

### Algebra I Common Core State Standards Regents Bimodal Worksheets

- 1 The table below shows the temperature,  $T(m)$ , of a cup of hot chocolate that is allowed to chill over several minutes,  $m$ .

Time, $m$ (minutes)	0	2	4	6	8
Temperature, $T(m)$ ( $^{\circ}\text{F}$ )	150	108	78	56	41

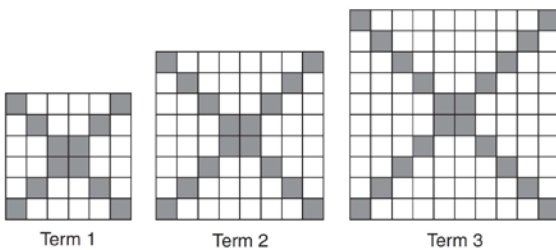
Which expression best fits the data for  $T(m)$ ?

- 2 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?
- 3 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?
- 4 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  $f(0) = 3$
- 5 The zeros of the function  $f(x) = 3x^2 - 3x - 6$  are
- 6 What is the domain of the relation shown below?  
 $\{(4, 2), (1, 1), (0, 0), (1, -1), (4, -2)\}$
- 7 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?
- 8 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?
- 9 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?

10 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?

11 The highest possible grade for a book report is 100. The teacher deducts 10 points for each day the report is late. Which kind of function describes this situation?

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

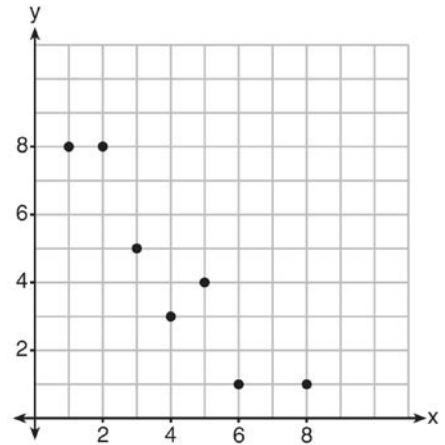


Assuming the pattern continues, which formula determines  $a_n$ , the number of shaded squares in the  $n$ th term?

13 Which polynomial is twice the sum of  $4x^2 - x + 1$  and  $-6x^2 + x - 4$ ?

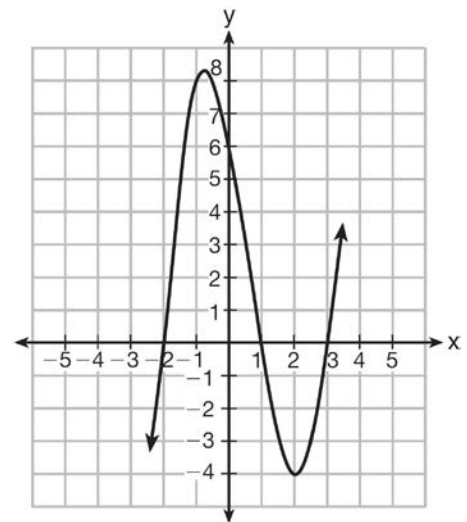
14 The zeros of the function  $f(x) = (x + 2)^2 - 25$  are

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



16 Which equation(s) represent the graph below?

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



- 17 The line represented by the equation  $4y + 2x = 33.6$  shares a solution point with the line represented by the table below.

x	y
-5	3.2
-2	3.8
2	4.6
4	5
11	6.4

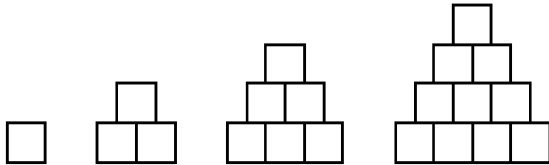
The solution for this system is

- 18 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?
- 19 The zeros of the function  $f(x) = 2x^2 - 4x - 6$  are
- 20 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?
- 21 An equation is given below.  

$$4(x - 7) = 0.3(x + 2) + 2.11$$
 The solution to the equation is
- 22 The expression  $-4.9t^2 + 50t + 2$  represents the height, in meters, of a toy rocket  $t$  seconds after launch. The initial height of the rocket, in meters, is
- 23 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?
- 24 The equation  $A = 1300(1.02)^7$  is being used to calculate the amount of money in a savings account. What does 1.02 represent in this equation?

- 25 What is the solution to the inequality  
 $2 + \frac{4}{9}x \geq 4 + x$ ?

- 26 A sequence of blocks is shown in the diagram below.



This sequence can be defined by the recursive function  $a_1 = 1$  and  $a_n = a_{n-1} + n$ . Assuming the pattern continues, how many blocks will there be when  $n = 7$ ?

- 27 Abigail's and Gina's ages are consecutive integers. Abigail is younger than Gina and Gina's age is represented by  $x$ . If the difference of the square of Gina's age and eight times Abigail's age is 17, which equation could be used to find Gina's age?
- 28 Anne invested \$1000 in an account with a 1.3% annual interest rate. She made no deposits or withdrawals on the account for 2 years. If interest was compounded annually, which equation represents the balance in the account after the 2 years?
- 29 In the function  $f(x) = (x - 2)^2 + 4$ , the minimum value occurs when  $x$  is

- 30 What is the solution of the equation  
 $2(x + 2)^2 - 4 = 28$ ?

- 31 Konnor wants to burn 250 Calories while exercising for 45 minutes at the gym. On the treadmill, he can burn 6 Cal/min. On the stationary bike, he can burn 5 Cal/min. If  $t$  represents the number of minutes on the treadmill and  $b$  represents the number of minutes on the stationary bike, which expression represents the number of Calories that Konnor can burn on the stationary bike?
- 32 Milton has his money invested in a stock portfolio. The value,  $v(x)$ , of his portfolio can be modeled with the function  $v(x) = 30,000(0.78)^x$ , where  $x$  is the number of years since he made his investment. Which statement describes the rate of change of the value of his portfolio?
- 33 The daily cost of production in a factory is calculated using  $c(x) = 200 + 16x$ , where  $x$  is the number of complete products manufactured. Which set of numbers best defines the domain of  $c(x)$ ?
- 34 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

- 35 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?

- 36 When solving the equation  $12x^2 - 7x = 6 - 2(x^2 - 1)$ , Evan wrote  $12x^2 - 7x = 6 - 2x^2 + 2$  as his first step. Which property justifies this step?

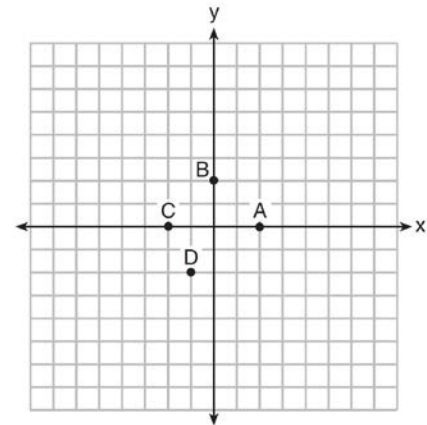
- 39 What is the solution to the system of equations below?

$$y = 2x + 8$$

$$3(-2x + y) = 12$$

- 37 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?

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



- 38 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?

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

41 When  $(2x - 3)^2$  is subtracted from  $5x^2$ , the result is

42 Which value of  $x$  satisfies the equation

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

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

44 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?

45 If a population of 100 cells triples every hour, which function represents  $p(t)$ , the population after  $t$  hours?

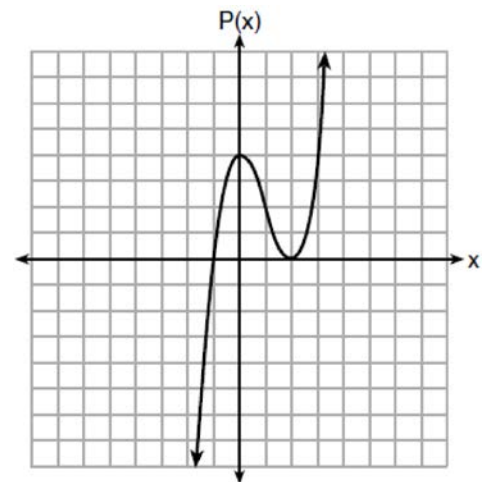
46 The function  $f(x) = 3x^2 + 12x + 11$  can be written in vertex form as

47 Alicia purchased  $H$  half-gallons of ice cream for \$3.50 each and  $P$  packages of ice cream cones for \$2.50 each. She purchased 14 items and spent \$43. Which system of equations could be used to determine how many of each item Alicia purchased?

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

49 When  $3x + 2 \leq 5(x - 4)$  is solved for  $x$ , the solution is

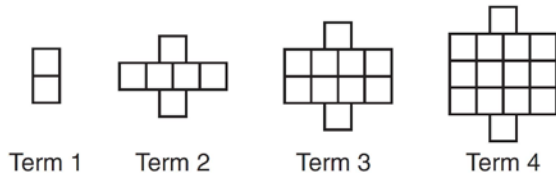
50 Wenona sketched the polynomial  $P(x)$  as shown on the axes below.



Which equation could represent  $P(x)$ ?

51 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?

52 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
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

53 Which function is shown in the table below?

x	f(x)
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27

54 A construction company uses the function  $f(p)$ , where  $p$  is the number of people working on a project, to model the amount of money it spends to complete a project. A reasonable domain for this function would be

56 The zeros of the function  $f(x) = x^2 - 5x - 6$  are

57 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

55 When factored completely, the expression  $p^4 - 81$  is equivalent to

- 58 A public opinion poll was taken to explore the relationship between age and support for a candidate in an election. The results of the poll are summarized in the table below.

Age	For	Against	No Opinion
21-40	30	12	8
41-60	20	40	15
Over 60	25	35	15

What percent of the 21-40 age group was for the candidate?

- 59 Kendal bought  $x$  boxes of cookies to bring to a party. Each box contains 12 cookies. She decides to keep two boxes for herself. She brings 60 cookies to the party. Which equation can be used to find the number of boxes,  $x$ , Kendal bought?

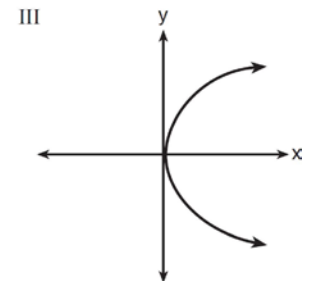
- 63 Which trinomial is equivalent to  $3(x-2)^2 - 2(x-1)$ ?

- 60 Faith wants to use the formula  $C(f) = \frac{5}{9}(f-32)$  to convert degrees Fahrenheit,  $f$ , to degrees Celsius,  $C(f)$ . If Faith calculated  $C(68)$ , what would her result be?

- 64 Which representations are functions?

I

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



- 61 If the original function  $f(x) = 2x^2 - 1$  is shifted to the left 3 units to make the function  $g(x)$ , which expression would represent  $g(x)$ ?

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

- 62 A part of Jennifer's work to solve the equation  $2(6x^2 - 3) = 11x^2 - x$  is shown below.

Given:  $2(6x^2 - 3) = 11x^2 - x$

Step 1:  $12x^2 - 6 = 11x^2 - x$

Which property justifies her first step?

- 65 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



66 Which recursively defined function represents the sequence 3, 7, 15, 31, ...?

67 What is the value of  $x$  in the equation  $\frac{x-2}{3} + \frac{1}{6} = \frac{5}{6}$ ?

68 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

69 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?

70 The expression  $3(x^2 - 1) - (x^2 - 7x + 10)$  is equivalent to

71 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

72 Which expression is equivalent to  $x^4 - 12x^2 + 36$ ?

73 The range of the function defined as  $y = 5^x$  is

74 Morgan throws a ball up into the air. The height of the ball above the ground, in feet, is modeled by the function  $h(t) = -16t^2 + 24t$ , where  $t$  represents the time, in seconds, since the ball was thrown. What is the appropriate domain for this situation?

75 What are the solutions to the equation  $3x^2 + 10x = 8$ ?

76 An online company lets you download songs for \$0.99 each after you have paid a \$5 membership fee. Which domain would be most appropriate to calculate the cost to download songs?

77 If the domain of the function  $f(x) = 2x^2 - 8$  is  $\{-2, 3, 5\}$ , then the range is

78 Given the function  $f(n)$  defined by the following:

$$f(1) = 2$$

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

Which set could represent the range of the function?

- 79 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?

- 80 What are the solutions to the equation  $3(x - 4)^2 = 27$ ?
- 81 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  $f(x)$ ?
- 82 What are the solutions to the equation  $x^2 - 8x = 10$ ?
- 83 How many of the equations listed below represent the line passing through the points (2,3) and (4,-7)?
- $$5x + y = 13$$
- $$y + 7 = -5(x - 4)$$
- $$y = -5x + 13$$
- $$y - 7 = 5(x - 4)$$
- 84 Dan took 12.5 seconds to run the 100-meter dash. He calculated the time to be approximately
- 85 Jordan works for a landscape company during his summer vacation. He is paid \$12 per hour for mowing lawns and \$14 per hour for planting gardens. He can work a maximum of 40 hours per week, and would like to earn at least \$250 this week. If  $m$  represents the number of hours mowing lawns and  $g$  represents the number of hours planting gardens, which system of inequalities could be used to represent the given conditions?
- 86 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?

87 A construction worker needs to move  $120 \text{ ft}^3$  of dirt by using a wheelbarrow. One wheelbarrow load holds  $8 \text{ ft}^3$  of dirt and each load takes him 10 minutes to complete. One correct way to figure out the number of hours he would need to complete this job is

88 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

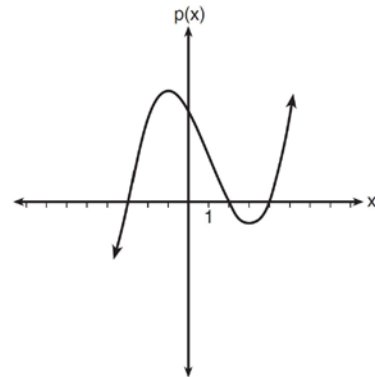
89 Andy has \$310 in his account. Each week,  $w$ , he withdraws \$30 for his expenses. Which expression could be used if he wanted to find out how much money he had left after 8 weeks?

90 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?

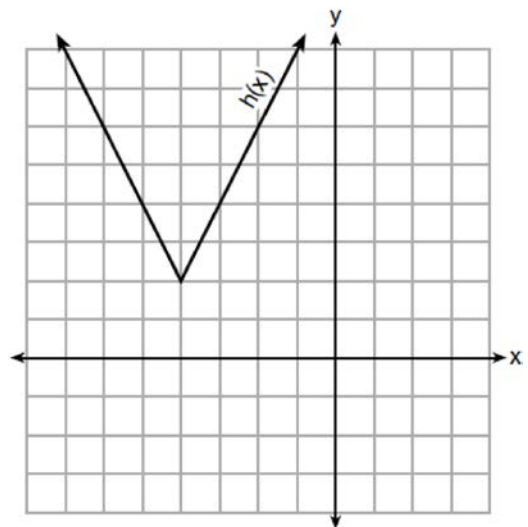
91 The distance a free falling object has traveled can be modeled by the equation  $d = \frac{1}{2}at^2$ , where  $a$  is acceleration due to gravity and  $t$  is the amount of time the object has fallen. What is  $t$  in terms of  $a$  and  $d$ ?

92 Which function defines the sequence  $-6, -10, -14, -18, \dots$ , where  $f(6) = -26$ ?

93 Based on the graph below, which expression is a possible factorization of  $p(x)$ ?



94 The function  $h(x)$ , which is graphed below, and the function  $g(x) = 2|x + 4| - 3$  are given.

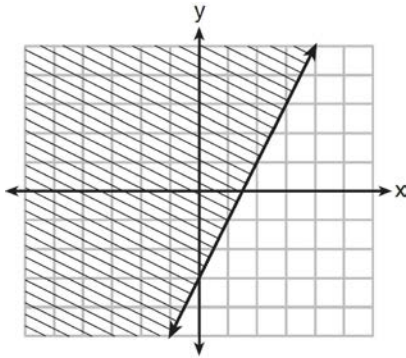


- Which statements about these functions are true?
- I.  $g(x)$  has a lower minimum value than  $h(x)$ .
  - II. For all values of  $x$ ,  $h(x) < g(x)$ .
  - III. For any value of  $x$ ,  $g(x) \neq h(x)$ .

- 95 The formula for the surface area of a right rectangular prism is  $A = 2lw + 2hw + 2lh$ , where  $l$ ,  $w$ , and  $h$  represent the length, width, and height, respectively. Which term of this formula is *not* dependent on the height?
- 96 Which equation and ordered pair represent the correct vertex form and vertex for  $j(x) = x^2 - 12x + 7$ ?
- 97 What are the zeros of the function  $f(x) = x^2 - 13x - 30$ ?
- 98 Lynn, Jude, and Anne were given the function  $f(x) = -2x^2 + 32$ , and they were asked to find  $f(3)$ . Lynn's answer was 14, Jude's answer was 4, and Anne's answer was  $\pm 4$ . Who is correct?
- 99 A plumber has a set fee for a house call and charges by the hour for repairs. The total cost of her services can be modeled by  $c(t) = 125t + 95$ . Which statements about this function are true?  
 I. A house call fee costs \$95.  
 II. The plumber charges \$125 per hour.  
 III. The number of hours the job takes is represented by  $t$ .
- 100 Which value of  $x$  results in equal outputs for  $j(x) = 3x - 2$  and  $b(x) = |x + 2|$ ?
- 101 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
- 102 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?
- 103 Which value of  $x$  satisfies the equation  $\frac{5}{6} \left( \frac{3}{8} - x \right) = 16$ ?
- 104 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
- 105 What is the solution set of the equation  $(x - 2)(x - a) = 0$ ?
- 106 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

- 107 Which inequality is represented by the graph below?



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

- 109 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?

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

- 111 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?

- 112 Given the functions  $h(x) = \frac{1}{2}x + 3$  and  $j(x) = |x|$ , which value of  $x$  makes  $h(x) = j(x)$ ?

- 113 Joe has a rectangular patio that measures 10 feet by 12 feet. He wants to increase the area by 50% and plans to increase each dimension by equal lengths,  $x$ . Which equation could be used to determine  $x$ ?

- 114 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?

- 115 Given the following expressions:

I.  $-\frac{5}{8} + \frac{3}{5}$       III.  $(\sqrt{5}) \cdot (\sqrt{5})$

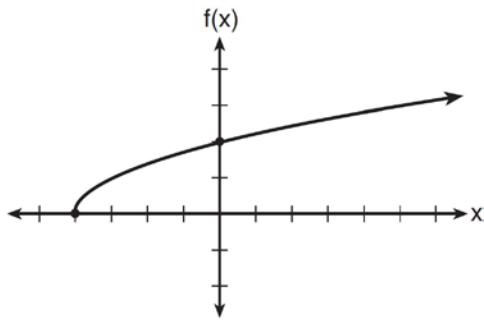
II.  $\frac{1}{2} + \sqrt{2}$       IV.  $3 \cdot (\sqrt{49})$

Which expression(s) result in an irrational number?

- 116 When factored completely,  $x^3 - 13x^2 - 30x$  is

- 117 What is the product of  $2x + 3$  and  $4x^2 - 5x + 6$ ?

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



The domain of the function is

- 119 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

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

- 121 The Celluloid Cinema sold 150 tickets to a movie. Some of these were child tickets and the rest were adult tickets. A child ticket cost \$7.75 and an adult ticket cost \$10.25. If the cinema sold \$1470 worth of tickets, which system of equations could be used to determine how many adult tickets,  $a$ , and how many child tickets,  $c$ , were sold?

- 122 Which value of  $x$  is a solution to the equation  $13 - 36x^2 = -12$ ?

- 123 If  $f(1) = 3$  and  $f(n) = -2f(n-1) + 1$ , then  $f(5) =$

- 124 A store sells self-serve frozen yogurt sundaes. The function  $C(w)$  represents the cost, in dollars, of a sundae weighing  $w$  ounces. An appropriate domain for the function would be

- 125 Which polynomial function has zeros at -3, 0, and 4?

- 126 The zeros of the function  $f(x) = 2x^3 + 12x - 10x^2$  are

- 127 The graphs of  $y = x^2 - 3$  and  $y = 3x - 4$  intersect at approximately

- 128 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?

- 129 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.

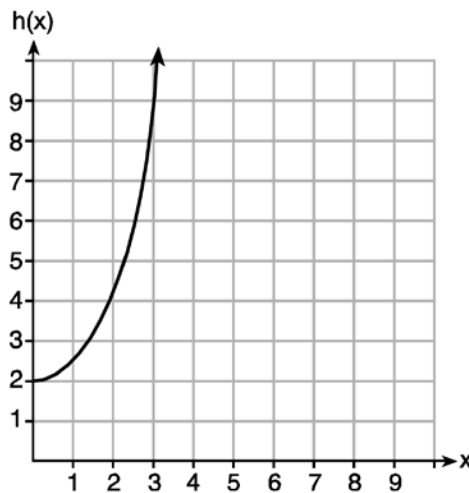
<b>t</b> (time, in days)	0	2	4
<b>f(t)</b> (bacteria)	25	15,625	9,765,625

Which function would accurately model the technician's data?

- 130 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



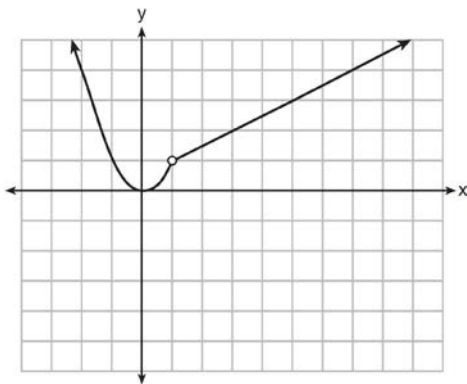
The correct list of functions ordered from greatest to least by average rate of change over the interval  $0 \leq x \leq 3$  is

- 131 What are the solutions to the equation  $x^2 - 8x = 24$ ?

- 132 What is the largest integer,  $x$ , for which the value of  $f(x) = 5x^4 + 30x^2 + 9$  will be greater than the value of  $g(x) = 3^x$ ?

133 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?

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

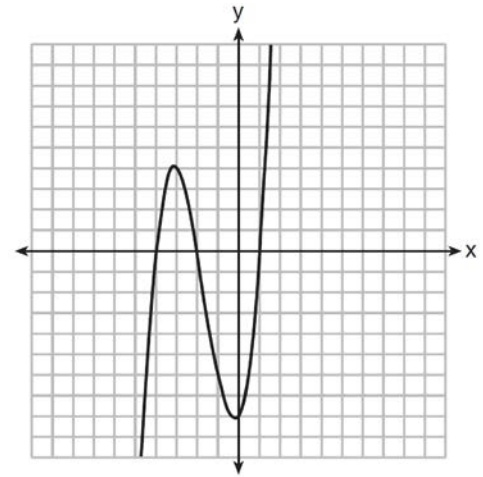


Which function is related to the graph?

135 Grisham is considering the three situations below.  
 I. For the first 28 days, a sunflower grows at a rate of 3.5 cm per day.  
 II. The value of a car depreciates at a rate of 15% per year after it is purchased.  
 III. The amount of bacteria in a culture triples every two days during an experiment.  
 Which of the statements describes a situation with an equal difference over an equal interval?

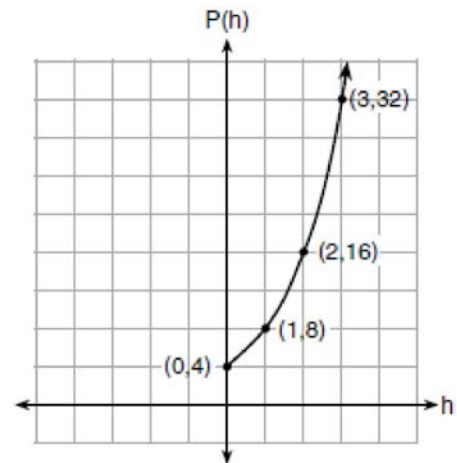
136 Which expression is equivalent to  $2(3g - 4) - (8g + 3)$ ?

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



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

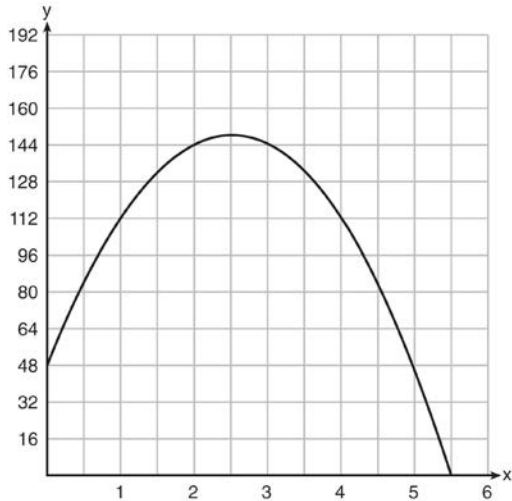
138 Vinny collects population data,  $P(h)$ , about a specific strain of bacteria over time in hours,  $h$ , as shown in the graph below.



Which equation represents the graph of  $P(h)$ ?



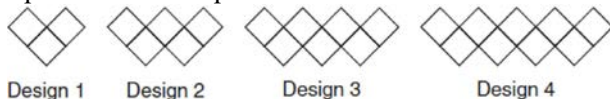
- 139 A ball is thrown into the air from the edge of a 48-foot-high cliff so that it eventually lands on the ground. The graph below shows the height,  $y$ , of the ball from the ground after  $x$  seconds.



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

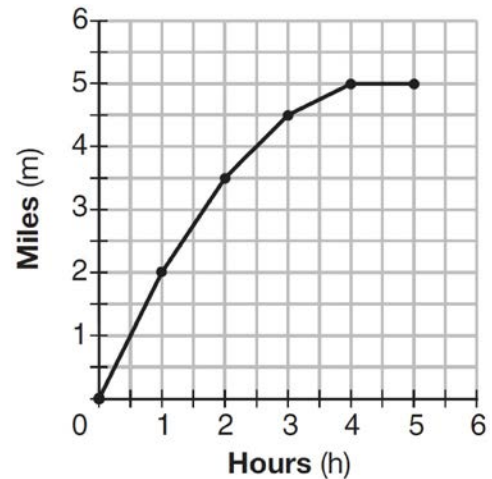
- 140 If  $f(x) = \frac{1}{2}x^2 - \left(\frac{1}{4}x + 3\right)$ , what is the value of  $f(8)$ ?

- 141 If the pattern below continues, which equation(s) is a recursive formula that represents the number of squares in this sequence?



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

- 143 The graph below shows the distance in miles,  $m$ , hiked from a camp in  $h$  hours.



Which hourly interval had the greatest rate of change?

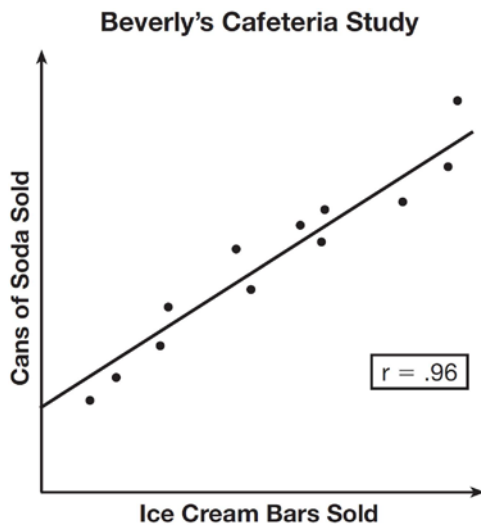
- 144 What is the *minimum* value of the function  $y = |x + 3| - 2$ ?

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

- 146 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

147 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?

148 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.

149 Ian is saving up to buy a new baseball glove. Every month he puts \$10 into a jar. Which type of function best models the total amount of money in the jar after a given number of months?

150 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?

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

152 The value of  $x$  which makes  $\frac{2}{3} \left( \frac{1}{4}x - 2 \right) = \frac{1}{5} \left( \frac{4}{3}x - 1 \right)$  true is

153 Last weekend, Emma sold lemonade at a yard sale. The function  $P(c) = .50c - 9.96$  represented the profit,  $P(c)$ , Emma earned selling  $c$  cups of lemonade. Sales were strong, so she raised the price for this weekend by 25 cents per cup. Which function represents her profit for this weekend?

- 154 A parking garage charges a base rate of \$3.50 for up to 2 hours, and an hourly rate for each additional hour. The sign below gives the prices for up to 5 hours of parking.

Parking Rates	
2 hours	\$3.50
3 hours	\$9.00
4 hours	\$14.50
5 hours	\$20.00

Which linear equation can be used to find  $x$ , the additional hourly parking rate?

- 155 The tables below show the values of four different functions for given values of  $x$ .

$x$	$f(x)$	$x$	$g(x)$	$x$	$h(x)$	$x$	$k(x)$
1	12	1	-1	1	9	1	-2
2	19	2	1	2	12	2	4
3	26	3	5	3	17	3	14
4	33	4	13	4	24	4	28

Which table represents a linear function?

- 156 A car leaves Albany, NY, and travels west toward Buffalo, NY. The equation  $D = 280 - 59t$  can be used to represent the distance,  $D$ , from Buffalo after  $t$  hours. In this equation, the 59 represents the
- 157 Sara was asked to solve this word problem: "The product of two consecutive integers is 156. What are the integers?" What type of equation should she create to solve this problem?
- 158 The expression  $49x^2 - 36$  is equivalent to
- 159 What is the solution to  $2h + 8 > 3h - 6$
- 160 Which recursively defined function has a first term equal to 10 and a common difference of 4?
- 161 In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

- 162 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?

- 163 Which expression is equivalent to  $16x^2 - 36$ ?

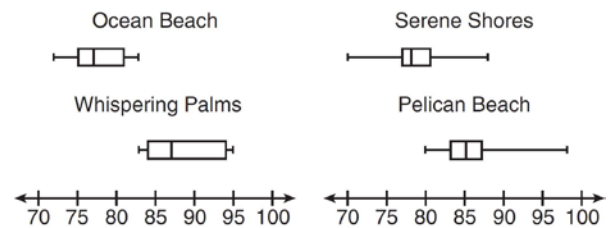
- 164 Connor wants to attend the town carnival. The price of admission to the carnival is \$4.50, and each ride costs an additional 79 cents. If he can spend at most \$16.00 at the carnival, which inequality can be used to solve for  $r$ , the number of rides Connor can go on, and what is the maximum number of rides he can go on?

- 165 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?

- 166 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

- 167 If  $4x^2 - 100 = 0$ , the roots of the equation are

- 168 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?

- 169 In a sequence, the first term is 4 and the common difference is 3. The fifth term of this sequence is
- 170 For a recently released movie, the function  $y = 119.67(0.61)^x$  models the revenue earned,  $y$ , in millions of dollars each week,  $x$ , for several weeks after its release. Based on the equation, how much more money, in millions of dollars, was earned in revenue for week 3 than for week 5?

171 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?

172 A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

	Hip-Hop	Alternative	Classic Rock
Middle School	28	18	4
High School	22	22	6
College	16	20	14

What percentage of college students prefer classic rock?

173 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

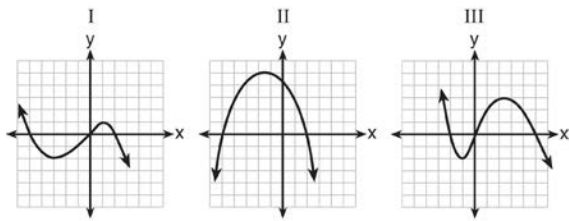
174 The range of the function  $f(x) = x^2 + 2x - 8$  is all real numbers

175 What are the roots of the equation  $x^2 + 4x - 16 = 0$ ?

176 Michael borrows money from his uncle, who is charging him simple interest using the formula  $I = Prt$ . To figure out what the interest rate,  $r$ , is, Michael rearranges the formula to find  $r$ . His new formula is  $r$  equals

177 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?

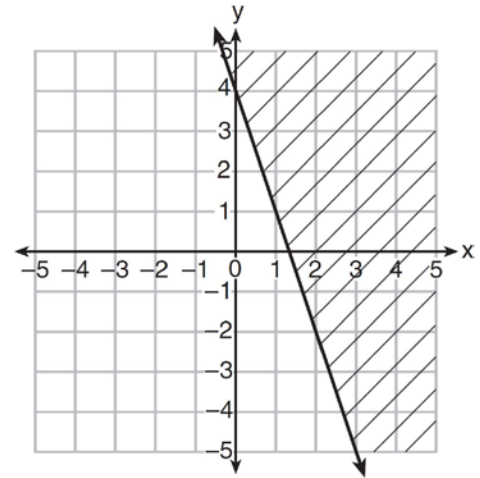
178 A polynomial function contains the factors  $x$ ,  $x - 2$ , and  $x + 5$ . Which graph(s) below could represent the graph of this function?



179 Which expression is equivalent to  $36x^2 - 100$ ?

180 Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula  $P_1 V_1 = P_2 V_2$ . When the formula is solved for  $P_2$ , the result is

181 Which inequality is represented in the graph below?

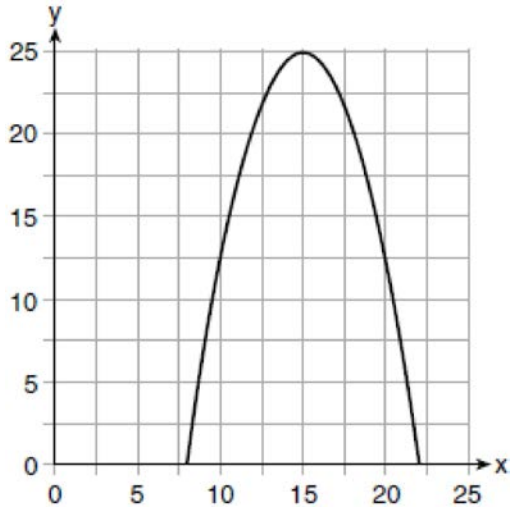


182 Given the set  $\{x \mid -2 \leq x \leq 2, \text{ where } x \text{ is an integer}\}$ , what is the solution of  $-2(x - 5) < 10$ ?

183 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

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

185 The graph of a quadratic function is shown below.



An equation that represents the function could be

## Algebra I Common Core State Standards Regents Bimodal Worksheets Answer Section

1 ANS:

$$150(0.85)^m$$

PTS: 2

REF: 081617ai

TOP: Modeling Exponential Functions

KEY: AI

2 ANS:

addition property of equality

PTS: 2

REF: 061401ai

TOP: Identifying Properties

3 ANS:

$$x^2 - 5x + 3 = 0$$

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

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

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

PTS: 2

REF: 061518ai

TOP: Solving Quadratics

KEY: completing the square

4 ANS:

I and III

PTS: 2

REF: 061421ai

TOP: Sequences

5 ANS:

-1 and 2

$$3x^2 - 3x - 6 = 0$$

$$3(x^2 - x - 2) = 0$$

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

$$x = 2, -1$$

PTS: 2

REF: 081513ai

TOP: Solving Quadratics

6 ANS:

 $\{0, 1, 4\}$ 

PTS: 2

REF: 081710ai

TOP: Domain and Range

KEY: limited domain

7 ANS:

$$0.05(x + 4) + 0.10(x) = \$1.25$$

PTS: 2

REF: 061416ai

TOP: Modeling Linear Equations



8 ANS:

$$3000(1 + 0.02)^{16}$$

PTS: 2

REF: 011504ai

TOP: Modeling Exponential Functions

KEY: AI

9 ANS:

4

$$16^{2t} = n^{4t}$$

$$(16^2)^t = (n^4)^t$$

$$((4^2)^2)^t = ((n^2)^2)^t$$

PTS: 2

REF: 011519ai

TOP: Modeling Exponential Functions

KEY: AI

10 ANS:

$$c(z) = 0.20(z - 1) + 0.46$$

PTS: 2

REF: 011523ai

TOP: Modeling Linear Functions

11 ANS:

linear

PTS: 2

REF: 081717ai

TOP: Families of Functions

12 ANS:

$$a_n = 4n + 8$$

PTS: 2

REF: 061424ai

TOP: Sequences

13 ANS:

$$-4x^2 - 6$$

PTS: 2

REF: 011813ai

TOP: Operations with Polynomials

KEY: addition

14 ANS:

-7 and 3

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

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

$$x = -7, 3$$

PTS: 2

REF: 081418ai

TOP: Zeros of Polynomials

KEY: AI

15 ANS:

-0.93

PTS: 2

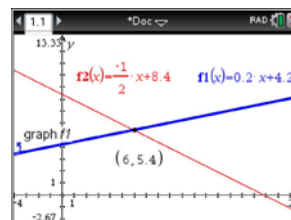
REF: 061411ai

TOP: Correlation Coefficient

- 16 ANS:  
II, only  
 $y = (x - 3)(x + 2)(x - 1)$

PTS: 2 REF: 061512ai TOP: Zeros of Polynomials  
KEY: AI

- 17 ANS:  
(6.0,5.4)



$$m = \frac{5 - 4.6}{4 - 2} = \frac{.4}{2} = 0.2 \quad 4(0.2x + 4.2) + 2x = 33.6 \quad y = 0.2(6) + 4.2 = 5.4$$

$$\begin{aligned} 5 &= .2(4) + b & 0.8x + 16.8 + 2x &= 33.6 \\ 4.2 &= b & 2.8x &= 16.8 \\ y &= 0.2x + 4.2 & x &= 6 \end{aligned}$$

PTS: 2 REF: 061618ai TOP: Solving Linear Systems  
KEY: substitution

- 18 ANS:  
 $3.00a + 1.50s$

PTS: 2 REF: 081503ai TOP: Modeling Expressions

- 19 ANS:  
3 and -1  
 $2x^2 - 4x - 6 = 0$

$$2(x^2 - 2x - 3) = 0$$

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

$$x = 3, -1$$

PTS: 2 REF: 011609ai TOP: Solving Quadratics

- 20 ANS:  
 $a_n = 8n - 14$

PTS: 2 REF: 081416ai TOP: Sequences

21 ANS:

8.3

$$4(x - 7) = 0.3(x + 2) + 2.11$$

$$4x - 28 = 0.3x + 0.6 + 2.11$$

$$3.7x - 28 = 2.71$$

$$3.7x = 30.71$$

$$x = 8.3$$

PTS: 2

REF: 061719ai

TOP: Solving Linear Equations

KEY: decimals

22 ANS:

2

$$-4.9(0)^2 + 50(0) + 2$$

PTS: 2

REF: 011811ai

TOP: Graphing Quadratic Functions

KEY: context

23 ANS:

$$C = 62 + 30(g - 2)$$

PTS: 2

REF: 081508ai

TOP: Modeling Linear Equations

24 ANS:

2% growth

PTS: 2

REF: 011608ai

TOP: Modeling Exponential Functions

25 ANS:

$$x \leq -\frac{18}{5}$$

$$2 + \frac{4}{9}x \geq 4 + x$$

$$-2 \geq \frac{5}{9}x$$

$$x \leq -\frac{18}{5}$$

PTS: 2

REF: 081711ai

TOP: Solving Linear Inequalities

26 ANS:

28

1, 3, 6, 10, 15, 21, 28, ...

PTS: 2

REF: 081715ai

TOP: Sequences KEY: term

27 ANS:

$$x^2 - 8(x - 1) = 17$$

PTS: 2

REF: 081723ai

TOP: Modeling Quadratics

- 28 ANS:  
 $A = 1000(1 + 0.013)^2$
- PTS: 2 REF: 061712ai TOP: Modeling Exponential Functions  
 KEY: AI
- 29 ANS:  
 2
- PTS: 2 REF: 011601ai TOP: Vertex Form of a Quadratic
- 30 ANS:  
 2 and  $-6$   
 $2(x + 2)^2 = 32$   
 $(x + 2)^2 = 16$   
 $x + 2 = \pm 4$   
 $x = -6, 2$
- PTS: 2 REF: 061619ai TOP: Solving Quadratics  
 KEY: taking square roots
- 31 ANS:  
 $5b$
- PTS: 2 REF: 081712ai TOP: Modeling Expressions
- 32 ANS:  
 It decreases 22% per year.
- PTS: 2 REF: 081624ai TOP: Modeling Exponential Functions
- 33 ANS:  
 whole numbers
- PTS: 2 REF: 011719ai TOP: Domain and Range
- 34 ANS:  
 1.7%
- PTS: 2 REF: 061517ai TOP: Modeling Exponential Functions
- 35 ANS:  
 $y = 14.1x + 5.8$
- PTS: 2 REF: 081421ai TOP: Regression KEY: linear
- 36 ANS:  
 distributive property of multiplication over subtraction
- PTS: 2 REF: 011801ai TOP: Identifying Properties

37 ANS:

12

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

PTS: 2

REF: 011521ai

TOP: Rate of Change

KEY: AI

38 ANS:

 $\{0, 1, 2, 3, \dots\}$ 

There are no negative or fractional cars.

PTS: 2

REF: 061402ai

TOP: Domain and Range

39 ANS:

no solution

$$3(-2x + 2x + 8) = 12$$

$$24 \neq 12$$

PTS: 2

REF: 061708ai

TOP: Solving Linear Systems

KEY: substitution

40 ANS:

A

PTS: 2

REF: 061420ai

TOP: Functional Notation

41 ANS:

$$x^2 + 12x - 9$$

$$5x^2 - (4x^2 - 12x + 9) = x^2 + 12x - 9$$

PTS: 2

REF: 011610ai

TOP: Operations with Polynomials

KEY: multiplication

42 ANS:

8.25

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

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

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

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

PTS: 2

REF: 061405ai

TOP: Solving Linear Equations

KEY: fractional expressions

43 ANS:

10

$4x - 5(0) = 40$

$4x = 40$

$x = 10$

PTS: 2 REF: 081408ai TOP: Graphing Linear Functions

44 ANS:

65

$a + p = 165 \quad 1.75(165 - p) + 2.5p = 337.5$

$1.75a + 2.5p = 337.5 \quad 288.75 - 1.75p + 2.5p = 337.5$

$0.75p = 48.75$

$p = 65$

PTS: 2 REF: 061506ai TOP: Modeling Linear Systems

45 ANS:

$p(t) = 100(3)^t$

PTS: 2 REF: 081714ai TOP: Families of Functions

KEY: AI

46 ANS:

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

$3(x^2 + 4x + 4) - 12 + 11$

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

PTS: 2 REF: 081621ai TOP: Vertex Form of a Quadratic

47 ANS:

$3.50H + 2.50P = 43$

$H + P = 14$

PTS: 2 REF: 011803ai TOP: Modeling Linear Systems

48 ANS:

$3 \pm 2\sqrt{7}$

$x^2 - 6x = 19$

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

$(x - 3)^2 = 28$

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

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

PTS: 2 REF: fall1302ai TOP: Solving Quadratics

KEY: quadratic formula

- 49 ANS:  
 $x \geq 11$   
 $3x + 2 \leq 5x - 20$   
 $22 \leq 2x$   
 $11 \leq x$
- PTS: 2 REF: 061609ai TOP: Solving Linear Inequalities
- 50 ANS:  
 $P(x) = (x + 1)(x - 2)^2$
- PTS: 2 REF: 081707ai TOP: Zeros of Polynomials  
 KEY: AI
- 51 ANS:  
 $0.75(7) + 1.25b \leq 22$
- PTS: 2 REF: 081505ai TOP: Modeling Linear Inequalities
- 52 ANS:  
 II and III
- PTS: 2 REF: 061522ai TOP: Sequences
- 53 ANS:  
 $f(x) = 3^x$
- PTS: 2 REF: 011616ai TOP: Families of Functions
- 54 ANS:  
 positive integers
- PTS: 2 REF: 011615ai TOP: Domain and Range
- 55 ANS:  
 $(p^2 + 9)(p + 3)(p - 3)$
- PTS: 2 REF: 011522ai TOP: Factoring the Difference of Perfect Squares  
 KEY: higher power AI
- 56 ANS:  
 -1 and 6  
 $f(x) = x^2 - 5x - 6 = (x + 1)(x - 6) = 0$   
 $x = -1, 6$
- PTS: 2 REF: 061612ai TOP: Zeros of Polynomials  
 KEY: AI
- 57 ANS:  
 up
- PTS: 2 REF: 081501ai TOP: Graphing Polynomial Functions

58 ANS:

60

$$\frac{30}{30 + 12 + 8} = 0.6$$

PTS: 2

REF: 061615ai

TOP: Frequency Tables

KEY: two-way

59 ANS:

$$12x - 24 = 60$$

PTS: 2

REF: 081616ai

TOP: Modeling Linear Equations

60 ANS:

20° Celsius

$$C(68) = \frac{5}{9}(68 - 32) = 20$$

PTS: 2

REF: 011710ai

TOP: Conversions KEY: formula

61 ANS:

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

PTS: 2

REF: 011819ai

TOP: Graphing Polynomial Functions

62 ANS:

distributive property of multiplication over subtraction

PTS: 2

REF: 081701ai

TOP: Identifying Properties

63 ANS:

$$3x^2 - 14x + 14$$

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

PTS: 2

REF: 081524ai

TOP: Operations with Polynomials

KEY: multiplication

64 ANS:

II and IV

PTS: 2

REF: 081511ai

TOP: Defining Functions

KEY: mixed

65 ANS:

$$0 \leq t \leq 3$$

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

$$16t^2 = 144$$

$$t^2 = 9$$

$$t = 3$$

PTS: 2

REF: 081423ai

TOP: Domain and Range



66 ANS:

$$f(1) = 3, f(n + 1) = 2f(n) + 1$$

PTS: 2 REF: 011618ai TOP: Sequences

67 ANS:

4

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

$$6x - 12 = 12$$

$$6x = 24$$

$$x = 4$$

PTS: 2 REF: 081420ai TOP: Solving Linear Equations

KEY: fractional expressions

68 ANS:

I, II, and IV

PTS: 2 REF: 081509ai TOP: Factoring Polynomials

KEY: quadratic

69 ANS:

$$m + f = 3.95$$

$$f + 0.005 = m$$

PTS: 2 REF: 081419ai TOP: Modeling Linear Systems

70 ANS:

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

$$3(x^2 - 1) - (x^2 - 7x + 10)$$

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

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

PTS: 2 REF: 061610ai TOP: Operations with Polynomials

KEY: subtraction

71 ANS:

$$(x^2 - 3y)(x^2 + 3y)$$

PTS: 2 REF: 061503ai TOP: Factoring the Difference of Perfect Squares

KEY: multivariable AI

72 ANS:

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

PTS: 2 REF: 081415ai TOP: Factoring Polynomials

KEY: higher power AI

73 ANS:  
 $y > 0$

PTS: 2 REF: 011619ai TOP: Domain and Range  
 KEY: real domain, exponential

74 ANS:  
 $0 \leq t \leq 1.5$   
 $0 = -16t^2 + 24t$   
 $0 = -8t(2t - 3)$   
 $t = 0, \frac{3}{2}$

PTS: 2 REF: 061724ai TOP: Graphing Quadratic Functions  
 KEY: context

75 ANS:  
 $\frac{2}{3}$  and  $-4$   
 $3x^2 + 10x - 8 = 0$   
 $(3x - 2)(x + 4) = 0$   
 $x = \frac{2}{3}, -4$

PTS: 2 REF: 081619ai TOP: Solving Quadratics  
 KEY: factoring

76 ANS:  
 whole numbers greater than or equal to one

PTS: 2 REF: 081620ai TOP: Domain and Range

77 ANS:  
 $\{0, 10, 42\}$   
 $f(-2) = 0, f(3) = 10, f(5) = 42$

PTS: 2 REF: 011812ai TOP: Domain and Range  
 KEY: limited domain

78 ANS:  
 $\{2, -8, 42, -208, \dots\}$   
 $f(1) = 2; f(2) = -5(2) + 2 = -8; f(3) = -5(-8) + 2 = 42; f(4) = -5(42) + 2 = -208$

PTS: 2 REF: 061718ai TOP: Sequences KEY: term

79 ANS:  
 exponential growth function

PTS: 2 REF: 061406ai TOP: Families of Functions

80 ANS:

1 and 7

$$3(x-4)^2 = 27$$

$$(x-4)^2 = 9$$

$$x-4 = \pm 3$$

$$x = 1, 7$$

PTS: 2 REF: 011814ai TOP: Solving Quadratics

KEY: taking square roots

81 ANS:

6

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

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

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

PTS: 2 REF: 081520ai TOP: Vertex Form of a Quadratic

82 ANS:

$$4 \pm \sqrt{26}$$

$$x^2 - 8x + 16 = 10 + 16$$

$$(x-4)^2 = 26$$

$$x-4 = \pm\sqrt{26}$$

$$x = 4 \pm \sqrt{26}$$

PTS: 2 REF: 061722ai TOP: Solving Quadratics

KEY: completing the square

83 ANS:

3

$$m = \frac{3-7}{2-4} = -5 \quad 3 = (-5)(2) + b \quad y = -5x + 13 \text{ represents the line passing through the points } (2, 3) \text{ and } (4, -7). \text{ The}$$

$$b = 13$$

fourth equation may be rewritten as  $y = 5x - 13$ , so is a different line.

PTS: 2 REF: 081720ai TOP: Writing Linear Equations

KEY: other forms

84 ANS:

0.2083 minute

$$12.5 \text{ sec} \times \frac{1 \text{ min}}{60 \text{ sec}} = 0.208\bar{3} \text{ min}$$

PTS: 2 REF: 061608ai TOP: Conversions KEY: dimensional analysis

85 ANS:

$$m + g \leq 40$$

$$12m + 14g \geq 250$$

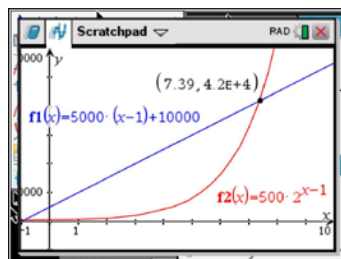
PTS: 2

REF: 061711ai

TOP: Modeling Systems of Linear Inequalities

86 ANS:

8



x	$A = 5000(x - 1) + 10000$	$B = 500(2)^{x-1}$
6	35,000	16,000
7	40,000	32,000
8	45,000	64,000
9	50,000	128,000

PTS: 2

REF: 081518ai

TOP: Families of Functions

87 ANS:

$$\frac{120 \text{ ft}^3}{1} \cdot \frac{1 \text{ load}}{8 \text{ ft}^3} \cdot \frac{10 \text{ min}}{1 \text{ load}} \cdot \frac{1 \text{ hr}}{60 \text{ min}}$$

PTS: 2

REF: 061720ai

TOP: Conversions KEY: dimensional analysis

88 ANS:

5

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

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

PTS: 2

REF: 011520ai

TOP: Sequences KEY: term

89 ANS:

$$280 - 30(w - 1)$$

PTS: 2

REF: 011718ai

TOP: Modeling Expressions

90 ANS:

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

PTS: 2

REF: spr1304ai

TOP: Geometric Applications of Quadratics

91 ANS:

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

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

$$2d = at^2$$

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

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

PTS: 2

REF: 061519ai

TOP: Transforming Formulas

92 ANS:

$$f(x) = -4x - 2$$

PTS: 2

REF: 081610ai

TOP: Sequences

93 ANS:

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

PTS: 2

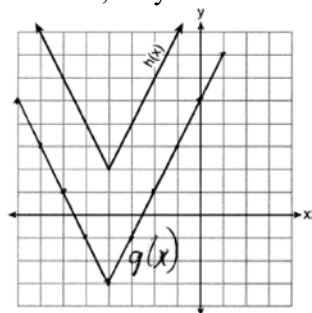
REF: 081623ai

TOP: Zeros of Polynomials

KEY: AI

94 ANS:

I and III, only



PTS: 2

REF: 081718ai

TOP: Comparing Functions

95 ANS:

$$2lw$$

PTS: 2

REF: 061702ai

TOP: Dependent and Independent Variables

96 ANS:

$$j(x) = (x-6)^2 - 29, (6, -29)$$

$$j(x) = x^2 - 12x + 36 + 7 - 36$$

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

PTS: 2

REF: 061616ai

TOP: Vertex Form of a Quadratic

97 ANS:

15 and  $-2$ 

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

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

$$x = 15, -2$$

PTS: 2

REF: 061510ai

TOP: Zeros of Polynomials

KEY: AI

98 ANS:

Lynn, only

$$f(3) = -2(3)^2 + 32 = -18 + 32 = 14$$

PTS: 2

REF: 061705ai

TOP: Functional Notation

99 ANS:

I, II, and III

PTS: 2

REF: 081709ai

TOP: Modeling Linear Functions

100 ANS:

2

$$|x + 2| = 3x - 2$$

$$x + 2 = 3x - 2$$

$$4 = 2x$$

$$x = 2$$

PTS: 2

REF: 081702ai

TOP: Other Systems

KEY: AI

101 ANS:

$$3x - 1 = \pm 5$$

PTS: 2

REF: 061521ai

TOP: Solving Quadratics

KEY: taking square roots

102 ANS:

$$\frac{5280 \text{ ft}}{1 \text{ mi}}$$

PTS: 2

REF: 011502ai

TOP: Conversions KEY: dimensional analysis

103 ANS:

$$-18.825$$

$$6\left(\frac{5}{6}\left(\frac{3}{8}-x\right)=16\right)$$

$$8\left(5\left(\frac{3}{8}-x\right)=96\right)$$

$$15-40x=768$$

$$-40x=753$$

$$x=-18.825$$

PTS: 2

REF: 081713ai

TOP: Solving Linear Equations

KEY: fractional expressions

104 ANS:

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

PTS: 2

REF: 011516ai

TOP: Transforming Formulas

105 ANS:

2 and  $a$ 

PTS: 2

REF: 011702ai

TOP: Solving Quadratics

106 ANS:

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

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

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

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

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

PTS: 2

REF: 061423ai

TOP: Transforming Formulas

107 ANS:

$$y \geq 2x - 3$$

PTS: 2

REF: 011605ai

TOP: Graphing Linear Inequalities

108 ANS:

$$y = x^2 + 10x + 24$$

$$(x + 4)(x + 6) = 0$$

$$x^2 + 10x + 24 = 0$$

PTS: 2

REF: spr1303ai

TOP: Zeros of Polynomials

KEY: AI

109 ANS:

whole numbers

PTS: 2

REF: 011506ai

TOP: Domain and Range

110 ANS:

$$x > 9$$

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

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

$$9 < x$$

PTS: 2

REF: 011507ai

TOP: Solving Linear Inequalities

111 ANS:

8

$$L + S = 20$$

$$27.98L + 10.98(20 - L) = 355.60$$

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

$$17L = 136$$

$$L = 8$$

PTS: 2

REF: 081510ai

TOP: Modeling Linear Systems

112 ANS:

-2

$$\frac{1}{2}x + 3 = |x| \quad -\frac{1}{2}x - 3 = x$$

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

$$-6 = 3x$$

$$x + 6 = 2x \quad -2 = x$$

$$6 = x$$

PTS: 2

REF: 011617ai

TOP: Other Systems

KEY: AI

113 ANS:

$$(10 + x)(12 + x) = 180$$

PTS: 2

REF: 011611ai

TOP: Geometric Applications of Quadratics



- 114 ANS:  
5000, the amount of money in the account initially
- PTS: 2 REF: 011515ai TOP: Modeling Exponential Functions
- 115 ANS:  
II, only
- PTS: 2 REF: 011604ai TOP: Operations with Radicals  
KEY: classify
- 116 ANS:  
 $x(x+2)(x-15)$
- PTS: 2 REF: 011612ai TOP: Factoring Polynomials  
KEY: higher power AI
- 117 ANS:  
 $8x^3 + 2x^2 - 3x + 18$   
 $(2x+3)(4x^2 - 5x + 6) = 8x^3 - 10x^2 + 12x + 12x^2 - 15x + 18 = 8x^3 + 2x^2 - 3x + 18$
- PTS: 2 REF: 081612ai TOP: Operations with Polynomials  
KEY: multiplication
- 118 ANS:  
 $\{x \mid x \geq -4\}$
- PTS: 2 REF: 061509ai TOP: Domain and Range  
KEY: graph
- 119 ANS:  
hours worked per week
- PTS: 2 REF: 011501ai TOP: Modeling Linear Functions
- 120 ANS:  
-1.75 and 4  
 $x^2 - 2x - 8 = \frac{1}{4}x - 1$   
 $4x^2 - 8x - 32 = x - 4$   
 $4x^2 - 9x - 28 = 0$   
 $(4x+7)(x-4) = 0$   
 $x = -\frac{7}{4}, 4$
- PTS: 2 REF: 081517ai TOP: Quadratic-Linear Systems  
KEY: AI

121 ANS:

$$a + c = 150$$

$$10.25a + 7.75c = 1470$$

PTS: 2

REF: 061605ai

TOP: Modeling Linear Systems

122 ANS:

$$-\frac{5}{6}$$

$$36x^2 = 25$$

$$x^2 = \frac{25}{36}$$

$$x = \pm\frac{5}{6}$$

PTS: 2

REF: 011715ai

TOP: Solving Quadratics

KEY: taking square roots

123 ANS:

43

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

PTS: 2

REF: 081424ai

TOP: Sequences

KEY: term

124 ANS:

nonnegative rational numbers

PTS: 2

REF: 061623ai

TOP: Domain and Range

125 ANS:

$$f(x) = x(x + 3)(x - 4)$$

PTS: 2

REF: 061710ai

TOP: Zeros of Polynomials

126 ANS:

{0,2,3}

$$2x^3 + 12x - 10x^2 = 0$$

$$2x(x^2 - 5x + 6) = 0$$

$$2x(x - 3)(x - 2) = 0$$

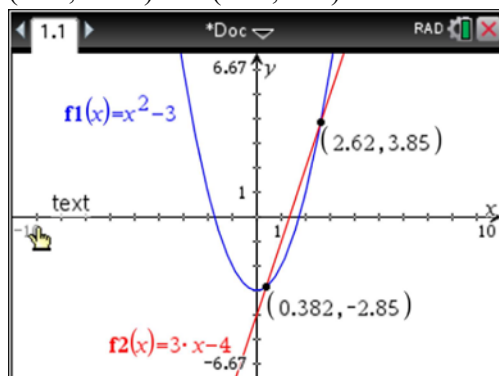
$$x = 0, 2, 3$$

PTS: 2

REF: 081719ai

TOP: Zeros of Polynomials

- 127 ANS:  
 (0.38, -2.85) and (2.62, 3.85)



PTS: 2 REF: 011810ai TOP: Quadratic-Linear Systems  
 KEY: algebraically

- 128 ANS:  
 $j^2 + 2j = 783$

PTS: 2 REF: 081409ai TOP: Modeling Quadratics

- 129 ANS:  
 $f(t) = 25^{t+1}$

PTS: 2 REF: 061513ai TOP: Families of Functions

- 130 ANS:  
 $h(x), f(x), g(x)$

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 TOP: Rate of Change  
 KEY: AI

- 131 ANS:  
 $x = 4 \pm 2\sqrt{10}$   
 $x^2 - 8x + 16 = 24 + 16$

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

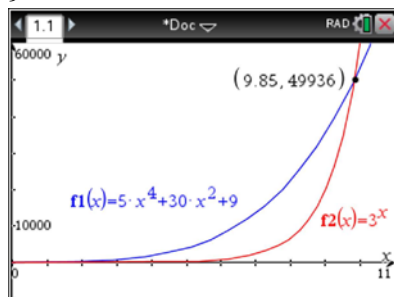
$$x-4 = \pm\sqrt{40}$$

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

PTS: 2 REF: 061523ai TOP: Solving Quadratics  
 KEY: completing the square

132 ANS:

9



PTS: 2 REF: 061621ai TOP: Families of Functions

133 ANS:

$$P(x) = -0.5x^2 + 500x - 350$$

$$P(x) = -0.5x^2 + 800x - 100 - (300x + 250) = -0.5x^2 + 500x - 350$$

PTS: 2 REF: 081406ai TOP: Operations with Functions

134 ANS:

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

PTS: 2 REF: 081422ai TOP: Graphing Piecewise-Defined Functions

135 ANS:

I, only

PTS: 2 REF: 011623ai TOP: Families of Functions

136 ANS:

$$-2g - 11$$

$$2(3g - 4) - (8g + 3) = 6g - 8 - 8g - 3 = -2g - 11$$

PTS: 2 REF: 011707ai TOP: Operations with Polynomials

KEY: subtraction

137 ANS:

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

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

PTS: 2 REF: 081504ai TOP: Zeros of Polynomials

KEY: AI

138 ANS:

$$P(h) = 4(2)^h$$

PTS: 2 REF: 061707ai TOP: Families of Functions

- 139 ANS:  
 $2.5 < x < 5.5$
- PTS: 2 REF: 061409ai TOP: Graphing Quadratic Functions  
 KEY: context
- 140 ANS:  
 27
- $$f(8) = \frac{1}{2}(8)^2 - \left(\frac{1}{4}(8) + 3\right) = 32 - 5 = 27$$
- PTS: 2 REF: 081704ai TOP: Functional Notation
- 141 ANS:  
 $a_1 = 3$
- $$a_n = a_{n-1} + 2$$
- PTS: 2 REF: 011818ai TOP: Sequences
- 142 ANS:  
 $f(x) = (x - 5)(x + 6)$
- PTS: 2 REF: 061412ai TOP: Solving Quadratics
- 143 ANS:  
 hour 0 to hour 1  
 The graph is steepest between hour 0 and hour 1.
- PTS: 2 REF: 081601ai TOP: Rate of Change  
 KEY: AI
- 144 ANS:  
 -2
- PTS: 2 REF: 011712ai TOP: Graphing Absolute Value Functions
- 145 ANS:  
 -1
- $$\frac{\sqrt{2\left(\frac{1}{2}\right) + 3}}{6\left(\frac{1}{2}\right) - 5} = \frac{\sqrt{4}}{-2} = \frac{2}{-2} = -1$$
- PTS: 2 REF: 081512ai TOP: Functional Notation
- 146 ANS:  
 $6x^2 - 28x + 30$
- PTS: 2 REF: 011510ai TOP: Operations with Polynomials  
 KEY: multiplication

- 147 ANS:  
 $c = 60 + 0.05d$
- PTS: 2 REF: 061422ai TOP: Modeling Linear Equations
- 148 ANS:  
 III, only
- PTS: 2 REF: 061516ai TOP: Analysis of Data
- 149 ANS:  
 linear
- PTS: 2 REF: 011805ai TOP: Families of Functions
- 150 ANS:  
 $750 < p < 1500$   
 $\frac{750 + 2.25p}{p} > 2.75$   $\frac{750 + 2.25p}{p} < 3.25$   
 $750 + 2.25p > 2.75p$   $750 + 2.25p < 3.25p$   
 $750 > .50p$   $750 < p$   
 $1500 > p$
- PTS: 2 REF: 061524ai TOP: Modeling Linear Inequalities
- 151 ANS:  
 $5x^2 + 11x - 13$
- PTS: 2 REF: 061403ai TOP: Operations with Polynomials  
 KEY: subtraction
- 152 ANS:  
 $-11.\bar{3}$   
 $\frac{2}{3} \left( \frac{1}{4}x - 2 \right) = \frac{1}{5} \left( \frac{4}{3}x - 1 \right)$   
 $10(3x - 24) = 3(16x - 12)$   
 $30x - 240 = 48x - 36$   
 $-204 = 18x$   
 $x = -11.\bar{3}$
- PTS: 2 REF: 011822ai TOP: Solving Linear Equations  
 KEY: fractional expressions
- 153 ANS:  
 $P(c) = .75c - 9.96$   
 $P(c) = (.50 + .25)c - 9.96 = .75c - 9.96$
- PTS: 2 REF: 011807ai TOP: Modeling Linear Functions

- 154 ANS:  
 $2x + 3.50 = 14.50$
- PTS: 2 REF: 081614ai TOP: Modeling Linear Equations
- 155 ANS:  
 $f(x)$
- PTS: 2 REF: 061606ai TOP: Families of Functions
- 156 ANS:  
 speed of the car
- PTS: 2 REF: 011709ai TOP: Modeling Linear Functions
- 157 ANS:  
 quadratic
- PTS: 2 REF: 061624ai TOP: Families of Functions
- 158 ANS:  
 $(7x - 6)(7x + 6)$
- PTS: 2 REF: 081703ai TOP: Factoring the Difference of Perfect Squares  
 KEY: quadratic
- 159 ANS:  
 $h < 14$   
 $2h + 8 > 3h - 6$   
 $14 > h$   
 $h < 14$
- PTS: 2 REF: 081607ai TOP: Solving Linear Inequalities
- 160 ANS:  
 $f(1) = 10$   
 $f(x) = f(x - 1) + 4$
- PTS: 2 REF: 081514ai TOP: Sequences
- 161 ANS:  
 $a_1 = 49; a_n = a_{n-1} + 21$
- PTS: 2 REF: 011708ai TOP: Sequences
- 162 ANS:  
 5.4  
 $\frac{36.6 - 15}{4 - 0} = \frac{21.6}{4} = 5.4$
- PTS: 2 REF: 061511ai TOP: Rate of Change  
 KEY: AI

- 163 ANS:  
 $4(2x + 3)(2x - 3)$   
 $16x^2 - 36 = 4(2x + 3)(2x - 3)$
- PTS: 2                      REF: 011701ai                      TOP: Factoring the Difference of Perfect Squares  
 KEY: quadratic
- 164 ANS:  
 $4.50 + 0.79r \leq 16.00$ ; 14 rides
- PTS: 2                      REF: 011513ai                      TOP: Modeling Linear Inequalities
- 165 ANS:  
 $f(t) = (9.05 \times 10^6)(1 + 0.031)^7$
- PTS: 2                      REF: 081507ai                      TOP: Modeling Exponential Functions  
 KEY: AI
- 166 ANS:  
 $0 \leq y \leq 8$   
 $f(2) = 0$   
 $f(6) = 8$
- PTS: 2                      REF: 081411ai                      TOP: Domain and Range  
 KEY: limited domain
- 167 ANS:  
 -5 and 5
- PTS: 2                      REF: 081403ai                      TOP: Solving Quadratics  
 KEY: taking square roots
- 168 ANS:  
 Pelican Beach
- PTS: 2                      REF: 011514ai                      TOP: Central Tendency and Dispersion
- 169 ANS:  
 16  
 $a_n = 3n + 1$   
 $a_5 = 3(5) + 1 = 16$
- PTS: 2                      REF: 061613ai                      TOP: Sequences                      KEY: term
- 170 ANS:  
 17.06  
 $119.67(0.61)^5 - 119.67(0.61)^3 \approx 17.06$
- PTS: 2                      REF: 011603ai                      TOP: Evaluating Functions



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

PTS: 2 REF: 081414ai TOP: Rate of Change  
 KEY: AI

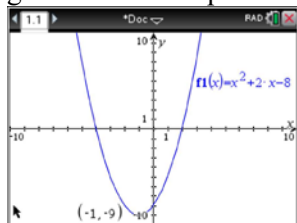
172 ANS:  
 $28\%$   
 $\frac{14}{16 + 20 + 14} = 28\%$

PTS: 2 REF: 011705ai TOP: Frequency Tables  
 KEY: two-way

173 ANS:  
 $F(x) = 2^x + 1$

PTS: 2 REF: 061415ai TOP: Families of Functions

174 ANS:  
 greater than or equal to  $-9$



$$f(x) = x^2 + 2x - 8 = x^2 + 2x + 1 - 9 = (x + 1)^2 - 9$$

PTS: 2 REF: 061611ai TOP: Domain and Range  
 KEY: real domain, quadratic

175 ANS:  
 $-2 \pm 2\sqrt{5}$   
 $x^2 + 4x = 16$   
 $x^2 + 4x + 4 = 16 + 4$   
 $(x + 2)^2 = 20$   
 $x + 2 = \pm\sqrt{4 \cdot 5}$   
 $= -2 \pm 2\sqrt{5}$

PTS: 2 REF: 061410ai TOP: Solving Quadratics  
 KEY: completing the square

176 ANS:  
 $\frac{I}{Pt}$

PTS: 2 REF: 011606ai TOP: Transforming Formulas

177 ANS:  
2589

$$25,000(0.86)^2 - 25,000(0.86)^3 = 18490 - 15901.40 = 2588.60$$

PTS: 2 REF: 011508ai TOP: Functional Notation

178 ANS:  
I, only

PTS: 2 REF: 011524ai TOP: Zeros of Polynomials

KEY: AI

179 ANS:

$$4(3x + 5)(3x - 5)$$

$$36x^2 - 100 = 4(9x^2 - 25) = 4(3x + 5)(3x - 5)$$

PTS: 2 REF: 081608ai TOP: Factoring the Difference of Perfect Squares

KEY: quadratic

180 ANS:

$$\frac{P_1 V_1}{V_2}$$

PTS: 2 REF: 011704ai TOP: Transforming Formulas

181 ANS:

$$y \geq -3x + 4$$

PTS: 2 REF: 061505ai TOP: Graphing Linear Inequalities

182 ANS:

1, 2

$$-2(x - 5) < 10$$

$$x - 5 > -5$$

$$x > 0$$

PTS: 2 REF: 011817ai TOP: Interpreting Solutions

183 ANS:

the amount spent to manufacture each radio

PTS: 2 REF: 061407ai TOP: Modeling Linear Functions

184 ANS:

$$-3 \pm \sqrt{7}$$

PTS: 2 REF: 081523ai TOP: Solving Quadratics

KEY: taking square roots

185 ANS:

$$q(x) = -\frac{1}{2}(x - 15)^2 + 25$$

Vertex (15,25), point (10,12.5)  $12.5 = a(10 - 15)^2 + 25$ 

$$-12.5 = 25a$$

$$-\frac{1}{2} = a$$

PTS: 2

REF: 061716ai

TOP: Graphing Quadratic Functions

KEY: no context