The product of their ages is 783. Which equation could be used to find Jeremy's age, j , if he is the younger man?

- 1) $j^2 + 2 = 783$
- 2) $j^2 - 2 = 783$
- 3) $j^2 + 2j = 783$
- 4) $j^2 - 2j = 783$

31 The third term in an arithmetic sequence is 10 and the fifth term is 26. If the first term is a_1 , which is an equation for the n th term of this sequence?

- 1) $a_n = 8n + 10$
- 2) $a_n = 8n - 14$
- 3) $a_n = 16n + 10$
- 4) $a_n = 16n - 38$

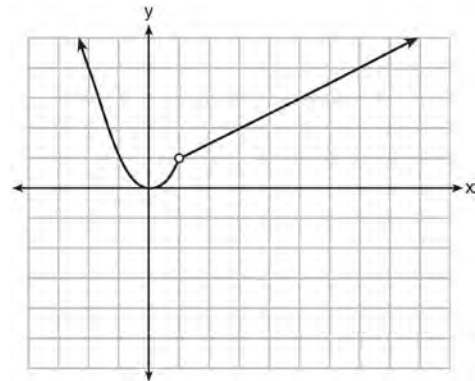
32 A company that manufactures radios first pays a start-up cost, and then spends a certain amount of money to manufacture each radio. If the cost of manufacturing r radios is given by the function $c(r) = 5.25r + 125$, then the value 5.25 best represents

- 1) the start-up cost
- 2) the profit earned from the sale of one radio
- 3) the amount spent to manufacture each radio
- 4) the average number of radios manufactured

33 Which statement is *not* always true?

- 1) The sum of two rational numbers is rational.
- 2) The product of two irrational numbers is rational.
- 3) The sum of a rational number and an irrational number is irrational.
- 4) The product of a nonzero rational number and an irrational number is irrational.

34 A function is graphed on the set of axes below.



Which function is related to the graph?

- 1) $f(x) = \begin{cases} x^2, & x < 1 \\ x - 2, & x > 1 \end{cases}$
- 2) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{1}{2}x + \frac{1}{2}, & x > 1 \end{cases}$
- 3) $f(x) = \begin{cases} x^2, & x < 1 \\ 2x - 7, & x > 1 \end{cases}$
- 4) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{3}{2}x - \frac{9}{2}, & x > 1 \end{cases}$

35 Mo's farm stand sold a total of 165 pounds of apples and peaches. She sold apples for \$1.75 per pound and peaches for \$2.50 per pound. If she made \$337.50, how many pounds of peaches did she sell?

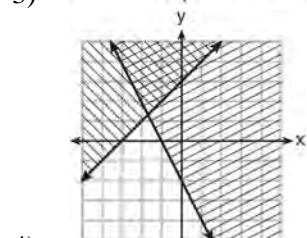
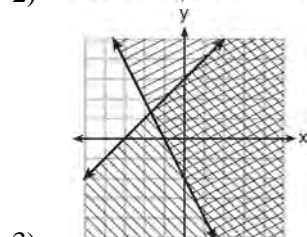
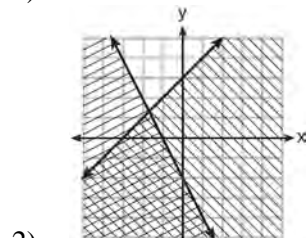
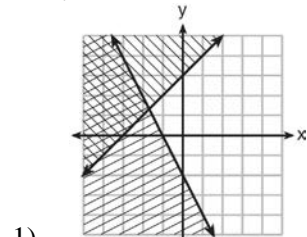
- 1) 11
- 2) 18
- 3) 65
- 4) 100

36 What is the value of x in the equation

$$\frac{x-2}{3} + \frac{1}{6} = \frac{5}{6}?$$

- 1) 4
- 2) 6
- 3) 8
- 4) 11

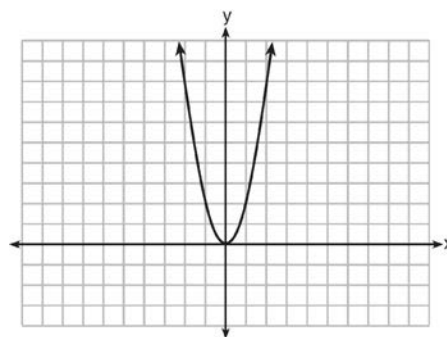
37 Which graph represents the solution of $y \leq x + 3$ and $y \geq -2x - 2$?



38 The owner of a small computer repair business has one employee, who is paid an hourly rate of \$22. The owner estimates his weekly profit using the function $P(x) = 8600 - 22x$. In this function, x represents the number of

- 1) computers repaired per week
- 2) hours worked per week
- 3) customers served per week
- 4) days worked per week

39 The graph of the equation $y = ax^2$ is shown below.



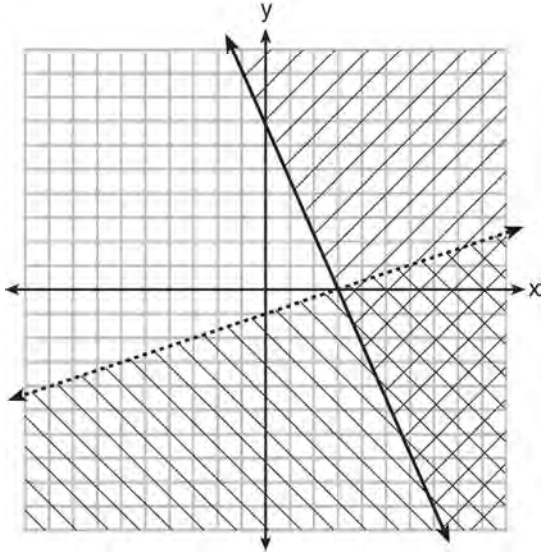
If a is multiplied by $-\frac{1}{2}$, the graph of the new equation is

- 1) wider and opens downward
- 2) wider and opens upward
- 3) narrower and opens downward
- 4) narrower and opens upward

40 Last week, a candle store received \$355.60 for selling 20 candles. Small candles sell for \$10.98 and large candles sell for \$27.98. How many large candles did the store sell?

- 1) 6
- 2) 8
- 3) 10
- 4) 12

- 41 What is one point that lies in the solution set of the system of inequalities graphed below?



- 1) (7,0)
 2) (3,0)
 3) (0,7)
 4) (-3,5)
- 42 Connor wants to attend the town carnival. The price of admission to the carnival is \$4.50, and each ride costs an additional 79 cents. If he can spend at most \$16.00 at the carnival, which inequality can be used to solve for r , the number of rides Connor can go on, and what is the maximum number of rides he can go on?
- 1) $0.79 + 4.50r \leq 16.00$; 3 rides
 2) $0.79 + 4.50r \leq 16.00$; 4 rides
 3) $4.50 + 0.79r \leq 16.00$; 14 rides
 4) $4.50 + 0.79r \leq 16.00$; 15 rides

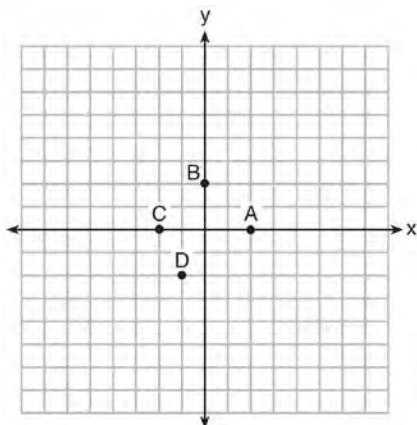
- 43 The formula for the volume of a cone is $V = \frac{1}{3} \pi r^2 h$. The radius, r , of the cone may be expressed as

- 1) $\sqrt{\frac{3V}{\pi h}}$
 2) $\sqrt{\frac{V}{3\pi h}}$
 3) $3\sqrt{\frac{V}{\pi h}}$
 4) $\frac{1}{3} \sqrt{\frac{V}{\pi h}}$

- 44 To watch a varsity basketball game, spectators must buy a ticket at the door. The cost of an adult ticket is \$3.00 and the cost of a student ticket is \$1.50. If the number of adult tickets sold is represented by a and student tickets sold by s , which expression represents the amount of money collected at the door from the ticket sales?
- 1) $4.50as$
 2) $4.50(a + s)$
 3) $(3.00a)(1.50s)$
 4) $3.00a + 1.50s$

- 45 If $f(1) = 3$ and $f(n) = -2f(n - 1) + 1$, then $f(5) =$
- 1) -5
 2) 11
 3) 21
 4) 43

46 The graph of $y = f(x)$ is shown below.



Which point could be used to find $f(2)$?

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

47 The table below shows the average diameter of a pupil in a person's eye as he or she grows older.

Age (years)	Average Pupil Diameter (mm)
20	4.7
30	4.3
40	3.9
50	3.5
60	3.1
70	2.7
80	2.3

What is the average rate of change, in millimeters per year, of a person's pupil diameter from age 20 to age 80?

- 1) 2.4
- 2) 0.04
- 3) -2.4
- 4) -0.04

48 Given the following quadratic functions:

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

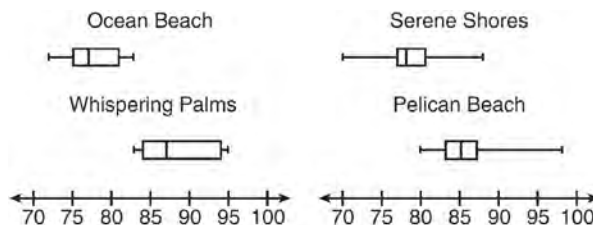
and

x	-3	-2	-1	0	1	2	3	4	5
$n(x)$	-7	0	5	8	9	8	5	0	-7

Which statement about these functions is true?

- 1) Over the interval $-1 \leq x \leq 1$, the average rate of change for $n(x)$ is less than that for $g(x)$.
- 2) The y -intercept of $g(x)$ is greater than the y -intercept for $n(x)$.
- 3) The function $g(x)$ has a greater maximum value than $n(x)$.
- 4) The sum of the roots of $n(x) = 0$ is greater than the sum of the roots of $g(x) = 0$.

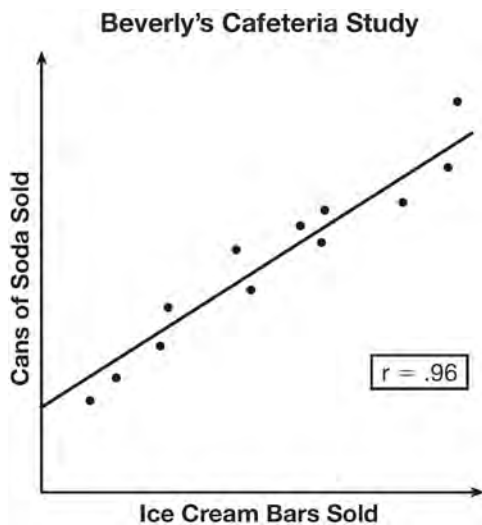
49 Corinne is planning a beach vacation in July and is analyzing the daily high temperatures for her potential destination. She would like to choose a destination with a high median temperature and a small interquartile range. She constructed box plots shown in the diagram below.



Which destination has a median temperature above 80 degrees and the smallest interquartile range?

- 1) Ocean Beach
- 2) Whispering Palms
- 3) Serene Shores
- 4) Pelican Beach

- 50 Beverly did a study this past spring using data she collected from a cafeteria. She recorded data weekly for ice cream sales and soda sales. Beverly found the line of best fit and the correlation coefficient, as shown in the diagram below.



Given this information, which statement(s) can correctly be concluded?

- I. Eating more ice cream causes a person to become thirsty.
 II. Drinking more soda causes a person to become hungry.
 III. There is a strong correlation between ice cream sales and soda sales.
- 1) I, only
 2) III, only
 3) I and III
 4) II and III

- 51 Which equation has the same solutions as

$$2x^2 + x - 3 = 0$$

1) $(2x - 1)(x + 3) = 0$
 2) $(2x + 1)(x - 3) = 0$
 3) $(2x - 3)(x + 1) = 0$
 4) $(2x + 3)(x - 1) = 0$

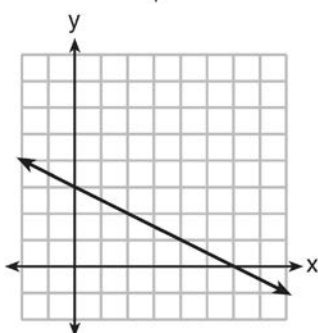
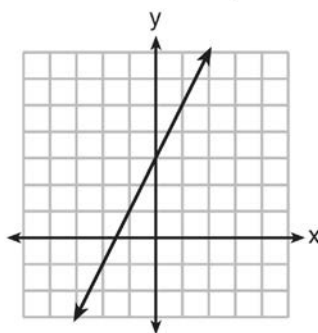
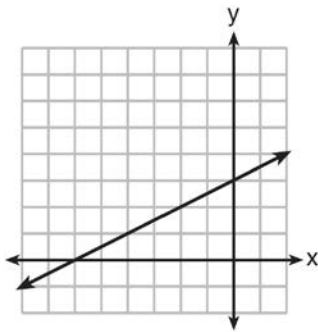
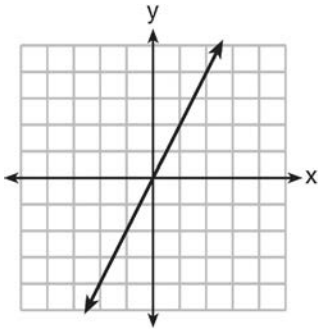
- 52 Four expressions are shown below.

I $2(2x^2 - 2x - 60)$
 II $4(x^2 - x - 30)$
 III $4(x + 6)(x - 5)$
 IV $4x(x - 1) - 120$

The expression $4x^2 - 4x - 120$ is equivalent to

- 1) I and II, only
 2) II and IV, only
 3) I, II, and IV
 4) II, III, and IV
- 53 Miriam and Jessica are growing bacteria in a laboratory. Miriam uses the growth function $f(t) = n^{2t}$ while Jessica uses the function $g(t) = n^{4t}$, where n represents the initial number of bacteria and t is the time, in hours. If Miriam starts with 16 bacteria, how many bacteria should Jessica start with to achieve the same growth over time?
- 1) 32
 2) 16
 3) 8
 4) 4
- 54 In 2013, the United States Postal Service charged \$0.46 to mail a letter weighing up to 1 oz. and \$0.20 per ounce for each additional ounce. Which function would determine the cost, in dollars, $c(z)$, of mailing a letter weighing z ounces where z is an integer greater than 1?
- 1) $c(z) = 0.46z + 0.20$
 2) $c(z) = 0.20z + 0.46$
 3) $c(z) = 0.46(z - 1) + 0.20$
 4) $c(z) = 0.20(z - 1) + 0.46$

55 Which graph shows a line where each value of y is three more than half of x ?



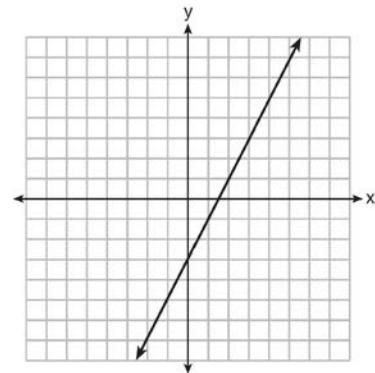
56 The inequality $7 - \frac{2}{3}x < x - 8$ is equivalent to

- 1) $x > 9$
- 2) $x > -\frac{3}{5}$
- 3) $x < 9$
- 4) $x < -\frac{3}{5}$

57 The solution of the equation $(x + 3)^2 = 7$ is

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

58 Which function has the same y -intercept as the graph below?



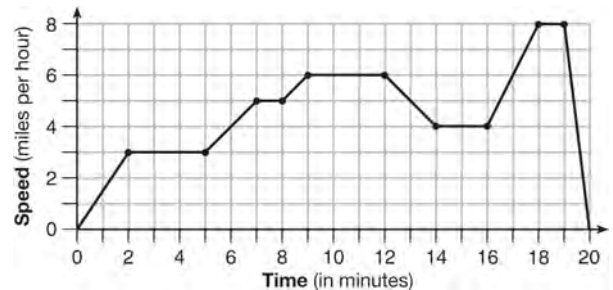
- 1) $y = \frac{12 - 6x}{4}$
- 2) $27 + 3y = 6x$
- 3) $6y + x = 18$
- 4) $y + 3 = 6x$

- 59 Some banks charge a fee on savings accounts that are left inactive for an extended period of time. The equation $y = 5000(0.98)^x$ represents the value, y , of one account that was left inactive for a period of x years. What is the y -intercept of this equation and what does it represent?
- 1) 0.98, the percent of money in the account initially
 - 2) 0.98, the percent of money in the account after x years
 - 3) 5000, the amount of money in the account initially
 - 4) 5000, the amount of money in the account after x years

- 60 Which point is *not* on the graph represented by $y = x^2 + 3x - 6$?
- 1) $(-6, 12)$
 - 2) $(-4, -2)$
 - 3) $(2, 4)$
 - 4) $(3, -6)$

- 61 Two functions, $y = |x - 3|$ and $3x + 3y = 27$, are graphed on the same set of axes. Which statement is true about the solution to the system of equations?
- 1) $(3, 0)$ is the solution to the system because it satisfies the equation $y = |x - 3|$.
 - 2) $(9, 0)$ is the solution to the system because it satisfies the equation $3x + 3y = 27$.
 - 3) $(6, 3)$ is the solution to the system because it satisfies both equations.
 - 4) $(3, 0)$, $(9, 0)$, and $(6, 3)$ are the solutions to the system of equations because they all satisfy at least one of the equations.

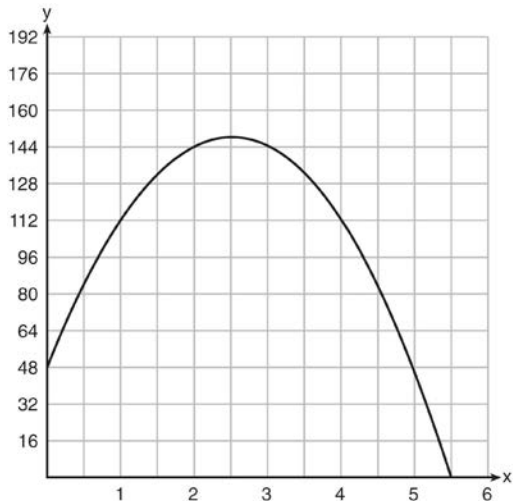
- 62 The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.



Which statement best describes what the jogger was doing during the 9 – 12 minute interval of her jog?

- 1) She was standing still.
 - 2) She was increasing her speed.
 - 3) She was decreasing her speed
 - 4) She was jogging at a constant rate.
- 63 A student is asked to solve the equation $4(3x - 1)^2 - 17 = 83$. The student's solution to the problem starts as $4(3x - 1)^2 = 100$
- $$(3x - 1)^2 = 25$$
- A correct next step in the solution of the problem is
- 1) $3x - 1 = \pm 5$
 - 2) $3x - 1 = \pm 25$
 - 3) $9x^2 - 1 = 25$
 - 4) $9x^2 - 6x + 1 = 5$
- 64 The zeros of the function $f(x) = 3x^2 - 3x - 6$ are
- 1) -1 and -2
 - 2) 1 and -2
 - 3) 1 and 2
 - 4) -1 and 2

- 65 A ball is thrown into the air from the edge of a 48-foot-high cliff so that it eventually lands on the ground. The graph below shows the height, y , of the ball from the ground after x seconds.



For which interval is the ball's height always *decreasing*?

- 1) $0 \leq x \leq 2.5$
- 2) $0 < x < 5.5$
- 3) $2.5 < x < 5.5$
- 4) $x \geq 2$

66 Given: $L = \sqrt{2}$

$$M = 3\sqrt{3}$$

$$N = \sqrt{16}$$

$$P = \sqrt{9}$$

Which expression results in a rational number?

- 1) $L + M$
- 2) $M + N$
- 3) $N + P$
- 4) $P + L$

- 67 The table below shows the average yearly balance in a savings account where interest is compounded annually. No money is deposited or withdrawn after the initial amount is deposited.

Year	Balance, in Dollars
0	380.00
10	562.49
20	832.63
30	1232.49
40	1824.39
50	2700.54

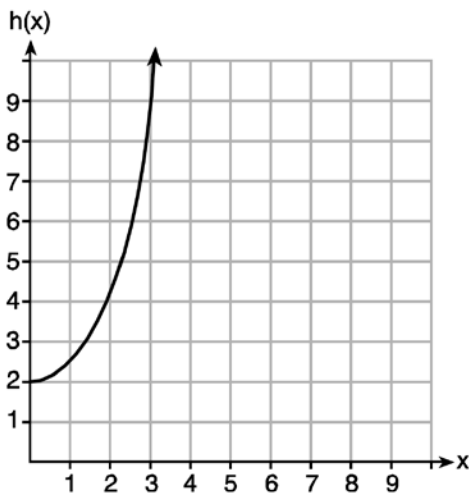
Which type of function best models the given data?

- 1) linear function with a negative rate of change
 - 2) linear function with a positive rate of change
 - 3) exponential decay function
 - 4) exponential growth function
- 68 Officials in a town use a function, C , to analyze traffic patterns. $C(n)$ represents the rate of traffic through an intersection where n is the number of observed vehicles in a specified time interval. What would be the most appropriate domain for the function?
- 1) $\{\dots -2, -1, 0, 1, 2, 3, \dots\}$
 - 2) $\{-2, -1, 0, 1, 2, 3\}$
 - 3) $\{0, \frac{1}{2}, 1, 1\frac{1}{2}, 2, 2\frac{1}{2}\}$
 - 4) $\{0, 1, 2, 3, \dots\}$

- 69 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) $h(x)$, $f(x)$, $g(x)$
- 70 What are the zeros of the function $f(x) = x^2 - 13x - 30$?
- 1) -10 and 3
 - 2) 10 and -3
 - 3) -15 and 2
 - 4) 15 and -2

- 71 When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?

- 1) $x^2 + 5x + 7 = 0$
 - 2) $x^2 + 5x + 3 = 0$
 - 3) $x^2 - 5x + 7 = 0$
 - 4) $x^2 - 5x + 3 = 0$
- 72 An astronaut drops a rock off the edge of a cliff on the Moon. The distance, $d(t)$, in meters, the rock travels after t seconds can be modeled by the function $d(t) = 0.8t^2$. What is the average speed, in meters per second, of the rock between 5 and 10 seconds after it was dropped?
- 1) 12
 - 2) 20
 - 3) 60
 - 4) 80
- 73 The function $V(t) = 1350(1.017)^t$ represents the value $V(t)$, in dollars, of a comic book t years after its purchase. The yearly rate of appreciation of the comic book is
- 1) 17%
 - 2) 1.7%
 - 3) 1.017%
 - 4) 0.017%

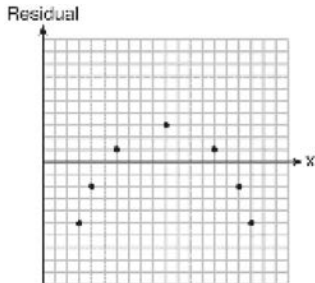
74 Which value of x satisfies the equation

$$\frac{7}{3} \left(x + \frac{9}{28} \right) = 20?$$

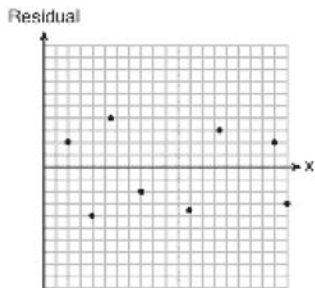
- 1) 8.25
- 2) 8.89
- 3) 19.25
- 4) 44.92

75 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)

76 If the area of a rectangle is expressed as $x^4 - 9y^2$, then the product of the length and the width of the rectangle could be expressed as

- 1) $(x - 3y)(x + 3y)$
- 2) $(x^2 - 3y)(x^2 + 3y)$
- 3) $(x^2 - 3y)(x^2 - 3y)$
- 4) $(x^4 + y)(x - 9y)$

77 The graph of a linear equation contains the points $(3, 11)$ and $(-2, 1)$. Which point also lies on the graph?

- 1) $(2, 1)$
- 2) $(2, 4)$
- 3) $(2, 6)$
- 4) $(2, 9)$

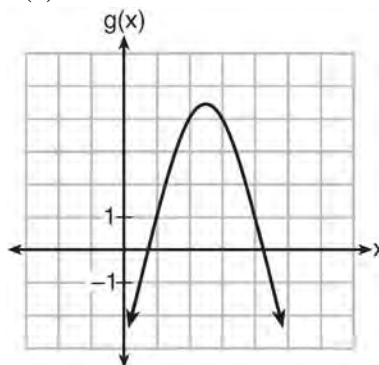
78 Which quadratic function has the largest maximum?

- 1) $h(x) = (3 - x)(2 + x)$

x	f(x)
-1	-3
0	5
1	9
2	9
3	5
4	-3

2)

- 3) $k(x) = -5x^2 - 12x + 4$



4)

79 If a sequence is defined recursively by $f(0) = 2$ and $f(n + 1) = -2f(n) + 3$ for $n \geq 0$, then $f(2)$ is equal to

- 1) 1
- 2) -11
- 3) 5
- 4) 17

Algebra 1 CCSS Multiple Choice Regents Exam Questions

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80 Which trinomial is equivalent to

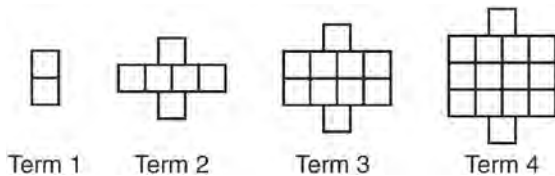
$$3(x - 2)^2 - 2(x - 1)?$$

- 1) $3x^2 - 2x - 10$
- 2) $3x^2 - 2x - 14$
- 3) $3x^2 - 14x + 10$
- 4) $3x^2 - 14x + 14$

81 The function $h(t) = -16t^2 + 144$ represents the height, $h(t)$, in feet, of an object from the ground at t seconds after it is dropped. A realistic domain for this function is

- 1) $-3 \leq t \leq 3$
- 2) $0 \leq t \leq 3$
- 3) $0 \leq h(t) \leq 144$
- 4) all real numbers

82 A pattern of blocks is shown below.



If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the n th term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

- 1) I and II
- 2) I and III
- 3) II and III
- 4) III, only

83 Natasha is planning a school celebration and wants to have live music and food for everyone who attends. She has found a band that will charge her \$750 and a caterer who will provide snacks and drinks for \$2.25 per person. If her goal is to keep the average cost per person between \$2.75 and \$3.25, how many people, p , must attend?

- 1) $225 < p < 325$
- 2) $325 < p < 750$
- 3) $500 < p < 1000$
- 4) $750 < p < 1500$

84 The cost of a pack of chewing gum in a vending machine is \$0.75. The cost of a bottle of juice in the same machine is \$1.25. Julia has \$22.00 to spend on chewing gum and bottles of juice for her team and she must buy seven packs of chewing gum. If b represents the number of bottles of juice, which inequality represents the maximum number of bottles she can buy?

- 1) $0.75b + 1.25(7) \geq 22$
- 2) $0.75b + 1.25(7) \leq 22$
- 3) $0.75(7) + 1.25b \geq 22$
- 4) $0.75(7) + 1.25b \leq 22$

85 If $f(x) = x^2 - 2x - 8$ and $g(x) = \frac{1}{4}x - 1$, for which value of x is $f(x) = g(x)$?

- 1) -1.75 and -1.438
- 2) -1.75 and 4
- 3) -1.438 and 0
- 4) 4 and 0

- 86 The two sets of data below represent the number of runs scored by two different youth baseball teams over the course of a season.

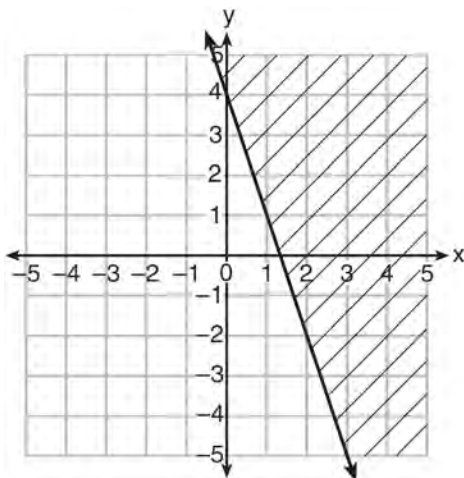
Team A: 4, 8, 5, 12, 3, 9, 5, 2

Team B: 5, 9, 11, 4, 6, 11, 2, 7

Which set of statements about the mean and standard deviation is true?

- 1) mean $A <$ mean B
standard deviation $A >$ standard deviation B
- 2) mean $A >$ mean B
standard deviation $A <$ standard deviation B
- 3) mean $A <$ mean B
standard deviation $A <$ standard deviation B
- 4) mean $A >$ mean B
standard deviation $A >$ standard deviation B

- 87 Which inequality is represented in the graph below?



- 1) $y \geq -3x + 4$
- 2) $y \leq -3x + 4$
- 3) $y \geq -4x - 3$
- 4) $y \leq -4x - 3$

- 88 The table below represents the function F .

x	3	4	6	7	8
$F(x)$	9	17	65	129	257

The equation that represents this function is

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

- 89 A laboratory technician studied the population growth of a colony of bacteria. He recorded the number of bacteria every other day, as shown in the partial table below.

t (time, in days)	0	2	4
$f(t)$ (bacteria)	25	15,625	9,765,625

Which function would accurately model the technician's data?

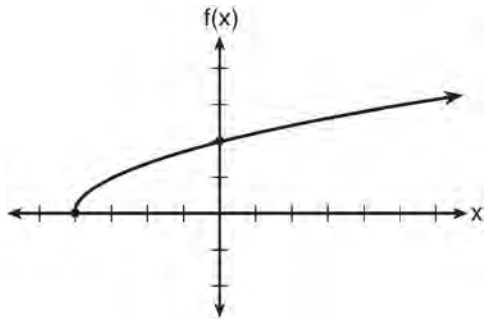
- 1) $f(t) = 25^t$
- 2) $f(t) = 25^{t+1}$
- 3) $f(t) = 25t$
- 4) $f(t) = 25(t+1)$

- 90 Which equation has the same solution as

$$x^2 - 6x - 12 = 0?$$

- 1) $(x+3)^2 = 21$
- 2) $(x-3)^2 = 21$
- 3) $(x+3)^2 = 3$
- 4) $(x-3)^2 = 3$

- 91 The graph of the function $f(x) = \sqrt{x+4}$ is shown below.



The domain of the function is

- 1) $\{x | x > 0\}$
 - 2) $\{x | x \geq 0\}$
 - 3) $\{x | x > -4\}$
 - 4) $\{x | x \geq -4\}$
- 92 What are the roots of the equation $x^2 + 4x - 16 = 0$?

- 1) $2 \pm 2\sqrt{5}$
- 2) $-2 \pm 2\sqrt{5}$
- 3) $2 \pm 4\sqrt{5}$
- 4) $-2 \pm 4\sqrt{5}$

- 93 Which recursively defined function has a first term equal to 10 and a common difference of 4?

- 1) $f(1) = 10$
 $f(x) = f(x-1) + 4$
- 2) $f(1) = 4$
 $f(x) = f(x-1) + 10$
- 3) $f(1) = 10$
 $f(x) = 4f(x-1)$
- 4) $f(1) = 4$
 $f(x) = 10f(x-1)$

- 94 A satellite television company charges a one-time installation fee and a monthly service charge. The total cost is modeled by the function $y = 40 + 90x$. Which statement represents the meaning of each part of the function?

- 1) y is the total cost, x is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.
- 2) y is the total cost, x is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.
- 3) x is the total cost, y is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.
- 4) x is the total cost, y is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.

- 95 The value in dollars, $v(x)$, of a certain car after x years is represented by the equation

$v(x) = 25,000(0.86)^x$. To the nearest dollar, how much more is the car worth after 2 years than after 3 years?

- 1) 2589
- 2) 6510
- 3) 15,901
- 4) 18,490

- 96 Fred is given a rectangular piece of paper. If the length of Fred's piece of paper is represented by $2x - 6$ and the width is represented by $3x - 5$, then the paper has a total area represented by

- 1) $5x - 11$
- 2) $6x^2 - 28x + 30$
- 3) $10x - 22$
- 4) $6x^2 - 6x - 11$

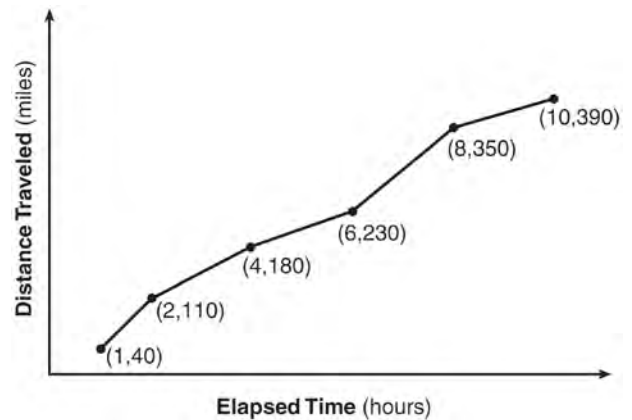
- 97 Which system of equations has the same solution as the system below?

$$2x + 2y = 16$$

$$3x - y = 4$$

- 1) $2x + 2y = 16$
 $6x - 2y = 4$
 - 2) $2x + 2y = 16$
 $6x - 2y = 8$
 - 3) $x + y = 16$
 $3x - y = 4$
 - 4) $6x + 6y = 48$
 $6x + 2y = 8$
- 98 Christopher looked at his quiz scores shown below for the first and second semester of his Algebra class.
Semester 1: 78, 91, 88, 83, 94
Semester 2: 91, 96, 80, 77, 88, 85, 92
Which statement about Christopher's performance is correct?
- 1) The interquartile range for semester 1 is greater than the interquartile range for semester 2.
 - 2) The median score for semester 1 is greater than the median score for semester 2.
 - 3) The mean score for semester 2 is greater than the mean score for semester 1.
 - 4) The third quartile for semester 2 is greater than the third quartile for semester 1.
- 99 When factored completely, the expression $p^4 - 81$ is equivalent to
- 1) $(p^2 + 9)(p^2 - 9)$
 - 2) $(p^2 - 9)(p^2 - 9)$
 - 3) $(p^2 + 9)(p + 3)(p - 3)$
 - 4) $(p + 3)(p - 3)(p + 3)(p - 3)$

- 100 The Jamison family kept a log of the distance they traveled during a trip, as represented by the graph below.



During which interval was their average speed the greatest?

- 1) the first hour to the second hour
 - 2) the second hour to the fourth hour
 - 3) the sixth hour to the eighth hour
 - 4) the eighth hour to the tenth hour
- 101 Krystal was given \$3000 when she turned 2 years old. Her parents invested it at a 2% interest rate compounded annually. No deposits or withdrawals were made. Which expression can be used to determine how much money Krystal had in the account when she turned 18?
- 1) $3000(1 + 0.02)^{16}$
 - 2) $3000(1 - 0.02)^{16}$
 - 3) $3000(1 + 0.02)^{18}$
 - 4) $3000(1 - 0.02)^{18}$

102 If $f(x) = \frac{1}{3}x + 9$, which statement is always true?

- 1) $f(x) < 0$
- 2) $f(x) > 0$
- 3) If $x < 0$, then $f(x) < 0$.
- 4) If $x > 0$, then $f(x) > 0$.

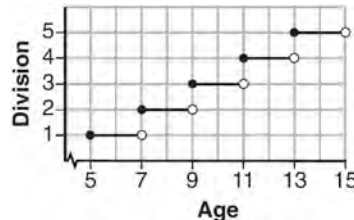
103 The value of the x -intercept for the graph of $4x - 5y = 40$ is

- 1) 10
- 2) $\frac{4}{5}$
- 3) $-\frac{4}{5}$
- 4) -8

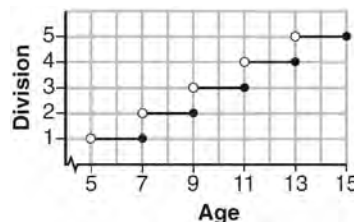
104 How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?

- 1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
- 2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
- 3) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
- 4) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

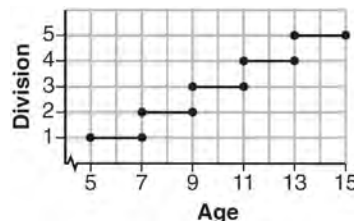
105 Morgan can start wrestling at age 5 in Division 1. He remains in that division until his next odd birthday when he is required to move up to the next division level. Which graph correctly represents this information?



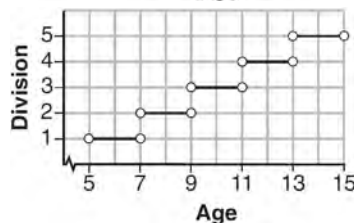
1)



2)



3)



4)

106 A sunflower is 3 inches tall at week 0 and grows 2 inches each week. Which function(s) shown below can be used to determine the height, $f(n)$, of the sunflower in n weeks?

- I. $f(n) = 2n + 3$
- II. $f(n) = 2n + 3(n - 1)$
- III. $f(n) = f(n - 1) + 2$ where $f(0) = 3$

- 1) I and II
- 2) II, only
- 3) III, only
- 4) I and III

- 107 The table below shows the number of grams of carbohydrates, x , and the number of Calories, y , of six different foods.

Carbohydrates (x)	Calories (y)
8	120
9.5	138
10	147
6	88
7	108
4	62

Which equation best represents the line of best fit for this set of data?

- 1) $y = 15x$
- 2) $y = 0.07x$
- 3) $y = 0.1x - 0.4$
- 4) $y = 14.1x + 5.8$

- 108 Which table represents a function?

- 1)

x	2	4	2	4
$f(x)$	3	5	7	9
- 2)

x	0	-1	0	1
$f(x)$	0	1	-1	0
- 3)

x	3	5	7	9
$f(x)$	2	4	2	4
- 4)

x	0	1	-1	0
$f(x)$	0	-1	0	1

- 109 A typical cell phone plan has a fixed base fee that includes a certain amount of data and an overage charge for data use beyond the plan. A cell phone plan charges a base fee of \$62 and an overage charge of \$30 per gigabyte of data that exceed 2 gigabytes. If C represents the cost and g represents the total number of gigabytes of data, which equation could represent this plan when more than 2 gigabytes are used?

- 1) $C = 30 + 62(2 - g)$
- 2) $C = 30 + 62(g - 2)$
- 3) $C = 62 + 30(2 - g)$
- 4) $C = 62 + 30(g - 2)$

- 110 A cell phone company charges \$60.00 a month for up to 1 gigabyte of data. The cost of additional data is \$0.05 per megabyte. If d represents the number of additional megabytes used and c represents the total charges at the end of the month, which linear equation can be used to determine a user's monthly bill?

- 1) $c = 60 - 0.05d$
- 2) $c = 60.05d$
- 3) $c = 60d - 0.05$
- 4) $c = 60 + 0.05d$

- 111 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)

- 112 The distance a free falling object has traveled can be modeled by the equation $d = \frac{1}{2}at^2$, where a is acceleration due to gravity and t is the amount of time the object has fallen. What is t in terms of a and d ?

- 1) $t = \sqrt{\frac{da}{2}}$
- 2) $t = \sqrt{\frac{2d}{a}}$
- 3) $t = \left(\frac{da}{d}\right)^2$
- 4) $t = \left(\frac{2d}{a}\right)^2$

- 113 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) $-3 \pm 4\sqrt{14}$

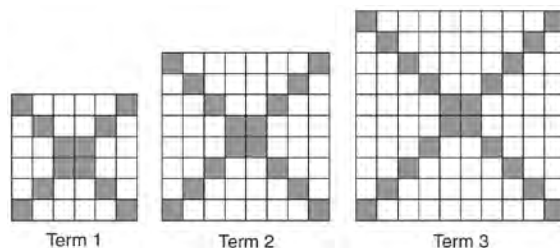
- 114 For which value of P and W is $P + W$ a rational number?

- 1) $P = \frac{1}{\sqrt{3}}$ and $W = \frac{1}{\sqrt{6}}$
- 2) $P = \frac{1}{\sqrt{4}}$ and $W = \frac{1}{\sqrt{9}}$
- 3) $P = \frac{1}{\sqrt{6}}$ and $W = \frac{1}{\sqrt{10}}$
- 4) $P = \frac{1}{\sqrt{25}}$ and $W = \frac{1}{\sqrt{2}}$

- 115 If $f(x) = 3^x$ and $g(x) = 2x + 5$, at which value of x is $f(x) < g(x)$?

- 1) -1
- 2) 2
- 3) -3
- 4) 4

- 116 The diagrams below represent the first three terms of a sequence.



Assuming the pattern continues, which formula determines a_n , the number of shaded squares in the n th term?

- 1) $a_n = 4n + 12$
- 2) $a_n = 4n + 8$
- 3) $a_n = 4n + 4$
- 4) $a_n = 4n + 2$

- 117 Which statement is *not* always true?

- 1) The product of two irrational numbers is irrational.
- 2) The product of two rational numbers is rational.
- 3) The sum of two rational numbers is rational.
- 4) The sum of a rational number and an irrational number is irrational.

Algebra 1 CCSS Multiple Choice Regents Exam Questions

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- 118 Peyton is a sprinter who can run the 40-yard dash in 4.5 seconds. He converts his speed into miles per hour, as shown below.

$$\frac{40 \text{ yd}}{4.5 \text{ sec}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

Which ratio is *incorrectly* written to convert his speed?

- 1) $\frac{3 \text{ ft}}{1 \text{ yd}}$
 - 2) $\frac{5280 \text{ ft}}{1 \text{ mi}}$
 - 3) $\frac{60 \text{ sec}}{1 \text{ min}}$
 - 4) $\frac{60 \text{ min}}{1 \text{ hr}}$
- 119 The table below shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars.

0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.4	1.8	2.5	3.7	3.8	4
4.2	4.6	5.1	6	6.3	7.2

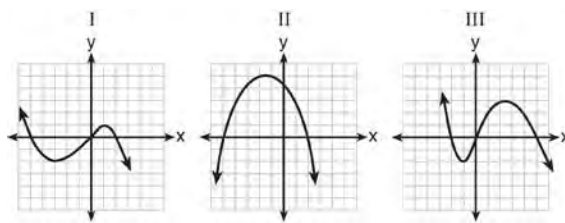
The team signs an additional player to a contract worth 10 million dollars per year. Which statement about the median and mean is true?

- 1) Both will increase.
 - 2) Only the median will increase.
 - 3) Only the mean will increase.
 - 4) Neither will change.
- 120 Which expression is equivalent to $x^4 - 12x^2 + 36$?
- 1) $(x^2 - 6)(x^2 - 6)$
 - 2) $(x^2 + 6)(x^2 + 6)$
 - 3) $(6 - x^2)(6 + x^2)$
 - 4) $(x^2 + 6)(x^2 - 6)$

- 121 Which equation has the same solutions as $x^2 + 6x - 7 = 0$?

- 1) $(x + 3)^2 = 2$
- 2) $(x - 3)^2 = 2$
- 3) $(x - 3)^2 = 16$
- 4) $(x + 3)^2 = 16$

- 122 A polynomial function contains the factors x , $x - 2$, and $x + 5$. Which graph(s) below could represent the graph of this function?



- 1) I, only
- 2) II, only
- 3) I and III
- 4) I, II, and III

- 123 The country of Benin in West Africa has a population of 9.05 million people. The population is growing at a rate of 3.1% each year. Which function can be used to find the population 7 years from now?

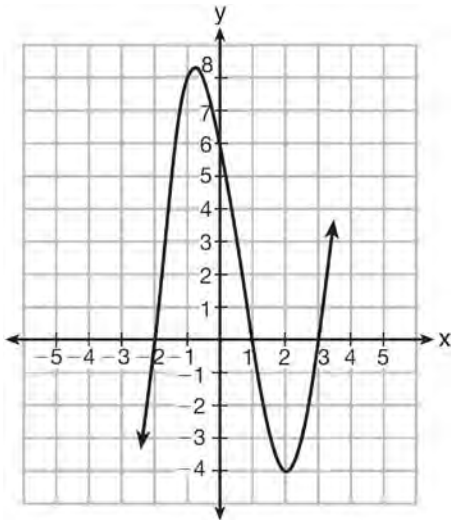
- 1) $f(t) = (9.05 \times 10^6)(1 - 0.31)^7$
- 2) $f(t) = (9.05 \times 10^6)(1 + 0.31)^7$
- 3) $f(t) = (9.05 \times 10^6)(1 + 0.031)^7$
- 4) $f(t) = (9.05 \times 10^6)(1 - 0.031)^7$

124 For which function defined by a polynomial are the zeros of the polynomial -4 and -6 ?

- 1) $y = x^2 - 10x - 24$
- 2) $y = x^2 + 10x + 24$
- 3) $y = x^2 + 10x - 24$
- 4) $y = x^2 - 10x + 24$

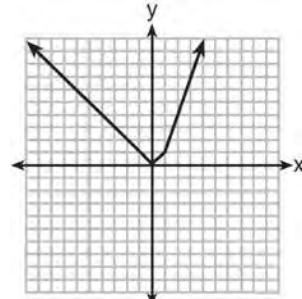
125 Which equation(s) represent the graph below?

- I $y = (x + 2)(x^2 - 4x - 12)$
 II $y = (x - 3)(x^2 + x - 2)$
 III $y = (x - 1)(x^2 - 5x - 6)$

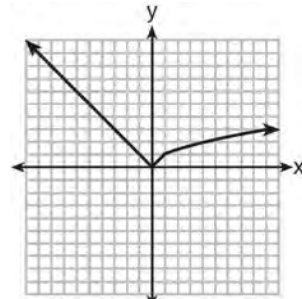


- 1) I, only
- 2) II, only
- 3) I and II
- 4) II and III

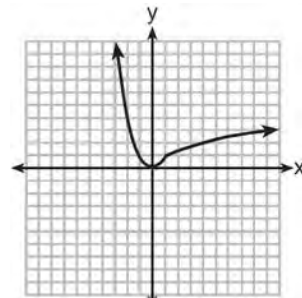
126 Which graph represents $f(x) = \begin{cases} |x| & x < 1 \\ \sqrt{x} & x \geq 1 \end{cases}$?



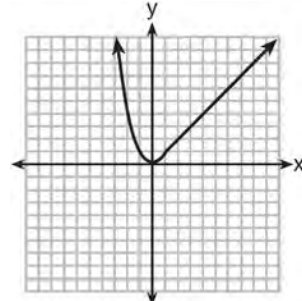
1)



2)

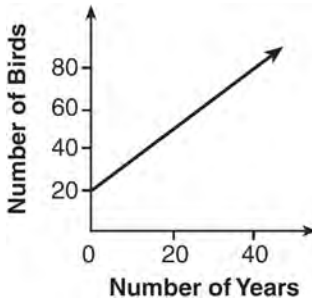
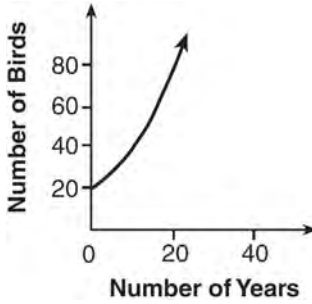
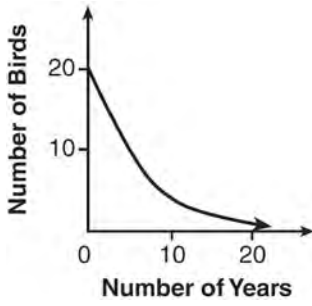
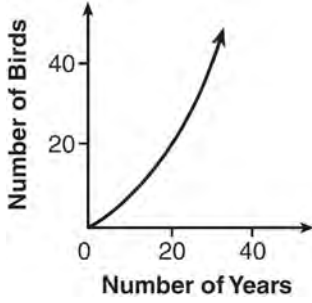


3)



4)

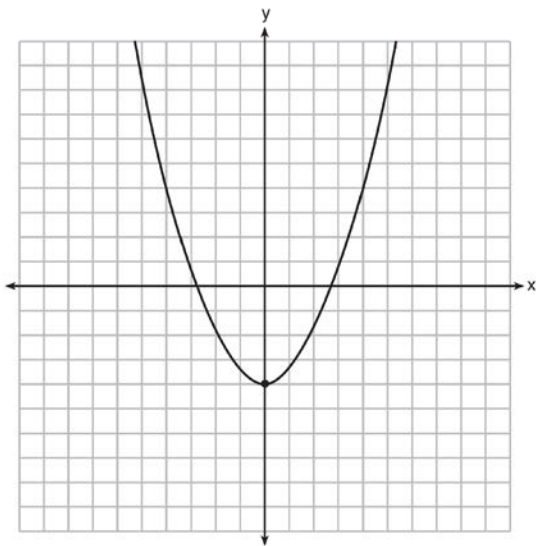
127 A population that initially has 20 birds approximately doubles every 10 years. Which graph represents this population growth?



Algebra 1 Common Core State Standards 2 Point Regents Exam Questions

128 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

129 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.

130 Dylan invested \$600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

131 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x , will they have the same amount of money saved? Explain how you arrived at your answer.

132 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

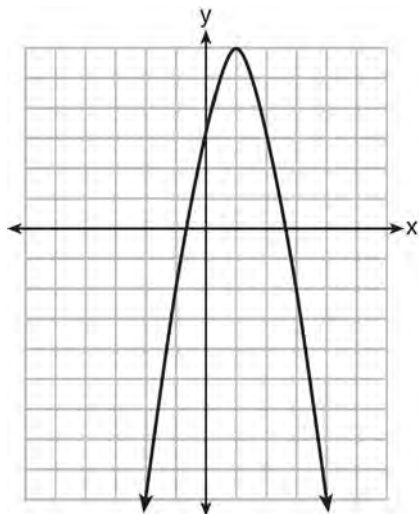
	1 Club	2 Clubs	3 or More Clubs
9 th	90	33	12
10 th	125	12	15
11 th	87	22	18
12 th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

133 Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

134 Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational. State whether Patrick is correct or incorrect. Justify your reasoning.

- 135 Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

Determine which function has the larger maximum value. Justify your answer.

- 136 Robin collected data on the number of hours she watched television on Sunday through Thursday nights for a period of 3 weeks. The data are shown in the table below.

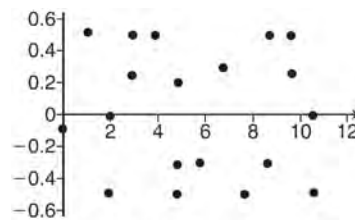
	Sun	Mon	Tues	Wed	Thurs
Week 1	4	3	3.5	2	2
Week 2	4.5	5	2.5	3	1.5
Week 3	4	3	1	1.5	2.5

Using an appropriate scale on the number line below, construct a box plot for the 15 values.

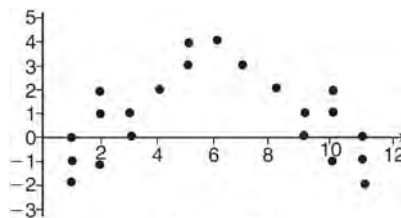


- 137 How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

- 138 The residual plots from two different sets of bivariate data are graphed below.



Graph A



Graph B

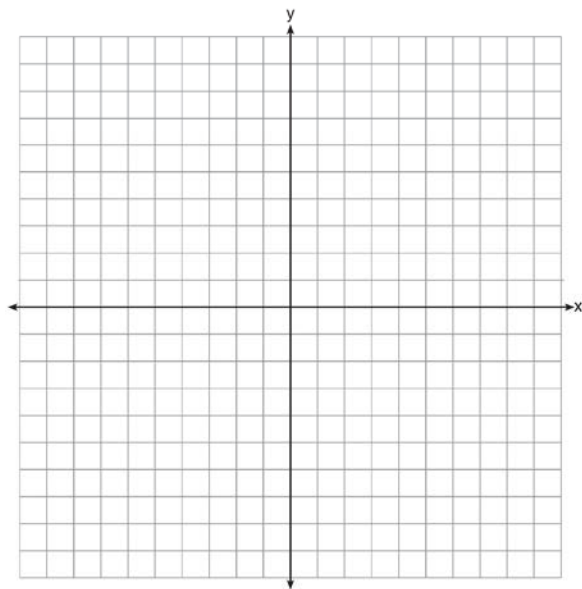
Explain, using evidence from graph A and graph B, which graph indicates that the model for the data is a good fit.

- 139 Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x , which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x , which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x , in dollars, that will make their weekly pay the same.

Algebra 1 Common Core State Standards 2 Point Regents Exam Questions

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- 140 Draw the graph of $y = \sqrt{x} - 1$ on the set of axes below.



- 141 Given $2x + ax - 7 > -12$, determine the largest integer value of a when $x = -1$.

- 142 The function f has a domain of $\{1, 3, 5, 7\}$ and a range of $\{2, 4, 6\}$. Could f be represented by $\{(1, 2), (3, 4), (5, 6), (7, 2)\}$? Justify your answer.

- 143 Alex is selling tickets to a school play. An adult ticket costs \$6.50 and a student ticket costs \$4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

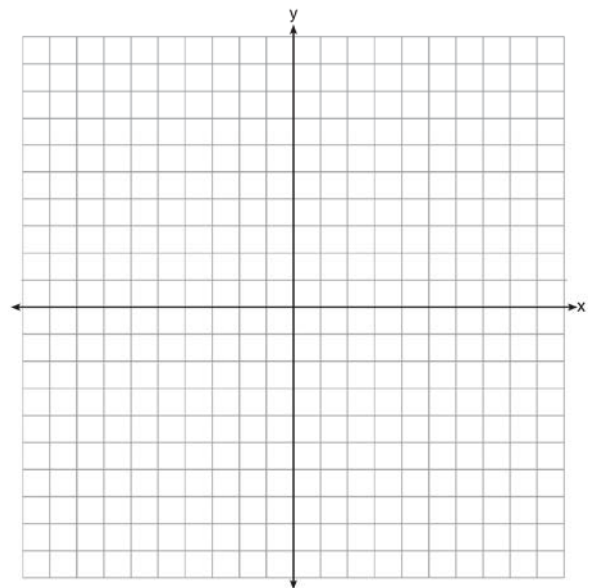
- 144 The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where x represents the number of years since being discovered. What is the percent of change each year? Explain how you arrived at your answer.

- 145 Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

Day (n)	1	2	3	4	5
Height (cm)	3.0	4.5	6.0	7.5	9.0

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the n th day.

- 146 On the set of axes below, graph the function represented by $y = \sqrt[3]{x-2}$ for the domain $-6 \leq x \leq 10$.



Algebra 1 Common Core State Standards 2 Point Regents Exam Questions

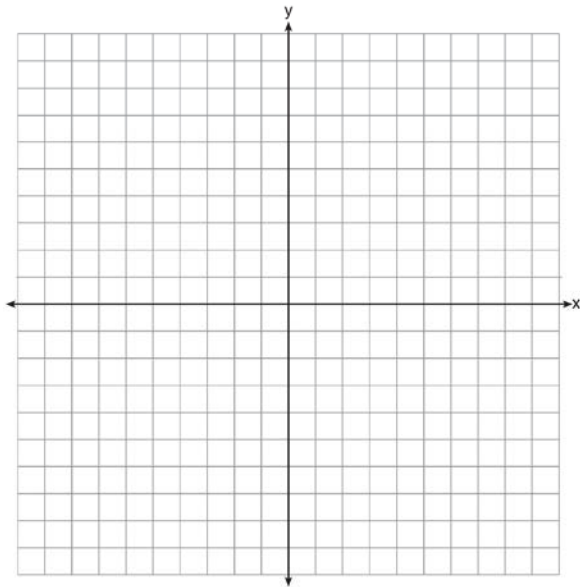
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- 147 Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

Number of Hours, x	1	2	3	4	5	6	7	8	9	10
Number of Bacteria, $B(x)$	220	280	350	440	550	690	860	1070	1340	1680

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

- 148 Graph the function $y = |x - 3|$ on the set of axes below.

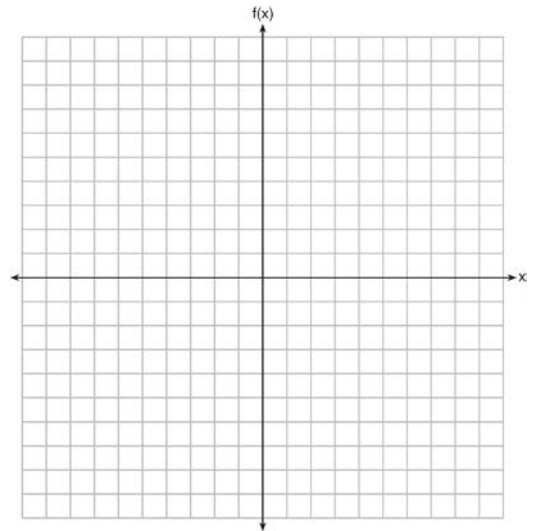


Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

- 149 Solve $8m^2 + 20m = 12$ for m by factoring.

- 150 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \leq x < 1 \\ 4, & 1 \leq x \leq 8 \end{cases}$$

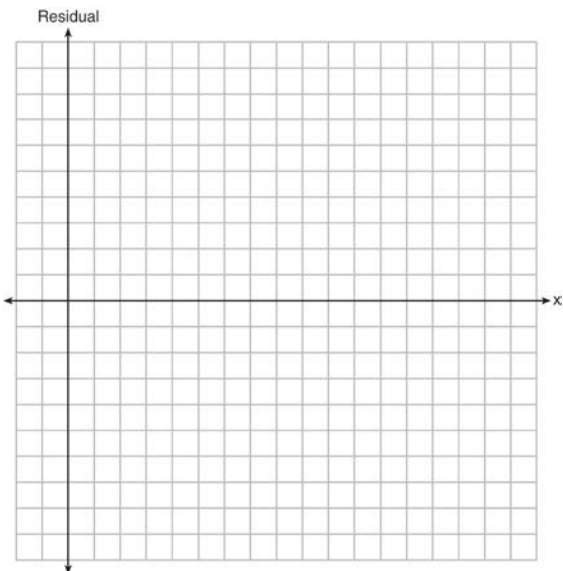


- 151 Rhonda deposited \$3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B , her account balance after t years.

- 152 The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	-1	-2	-3	-2	-1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

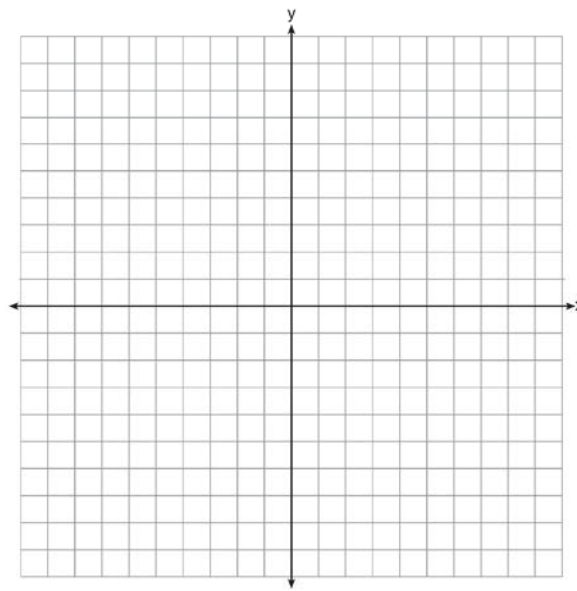
- 153 A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$. State the value of c that creates a perfect square trinomial. Explain how the value of c is determined.

- 154 Factor the expression $x^4 + 6x^2 - 7$ completely.

- 155 On the set of axes below, draw the graph of the equation $y = -\frac{3}{4}x + 3$.



Is the point $(3, 2)$ a solution to the equation? Explain your answer based on the graph drawn.

- 156 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.]

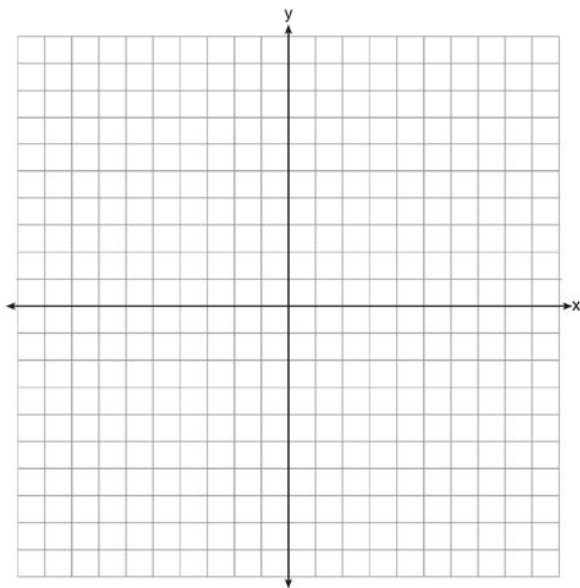
- 157 In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b .

- 158 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.

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

Write the linear regression equation for these data where miles driven is the independent variable. (Round all values to the *nearest hundredth*.)

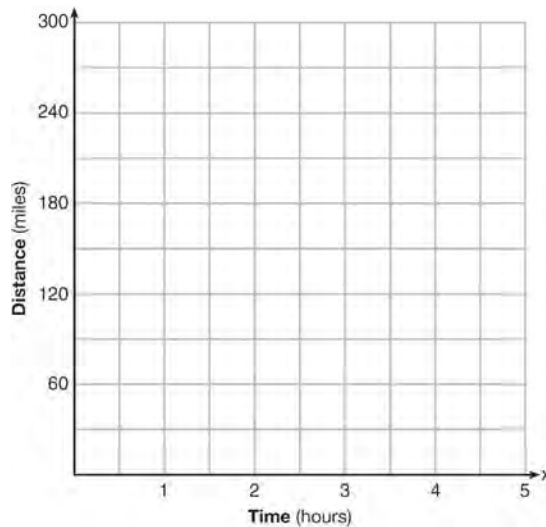
- 159 On the set of axes below, graph the inequality $2x + y > 1$.



- 160 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

- 161 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.
- Write a system of inequalities that represent this situation.
 - 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.

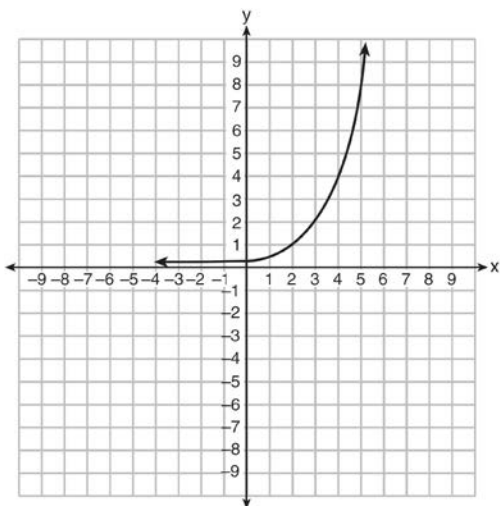
- 162 A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination. On the set of axes below, draw a graph that models the driver's distance from home.



163 Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day d . Find $T(6)$, the minutes he will spend on the treadmill on day 6.

164 A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where t is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

165 Write an exponential equation for the graph shown below.



Explain how you determined the equation.

166 Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.

167 The breakdown of a sample of a chemical compound is represented by the function $p(t) = 300(0.5)^t$, where $p(t)$ represents the number of milligrams of the substance and t represents the time, in years. In the function $p(t)$, explain what 0.5 and 300 represent.

168 A function is shown in the table below.

x	f(x)
-4	2
-1	-4
0	-2
3	16

If included in the table, which ordered pair, $(-4, 1)$ or $(1, -4)$, would result in a relation that is no longer a function? Explain your answer.

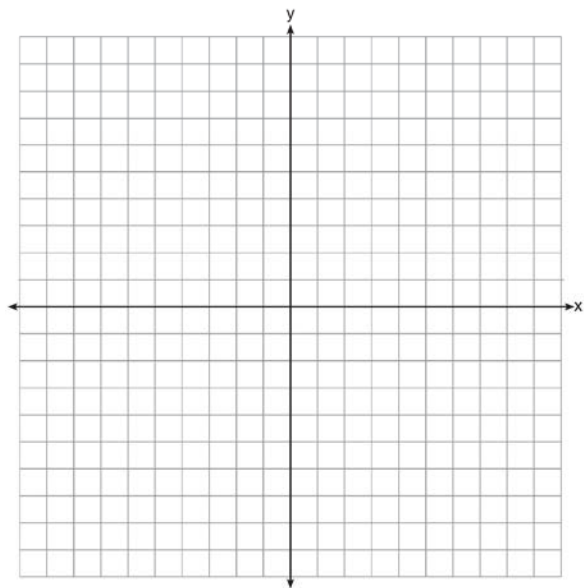
169 A gardener is planting two types of trees:
 Type A is three feet tall and grows at a rate of 15 inches per year.
 Type B is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

170 Solve the inequality below to determine and state the smallest possible value for x in the solution set.

$$3(x + 3) \leq 5x - 3$$

- 171 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.
- 172 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?
- 173 The vertex of the parabola represented by $f(x) = x^2 - 4x + 3$ has coordinates $(2, -1)$. Find the coordinates of the vertex of the parabola defined by $g(x) = f(x - 2)$. Explain how you arrived at your answer. [The use of the set of axes below is optional.]



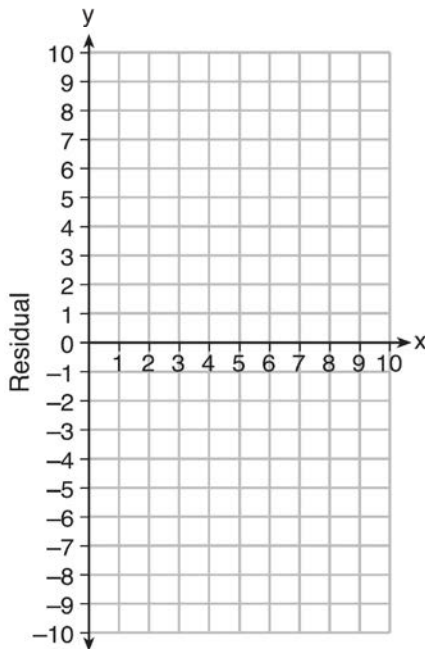
Algebra 1 Common Core State Standards 4 Point Regents Exam Questions

174 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.

175 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.

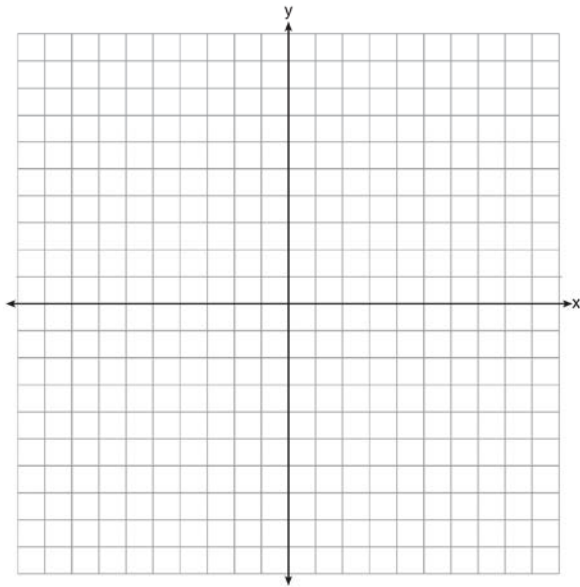
Months Since First Viewing	Total Views
0	843
1	1708
2	forgot to record
3	7124
4	14,684
5	29,787
6	62,381

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

176 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

177 Write an equation that defines $m(x)$ as a trinomial where $m(x) = (3x - 1)(3 - x) + 4x^2 + 19$. Solve for x when $m(x) = 0$.

- 178 On the set of axes below, graph the function $y = |x + 1|$.



State the range of the function. State the domain over which the function is increasing.

- 179 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \leq x \leq 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

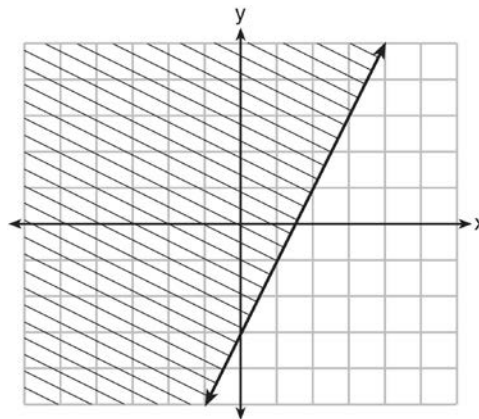
Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours. Determine the number of hours an employee must work in order to earn \$445. Explain how you arrived at this answer.

- 180 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data. Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the nearest download. Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

- 181 The graph of an inequality is shown below.



- Write the inequality represented by the graph.
- On the same set of axes, graph the inequality $x + 2y < 4$.
- The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2, 1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

- 182 The table below shows the attendance at a museum in select years from 2007 to 2013.

Year	2007	2008	2009	2011	2013
Attendance (millions)	8.3	8.5	8.5	8.8	9.3

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and y is used to represent the attendance. Round all values to the *nearest hundredth*. State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

- 183 Caitlin has a movie rental card worth \$175. After she rents the first movie, the card's value is \$172.25. After she rents the second movie, its value is \$169.50. After she rents the third movie, the card is worth \$166.75. Assuming the pattern continues, write an equation to define $A(n)$, the amount of money on the rental card after n rentals. Caitlin rents a movie every Friday night. How many weeks in a row can she afford to rent a movie, using her rental card only? Explain how you arrived at your answer.

- 184 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

- 185 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

- a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.
 b) Explain what the correlation coefficient suggests in the context of this problem.

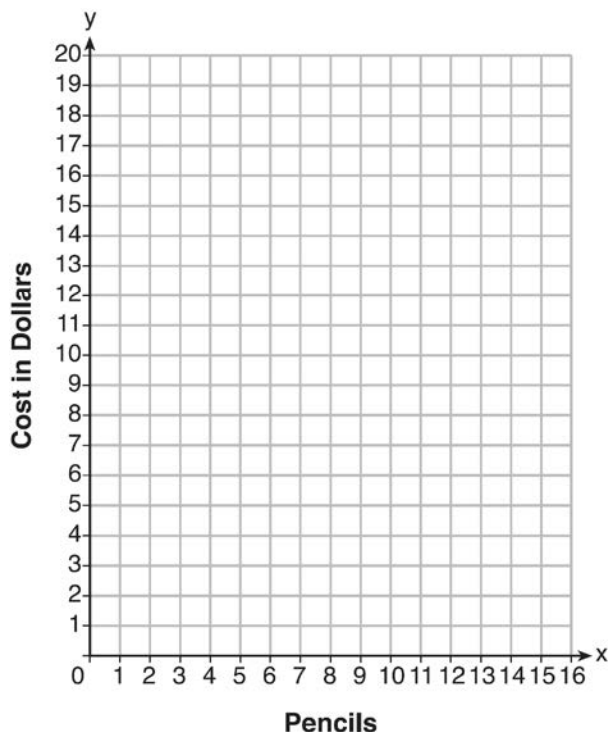
- 186 Solve for x algebraically:
 $7x - 3(4x - 8) \leq 6x + 12 - 9x$
 If x is a number in the interval $[4, 8]$, state all integers that satisfy the given inequality. Explain how you determined these values.

- 187 The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, r , in terms of V and h . Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

- 188 At an office supply store, if a customer purchases fewer than 10 pencils, the cost of each pencil is \$1.75. If a customer purchases 10 or more pencils, the cost of each pencil is \$1.25. Let c be a function for which $c(x)$ is the cost of purchasing x pencils, where x is a whole number.

$$c(x) = \begin{cases} 1.75x, & \text{if } 0 \leq x \leq 9 \\ 1.25x, & \text{if } x \geq 10 \end{cases}$$

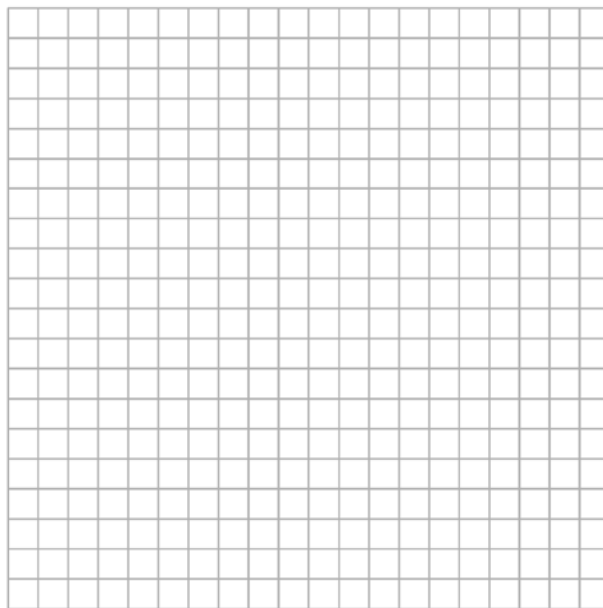
Create a graph of c on the axes below.



A customer brings 8 pencils to the cashier. The cashier suggests that the total cost to purchase 10 pencils would be less expensive. State whether the cashier is correct or incorrect. Justify your answer.

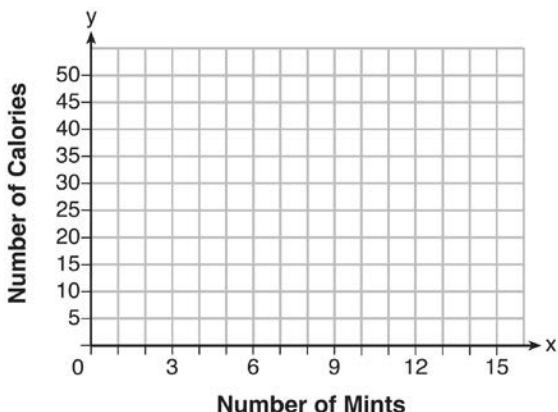
- 189 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.
 b) Rewrite $f(x)$ in vertex form by completing the square.

- 190 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?

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

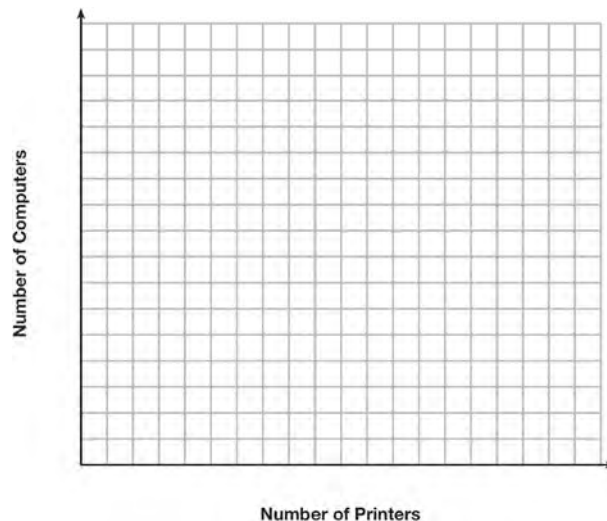


Write an equation that represents $C(x)$. A full box of mints contains 180 Calories. Use the equation to determine the total number of mints in the box.

- 192 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A , h , and b_2 . The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.

- 193 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. 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. 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.

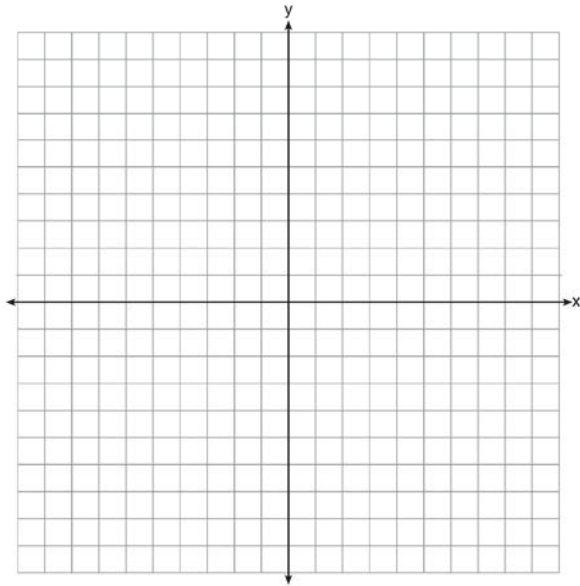
- 194 An on-line electronics store must sell at least \$2500 worth of printers and computers per day. Each printer costs \$50 and each computer costs \$500. The store can ship a maximum of 15 items per day. On the set of axes below, graph a system of inequalities that models these constraints.



Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

- 195 An animal shelter spends \$2.35 per day to care for each cat and \$5.50 per day to care for each dog. Pat noticed that the shelter spent \$89.50 caring for cats and dogs on Wednesday. Write an equation to represent the possible numbers of cats and dogs that could have been at the shelter on Wednesday. Pat said that there might have been 8 cats and 14 dogs at the shelter on Wednesday. Are Pat's numbers possible? Use your equation to justify your answer. Later, Pat found a record showing that there were a total of 22 cats and dogs at the shelter on Wednesday. How many cats were at the shelter on Wednesday?

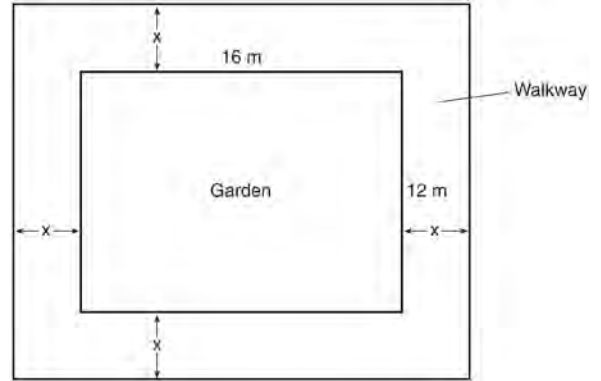
196 On the axes below, graph $f(x) = |3x|$.



If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$? If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

197 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks. Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink. Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

198 A rectangular garden measuring 12 meters by 16 meters is to have a walkway installed around it with a width of x meters, as shown in the diagram below. Together, the walkway and the garden have an area of 396 square meters.

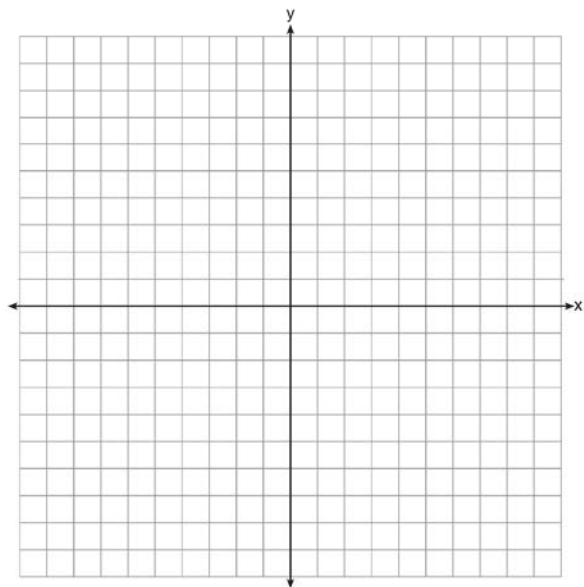


Write an equation that can be used to find x , the width of the walkway. Describe how your equation models the situation. Determine and state the width of the walkway, in meters.

Algebra 1 CCSS 4 Point Regents Exam Questions

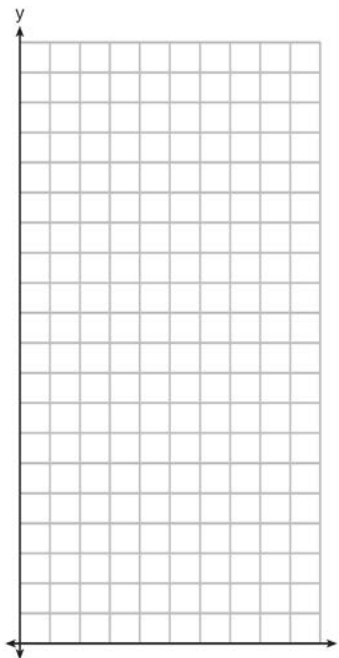
www.jmap.org

- 199 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

- 200 Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

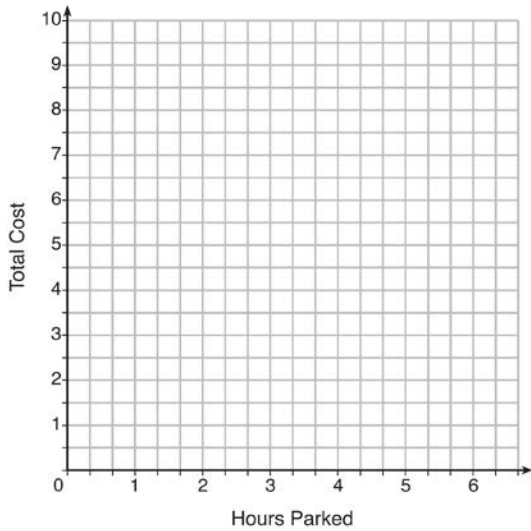
Algebra 1 CCSS 4 Point Regents Exam Questions

www.jmap.org

201 The table below lists the total cost for parking for a period of time on a street in Albany, N.Y. The total cost is for any length of time up to and including the hours parked. For example, parking for up to and including 1 hour would cost \$1.25; parking for 3.5 hours would cost \$5.75.

Hours Parked	Total Cost
1	1.25
2	2.50
3	4.00
4	5.75
5	7.75
6	10.00

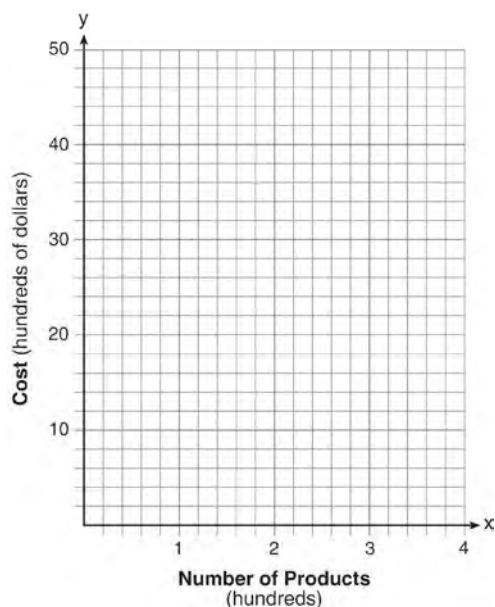
Graph the step function that represents the cost for the number of hours parked.



Explain how the cost per hour to park changes over the six-hour period.

Algebra 1 Common Core State Standards 6 Point Regents Exam Questions

- 202 A company is considering building a manufacturing plant. They determine the weekly production cost at site A to be $A(x) = 3x^2$ while the production cost at site B is $B(x) = 8x + 3$, where x represents the number of products, *in hundreds*, and $A(x)$ and $B(x)$ are the production costs, *in hundreds of dollars*. Graph the production cost functions on the set of axes below and label them site A and site B .

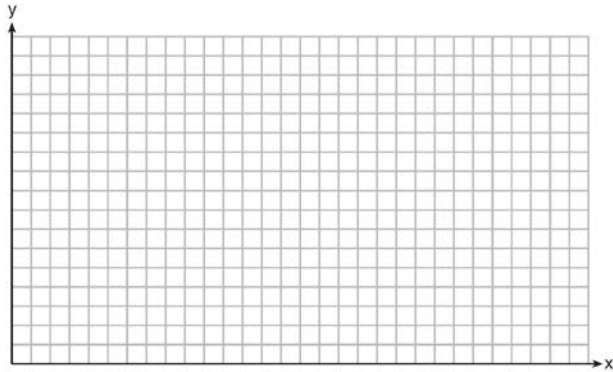


State the positive value(s) of x for which the production costs at the two sites are equal. Explain how you determined your answer. If the company plans on manufacturing 200 products per week, which site should they use? Justify your answer.

- 203 A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width. Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create. Explain how your equation or inequality models the situation. Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

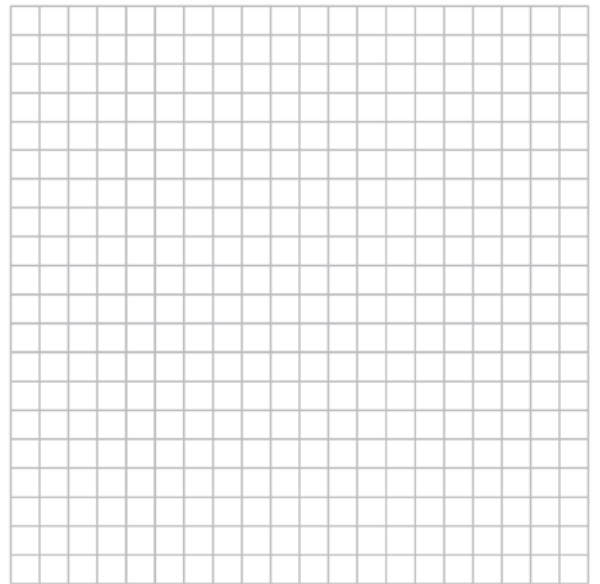
- 204 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters. The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden. Explain how your equation models the situation. Determine the area, in square meters, of the new rectangular garden.

- 205 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet. On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.



Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem. The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

- 206 A local business was looking to hire a landscaper to work on their property. They narrowed their choices to two companies. Flourish Landscaping Company charges a flat rate of \$120 per hour. Green Thumb Landscapers charges \$70 per hour plus a \$1600 equipment fee. Write a system of equations representing how much each company charges. Determine and state the number of hours that must be worked for the cost of each company to be the same. [The use of the grid below is optional.] If it is estimated to take at least 35 hours to complete the job, which company will be less expensive? Justify your answer.



Algebra 1 CCSS 6 Point Regents Exam Questions

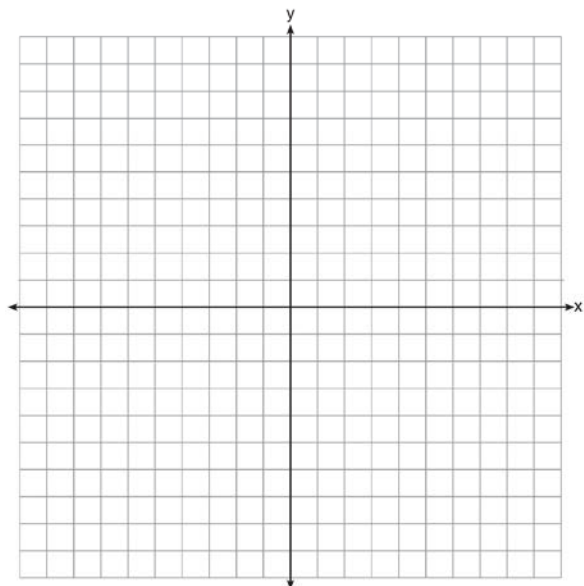
www.jmap.org

207 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.

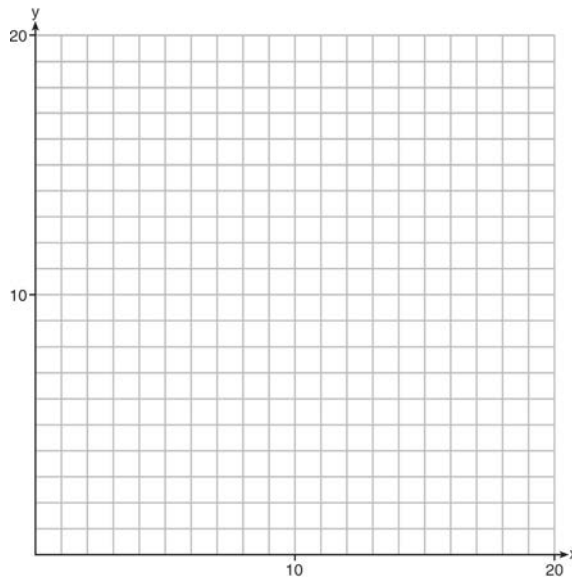
a) In function notation, write $A(x)$ to represent the total cost of attending carnival *A* and going on x rides. In function notation, write $B(x)$ to represent the total cost of attending carnival *B* and going on x rides.

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.



208 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work no more than 15 hours a week, due to school commitments. Edith wants to earn at least \$80 a week, working a combination of both jobs. Write a system of inequalities that can be used to represent the situation. Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

Algebra 1 Common Core State Standards Multiple Choice Regents Exam Questions Answer Section

- 1 ANS: 3 PTS: 2 REF: 011505ai NAT: F.LE.1b
TOP: Families of Functions
- 2 ANS: 2 PTS: 2 REF: 061404ai NAT: A.REI.12
TOP: Graphing Systems of Linear Inequalities KEY: bimodalgraph

3 ANS: 3

$$\frac{\sqrt{2\left(\frac{1}{2}\right)+3}}{6\left(\frac{1}{2}\right)-5} = \frac{\sqrt{4}}{-2} = \frac{2}{-2} = -1$$

- PTS: 2 REF: 081512ai NAT: F.IF.2 TOP: Functional Notation
- 4 ANS: 3
15 > 5

- PTS: 2 REF: 081502ai NAT: A.CED.2 TOP: Graphing Linear Systems
- 5 ANS: 4 PTS: 2 REF: 081419ai NAT: A.CED.2
TOP: Modeling Linear Systems

- 6 ANS: 3 PTS: 2 REF: 061501ai NAT: F.LE.5
TOP: Modeling Linear Functions

- 7 ANS: 1 PTS: 2 REF: 081515ai NAT: F.IF.6
TOP: Rate of Change

8 ANS: 4

$$(x+2)^2 - 25 = 0$$

$$((x+2)+5)((x+2)-5) = 0$$

$$x = -7, 3$$

- PTS: 2 REF: 081418ai NAT: F.IF.8a TOP: Zeros of Polynomials

9 ANS: 1

$$x^2 - 12x + 7$$

$$x^2 - 12x + 36 - 29$$

$$(x-6)^2 - 29$$

- PTS: 2 REF: 081520ai NAT: A.SSE.3 TOP: Solving Quadratics
KEY: completing the square

10 ANS: 1

$$x^2 - 8x + 16 = 24 + 16$$

$$(x - 4)^2 = 40$$

$$x - 4 = \pm\sqrt{40}$$

$$x = 4 \pm 2\sqrt{10}$$

PTS: 2 REF: 061523ai NAT: A.REI.4 TOP: Solving Quadratics

KEY: completing the square

11 ANS: 1 PTS: 2 REF: 011516ai NAT: A.CED.4

TOP: Transforming Formulas

12 ANS: 3

		Company 1	Company 2
1	median salary	33,500	36,250
2	mean salary	33,750	44,125
3	salary range	8,000	36,000
4	mean age	28.25	28.25

PTS: 2 REF: 081404ai NAT: S.ID.2 TOP: Central Tendency and Dispersion

13 ANS: 2 PTS: 2 REF: 061403ai NAT: A.APR.1

TOP: Operations with Polynomials KEY: subtraction

14 ANS: 2 PTS: 2 REF: 081501ai NAT: F.BF.3

TOP: Transformations with Functions and Relations

15 ANS: 3

$$\frac{36.6 - 15}{4 - 0} = \frac{21.6}{4} = 5.4$$

PTS: 2 REF: 061511ai NAT: F.IF.6 TOP: Rate of Change

16 ANS: 3 PTS: 2 REF: 061412ai NAT: A.SSE.3

TOP: Solving Quadratics

17 ANS: 2 PTS: 2 REF: 081511ai NAT: F.IF.1

TOP: Defining Functions

18 ANS: 3 PTS: 2 REF: 081412ai NAT: F.LE.1b

TOP: Families of Functions

19 ANS: 4 PTS: 2 REF: spr1304ai NAT: A.CED.1

TOP: Geometric Applications of Quadratics

20 ANS: 3

x	$A = 5000x + 10000$	$B = 500(2)^{x-1}$
6	40,000	16,000
7	45,000	32,000
8	50,000	64,000
9	55,000	128,000

PTS: 2 REF: 081518ai NAT: F.LE.3

TOP: Comparing Linear and Exponential Functions

- 21 ANS: 1 PTS: 2 REF: 081504ai NAT: A.APR.3
TOP: Zeros of Polynomials
- 22 ANS: 3 PTS: 2 REF: spr1302ai NAT: A.APR.3
TOP: Zeros of Polynomials KEY: bimodalgraph
- 23 ANS: 1
 $f(2) = 0$
 $f(6) = 8$
- PTS: 2 REF: 081411ai NAT: F.IF.2 TOP: Domain and Range
- 24 ANS: 2 PTS: 2 REF: 061416ai NAT: A.CED.1
TOP: Modeling Linear Equations
- 25 ANS: 3 PTS: 2 REF: 061411ai NAT: S.ID.8
TOP: Correlation Coefficient and Residuals
- 26 ANS: 3 PTS: 2 REF: 081403ai NAT: A.REI.4
TOP: Solving Quadratics KEY: taking square roots
- 27 ANS: 2 PTS: 2 REF: 011506ai NAT: F.IF.5
TOP: Domain and Range
- 28 ANS: 2
 $P(x) = -0.5x^2 + 800x - 100 - (300x + 250) = -0.5x^2 + 500x - 350$
- PTS: 2 REF: 081406ai NAT: A.APR.1 TOP: Operations with Polynomials
KEY: subtraction
- 29 ANS: 1 PTS: 2 REF: 061401ai NAT: A.REI.1
TOP: Identifying Properties
- 30 ANS: 3 PTS: 2 REF: 081409ai NAT: A.CED.1
TOP: Modeling Quadratics
- 31 ANS: 2 PTS: 2 REF: 081416ai NAT: F.LE.2
TOP: Sequences
- 32 ANS: 3 PTS: 2 REF: 061407ai NAT: F.LE.5
TOP: Modeling Linear Functions
- 33 ANS: 2 PTS: 2 REF: 061508ai NAT: N.RN.3
TOP: Classifying Numbers
- 34 ANS: 2 PTS: 2 REF: 081422ai NAT: F.IF.7
TOP: Graphing Piecewise-Defined Functions
- 35 ANS: 3
 $a + p = 165$ $1.75(165 - p) + 2.5p = 337.5$
 $1.75a + 2.5p = 337.5$ $288.75 - 1.75p + 2.5p = 337.5$
 $0.75p = 48.75$
 $p = 65$
- PTS: 2 REF: 061506ai NAT: A.REI.6 TOP: Modeling Linear Systems

36 ANS: 1

$$\frac{x-2}{3} = \frac{4}{6}$$

$$6x - 12 = 12$$

$$6x = 24$$

$$x = 4$$

PTS: 2 REF: 081420ai NAT: A.REI.3 TOP: Solving Linear Equations
KEY: fractional expressions

37 ANS: 3 PTS: 2 REF: 081506ai NAT: A.REI.12

TOP: Graphing Systems of Linear Inequalities

38 ANS: 2 PTS: 2 REF: 011501ai NAT: A.SSE.1

TOP: Modeling Linear Functions

39 ANS: 1 PTS: 2 REF: 081417ai NAT: F.BF.3

TOP: Transformations with Functions and Relations

40 ANS: 2

$$L + S = 20 \quad 27.98L + 10.98(20 - L) = 355.60$$

$$27.98L + 10.98S = 355.60 \quad 27.98L + 219.60 - 10.98L = 355.60$$

$$17L = 136$$

$$L = 8$$

PTS: 2 REF: 081510ai NAT: A.REI.6 TOP: Modeling Linear Systems

41 ANS: 1 PTS: 2 REF: 081407ai NAT: A.REI.12

TOP: Graphing Systems of Linear Inequalities

42 ANS: 3 PTS: 2 REF: 011513ai NAT: A.CED.3

TOP: Modeling Linear Inequalities

43 ANS: 1

$$V = \frac{1}{3} \pi r^2 h$$

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi h} = r^2$$

$$\sqrt{\frac{3V}{\pi h}} = r$$

PTS: 2 REF: 061423ai NAT: A.CED.4 TOP: Transforming Formulas

44 ANS: 4 PTS: 2 REF: 081503ai NAT: A.SSE.1

TOP: Modeling Linear Equations

45 ANS: 4

$$f(1) = 3; f(2) = -5; f(3) = 11; f(4) = -21; f(5) = 43$$

PTS: 2 REF: 081424ai NAT: F.IF.3 TOP: Sequences

46 ANS: 1 PTS: 2 REF: 061420ai NAT: F.IF.2
TOP: Functional Notation

47 ANS: 4
 $\frac{4.7-2.3}{20-80} = \frac{2.4}{-60} = -0.04.$

PTS: 2 REF: 081414ai NAT: F.IF.6 TOP: Rate of Change
48 ANS: 4

$$1) \frac{g(1)-g(-1)}{1-(-1)} = \frac{4-6}{2} = \frac{-2}{2} = -1 \quad 2) g(0) = 6 \quad 3) x = \frac{-(-1)}{2(-1)} = -\frac{1}{2}; g\left(-\frac{1}{2}\right) = -\left(-\frac{1}{2}\right)^2 + \frac{1}{2} + 6 = 6\frac{1}{4}$$

$$\frac{n(1)-n(-1)}{1-(-1)} = \frac{9-5}{2} = \frac{4}{2} = 2 \quad n(0) = 8 \quad x = 1; n(1) = 9$$

$$4) g:S = \frac{-(-1)}{-1} = -1$$

$$n: S = -2 + 4 = 2$$

PTS: 2 REF: 081521ai NAT: F.IF.9 TOP: Graphing Quadratic Functions
49 ANS: 4 PTS: 2 REF: 011514ai NAT: S.ID.2
TOP: Central Tendency and Dispersion

50 ANS: 2 PTS: 2 REF: 061516ai NAT: S.ID.9
TOP: Analysis of Data

51 ANS: 4 PTS: 2 REF: 011503ai NAT: A.SSE.3
TOP: Solving Quadratics

52 ANS: 3 PTS: 2 REF: 081509ai NAT: A.SSE.2
TOP: Factoring Polynomials

53 ANS: 4
 $16^{2t} = n^{4t}$

$$16^2 = n^4$$

$$256 = n^4$$

$$4 = n$$

PTS: 2 REF: 011519ai NAT: A.SSE.3 TOP: Solving Exponential Equations
54 ANS: 4 PTS: 2 REF: 011523ai NAT: A.CED.2
TOP: Modeling Linear Functions

55 ANS: 2 PTS: 2 REF: 081413ai NAT: A.CED.2
TOP: Graphing Linear Functions KEY: bimodalgraph

56 ANS: 1

$$7 - \frac{2}{3}x < x - 8$$

$$15 < \frac{5}{3}x$$

$$9 < x$$

PTS: 2 REF: 011507ai NAT: A.REI.3 TOP: Solving Linear Inequalities

57 ANS: 3 PTS: 2 REF: 081523ai NAT: A.REI.4
TOP: Solving Quadratics KEY: completing the square58 ANS: 4
 $y + 3 = 6(0)$
 $y = -3$

PTS: 2 REF: 011509ai NAT: F.IF.4 TOP: Graphing Linear Functions

59 ANS: 3 PTS: 2 REF: 011515ai NAT: F.IF.8b
TOP: Modeling Exponential Functions60 ANS: 4 PTS: 2 REF: 081405ai NAT: A.REI.10
TOP: Graphing Quadratic Functions61 ANS: 3 PTS: 2 REF: 011518ai NAT: A.REI.11
TOP: Nonlinear Systems62 ANS: 4 PTS: 2 REF: 061502ai NAT: F.IF.4
TOP: Relating Graphs to Events63 ANS: 1 PTS: 2 REF: 061521ai NAT: A.REI.4
TOP: Solving Quadratics KEY: completing the square64 ANS: 4
 $3x^2 - 3x - 6 = 0$
 $3(x^2 - x - 2) = 0$
 $3(x - 2)(x + 1) = 0$
 $x = 2, -1$

PTS: 2 REF: 081513ai NAT: A.SSE.3 TOP: Solving Quadratics

65 ANS: 3 PTS: 2 REF: 061409ai NAT: F.IF.4
TOP: Graphing Quadratic Functions66 ANS: 3
 $\sqrt{16} + \sqrt{9} = \frac{7}{1}$ may be expressed as the ratio of two integers.

PTS: 2 REF: 061413ai NAT: N.RN.3 TOP: Classifying Numbers

67 ANS: 4 PTS: 2 REF: 061406ai NAT: F.LE.1c
TOP: Comparing Linear and Exponential Functions

68 ANS: 4

There are no negative or fractional cars.

PTS: 2

REF: 061402ai

NAT: F.IF.5

TOP: Domain and Range

69 ANS: 4

Over the interval $0 \leq x \leq 3$, the average rate of change for $h(x) = \frac{9-2}{3-0} = \frac{7}{3}$, $f(x) = \frac{7-1}{3-0} = \frac{6}{3} = 2$, and

$$g(x) = \frac{3-0}{3-0} = \frac{3}{3} = 1.$$

PTS: 2

REF: spr1301ai

NAT: F.IF.6

TOP: Rate of Change

70 ANS: 4

$$x^2 - 13x - 30 = 0$$

$$(x - 15)(x + 2) = 0$$

$$x = 15, -2$$

PTS: 2

REF: 061510ai

NAT: A.APR.3a

TOP: Zeros of Polynomials

71 ANS: 4

$$x^2 - 5x = -3$$

$$x^2 - 5x + \frac{25}{4} = \frac{-12}{4} + \frac{25}{4}$$

$$\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$$

PTS: 2

REF: 061518ai

NAT: A.REI.4

TOP: Solving Quadratics

KEY: completing the square

72 ANS: 1

$$\frac{0.8(10^2) - 0.8(5^2)}{10 - 5} = \frac{80 - 20}{5} = 12$$

PTS: 2

REF: 011521ai

NAT: F.IF.6

TOP: Rate of Change

73 ANS: 2

PTS: 2

REF: 061517ai

NAT: A.SSE.1

TOP: Modeling Exponential Functions

74 ANS: 1

$$\frac{7}{3} \left(x + \frac{9}{28} \right) = 20$$

$$\frac{7}{3}x + \frac{3}{4} = \frac{80}{4}$$

$$\frac{7}{3}x = \frac{77}{4}$$

$$x = \frac{33}{4} = 8.25$$

PTS: 2 REF: 061405ai NAT: A.REI.3 TOP: Solving Linear Equations
KEY: fractional expressions

75 ANS: 3

A correlation coefficient close to -1 or 1 indicates a good fit. For a residual plot, there should be no observable pattern and a similar distribution of residuals above and below the x -axis.

PTS: 2 REF: fall1303ai NAT: S.ID.6 TOP: Correlation Coefficient and Residuals

76 ANS: 2 PTS: 2 REF: 061503ai NAT: A.SSE.2
TOP: Factoring Polynomials

77 ANS: 4

$$m = \frac{11-1}{3-(-2)} = \frac{10}{5} = 2 \quad y = mx + b \quad y = 2x + 5$$

$$11 = 2(3) + b \quad 9 = 2(2) + 5$$

$$5 = b$$

PTS: 2 REF: 011511ai NAT: A.REI.10 TOP: Graphing Linear Functions

78 ANS: 3

$h(x) = -x^2 + x + 6$ Maximum of $f(x) = 9$ $k(x) = -5x^2 - 12x + 4$ Maximum of $g(x) < 5$

$$x = \frac{-1}{2(-1)} = \frac{1}{2}$$

$$x = \frac{12}{2(-5)} = -\frac{6}{5}$$

$$y = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$$

$$y = -5\left(-\frac{6}{5}\right)^2 - 12\left(-\frac{6}{5}\right) + 4$$

$$= -\frac{1}{4} + \frac{2}{4} + 6$$

$$= -\frac{36}{5} + \frac{72}{5} + \frac{20}{5}$$

$$= 6\frac{1}{4}$$

$$= \frac{56}{5}$$

$$= 11\frac{1}{5}$$

PTS: 2 REF: 061514ai NAT: F.IF.9 TOP: Graphing Quadratic Functions

79 ANS: 3

$$f(0+1) = -2f(0) + 3 = -2(2) + 3 = -1$$

$$f(1+1) = -2f(1) + 3 = -2(-1) + 3 = 5$$

PTS: 2 REF: 011520ai NAT: F.IF.3 TOP: Sequences

80 ANS: 4

$$3(x^2 - 4x + 4) - 2x + 2 = 3x^2 - 12x + 12 - 2x + 2 = 3x^2 - 14x + 14$$

PTS: 2 REF: 081524ai NAT: A.APR.1 TOP: Operations with Polynomials

KEY: mixed

81 ANS: 2

$$0 = -16t^2 + 144$$

$$16t^2 = 144$$

$$t^2 = 9$$

$$t = 3$$

PTS: 2 REF: 081423ai NAT: F.IF.5 TOP: Domain and Range

82 ANS: 3 PTS: 2 REF: 061522ai NAT: F.BF.2

TOP: Sequences

83 ANS: 4

$$\frac{750 + 2.25p}{p} > 2.75 \quad \frac{750 + 2.25p}{p} < 3.25$$

$$750 + 2.25p > 2.75p \quad 750 + 2.25p < 3.25p$$

$$750 > .50p \quad 750 < p$$

$$1500 > p$$

PTS: 2 REF: 061524ai NAT: A.CED.3 TOP: Modeling Linear Inequalities

84 ANS: 4 PTS: 2 REF: 081505ai NAT: A.CED.3

TOP: Modeling Linear Inequalities

85 ANS: 2

$$x^2 - 2x - 8 = \frac{1}{4}x - 1$$

$$4x^2 - 8x - 32 = x - 4$$

$$4x^2 - 9x - 28 = 0$$

$$(4x + 7)(x - 4) = 0$$

$$x = -\frac{7}{4}, 4$$

PTS: 2 REF: 081517ai NAT: A.REI.11 TOP: Quadratic-Linear Systems

- 86 ANS: 1
A: $\bar{x} = 6$; $\sigma_x = 3.16$ B: $\bar{x} = 6.875$; $\sigma_x = 3.06$
- PTS: 2 REF: 081519ai NAT: S.ID.2 TOP: Central Tendency and Dispersion
- 87 ANS: 1 PTS: 2 REF: 061505ai NAT: A.REI.12
TOP: Graphing Linear Inequalities
- 88 ANS: 3 PTS: 2 REF: 061415ai NAT: F.LE.2
TOP: Comparing Linear and Exponential Functions
- 89 ANS: 2 PTS: 2 REF: 061513ai NAT: F.LE.2
TOP: Comparing Linear and Exponential Functions
- 90 ANS: 2
 $x^2 - 6x = 12$
 $x^2 - 6x + 9 = 12 + 9$
 $(x - 3)^2 = 21$
- PTS: 2 REF: 061408ai NAT: A.REI.4 TOP: Solving Quadratics
KEY: completing the square
- 91 ANS: 4 PTS: 2 REF: 061509ai NAT: F.IF.1
TOP: Domain and Range
- 92 ANS: 2
 $x^2 + 4x = 16$
 $x^2 + 4x + 4 = 16 + 4$
 $(x + 2)^2 = 20$
 $x + 2 = \pm\sqrt{4 \cdot 5}$
 $= -2 \pm 2\sqrt{5}$
- PTS: 2 REF: 061410ai NAT: A.REI.4 TOP: Solving Quadratics
KEY: completing the square
- 93 ANS: 1 PTS: 2 REF: 081514ai NAT: F.IF.3
TOP: Sequences
- 94 ANS: 2 PTS: 2 REF: 081402ai NAT: F.LE.5
TOP: Modeling Linear Functions
- 95 ANS: 1
 $25,000(0.86)^2 - 25,000(0.86)^3 = 18490 - 15901.40 = 2588.60$
- PTS: 2 REF: 011508ai NAT: F.IF.8b TOP: Evaluating Exponential Expressions
- 96 ANS: 2 PTS: 2 REF: 011510ai NAT: A.APR.1
TOP: Operations with Polynomials KEY: multiplication

97 ANS: 2
 $2(3x - y = 4)$
 $6x - 2y = 8$

PTS: 2 REF: 061414ai NAT: A.REI.5 TOP: Solving Linear Systems

98 ANS: 3

	Mean	Q1	Median	Q3	IQR
Semester 1	86.8	80.5	88	92.5	12
Semester 2	87	80	88	92	12

PTS: 2 REF: 061419ai NAT: S.ID.2 TOP: Central Tendency and Dispersion

99 ANS: 3 PTS: 2 REF: 011522ai NAT: A.SSE.2
 TOP: Factoring Polynomials

100 ANS: 1

$$\frac{110 - 40}{2 - 1} > \frac{350 - 230}{8 - 6}$$

$$70 > 60$$

PTS: 2 REF: 061418ai NAT: F.IF.6 TOP: Rate of Change

101 ANS: 1 PTS: 2 REF: 011504ai NAT: F.BF.1
 TOP: Modeling Exponential Functions

102 ANS: 4 PTS: 2 REF: 061417ai NAT: F.IF.2
 TOP: Domain and Range

103 ANS: 1

$$4x - 5(0) = 40$$

$$4x = 40$$

$$x = 10$$

PTS: 2 REF: 081408ai NAT: F.IF.4 TOP: Graphing Linear Functions

104 ANS: 2 PTS: 2 REF: 011512ai NAT: F.BF.3
 TOP: Transformations with Functions and Relations

105 ANS: 1 PTS: 2 REF: 061507ai NAT: F.IF.7
 TOP: Graphing Step Functions KEY: bimodalgraph

106 ANS: 4 PTS: 2 REF: 061421ai NAT: F.IF.3
 TOP: Sequences

107 ANS: 4 PTS: 2 REF: 081421ai NAT: S.ID.6
 TOP: Regression KEY: linear

108 ANS: 3 PTS: 2 REF: 061504ai NAT: F.IF.1
 TOP: Defining Functions

109 ANS: 4 PTS: 2 REF: 081508ai NAT: F.BF.1
 TOP: Modeling Linear Functions

110 ANS: 4 PTS: 2 REF: 061422ai NAT: A.CED.1
 TOP: Modeling Linear Equations

111 ANS: 2

(4,3) is on the boundary of $y > -\frac{1}{2}x + 5$, so (4,3) is not a solution of the system.

PTS: 2

REF: fall1301ai

NAT: A.REI.12

TOP: Graphing Systems of Linear Inequalities

112 ANS: 2

$$d = \frac{1}{2}at^2$$

$$2d = at^2$$

$$\frac{2d}{a} = t^2$$

$$\sqrt{\frac{2d}{a}} = t$$

PTS: 2

REF: 061519ai

NAT: A.CED.4

TOP: Transforming Formulas

113 ANS: 1

$$x^2 - 6x = 19$$

$$x^2 - 6x + 9 = 19 + 9$$

$$(x - 3)^2 = 28$$

$$x - 3 = \pm\sqrt{4 \cdot 7}$$

$$x = 3 \pm 2\sqrt{7}$$

PTS: 2

REF: fall1302ai

NAT: A.REI.4

TOP: Solving Quadratics

KEY: completing the square

114 ANS: 2

$$\frac{1}{\sqrt{4}} + \frac{1}{\sqrt{9}} = \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$

PTS: 2

REF: 081522ai

NAT: N.RN.3

TOP: Classifying Numbers

115 ANS: 1

$$f(-1) < g(-1)$$

$$3^{-1} < 2(-1) + 5$$

$$\frac{1}{3} < 3$$

PTS: 2

REF: 061515ai

NAT: F.LE.3

TOP: Comparing Linear and Exponential Functions

116 ANS: 2

PTS: 2

REF: 061424ai

NAT: F.LE.2

TOP: Sequences

117 ANS: 1

PTS: 2

REF: 081401ai

NAT: N.RN.3

TOP: Classifying Numbers

- 118 ANS: 2 PTS: 2 REF: 011502ai NAT: N.Q.1
TOP: Conversions
- 119 ANS: 3
Median remains at 1.4.
- PTS: 2 REF: 061520ai NAT: S.ID.3 TOP: Central Tendency and Dispersion
- 120 ANS: 1 PTS: 2 REF: 081415ai NAT: A.SSE.2
TOP: Factoring Polynomials
- 121 ANS: 4
 $x^2 + 6x = 7$
 $x^2 + 6x + 9 = 7 + 9$
 $(x + 3)^2 = 16$
- PTS: 2 REF: 011517ai NAT: A.REI.4 TOP: Solving Quadratics
KEY: completing the square
- 122 ANS: 1 PTS: 2 REF: 011524ai NAT: A.APR.3
TOP: Zeros of Polynomials
- 123 ANS: 3 PTS: 2 REF: 081507ai NAT: F.LE.2
TOP: Modeling Exponential Functions
- 124 ANS: 2
 $(x + 4)(x + 6) = 0$
 $x^2 + 10x + 24 = 0$
- PTS: 2 REF: spr1303ai NAT: A.APR.3a TOP: Zeros of Polynomials
- 125 ANS: 2
 $y = (x - 3)(x + 2)(x - 1)$
- PTS: 2 REF: 061512ai NAT: A.APR.3 TOP: Zeros of Polynomials
- 126 ANS: 2 PTS: 2 REF: 081516ai NAT: F.IF.7
TOP: Graphing Piecewise-Defined Functions KEY: bimodalgraph
- 127 ANS: 3 PTS: 2 REF: 081410ai NAT: F.LE.2
TOP: Families of Functions KEY: bimodalgraph

**Algebra 1 Common Core State Standards 2 Point Regents Exam Questions
Answer Section**

128 ANS:

$$34 = l\left(\frac{1}{2}l\right)$$

$$68 = l^2$$

$$8.2 \approx l$$

$$4.1 \approx w$$

PTS: 2

REF: 061532ai

NAT: A.CED.1

TOP: Geometric Applications of Quadratics

129 ANS:

$$\frac{1}{2}x^2 - 4 = 0$$

$$x^2 - 8 = 0$$

$$x^2 = 8$$

$$x = \pm 2\sqrt{2}$$

PTS: 2

REF: fall1306ai

NAT: A.REI.4

TOP: Solving Quadratics

KEY: taking square roots

130 ANS:

$$A = 600(1.016)^2 \approx 619.35$$

PTS: 2

REF: 061529ai

NAT: A.CED.1

TOP: Modeling Exponential Functions

131 ANS:

$x^2 + 46 = 60 + 5x$ John and Sarah will have the same amount of money saved at 7 weeks. I set the

$$x^2 - 5x - 14 = 0$$

$$(x - 7)(x + 2) = 0$$

$$x = 7$$

expressions representing their savings equal to each other and solved for the positive value of x by factoring.

PTS: 2

REF: 061527ai

NAT: A.REI.11

TOP: Quadratic-Linear Systems

132 ANS:

$$\frac{33 + 12}{180} = 25\%$$

PTS: 2

REF: 011526ai

NAT: S.ID.5

TOP: Frequency Histograms, Bar Graphs and Tables

133 ANS:

 $-3x + 7 - 5x < 15$ 0 is the smallest integer.

$$-8x < 8$$

$$x > -1$$

PTS: 2

REF: 061530ai

NAT: A.REI.3

TOP: Solving Linear Inequalities

134 ANS:

Correct. The sum of a rational and irrational is irrational.

PTS: 2

REF: 011525ai

NAT: N.RN.3

TOP: Classifying Numbers

135 ANS:

g. The maximum of f is 6. For g , the maximum is 11. $x = \frac{-b}{2a} = \frac{-4}{2\left(-\frac{1}{2}\right)} = \frac{-4}{-1} = 4$

$$y = -\frac{1}{2}(4)^2 + 4(4) + 3 = -8 + 16 + 3 = 11$$

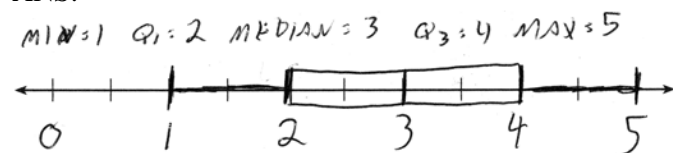
PTS: 2

REF: 081429ai

NAT: F.IF.9

TOP: Graphing Quadratic Functions

136 ANS:



PTS: 2

REF: 061432ai

NAT: S.ID.1

TOP: Box Plots

137 ANS:

$$b^2 - 4ac = (-2)^2 - 4(1)(5) = 4 - 20 = -16 \text{ None}$$

PTS: 2

REF: 081529ai

NAT: A.REI.4

TOP: Using the Discriminant

138 ANS:

Graph A is a good fit because it does not have a clear pattern, whereas Graph B does.

PTS: 2

REF: 061531ai

NAT: S.ID.6

TOP: Correlation Coefficient and Residuals

139 ANS:

$$185 + 0.03x = 275 + 0.025x$$

$$0.005x = 90$$

$$x = 18000$$

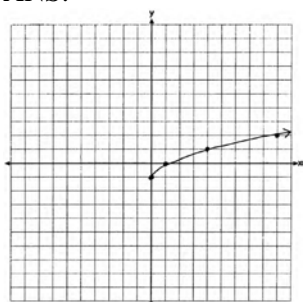
PTS: 2

REF: 081427ai

NAT: A.REI.6

TOP: Solving Linear Systems

140 ANS:



PTS: 2 REF: 061425ai NAT: F.IF.7 TOP: Graphing Root Functions

141 ANS:

$$2(-1) + a(-1) - 7 > -12 \quad a = 2$$

$$-a - 9 > -12$$

$$-a > -3$$

$$a < 3$$

PTS: 2 REF: 061427ai NAT: A.REI.3 TOP: Solving Linear Inequalities

142 ANS:

Yes, because every element of the domain is assigned one unique element in the range.

PTS: 2 REF: 061430ai NAT: F.IF.1 TOP: Defining Functions

143 ANS:

$$f(x) = 6.50x + 4(12)$$

PTS: 2 REF: 061526ai NAT: F.BF.1 TOP: Modeling Linear Functions

144 ANS:

$1 - 0.95 = 0.05 = 5\%$ To find the rate of change of an equation in the form $y = ab^x$, subtract b from 1.

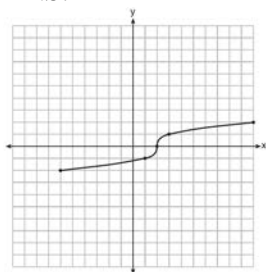
PTS: 2 REF: 081530ai NAT: F.LE.5 TOP: Modeling Exponential Functions

145 ANS:

$$h(n) = 1.5(n - 1) + 3$$

PTS: 2 REF: 081525ai NAT: F.BF.1 TOP: Modeling Linear Functions

146 ANS:

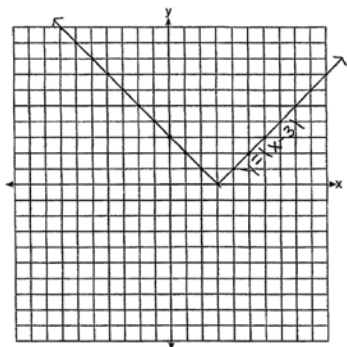


PTS: 2 REF: fall1304ai NAT: F.IF.7 TOP: Graphing Root Functions

- 147 ANS:
Exponential, because the function does not grow at a constant rate.

PTS: 2 REF: 081527ai NAT: S.ID.6
TOP: Comparing Linear and Exponential Functions

- 148 ANS:



The graph has shifted three units to the right.

PTS: 2 REF: 061525ai NAT: F.BF.3
TOP: Transformations with Functions and Relations

- 149 ANS:

$$8m^2 + 20m - 12 = 0$$

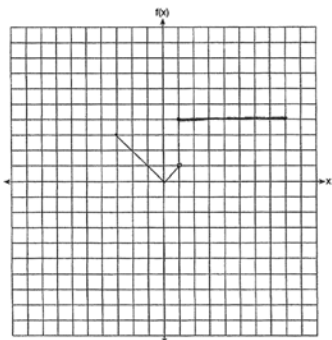
$$4(2m^2 + 5m - 3) = 0$$

$$(2m - 1)(m + 3) = 0$$

$$m = \frac{1}{2}, -3$$

PTS: 2 REF: fall1305ai NAT: A.SSE.3 TOP: Solving Quadratics

- 150 ANS:



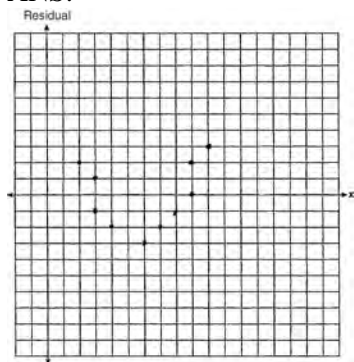
PTS: 2 REF: 011530ai NAT: F.IF.7 TOP: Graphing Piecewise-Defined Functions

- 151 ANS:

$$B = 3000(1.042)^t$$

PTS: 2 REF: 081426ai NAT: F.BF.1 TOP: Modeling Exponential Functions

152 ANS:



The line is a poor fit because the residuals form a pattern.

PTS: 2

REF: 081431ai

NAT: S.ID.6

TOP: Correlation Coefficient and Residuals

153 ANS:

Since $(x+p)^2 = x^2 + 2px + p^2$, p is half the coefficient of x , and the constant term is equal to p^2 . $\left(\frac{6}{2}\right)^2 = 9$

PTS: 2

REF: 081432ai

NAT: A.REI.4

TOP: Solving Quadratics

KEY: completing the square

154 ANS:

$$x^4 + 6x^2 - 7$$

$$(x^2 + 7)(x^2 - 1)$$

$$(x^2 + 7)(x + 1)(x - 1)$$

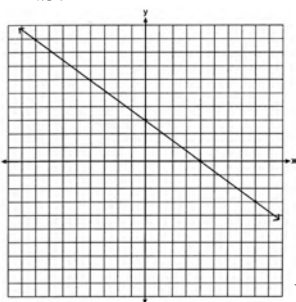
PTS: 2

REF: 061431ai

NAT: A.SSE.2

TOP: Factoring Polynomials

155 ANS:



No, because (3,2) is not on the graph.

PTS: 2

REF: 061429ai

NAT: A.REI.10

TOP: Graphing Linear Functions

156 ANS:

$$12x + 9(2x) + 5(3x) = 15 \quad 6\left(\frac{1}{3}\right) = 2 \text{ pounds}$$

$$45x = 15$$

$$x = \frac{1}{3}$$

PTS: 2

REF: spr1305ai

NAT: A.CED.3

TOP: Modeling Linear Equations

157 ANS:

$$x^2 + 10x + 24 = (x + 4)(x + 6) = (x + 6)(x + 4). \quad 6 \text{ and } 4$$

PTS: 2

REF: 081425ai

NAT: A.SSE.3

TOP: Solving Quadratics

158 ANS:

$$y = 0.05x - 0.92$$

PTS: 2

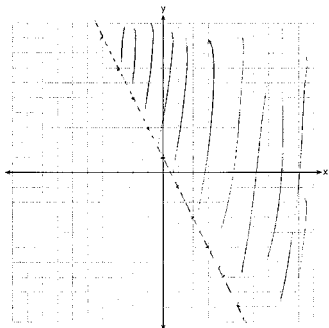
REF: fall1307ai

NAT: S.ID.6

TOP: Regression

KEY: linear

159 ANS:



PTS: 2

REF: 081526ai

NAT: A.REI.13

TOP: Graphing Linear Inequalities

160 ANS:

$$4x^2 - 12x - 7 = 0$$

$$(4x^2 - 14x) + (2x - 7) = 0$$

$$2x(2x - 7) + (2x - 7) = 0$$

$$(2x + 1)(2x - 7) = 0$$

$$x = -\frac{1}{2}, \frac{7}{2}$$

PTS: 2

REF: 011529ai

NAT: A.REI.4

TOP: Solving Quadratics

KEY: factoring

161 ANS:

a) $p + d \leq 800$ b) $6(440) + 9d \geq 5000$ Since $440 + 263 \leq 800$, it is possible.

$$6p + 9d \geq 5000 \quad 2640 + 9d \geq 5000$$

$$9d \geq 2360$$

$$d \geq 262.\bar{2}$$

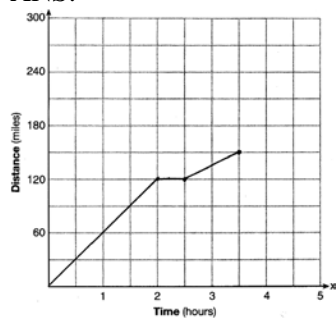
PTS: 2

REF: spr1306ai

NAT: A.CED.3

TOP: Modeling Systems of Linear Inequalities

162 ANS:



PTS: 2 REF: 081528ai NAT: F.IF.4 TOP: Relating Graphs to Events

163 ANS:

$$T(d) = 2d + 28 \quad T(6) = 2(6) + 28 = 40$$

PTS: 2 REF: 081532ai NAT: A.CED.1 TOP: Modeling Linear Functions

164 ANS:

$$-16t^2 + 64t = 0 \quad 0 \leq t \leq 4 \quad \text{The rocket launches at } t = 0 \text{ and lands at } t = 4$$

$$-16t(t - 4) = 0$$

$$t = 0, 4$$

PTS: 2 REF: 081531ai NAT: F.IF.4 TOP: Graphing Quadratic Functions

165 ANS:

$y = 0.25(2)^x$. I inputted the four integral values from the graph into my graphing calculator and determined the exponential regression equation.

PTS: 2 REF: 011532ai NAT: S.ID.6 TOP: Regression

KEY: exponential

166 ANS:

$$(2x^2 + 7x - 10)(x + 5)$$

$$2x^3 + 7x^2 - 10x + 10x^2 + 35x - 50$$

$$2x^3 + 17x^2 + 25x - 50$$

PTS: 2 REF: 081428ai NAT: A.APR.1 TOP: Operations with Polynomials

KEY: multiplication

167 ANS:

0.5 represents the rate of decay and 300 represents the initial amount of the compound.

PTS: 2 REF: 061426ai NAT: F.LE.5 TOP: Modeling Exponential Functions

168 ANS:

$(-4, 1)$, because then every element of the domain is not assigned one unique element in the range.

PTS: 2 REF: 011527ai NAT: F.IF.1 TOP: Defining Functions

169 ANS:

$$15x + 36 = 10x + 48$$

$$5x = 12$$

$$x = 2.4$$

PTS: 2

REF: 011531ai

NAT: A.CED.1

TOP: Modeling Linear Equations

170 ANS:

$$6. 3x + 9 \leq 5x - 3$$

$$12 \leq 2x$$

$$6 \leq x$$

PTS: 2

REF: 081430ai

NAT: A.REI.3

TOP: Solving Linear Inequalities

171 ANS:

$$-2x^2 + 6x + 4$$

PTS: 2

REF: 011528ai

NAT: A.APR.1

TOP: Operations with Polynomials

KEY: subtraction

172 ANS:

$$(3x^2 - 2x + 5) - (x^2 + 3x - 2) = 2x^2 - 5x + 7$$

$$\frac{1}{2}x^2(2x^2 - 5x + 7) = x^4 - \frac{5}{2}x^3 + \frac{7}{2}x^2$$

PTS: 2

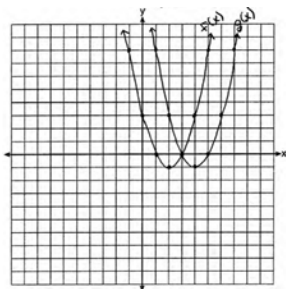
REF: 061528ai

NAT: A.APR.1

TOP: Operations with Polynomials

KEY: mixed

173 ANS:



(4, -1). $f(x - 2)$ is a horizontal shift two units to the right.

PTS: 2

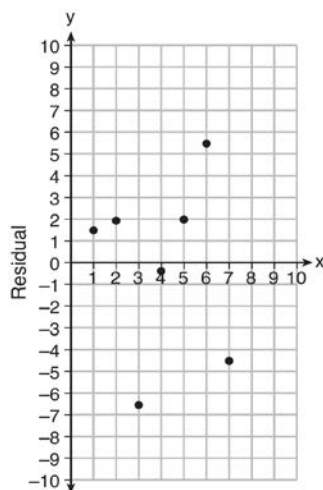
REF: 061428ai

NAT: F.BF.3

TOP: Transformations with Functions and Relations

Algebra 1 Common Core State Standards 4 Point Regents Exam Questions Answer Section

174 ANS:



$$y = 6.32x + 22.43$$

Based on the residual plot, the equation is a good fit for the data because the residual values are scattered without a pattern and are fairly evenly distributed above and below the x -axis.

PTS: 4

REF: fall1314ai

NAT: S.ID.6

TOP: Correlation Coefficient and Residuals

175 ANS:

$y = 836.47(2.05)^x$ The data appear to grow at an exponential rate. $y = 836.47(2.05)^2 \approx 3515$.

PTS: 4

REF: fall1313ai

NAT: S.ID.6

TOP: Regression

176 ANS:

$$w(w + 40) = 6000$$

$$w^2 + 40w - 6000 = 0$$

$$(w + 100)(w - 60) = 0$$

$$w = 60, l = 100$$

PTS: 4

REF: 081436ai

NAT: A.CED.1

TOP: Geometric Applications of Quadratics

177 ANS:

$$m(x) = (3x - 1)(3 - x) + 4x^2 + 19 \quad x^2 + 10x + 16 = 0$$

$$m(x) = 9x - 3x^2 - 3 + x + 4x^2 + 19 \quad (x + 8)(x + 2) = 0$$

$$m(x) = x^2 + 10x + 16 \quad x = -8, -2$$

PTS: 4

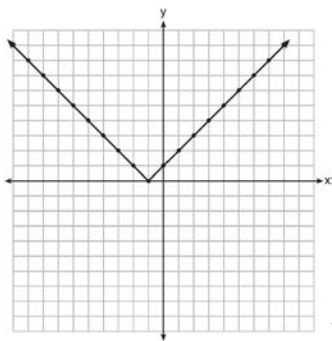
REF: 061433ai

NAT: A.REI.4

TOP: Solving Quadratics

KEY: factoring

178 ANS:

Range: $y \geq 0$. The function is increasing for $x > -1$.

PTS: 4 REF: fall1310ai NAT: F.IF.7 TOP: Graphing Absolute Value Functions

179 ANS:

$$\begin{array}{rcl}
 w(52) - w(38) & 15(x - 40) + 400 = 445 & \text{Since } w(x) > 400, x > 40. \text{ I substituted 445 for } w(x) \text{ and solved} \\
 15(52 - 40) + 400 - 10(38) & 15(x - 40) = 45 & \\
 180 + 400 - 380 & x - 40 = 3 & \\
 200 & x = 43 &
 \end{array}$$

for x .

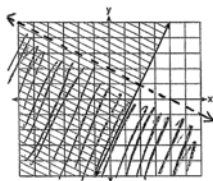
PTS: 4 REF: 061534ai NAT: F.IF.2 TOP: Functional Notation

180 ANS:

$$y = 80(1.5)^x \quad 80(1.5)^{26} \approx 3,030,140. \text{ No, because the prediction at } x = 52 \text{ is already too large.}$$

PTS: 4 REF: 061536ai NAT: S.ID.6 TOP: Regression
KEY: exponential

181 ANS:



$$y \geq 2x - 3. \quad \text{Oscar is wrong. } (2) + 2(1) < 4 \text{ is not true.}$$

PTS: 4 REF: 011534ai NAT: A.REI.12 TOP: Graphing Systems of Linear Inequalities

182 ANS:

$$y = 0.16x + 8.27 \quad r = 0.97, \text{ which suggests a strong association.}$$

PTS: 4 REF: 081536ai NAT: S.ID.6 TOP: Regression
KEY: linear

183 ANS:

$$A(n) = 175 - 2.75n \quad 0 = 175 - 2.75n \quad \text{After 63 weeks, Caitlin will not have enough money to rent another movie.}$$

$$2.75n = 175$$

$$n = 63.6$$

PTS: 4 REF: 061435ai NAT: F.BF.1 TOP: Modeling Linear Functions

184 ANS:

$$24x + 27y = 144 \quad -8.5y = -51 \quad \text{Agree, as both systems have the same solution.}$$

$$24x + 10y = 42 \quad y = 6$$

$$17y = 102 \quad 8x + 9(6) = 48$$

$$y = 6 \quad 8x = -6$$

$$8x + 9(6) = 48 \quad x = -\frac{3}{4}$$

$$8x = -6$$

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

PTS: 4 REF: 061533ai NAT: A.REI.6 TOP: Solving Linear Systems

185 ANS:

$r \approx 0.94$. The correlation coefficient suggests that as calories increase, so does sodium.

PTS: 4 REF: 011535ai NAT: S.ID.8 TOP: Correlation Coefficient and Residuals

186 ANS:

$7x - 3(4x - 8) \leq 6x + 12 - 9x$ 6, 7, 8 are the numbers greater than or equal to 6 in the interval.

$$7x - 12x + 24 \leq -3x + 12$$

$$-5x + 24 \leq -3x + 12$$

$$12 \leq 2x$$

$$6 \leq x$$

PTS: 4 REF: 081534ai NAT: A.REI.3 TOP: Solving Linear Inequalities

187 ANS:

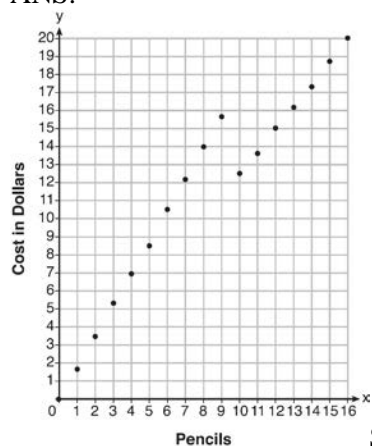
$$\frac{V}{\pi h} = \frac{\pi r^2 h}{\pi h} \quad d = 2\sqrt{\frac{66}{3.3\pi}} \approx 5$$

$$\frac{V}{\pi h} = r^2$$

$$\sqrt{\frac{V}{\pi h}} = r$$

PTS: 4 REF: 081535ai NAT: A.CED.4 TOP: Transforming Formulas

188 ANS:



Since according to the graph, 8 pencils cost \$14 and 10 pencils cost \$12.50, the cashier is correct.

PTS: 4

REF: fall1312ai

NAT: F.IF.7

TOP: Graphing Piecewise-Defined Functions

189 ANS:

The vertex represents a maximum since $a < 0$. $f(x) = -x^2 + 8x + 9$

$$= -(x^2 - 8x - 9)$$

$$= -(x^2 - 8x + 16) + 9 + 16$$

$$= -(x - 4)^2 + 25$$

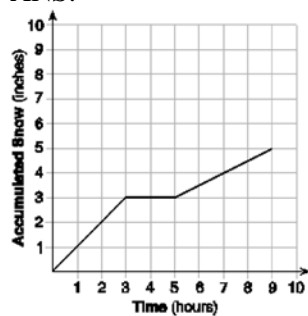
PTS: 4

REF: 011536ai

NAT: F.IF.8a

TOP: Graphing Quadratic Functions

190 ANS:



At 6 hours, $3\frac{1}{2}$ inches of snow have fallen.

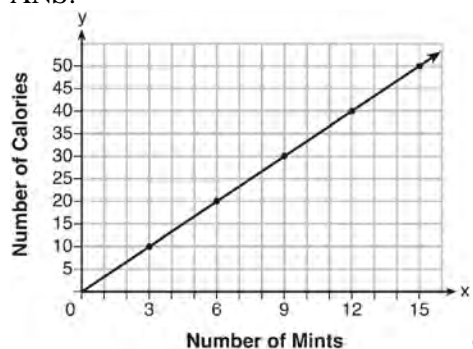
PTS: 4

REF: spr1307ai

NAT: F.IF.4

TOP: Relating Graphs to Events

191 ANS:



$$C(x) = \frac{10}{3}x \quad 180 = \frac{10}{3}x$$

$$540 = 10x$$

$$54 = x$$

PTS: 4

REF: fall1308ai

NAT: A.CED.2

TOP: Graphing Linear Functions

192 ANS:

$$A = \frac{1}{2}h(b_1 + b_2) \quad b_1 = \frac{2(60)}{6} - 12 = 20 - 12 = 8$$

$$\frac{2A}{h} = b_1 + b_2$$

$$\frac{2A}{h} - b_2 = b_1$$

PTS: 4

REF: 081434ai

NAT: A.CED.4

TOP: Transforming Formulas

193 ANS:

$$8x + 11y \geq 200 \quad 8x + 11(15) \geq 200$$

$$8x + 165 \geq 200$$

$$8x \geq 35$$

$$x \geq 4.375$$

5 hours

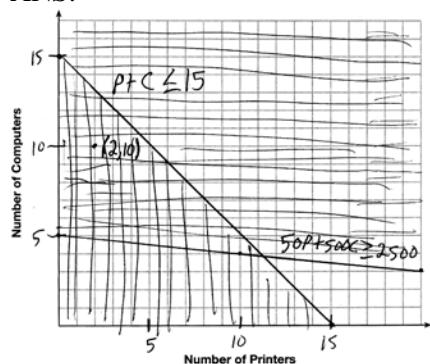
PTS: 4

REF: fall1309ai

NAT: A.CED.3

TOP: Modeling Linear Inequalities

194 ANS:



A combination of 2 printers and 10 computers meets all the constraints because (2, 10) is in the solution set of the graph.

PTS: 4 REF: 061535ai NAT: A.CED.3 TOP: Modeling Systems of Linear Inequalities

195 ANS:

$$2.35c + 5.50d = 89.50 \quad \text{Pat's numbers are not possible: } 2.35(8) + 5.50(14) \neq 89.50 \quad c + d = 22$$

$$18.80 + 77.00 \neq 89.50 \quad 2.35c + 5.50(22 - c) = 89.50$$

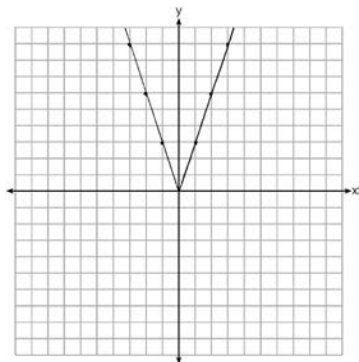
$$95.80 \neq 89.50 \quad 2.35c + 121 - 5.50c = 89.50$$

$$-3.15c = -31.50$$

$$c = 10$$

PTS: 4 REF: 061436ai NAT: A.CED.3 TOP: Modeling Linear Systems

196 ANS:



2 down. 4 right.

PTS: 4 REF: 081433ai NAT: F.BF.3
TOP: Transformations with Functions and Relations

197 ANS:

$$2p + 3d = 18.25 \quad 4p + 6d = 36.50 \quad 4p + 2(2.25) = 27.50$$

$$4p + 2d = 27.50 \quad 4p + 2d = 27.50 \quad 4p = 23$$

$$4d = 9 \quad p = 5.75$$

$$d = 2.25$$

PTS: 2 REF: 011533ai NAT: A.CED.2 TOP: Modeling Linear Systems

198 ANS:

$(2x + 16)(2x + 12) = 396$. The length, $2x + 16$, and the width, $2x + 12$, are multiplied and set equal to the area.

$$(2x + 16)(2x + 12) = 396$$

$$4x^2 + 24x + 32x + 192 = 396$$

$$4x^2 + 56x - 204 = 0$$

$$x^2 + 14x - 51 = 0$$

$$(x + 17)(x - 3) = 0$$

$$x = 3 = \text{width}$$

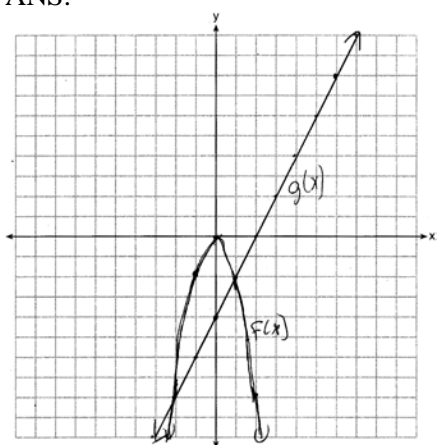
PTS: 4

REF: 061434ai

NAT: A.CED.1

TOP: Geometric Applications of Quadratics

199 ANS:



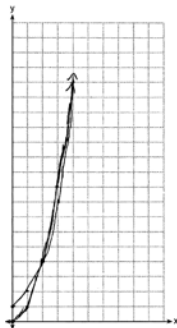
PTS: 4

REF: 081435ai

NAT: A.REI.7

TOP: Quadratic-Linear Systems

200 ANS:



$g(x)$ has a greater value: $2^{20} > 20^2$

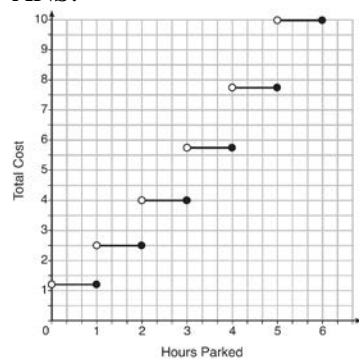
PTS: 4

REF: 081533ai

NAT: F.LE.3

TOP: Comparing Quadratic and Exponential Functions

201 ANS:



The cost for each additional hour increases after the first 2 hours.

PTS: 4

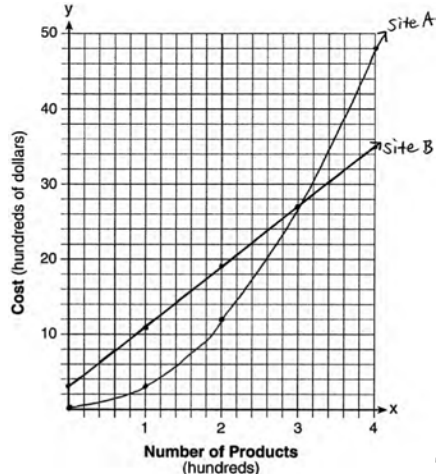
REF: fall1311ai

NAT: F.IF.7

TOP: Graphing Step Functions

Algebra 1 Common Core State Standards 6 Point Regents Exam Questions Answer Section

202 ANS:



The graphs of the production costs intersect at $x = 3$. The company should use Site A, because the cost of Site A is lower at $x = 2$.

PTS: 6 REF: 061437ai NAT: A.REI.7 TOP: Quadratic-Linear Systems

203 ANS:

$(2x + 8)(2x + 6) = 100$ The frame has two parts added to each side, so $2x$ must be added to the length and width.

$$4x^2 + 28x + 48 = 100$$

$$x^2 + 7x - 13 = 0$$

Multiply length and width to find area and set equal to 100. $x = \frac{-7 \pm \sqrt{7^2 - 4(1)(-13)}}{2(1)} = \frac{-7 + \sqrt{101}}{2} \approx 1.5$

PTS: 6 REF: 081537ai NAT: A.CED.1 TOP: Geometric Applications of Quadratics

204 ANS:

$(x - 3)(2x) = 1.25x^2$ Because the original garden is a square, x^2 represents the original area, $x - 3$ represents the side decreased by 3 meters, $2x$ represents the doubled side, and $1.25x^2$ represents the new garden with an area 25% larger. $(x - 3)(2x) = 1.25x^2$ $1.25(8)^2 = 80$

$$2x^2 - 6x = 1.25x^2$$

$$.75x^2 - 6x = 0$$

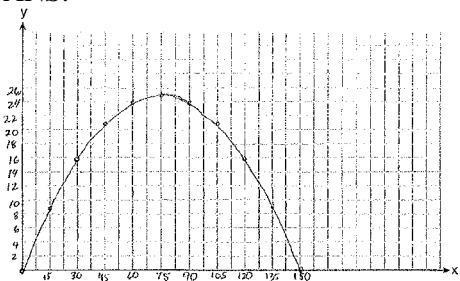
$$x^2 - 8x = 0$$

$$x(x - 8) = 0$$

$$x = 8$$

PTS: 6 REF: 011537ai NAT: A.CED.1 TOP: Geometric Applications of Quadratics

205 ANS:



$$x = \frac{-\frac{2}{3}}{2\left(-\frac{1}{225}\right)} = -\frac{2}{3} \cdot -\frac{225}{2} = 75 \quad y = -\frac{1}{225}(75)^2 + \frac{2}{3}(75) = -25 + 50 = 25$$

(75,25) represents the horizontal distance (75) where the football is at its greatest height (25). No, because the ball is less than 10 feet high $y = -\frac{1}{225}(135)^2 + \frac{2}{3}(135) = -81 + 90 = 9$

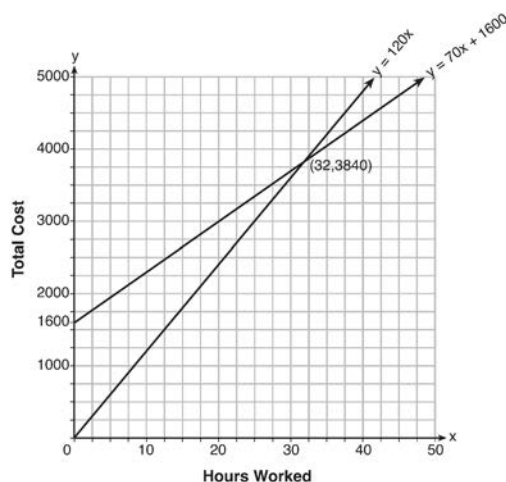
PTS: 6

REF: 061537ai

NAT: F.IF.4

TOP: Graphing Quadratic Functions

206 ANS:



$$y = 120x \text{ and } y = 70x + 1600$$

$$120x = 70x + 1600$$

$$50x = 1600$$

$$x = 32$$

$$y = 120(35) = 4200 \quad \text{Green Thumb is less expensive.}$$

$$y = 70(35) + 1600 = 4050$$

PTS: 6

REF: fall1315ai

NAT: A.REI.6

TOP: Modeling Linear Systems

207 ANS:

a) $A(x) = 1.50x + 6$ b) $1.50x + 6 = 2x + 2.50$ c) $A(x) = 1.50(5) + 6 = 13.50$ Carnival B has a lower cost.

$$B(x) = 2x + 2.50 \quad .50x = 3.50 \quad B(x) = 2(5) + 2.50 = 12.50$$

$$x = 7$$

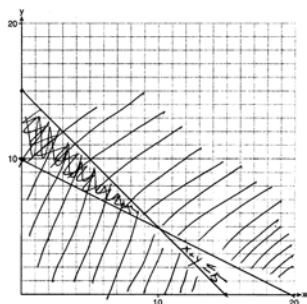
PTS: 6

REF: spr1308ai

NAT: A.REI.6

TOP: Modeling Linear Systems

208 ANS:



$$x + y \leq 15$$

$$4x + 8y \geq 80$$

One hour at school and eleven hours at the library.

PTS: 6

REF: 081437ai

NAT: A.CED.3

TOP: Modeling Systems of Linear Inequalities