JMAP
REGENTS BY STATE STANDARD: TOPIC

NY Algebra I Regents Exam Questions from Spring 2013 to January 2024 Sorted by State Standard: Topic

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Algebra I Regents Exam Questions by State Standard: Topic

EXPRESSIONS AND EQUATIONS

A.SSE.A.1: DEPENDENT AND INDEPENDENT VARIABLES

1 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?
1) A
2) $2lw$
3) $2hw$
4) $2lh$

A.SSE.A.1: MODELING EXPRESSIONS

2 What is the degree of the polynomial $2x + x^3 + 5x^2$?
1) 1
2) 2
3) 3
4) 4

3 What is the degree of the polynomial $5x - 3x^2 - 1 + 7x^3$?
1) 1
2) 2
3) 3
4) 5

4 What is the constant term of the polynomial $4d + 6 + 3d^2$?
1) 6
2) 2
3) 3
4) 4

5 When $3x^2 + 7x - 6 + 2x^3$ is written in standard form, the leading coefficient is
1) 7
2) 2
3) 3
4) –6

6 When multiplying polynomials for a math assignment, Pat found the product to be $-4x + 8x^2 - 2x^3 + 5$. He then had to state the leading coefficient of this polynomial. Pat wrote down −4. Do you agree with Pat's answer? Explain your reasoning.

7 Students were asked to write $6x^5 + 8x - 3x^3 + 7x^7$ in standard form. Shown below are four student responses.

Anne: $7x^7 + 6x^5 - 3x^3 + 8x$

Bob: $-3x^3 + 6x^5 + 7x^7 + 8x$

Carrie: $8x + 7x^7 + 6x^5 - 3x^3$

Dylan: $8x - 3x^3 + 6x^5 + 7x^7$

Which student is correct?
1) Anne
2) Bob
3) Carrie
4) Dylan

8 Students were asked to write $2x^3 + 3x + 4x^2 + 1$ in standard form. Four student responses are shown below.

Alexa: $4x^2 + 3x + 2x^3 + 1$

Carol: $2x^3 + 3x + 4x^2 + 1$

Ryan: $2x^3 + 4x^2 + 3x + 1$

Eric: $1 + 2x^3 + 3x + 4x^2$

Which student's response is correct?

1) Alexa
2) Carol
3) Ryan
4) Eric

9 Mrs. Allard asked her students to identify which of the polynomials below are in standard form and explain why.

I. $15x^4 - 6x + 3x^2 - 1$

II. $12x^3 + 8x + 4$

III. $2x^5 + 8x^2 + 10x$

Which student's response is correct?

1) Tyler said I and II because the coefficients are decreasing.
2) Susan said only II because all the numbers are decreasing.
3) Fred said II and III because the exponents are decreasing.
4) Alyssa said II and III because they each have three terms.

10 Which polynomial has a leading coefficient of 4 and a degree of 3?

1) $3x^4 - 2x^2 + 4x - 7$
2) $4 + x - 4x^2 + 5x^3$
3) $4x^4 - 3x^3 + 2x^2$
4) $2x + x^2 + 4x^3$

11 Students were asked to write an expression which had a leading coefficient of 3 and a constant term of –4. Which response is correct?

1) $3 - 2x^3 - 4x$
2) $7x^3 - 3x^5 - 4$
3) $4 - 7x + 3x^3$
4) $-4x^2 + 3x^4 - 4$

12 An example of a sixth-degree polynomial with a leading coefficient of seven and a constant term of four is

1) $6x^7 - x^5 + 2x + 4$
2) $4 + x + 7x^6 - 3x^2$
3) $7x^4 + 6 + x^2$
4) $5x + 4x^6 + 7$

13 An expression of the fifth degree is written with a leading coefficient of seven and a constant of six. Which expression is correctly written for these conditions?

1) $6x^5 + x^4 + 7$
2) $7x^6 - 6x^4 + 5$
3) $6x^7 - x^5 + 5$
4) $7x^5 + 2x^2 + 6$

14 When $(x)(x - 5)(2x + 3)$ is expressed as a polynomial in standard form, which statement about the resulting polynomial is true?

1) The constant term is 2.
2) The leading coefficient is 2.
3) The degree is 2.
4) The number of terms is 2.

15 Which statement is correct about the polynomial $3x^2 + 5x - 2$?
1) It is a third-degree polynomial with a constant term of –2.
2) It is a third-degree polynomial with a leading coefficient of 3.
3) It is a second-degree polynomial with a constant term of 2.
4) It is a second-degree polynomial with a leading coefficient of 3.

16 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?
1) b
2) $5b$
3) $45 - b$
4) $250 - 5b$

17 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) $3.00a + 1.50s$

18 Bryan's hockey team is purchasing jerseys. The company charges \$250 for a onetime set-up fee and \$23 for each printed jersey. Which expression represents the total cost of x number of jerseys for the team?
1) $23x$
2) $23 + 250x$
3) $23x + 250$
4) $23(x + 250)$

19 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?
1) $310 - 8w$
2) $280 + 30(w - 1)$
3) $310w - 30$
4) $280 - 30(w - 1)$

A.REI.A.1: IDENTIFYING PROPERTIES

20 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

21 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?
1) subtraction property of equality
2) multiplication property of equality
3) associative property of multiplication
4) distributive property of multiplication over subtraction

22 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?

1) identity property of multiplication
2) multiplication property of equality
3) commutative property of multiplication
4) distributive property of multiplication over subtraction

23 When solving $p^2 + 5 = 8p - 7$, Kate wrote $p^2 + 12 = 8p$. The property she used is

1) the associative property
2) the commutative property
3) the distributive property
4) the addition property of equality

24 In the process of solving the equation $10x^2 - 12x - 16x = 6$, George wrote $2(5x^2 - 14x) = 2(3)$, followed by $5x^2 - 14x = 3$. Which properties justify George's process?

A. addition property of equality
B. division property of equality
C. commutative property of addition
D. distributive property

1) *A* and *C*
2) *A* and *B*
3) *D* and *C*
4) *D* and *B*

25 Britney is solving a quadratic equation. Her first step is shown below.

Problem: $3x^2 - 8 - 10x = 3(2x + 3)$

Step 1: $3x^2 - 10x - 8 = 6x + 9$

Which two properties did Britney use to get to step 1?

I. addition property of equality
II. commutative property of addition
III. multiplication property of equality
IV. distributive property of multiplication over addition

1) I and III
2) I and IV
3) II and III
4) II and IV

26 A student is in the process of solving an equation. The original equation and the first step are shown below.

Original: $3a + 6 = 2 - 5a + 7$

Step one: $3a + 6 = 2 + 7 - 5a$

Which property did the student use for the first step? Explain why this property is correct.

27 John was given the equation $4(2a + 3) = -3(a - 1) + 31 - 11a$ to solve. Some of the steps and their reasons have already been completed. State a property of numbers for each missing reason.

$4(2a + 3) = -3(a - 1) + 31 - 11a$	Given
$8a + 12 = -3a + 3 + 31 - 11a$	_____
$8a + 12 = 34 - 14a$	Combining like terms
$22a + 12 = 34$	_____

A.REI.B.3: SOLVING LINEAR EQUATIONS

28 The solution to $3(x-8)+4x=8x+4$ is
1) 12
2) 28
3) –12
4) –28

29 The solution to $-2(1-4x)=3x+8$ is
1) $\frac{6}{11}$
2) 2
3) $-\frac{10}{7}$
4) –2

30 What is the solution to $2+3(2a+1)=3(a+2)$?
1) $\frac{1}{7}$
2) $\frac{1}{3}$
3) $-\frac{3}{7}$
4) $-\frac{1}{3}$

31 An equation is given below.
$$4(x-7)=0.3(x+2)+2.11$$
The solution to the equation is
1) 8.3
2) 8.7
3) 3
4) -3

32 The value of x that satisfies the equation $\frac{4}{3}=\frac{x+10}{15}$ is
1) –6
2) 5
3) 10
4) 30

33 The solution to $\frac{2}{3}(3-2x)=\frac{3}{4}$ is
1) $-\frac{11}{8}$
2) $\frac{5}{8}$
3) $-\frac{33}{16}$
4) $\frac{15}{16}$

34 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

35 Which value of x makes $\frac{x-3}{4}+\frac{2}{3}=\frac{17}{12}$ true?
1) 8
2) 6
3) 0
4) 4

36 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

37 What is the solution to the equation $\frac{3}{5}\left(x+\frac{4}{3}\right)=1.04$?

1) $3.0\overline{6}$
2) 0.4
3) $-0.4\overline{8}$
4) $-0.709\overline{3}$

38 Which value of x satisfies the equation $\frac{5}{6}\left(\frac{3}{8}-x\right)=16$?

1) −19.575
2) −18.825
3) −16.3125
4) −15.6875

39 What is the value of x in the equation $\frac{5(2x-4)}{3}+9=14$?

1) 1.9
2) 3.5
3) 5.3
4) 8.9

40 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

1) −10
2) −2
3) $-9.\overline{09}$
4) $-11.\overline{3}$

41 Which of the equations below have the same solution?

I. $10(x-5)=-15$
II. $4+2(x-2)=9$
III. $\frac{1}{3}x=\frac{3}{2}$

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

42 Solve the equation algebraically for x: $-2.4(x+1.4)=6.8x-22.68$

43 Solve the equation below algebraically for the exact value of x.

$$6-\frac{2}{3}(x+5)=4x$$

44 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x=-\frac{5}{4}x+2$$

A.CED.A.1: MODELING LINEAR EQUATIONS

45 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?
1) $2x - 12 = 60$
2) $12x - 2 = 60$
3) $12x - 24 = 60$
4) $24 - 12x = 60$

46 Nicci's sister is 7 years less than twice Nicci's age, a. The sum of Nicci's age and her sister's age is 41. Which equation represents this relationship?
1) $a + (7 - 2a) = 41$
2) $a + (2a - 7) = 41$
3) $2a - 7 = 41$
4) $a = 2a - 7$

47 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) $0.05(4x) + 0.10(x) = \$1.25$

48 Joe has dimes and nickels in his piggy bank totaling \$1.45. The number of nickels he has is 5 more than twice the number of dimes, d. Which equation could be used to find the number of dimes he has?
1) $0.10d + 0.05(2d + 5) = 1.45$
2) $0.10(2d + 5) + 0.05d = 1.45$
3) $d + (2d + 5) = 1.45$
4) $(d - 5) + 2d = 1.45$

49 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?
1) $9.00 + 3x = 20.00$
2) $9.00 + 3.50x = 20.00$
3) $2x + 3.50 = 14.50$
4) $2x + 9.00 = 14.50$

50 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.

51 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.]

52 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each. If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought. Use your equation to determine algebraically how many pens Hannah bought.

53 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month. Write an equation that can be used to determine after how many months the boys will owe the same amount. Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time. Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

A.CED.A.2: MODELING LINEAR EQUATIONS

54 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) $c = 60 + 0.05d$

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

56 The cost of one pound of grapes, g, is 15 cents more than one pound of apples, a. The cost of one pound of bananas, b, is twice as much as one pound of grapes. Write an equation that represents the cost of one pound of bananas in terms of the cost of one pound of apples.

57 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs. The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99. State an equation that represents the cost, *C*, when *s* songs are downloaded. Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

A.CED.A.4: TRANSFORMING FORMULAS

58 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

1) $\frac{I-P}{t}$
2) $\frac{P-I}{t}$
3) $\frac{I}{Pt}$
4) $\frac{Pt}{I}$

59 Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula $P_1V_1 = P_2V_2$. When the formula is solved for P_2, the result is

1) $P_1V_1V_2$
2) $\frac{V_2}{P_1V_1}$
3) $\frac{P_1V_1}{V_2}$
4) $\frac{P_1V_2}{V_1}$

60 The formula $Ax + By = C$ represents the equation of a line in standard form. Which expression represents *y* in terms of *A*, *B*, *C*, and *x*?

1) $\frac{C-Ax}{B}$
2) $\frac{C-A}{Bx}$
3) $\frac{C-A}{x+B}$
4) $\frac{C-B}{Ax}$

61 An equation used to find the velocity of an object is given as $v^2 = u^2 + 2as$, where *u* is the initial velocity, *v* is the final velocity, *a* is the acceleration of the object, and *s* is the distance traveled. When this equation is solved for *a*, the result is

1) $a = \frac{v^2u^2}{2s}$
2) $a = \frac{v^2-u^2}{2s}$
3) $a = v^2 - u^2 - 2s$
4) $a = 2s(v^2 - u^2)$

62 Students were asked to write a formula for the length of a rectangle by using the formula for its perimeter, $p = 2\ell + 2w$. Three of their responses are shown below.

I. $\ell = \frac{1}{2}p - w$

II. $\ell = \frac{1}{2}(p - 2w)$

III. $\ell = \frac{p-2w}{2}$

Which responses are correct?

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

63 The formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)h$. The height, *h*, of the trapezoid may be expressed as

1) $2A - b_1 - b_2$
2) $\frac{2A - b_1}{b_2}$
3) $\frac{1}{2}A - b_1 - b_2$
4) $\frac{2A}{b_1 + b_2}$

64 The volume of a trapezoidal prism can be found using the formula $V = \frac{1}{2}a(b + c)h$. Which equation is correctly solved for *b*?

1) $b = \frac{V}{2ah} + c$
2) $b = \frac{V}{2ah} - c$
3) $b = \frac{2V}{ah} + c$
4) $b = \frac{2V}{ah} - c$

65 The amount of energy, *Q*, in joules, needed to raise the temperature of *m* grams of a substance is given by the formula $Q = mC(T_f - T_i)$, where *C* is the specific heat capacity of the substance. If its initial temperature is T_i, an equation to find its final temperature, T_f, is

1) $T_f = \frac{Q}{mC} - T_i$
2) $T_f = \frac{Q}{mC} + T_i$
3) $T_f = \frac{T_i + Q}{mC}$
4) $T_f = \frac{Q - mC}{T_i}$

66 The formula for blood flow rate is given by $F = \frac{p_1 - p_2}{r}$, where *F* is the flow rate, p_1 the initial pressure, p_2 the final pressure, and *r* the resistance created by blood vessel size. Which formula can *not* be derived from the given formula?

1) $p_1 = Fr + p_2$
2) $p_2 = p_1 - Fr$
3) $r = F(p_2 - p_1)$
4) $r = \frac{p_1 - p_2}{F}$

67 The formula for electrical power, *P*, is $P = I^2R$, where *I* is current and *R* is resistance. The formula for *I* in terms of *P* and *R* is

1) $I = \left(\frac{P}{R}\right)^2$
2) $I = \sqrt{\frac{P}{R}}$
3) $I = (P - R)^2$
4) $I = \sqrt{P - R}$

68 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) $r = \frac{V}{2\pi}$

69 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) $t = \left(\frac{2d}{a}\right)^2$

70 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) $\frac{1}{3}\sqrt{\frac{V}{\pi h}}$

71 When the equation $\frac{x-1}{2} - \frac{a}{4} = \frac{3a}{4}$ is solved for x in terms of a, the solution is

1) $\frac{3a}{2} + 1$

2) $a + 1$

3) $\frac{4a+1}{2}$

4) $2a + 1$

72 The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.

73 A formula for determining the finite sum, S, of an arithmetic sequence of numbers is $S = \frac{n}{2}(a + b)$, where n is the number of terms, a is the first term, and b is the last term. Express b in terms of a, S, and n.

74 The temperature inside a cooling unit is measured in degrees Celsius, C. Josh wants to find out how cold it is in degrees Fahrenheit, F. Solve the formula $C = \frac{5}{9}(F - 32)$ for F so that Josh can convert Celsius to Fahrenheit.

75 The formula for converting degrees Fahrenheit (F) to degrees Kelvin (K) is:

$$K = \frac{5}{9}(F + 459.67)$$

Solve for F, in terms of K.

76 The formula $a = \frac{v_f - v_i}{t}$ is used to calculate acceleration as the change in velocity over the period of time. Solve the formula for the final velocity, v_f, in terms of initial velocity, v_i, acceleration, a, and time, t.

77 The formula $d = t\left(\frac{v_i + v_f}{2}\right)$ is used to calculate the distance, *d*, covered by an object in a given period of time, *t*. Solve the formula for v_f, the final velocity, in terms of *d*, *t*, and v_i, the initial velocity.

78 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for *h* in terms of *V*, *r*, and π.

79 Using the formula for the volume of a cone, express *r* in terms of *V*, *h*, and π.

80 The formula $F_g = \frac{GM_1M_2}{r^2}$ calculates the gravitational force between two objects where *G* is the gravitational constant, M_1 is the mass of one object, M_2 is the mass of the other object, and *r* is the distance between them. Solve for the positive value of *r* in terms of F_g, *G*, M_1, and M_2.

81 Solve the equation below for *x* in terms of *a*.

$$4(ax + 3) - 3ax = 25 + 3a$$

82 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.

83 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.

RATE

N.Q.A.1: CONVERSIONS

84 The following conversion was done correctly:

$$\frac{3\text{ miles}}{1\text{ hour}} \bullet \frac{1\text{ hour}}{60\text{ minutes}} \bullet \frac{5280\text{ feet}}{1\text{ mile}} \bullet \frac{12\text{ inches}}{1\text{ foot}}$$

What were the final units for this conversion?

1) minutes per foot
2) minutes per inch
3) feet per minute
4) inches per minute

85 Morgan read that a snail moves about 72 feet per day. He performs the calculation $\frac{72\text{ feet}}{1\text{ day}} \bullet \frac{1\text{ day}}{24\text{ hours}} \bullet \frac{1\text{ hour}}{60\text{ minutes}} \bullet \frac{12\text{ inches}}{1\text{ foot}}$ to convert this rate to different units. What are the units for the converted rate?

1) hours/inch
2) minutes/inch
3) inches/hour
4) inches/minute

86 It takes Tim 4.5 hours to run 50 kilometers. Which expression will allow him to change this rate to minutes per mile?

1) $\frac{4.5\text{ hr}}{50\text{ km}} \bullet \frac{1.609\text{ km}}{1\text{ mi}} \bullet \frac{60\text{ min}}{1\text{ hr}}$
2) $\frac{50\text{ km}}{4.50\text{ hr}} \bullet \frac{1\text{ mi}}{1.609\text{ km}} \bullet \frac{60\text{ min}}{1\text{ hr}}$
3) $\frac{50\text{ km}}{4.50\text{ hr}} \bullet \frac{1\text{ mi}}{1.609\text{ km}} \bullet \frac{1\text{ hr}}{60\text{ min}}$
4) $\frac{4.5\text{ hr}}{50\text{ km}} \bullet \frac{1\text{ mi}}{1.609\text{ km}} \bullet \frac{60\text{ min}}{1\text{ hr}}$

87 Joe compared gas prices in England and New York State one day. In England, gas sold for 1.35 euros per liter, and one dollar equaled 0.622 euros. A correct way to figure out this cost, in dollars per gallon, is

1) $\frac{1.35 \text{ euros}}{1 \text{ L}} \bullet \frac{1 \text{ L}}{0.264 \text{ gal}} \bullet \frac{\$1.00}{0.622 \text{ euros}}$

2) $\frac{1.35 \text{ euros}}{1 \text{ L}} \bullet \frac{\$1.00}{0.622 \text{ euros}} \bullet \frac{0.264 \text{ gal}}{1 \text{ L}}$

3) $\frac{1.35 \text{ euros}}{1 \text{ L}} \bullet \frac{1 \text{ L}}{0.264 \text{ gal}} \bullet \frac{0.622 \text{ euros}}{\$1.00}$

4) $\frac{1.35 \text{ euros}}{1 \text{ L}} \bullet \frac{0.622 \text{ euros}}{\$1.00} \bullet \frac{0.264 \text{ gal}}{1 \text{ L}}$

88 A swimmer set a world record in the women's 1500-meter freestyle, finishing the race in 15.42 minutes. If 1 meter is approximately 3.281 feet, which set of calculations could be used to convert her speed to miles per hour?

1) $\frac{1500 \text{ meters}}{15.42 \text{ min}} \bullet \frac{60 \text{ min}}{1 \text{ hour}} \bullet \frac{1 \text{ meter}}{3.281 \text{ feet}} \bullet \frac{1 \text{ mile}}{5280 \text{ feet}}$

2) $\frac{1500 \text{ meters}}{15.42 \text{ min}} \bullet \frac{60 \text{ min}}{1 \text{ hour}} \bullet \frac{3.281 \text{ feet}}{1 \text{ meter}} \bullet \frac{1 \text{ mile}}{5280 \text{ feet}}$

3) $\frac{1500 \text{ meters}}{15.42 \text{ min}} \bullet \frac{3.281 \text{ feet}}{1 \text{ meter}} \bullet \frac{1 \text{ mile}}{5280 \text{ feet}}$

4) $\frac{1500 \text{ meters}}{15.42 \text{ min}} \bullet \frac{60 \text{ min}}{1 \text{ hour}} \bullet \frac{1 \text{ mile}}{5280 \text{ feet}}$

89 A construction worker needs to move 120 ft^3 of dirt by using a wheelbarrow. One wheelbarrow load holds 8 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

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

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

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

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

90 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) $\frac{60 \text{ min}}{1 \text{ hr}}$

91 A company ships an average of 30,000 items each week. The approximate number of items shipped each minute is calculated using the conversion

1) $\frac{30,000 \text{ items}}{1 \text{ week}} \bullet \frac{7 \text{ days}}{1 \text{ week}} \bullet \frac{60 \text{ min}}{1 \text{ hr}} \bullet \frac{1 \text{ day}}{24 \text{ hrs}}$

2) $\frac{30,000 \text{ items}}{1 \text{ week}} \bullet \frac{1 \text{ week}}{7 \text{ days}} \bullet \frac{1 \text{ day}}{24 \text{ hrs}} \bullet \frac{1 \text{ hr}}{60 \text{ min}}$

3) $\frac{1 \text{ week}}{30,000 \text{ items}} \bullet \frac{1 \text{ week}}{7 \text{ days}} \bullet \frac{1 \text{ day}}{24 \text{ hrs}} \bullet \frac{1 \text{ hr}}{60 \text{ min}}$

4) $\frac{1 \text{ week}}{30,000 \text{ items}} \bullet \frac{7 \text{ days}}{1 \text{ week}} \bullet \frac{24 \text{ hrs}}{1 \text{ day}} \bullet \frac{60 \text{ min}}{1 \text{ hr}}$

92 When the temperature is 59°F, the speed of sound at sea level is 1225 kilometers per hour. Which process could be used to convert this speed into feet per second?

1) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{0.62 \text{ mi}}{1 \text{ km}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ mi}}{5280 \text{ ft}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

2) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{0.62 \text{ mi}}{1 \text{ km}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

3) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{1 \text{ km}}{0.62 \text{ mi}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

4) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{0.62 \text{ mi}}{1 \text{ km}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{60 \text{ min}}{1 \text{ hr}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

93 Olivia entered a baking contest. As part of the contest, she needs to demonstrate how to measure a gallon of milk if she only has a teaspoon measure. She converts the measurement using the ratios below:

$$\frac{4 \text{ quarts}}{1 \text{ gallon}} \bullet \frac{2 \text{ pints}}{1 \text{ quart}} \bullet \frac{2 \text{ cups}}{1 \text{ pint}} \bullet \frac{\frac{1}{4} \text{ cup}}{4 \text{ tablespoons}} \bullet \frac{3 \text{ teaspoons}}{1 \text{ tablespoon}}$$

Which ratio is *incorrectly* written in Olivia's conversion?

1) $\frac{4 \text{ quarts}}{1 \text{ gallon}}$

2) $\frac{2 \text{ pints}}{1 \text{ quart}}$

3) $\frac{\frac{1}{4} \text{ cup}}{4 \text{ tablespoons}}$

4) $\frac{3 \text{ teaspoons}}{1 \text{ tablespoon}}$

94 Sarah travels on her bicycle at a speed of 22.7 miles per hour. What is Sarah's approximate speed, in kilometers per minute?

1) 0.2
2) 0.6
3) 36.5
4) 36.6

95 Bamboo plants can grow 91 centimeters per day. What is the approximate growth of the plant, in inches per hour?

1) 1.49
2) 3.79
3) 9.63
4) 35.83

96 Dan took 12.5 seconds to run the 100-meter dash. He calculated the time to be approximately

1) 0.2083 minute
2) 750 minutes
3) 0.2083 hour
4) 0.52083 hour

97 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?
1) 20° Celsius
2) 20° Fahrenheit
3) 154° Celsius
4) 154° Fahrenheit

98 The Utica Boilermaker is a 15-kilometer road race. Sara is signed up to run this race and has done the following training runs:
I. 10 miles
II. 44,880 feet
III. 15,560 yards
Which run(s) are at least 15 kilometers?
1) I, only
2) II, only
3) I and III
4) II and III

99 A news report suggested that an adult should drink a minimum of 4 pints of water per day. Based on this report, determine the minimum amount of water an adult should drink, in fluid ounces, per week.

100 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons. Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

101 A two-inch-long grasshopper can jump a horizontal distance of 40 inches. An athlete, who is five feet nine, wants to cover a distance of one mile by jumping. If this person could jump at the same ratio of body-length to jump-length as the grasshopper, determine, to the *nearest jump*, how many jumps it would take this athlete to jump one mile.

N.Q.A.2: USING RATE

102 Patricia is trying to compare the average rainfall of New York to that of Arizona. A comparison between these two states for the months of July through September would be best measured in
1) feet per hour
2) inches per hour
3) inches per month
4) feet per month

103 The owner of a landscaping business wants to know how much time, on average, his workers spend mowing one lawn. Which is the most appropriate rate with which to calculate an answer to his question?
1) lawns per employee
2) lawns per day
3) employee per lawns
4) hours per lawn

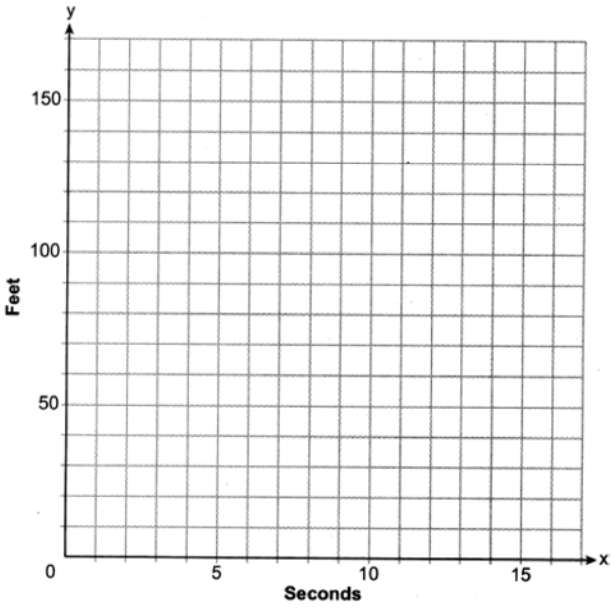
A.CED.A.2: SPEED

104 The distance traveled is equal to the rate of speed multiplied by the time traveled. If the distance is measured in feet and the time is measured in minutes, then the rate of speed is expressed in which units? Explain how you arrived at your answer.

105 Loretta and her family are going on vacation. Their destination is 610 miles from their home. Loretta is going to share some of the driving with her dad. Her average speed while driving is 55 mph and her dad's average speed while driving is 65 mph. The plan is for Loretta to drive for the first 4 hours of the trip and her dad to drive for the remainder of the trip. Determine the number of hours it will take her family to reach their destination. After Loretta has been driving for 2 hours, she gets tired and asks her dad to take over. Determine, to the *nearest tenth of an hour*, how much time the family will save by having Loretta's dad drive for the remainder of the trip.

106 An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles. Determine the speed of the plane, at cruising altitude, in miles per minute. Write an equation to represent the number of miles the plane has flown, *y*, during *x* minutes at cruising altitude, only. Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

107 Aidan and his sister Ella are having a race. Aidan runs at a rate of 10 feet per second. Ella runs at a rate of 6 feet per second. Since Ella is younger, Aidan is letting her begin 30 feet ahead of the starting line. Let *y* represent the distance from the starting line and *x* represent the time elapsed, in seconds. Write an equation to model the distance Aidan traveled. Write an equation to model the distance Ella traveled. On the set of axes below, graph your equations.



Exactly how many seconds does it take Aidan to catch up to Ella? Justify your answer.

F.IF.B.6: RATE OF CHANGE

108 The table below shows the cost of mailing a postcard in different years. During which time interval did the cost increase at the greatest average rate?

Year	1898	1971	1985	2006	2012
Cost (¢)	1	6	14	24	35

1) 1898-1971
2) 1971-1985
3) 1985-2006
4) 2006-2012

109 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

110 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

111 The table below shows the number of reported polio cases in Nigeria from 2006 to 2015.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Cases	1129	285	798	388	21	62	122	53	60	0

What is the average rate of change, to the *nearest hundredth*, of the number of reported polio cases per year in Nigeria from 2006 to 2013?

1) –0.01
2) –125.44
3) –134.50
4) –153.71

112 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

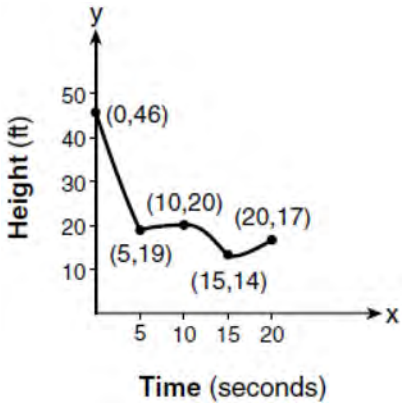
113 The table below shows the year and the number of households in a building that had high-speed broadband internet access.

Number of Households	11	16	23	33	42	47
Year	2002	2003	2004	2005	2006	2007

For which interval of time was the average rate of change the *smallest*?

1) 2002 - 2004
2) 2003 - 2005
3) 2004 - 2006
4) 2005 - 2007

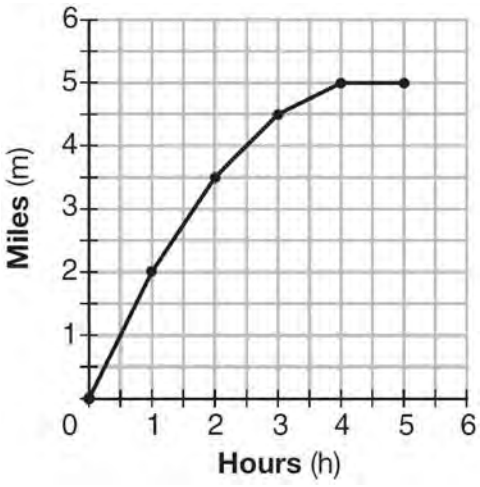
114 The graph below models the height of a remote-control helicopter over 20 seconds during flight.



Over which interval does the helicopter have the *slowest* average rate of change?

1) 0 to 5 seconds
2) 5 to 10 seconds
3) 10 to 15 seconds
4) 15 to 20 seconds

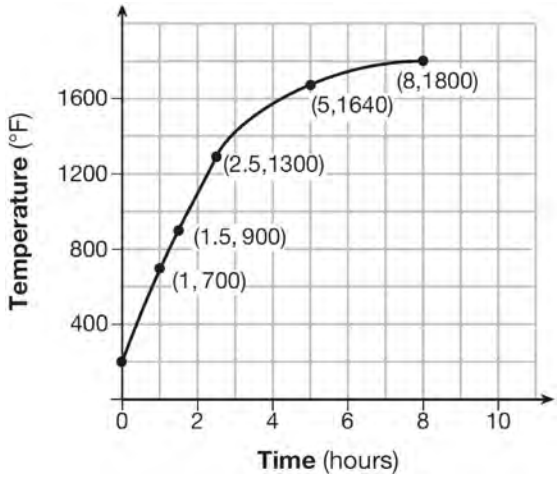
115 The graph below shows the distance in miles, *m*, hiked from a camp in *h* hours.



Which hourly interval had the greatest rate of change?

1) hour 0 to hour 1
2) hour 1 to hour 2
3) hour 2 to hour 3
4) hour 3 to hour 4

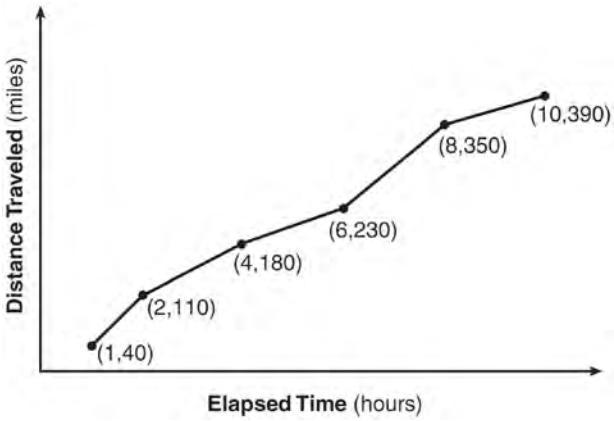
116 Firing a piece of pottery in a kiln takes place at different temperatures for different amounts of time. The graph below shows the temperatures in a kiln while firing a piece of pottery after the kiln is preheated to 200ºF.



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

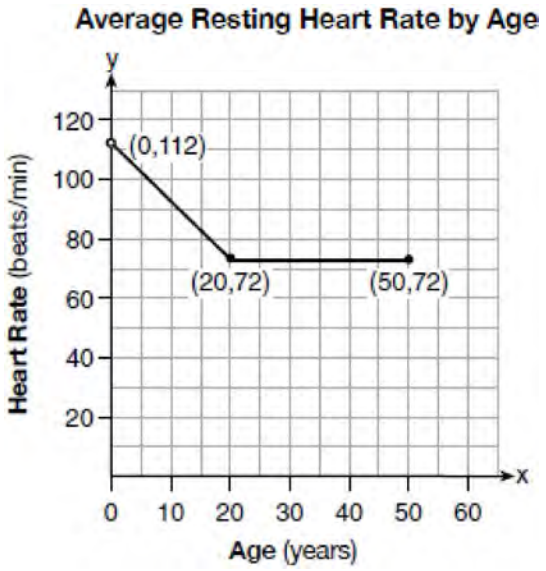
117 The Jamison family kept a log of the distance they traveled during a trip, as represented by the graph below.



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

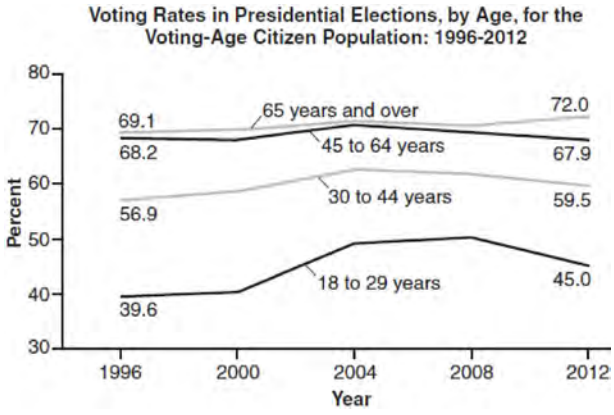
118 A graph of average resting heart rates is shown below. The average resting heart rate for adults is 72 beats per minute, but doctors consider resting rates from 60-100 beats per minute within normal range.



Which statement about average resting heart rates is *not* supported by the graph?

1) A 10-year-old has the same average resting heart rate as a 20-year-old.
2) A 20-year-old has the same average resting heart rate as a 30-year-old.
3) A 40-year-old may have the same average resting heart rate for ten years.
4) The average resting heart rate for teenagers steadily decreases.

119 Voting rates in presidential elections from 1996-2012 are modeled below.



Which statement does *not* correctly interpret voting rates by age based on the given graph?

1) For citizens 18-29 years of age, the rate of change in voting rate was greatest between years 2000-2004.
2) From 1996-2012, the average rate of change was positive for only two age groups.
3) About 70% of people 45 and older voted in the 2004 election.
4) The voting rates of eligible age groups lies between 35 and 75 percent during presidential elections every 4 years from 1996-2012.

120 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?

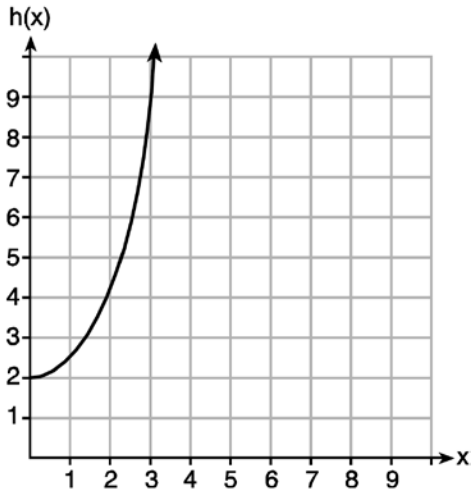
1) 12
2) 20
3) 60
4) 80

121 The value of Tony's investment was $1140 on January 1st. On this date three years later, his investment was worth $1824. The average rate of change for this investment was $19 per
1) day
2) month
3) quarter
4) year

122 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 $0 \le x \le 3$ 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)

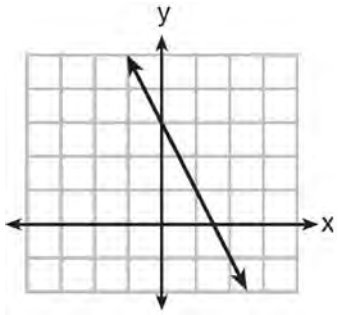
123 Which function has a constant rate of change equal to –3?

1)

x	y
0	2
1	5
2	8
3	11

2) $\{(1,5),(2,2),(3,-5),(4,4)\}$

3)



4) $2y = -6x + 10$

124 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

125 The table below represents the height of a bird above the ground during flight, with $P(t)$ representing height in feet and t representing time in seconds.

t	P(t)
0	6.71
3	6.26
4	6
9	3.41

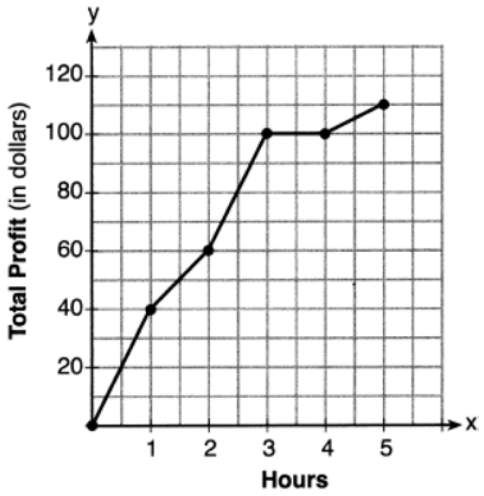
Calculate the average rate of change from 3 to 9 seconds, in feet per second.

126 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

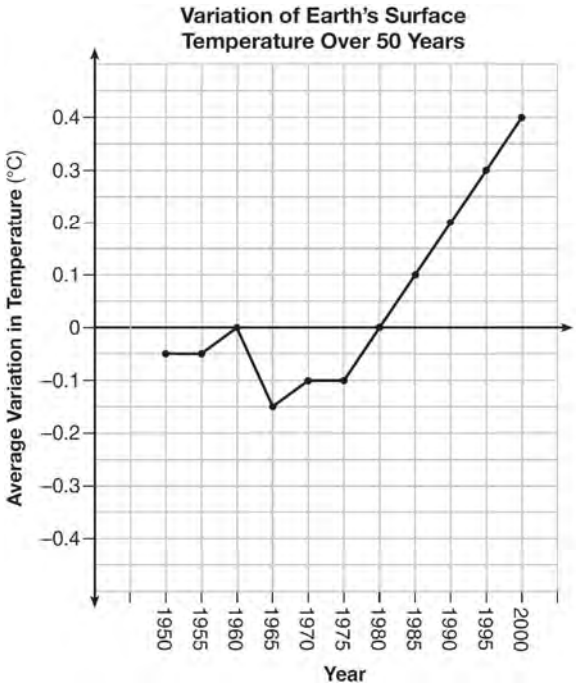
Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greater rate of snowfall, in inches per hour? Justify your answer.

127 The total profit earned at a garage sale during the first five hours is modeled by the graph shown below.



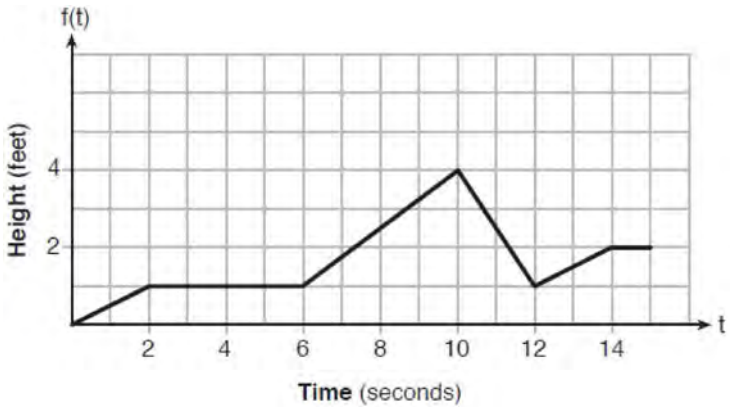
Determine the average rate of change, in dollars per hour, over the interval $1 \leq x \leq 4$.

128 The graph below shows the variation in the average temperature of Earth's surface from 1950-2000, according to one source.



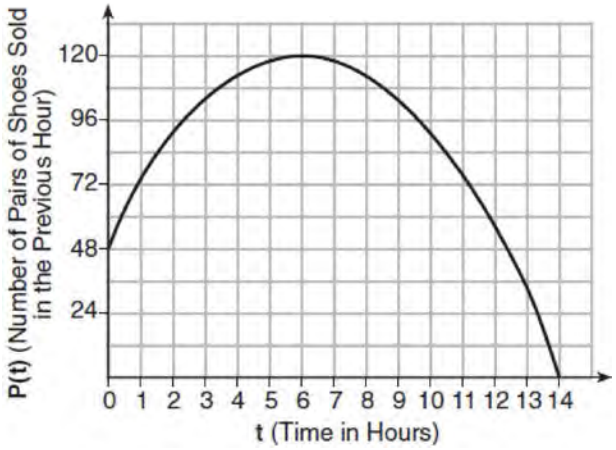
During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

129 The graph of $f(t)$ models the height, in feet, that a bee is flying above the ground with respect to the time it traveled in t seconds.



State all time intervals when the bee's rate of change is zero feet per second. Explain your reasoning.

130 A manager wanted to analyze the online shoe sales for his business. He collected data for the number of pairs of shoes sold each hour over a 14-hour time period. He created a graph to model the data, as shown below.

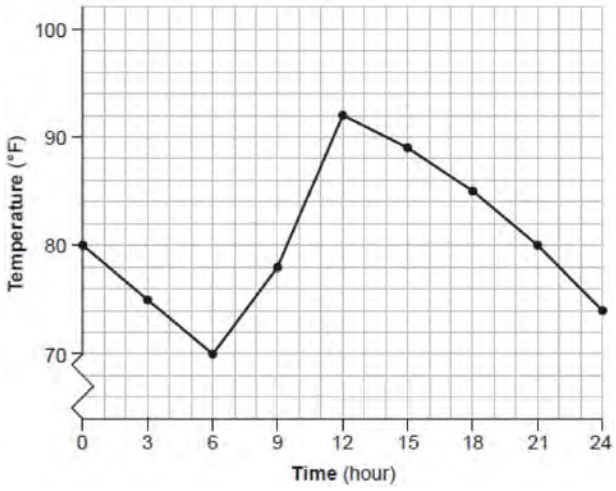


The manager believes the set of integers would be the most appropriate domain for this model. Explain why he is *incorrect*. State the entire interval for which the number of pairs of shoes sold is increasing. Determine the average rate of change between the sixth and fourteenth hours, and explain what it means in the context of the problem.

131 Jean recorded temperatures over a 24-hour period one day in August in Syracuse, NY. Her results are shown in the table below.

Time (hour)	0	3	6	9	12	15	18	21	24
Temperature (°F)	80	75	70	78	92	89	85	80	74

Her data are modeled on the graph below.



State the entire interval over which the temperature is increasing. State the three-hour interval that has the greatest rate of change in temperature. State the average rate of change from hour 12 to hour 24. Explain what this means in the context of the problem.

132 A population of rabbits in a lab, $p(x)$, can be modeled by the function $p(x) = 20(1.014)^x$, where x represents the number of days since the population was first counted. Explain what 20 and 1.014 represent in the context of the problem. Determine, to the *nearest tenth*, the average rate of change from day 50 to day 100.

LINEAR EQUATIONS

F.BF.A.1: MODELING LINEAR FUNCTIONS

133 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?

1) $P(c) = .25c - 9.96$
2) $P(c) = .50c - 9.71$
3) $P(c) = .50c - 10.21$
4) $P(c) = .75c - 9.96$

134 A high school club is researching a tour package offered by the Island Kayak Company. The company charges $35 per person and $245 for the tour guide. Which function represents the total cost, $C(x)$, of this kayak tour package for x club members?

1) $C(x) = 35x$
2) $C(x) = 35x + 245$
3) $C(x) = 35(x + 245)$
4) $C(x) = 35 + (x + 245)$

135 At Benny's Cafe, a mixed-greens salad costs $5.75. Additional toppings can be added for $0.75 each. Which function could be used to determine the cost, $c(s)$, in dollars, of a salad with s additional toppings?

1) $c(s) = 5.75s + 0.75$
2) $c(s) = 0.75s + 5.75$
3) $c(s) = 5.00s + 0.75$
4) $c(s) = 0.75s + 5.00$

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

137 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.

138 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.

139 Jim is a furniture salesman. His weekly pay is $300 plus 3.5% of his total sales for the week. Jim sells x dollars' worth of furniture during the week. Write a function, $p(x)$, which can be used to determine his pay for the week. Use this function to determine Jim's pay to the *nearest cent* for a week when his sales total is $8250.

140 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.

F.LE.A.2: MODELING LINEAR FUNCTIONS

141 Which chart could represent the function $f(x) = -2x + 6$?

1)

x	f(x)
0	6
2	10
4	14
6	18

2)

x	f(x)
0	4
2	6
4	8
6	10

3)

x	f(x)
0	8
2	10
4	12
6	14

4)

x	f(x)
0	6
2	2
4	–2
6	–6

142 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 nth day.

143 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data. Explain what the slope and y-intercept of $f(x)$ mean in the given context.

F.LE.B.5: MODELING LINEAR FUNCTIONS

144 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
1) car's distance from Albany
2) speed of the car
3) distance between Buffalo and Albany
4) number of hours driving

145 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

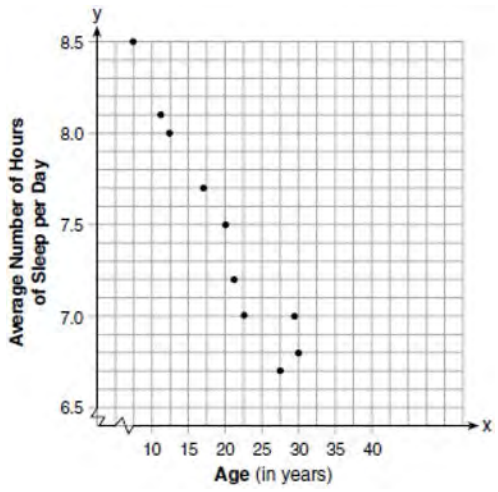
146 The owner of a small computer repair business has one employee, who is paid an hourly rate of $22. The owner estimates his weekly profit using the function $P(x) = 8600 - 22x$. In this function, x represents the number of
1) computers repaired per week
2) hours worked per week
3) customers served per week
4) days worked per week

147 The amount Mike gets paid weekly can be represented by the expression $2.50a + 290$, where a is the number of cell phone accessories he sells that week. What is the constant term in this expression and what does it represent?
1) $2.50a$, the amount he is guaranteed to be paid each week
2) $2.50a$, the amount he earns when he sells a accessories
3) 290, the amount he is guaranteed to be paid each week
4) 290, the amount he earns when he sells a accessories

148 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.

149 A student plotted the data from a sleep study as shown in the graph below.



The student used the equation of the line $y = -0.09x + 9.24$ to model the data. What does the rate of change represent in terms of these data?

1) The average number of hours of sleep per day increases 0.09 hour per year of age.
2) The average number of hours of sleep per day decreases 0.09 hour per year of age.
3) The average number of hours of sleep per day increases 9.24 hours per year of age.
4) The average number of hours of sleep per day decreases 9.24 hours per year of age.

150 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.

151 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.

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

152 The Speedy Jet Ski Rental Company charges an insurance fee and an hourly rental rate. The total cost is modeled by the function $R(x) = 30 + 40x$. Based on this model, which statements are true?

I. $R(x)$ represents the total cost.
II. x is the number of hours rented.
III. \$40 is the insurance fee.
IV. \$30 is the hourly rental rate.

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

153 Each day, a local dog shelter spends an average of \$2.40 on food per dog. The manager estimates the shelter's daily expenses, assuming there is at least one dog in the shelter, using the function $E(x) = 30 + 2.40x$. Which statements regarding the function $E(x)$ are correct?

I. x represents the number of dogs at the shelter per day.
II. x represents the number of volunteers at the shelter per day.
III. 30 represents the shelter's total expenses per day.
IV. 30 represents the shelter's nonfood expenses per day.

1) I and III
2) I and IV
3) II and III
4) II and IV

154 The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership. State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

155 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m. If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

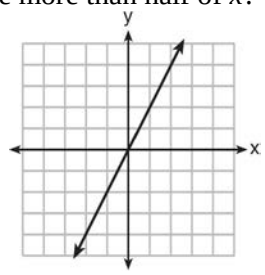
156 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, t, the balloon is in the air.

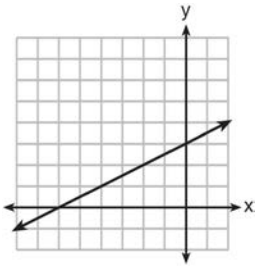
Time (min)	2	5	7	10	12
Height (ft)	64	168	222	318	369

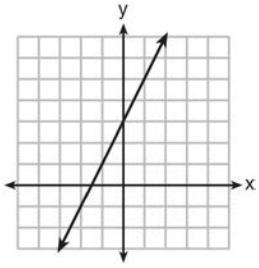
The function $h(t) = 30.5t + 8.7$ can be used to model this data table. Explain the meaning of the slope in the context of the problem. Explain the meaning of the y-intercept in the context of the problem.

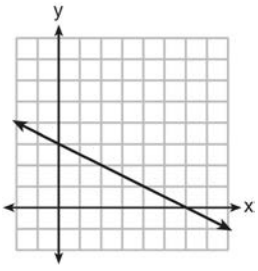
A.CED.A.2: GRAPHING LINEAR FUNCTIONS

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

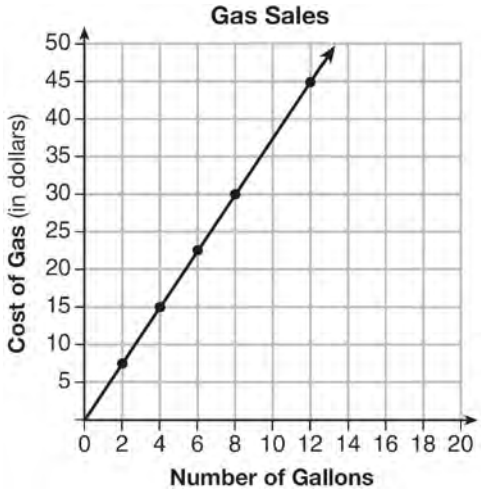
1) 

2) 

3) 

4) 

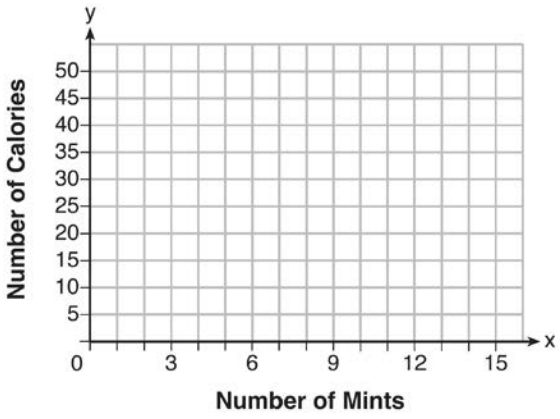
158 The graph below was created by an employee at a gas station.



Which statement can be justified by using the graph?

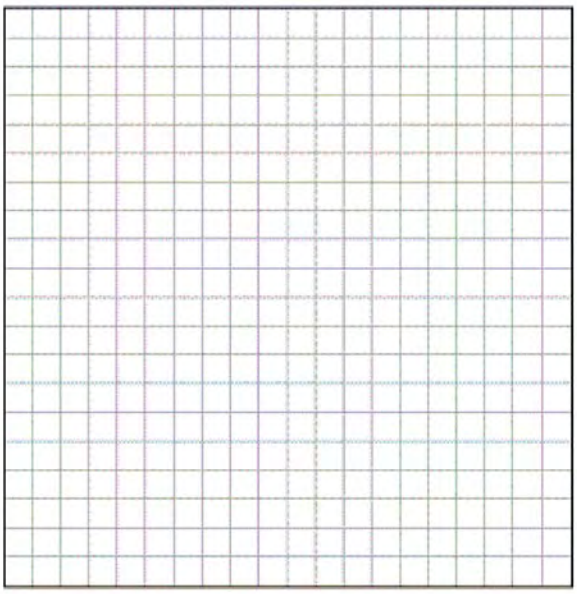
1) If 10 gallons of gas was purchased, $35 was paid.
2) For every gallon of gas purchased, $3.75 was paid.
3) For every 2 gallons of gas purchased, $5.00 was paid.
4) If zero gallons of gas were purchased, zero miles were driven.

159 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.

160 Zeke and six of his friends are going to a baseball game. Their combined money totals \$28.50. At the game, hot dogs cost \$1.25 each, hamburgers cost \$2.50 each, and sodas cost \$0.50 each. Each person buys one soda. They spend all \$28.50 on food and soda. Write an equation that can determine the number of hot dogs, x, and hamburgers, y, Zeke and his friends can buy. Graph your equation on the grid below.



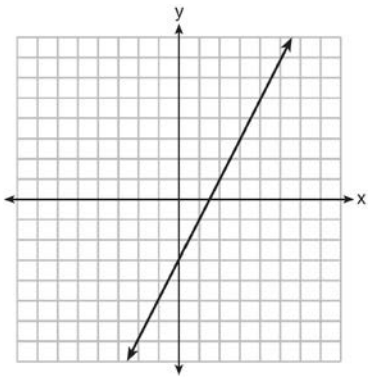
Determine how many different combinations, including those combinations containing zero, of hot dogs and hamburgers Zeke and his friends can buy, spending all \$28.50. Explain your answer.

F.IF.B.4: GRAPHING LINEAR FUNCTIONS

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

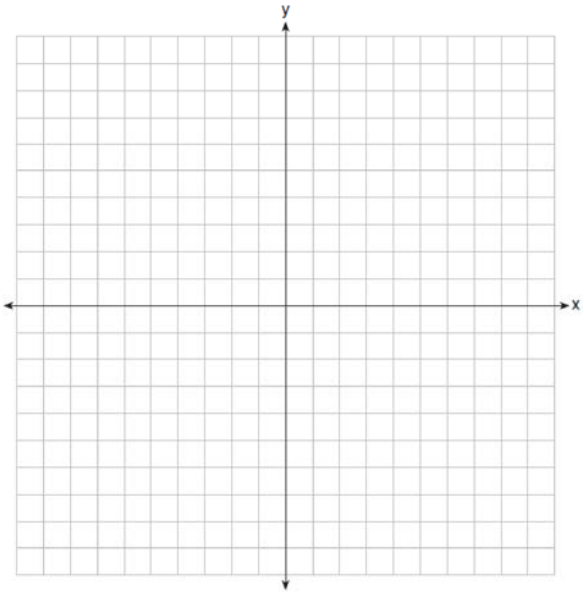
1) 10
2) $\frac{4}{5}$
3) $-\frac{4}{5}$
4) -8

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



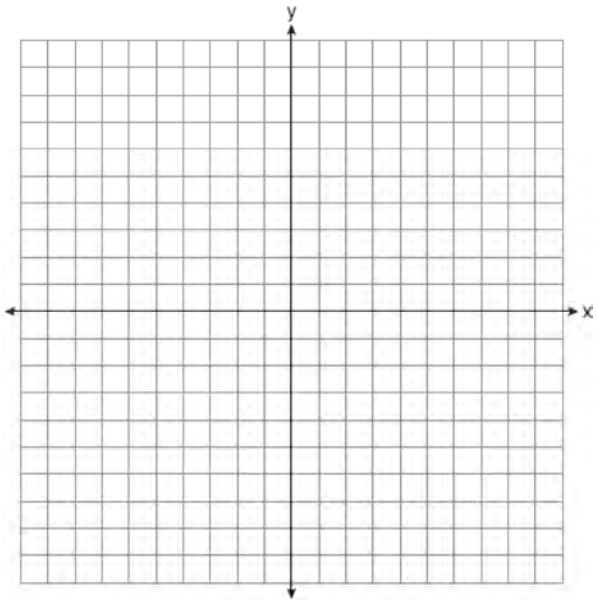
1) $y = \frac{12 - 6x}{4}$
2) $27 + 3y = 6x$
3) $6y + x = 18$
4) $y + 3 = 6x$

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



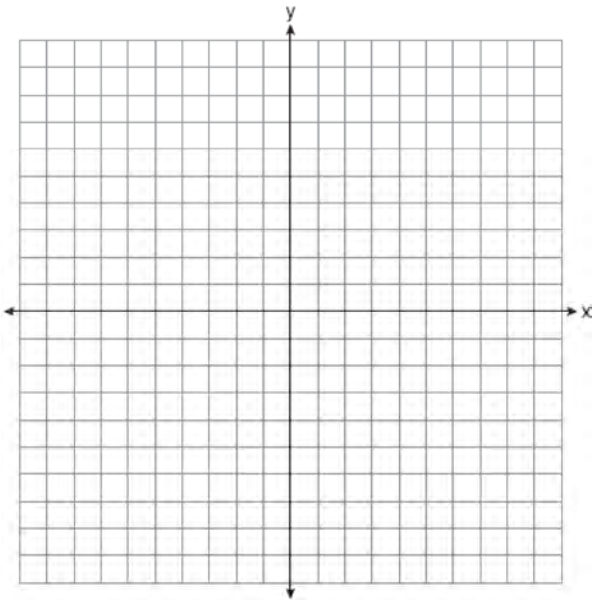
Is the point $(3,2)$ a solution to the equation? Explain your answer based on the graph drawn.

164 On the set of axes below, graph the line whose equation is $2y = -3x - 2$.



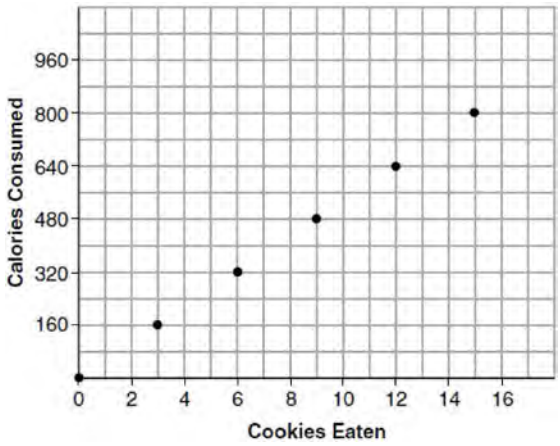
This linear equation contains the point $(2,k)$. State the value of *k*.

165 On the set of axes below, graph the equation $3y + 2x = 15$.



Explain why $(-6, 9)$ is a solution to the equation.

166 Samantha purchases a package of sugar cookies. The nutrition label states that each serving size of 3 cookies contains 160 Calories. Samantha creates the graph below showing the number of cookies eaten and the number of Calories consumed.



Explain why it is appropriate for Samantha to draw a line through the points on the graph.

A.REI.D.10: WRITING LINEAR EQUATIONS

167 What is the equation of the line that passes through the point $(6, -3)$ and has a slope of $-\frac{4}{3}$?

1) $3y = -4x + 15$
2) $3y = -4x + 6$
3) $-3y = 4x + 15$
4) $-3y = 4x + 6$

168 What is an equation of the line that passes through the points $(2, 7)$ and $(-1, 3)$?

1) $y - 2 = \frac{3}{4}(x - 7)$
2) $y - 2 = \frac{4}{3}(x - 7)$
3) $y - 7 = \frac{3}{4}(x - 2)$
4) $y - 7 = \frac{4}{3}(x - 2)$

169 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) $(2, 9)$

170 How many of the equations listed below represent the line passing through the points $(2,3)$ and $(4,-7)$?

$5x + y = 13$

$y + 7 = -5(x - 4)$

$y = -5x + 13$

$y - 7 = 5(x - 4)$

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

171 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

INEQUALITIES

A.REI.B.3: SOLVING LINEAR INEQUALITIES

172 What is the solution to $2h + 8 > 3h - 6$?

1) $h < 14$
2) $h < \frac{14}{5}$
3) $h > 14$
4) $h > \frac{14}{5}$

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

1) $x \le 3$
2) $x \ge 3$
3) $x \le -11$
4) $x \ge 11$

174 The solution to $4p + 2 < 2(p + 5)$ is

1) $p > -6$
2) $p < -6$
3) $p > 4$
4) $p < 4$

175 What is the solution to $-3(x - 6) > 2x - 2$?

1) $x > 4$
2) $x < 4$
3) $x > -16$
4) $x < -16$

176 What is the solution to the inequality $2x - 7 > 2.5x + 3$?

1) $x > -5$
2) $x < -5$
3) $x > -20$
4) $x < -20$

177 What is the solution to $\frac{3}{2}b + 5 < 17$?

1) $b < 8$
2) $b > 8$
3) $b < 18$
4) $b > 18$

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

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

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

1) $x \leq -\frac{18}{5}$
2) $x \geq -\frac{18}{5}$
3) $x \leq \frac{54}{5}$
4) $x \geq \frac{54}{5}$

180 What is the solution to the inequality below?

$$4-\frac{2}{5}x \geq \frac{1}{3}x+15$$

1) $x \leq 11$
2) $x \geq 11$
3) $x \leq -15$
4) $x \geq -15$

181 When $3a+7b > 2a-8b$ is solved for a, the result is

1) $a > -b$
2) $a < -b$
3) $a < -15b$
4) $a > -15b$

182 Solve the inequality below:

$$1.8-0.4y \geq 2.2-2y$$

183 Solve algebraically for x:
$3600+1.02x < 2000+1.04x$

184 Solve algebraically for y: $4(y-3) \leq 4(2y+1)$

185 Solve the inequality $-\frac{2}{3}x+6 > -12$ algebraically for x.

186 Solve $\frac{3}{5}x+\frac{1}{3} < \frac{4}{5}x-\frac{1}{3}$ for x.

187 Given that $a > b$, solve for x in terms of a and b:

$$b(x-3) \geq ax+7b$$

A.REI.B.3: INTERPRETING SOLUTIONS

188 Given $7x+2 \geq 58$, which number is *not* in the solution set?

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

189 Which value would be a solution for x in the inequality $47-4x < 7$?

1) -13
2) -10
3) 10
4) 11

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

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

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

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

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

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

194 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.

A.CED.A.1: MODELING LINEAR INEQUALITIES

195 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) $0.75(7) + 1.25b \leq 22$

196 Ashley only has 7 quarters and some dimes in her purse. She needs at least \$3.00 to pay for lunch. Which inequality could be used to determine the number of dimes, d, she needs in her purse to be able to pay for lunch?
1) $1.75 + d \geq 3.00$
2) $1.75 + 0.10d \geq 3.00$
3) $1.75 + d \leq 3.00$
4) $1.75 + 0.10d \leq 3.00$

197 An ice cream shop sells ice cream cones, c, and milkshakes, m. Each ice cream cone costs \$1.50 and each milkshake costs \$2.00. Donna has \$19.00 to spend on ice cream cones and milkshakes. If she must buy 5 ice cream cones, which inequality could be used to determine the maximum number of milkshakes she can buy?
1) $1.50(5) + 2.00m \geq 19.00$
2) $1.50(5) + 2.00m \leq 19.00$
3) $1.50c + 2.00(5) \geq 19.00$
4) $1.50c + 2.00(5) \leq 19.00$

198 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

199 Two texting plans are advertised. Plan A has a monthly fee of \$15 with a charge of \$0.08 per text. Plan B has a monthly fee of \$3 with a charge of \$0.12 per text. If t represents the number of text messages in a month, which inequality should be used to show that the cost of Plan A is *less* than the cost of Plan B?
1) $15 + 0.08t < 3 + 0.12t$
2) $15 + 0.08t > 3 + 0.12t$
3) $15t + 0.08 < 3t + 0.12$
4) $15t + 0.08 > 3t + 0.12$

200 The math department needs to buy new textbooks and laptops for the computer science classroom. The textbooks cost $116.00 each, and the laptops cost $439.00 each. If the math department has $6500 to spend and purchases 30 textbooks, how many laptops can they buy?
1) 6
2) 7
3) 11
4) 12

201 Maria orders T-shirts for her volleyball camp. Adult-sized T-shirts cost $6.25 each and youth-sized T-shirts cost $4.50 each. Maria has $550 to purchase both adult-sized and youth-sized T-shirts. If she purchases 45 youth-sized T-shirts, determine algebraically the maximum number of adult-sized T-shirts she can purchase.

202 Sarah wants to buy a snowboard that has a total cost of $580, including tax. She has already saved $135 for it. At the end of each week, she is paid $96 for babysitting and is going to save three-quarters of that for the snowboard. Write an inequality that can be used to determine the minimum number of weeks Sarah needs to babysit to have enough money to purchase the snowboard. Determine and state the minimum number of full weeks Sarah needs to babysit to have enough money to purchase this snowboard.

203 A store sells grapes for $1.99 per pound, strawberries for $2.50 per pound, and pineapples for $2.99 each. Jonathan has $25 to buy fruit. He plans to buy 2 more pounds of strawberries than grapes. He also plans to buy 2 pineapples. If x represents the number of pounds of grapes, write an inequality in one variable that models this scenario. Determine algebraically the maximum number of whole pounds of grapes he can buy.

A.CED.A.3: MODELING LINEAR INEQUALITIES

204 Joy wants to buy strawberries and raspberries to bring to a party. Strawberries cost $1.60 per pound and raspberries cost $1.75 per pound. If she only has $10 to spend on berries, which inequality represents the situation where she buys x pounds of strawberries and y pounds of raspberries?
1) $1.60x + 1.75y \leq 10$
2) $1.60x + 1.75y \geq 10$
3) $1.75x + 1.60y \leq 10$
4) $1.75x + 1.60y \geq 10$

205 Peter has $100 to spend on drinks for his party. Bottles of lemonade cost $2 each, and juice boxes cost $0.50 each. If x is the number of bottles of lemonade and y is the number of juice boxes, which inequality models this situation?
1) $0.50x + 2y \leq 100$
2) $0.50x + 2y \geq 100$
3) $2x + 0.50y \leq 100$
4) $2x + 0.50y \geq 100$

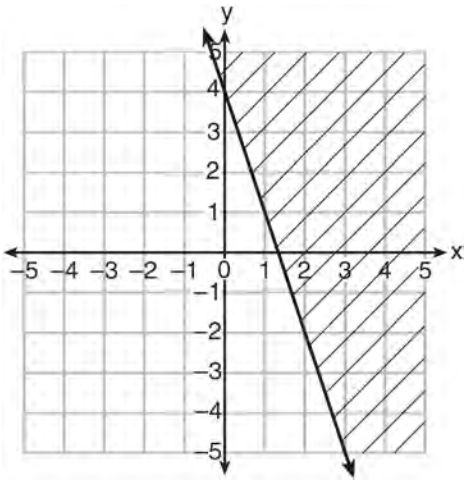
206 David has two jobs. He earns $8 per hour babysitting his neighbor's children and he earns $11 per hour working at the coffee shop. Write an inequality to represent the number of hours, x, babysitting and the number of hours, y, working at the coffee shop that David will need to work to earn a minimum 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.

207 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt. Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered. Determine algebraically and state the minimum number of shirts that must be ordered for it to be cheaper to use Company *A*.

208 The senior class at Hills High School is purchasing sports drinks and bottled water to sell at the school field day. At the local discount store, a case of sports drinks costs $15.79, and a case of bottled water costs $5.69. The senior class has $125 to spend on the drinks. If *x* represents the number of cases of sports drinks and *y* represents the number of cases of bottled water purchased, write an inequality that models this situation. Nine cases of bottled water are purchased for this year's field day. Use your inequality to determine algebraically the maximum number of full cases of sports drinks that can be purchased. Explain your answer.

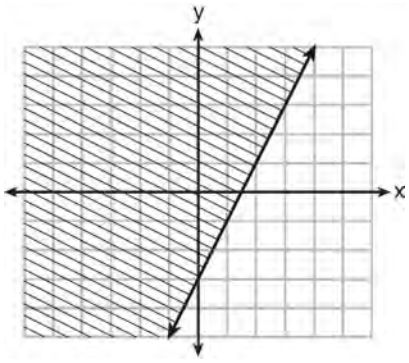
A.REI.D.12: GRAPHING LINEAR INEQUALITIES

209 Which inequality is represented in the graph below?



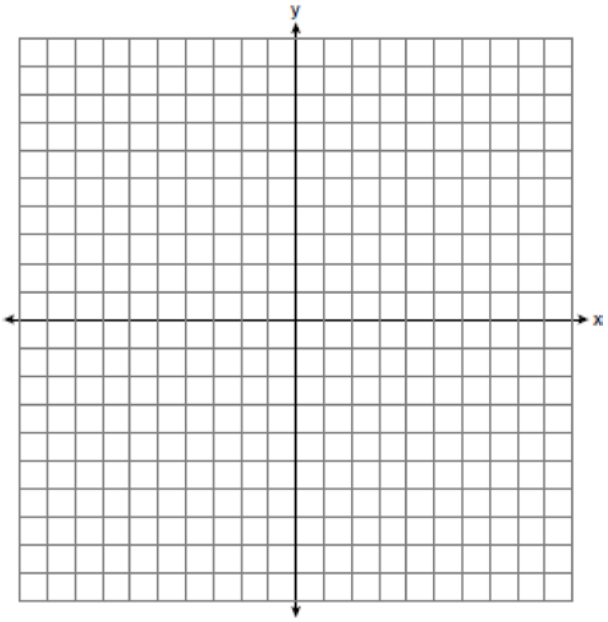
1) $y \geq -3x + 4$
2) $y \leq -3x + 4$
3) $y \geq -4x - 3$
4) $y \leq -4x - 3$

210 Which inequality is represented by the graph below?

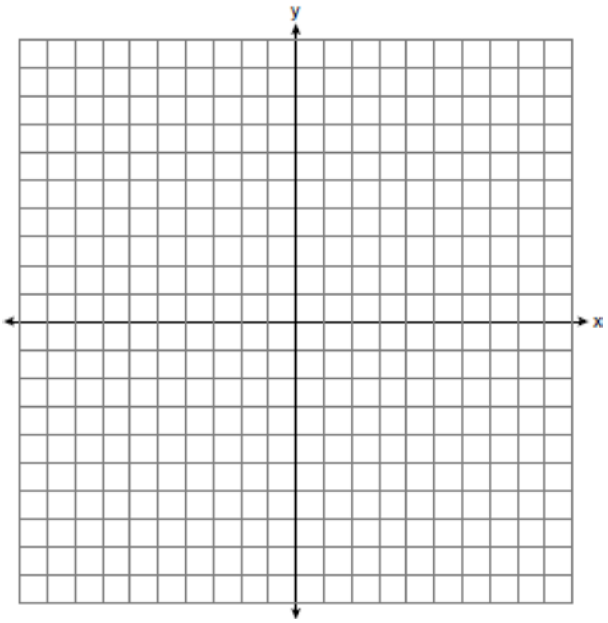


1) $y \leq 2x - 3$
2) $y \geq 2x - 3$
3) $y \leq -3x + 2$
4) $y \geq -3x + 2$

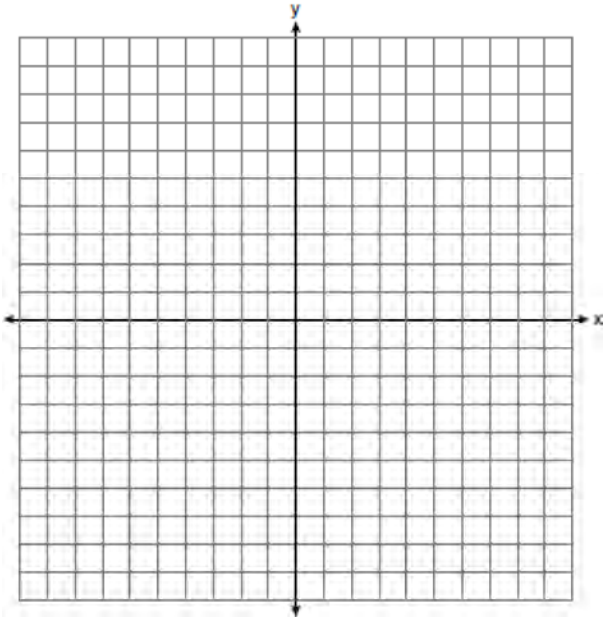
211 Graph the inequality $y > 2x - 5$ on the set of axes below. State the coordinates of a point in its solution.



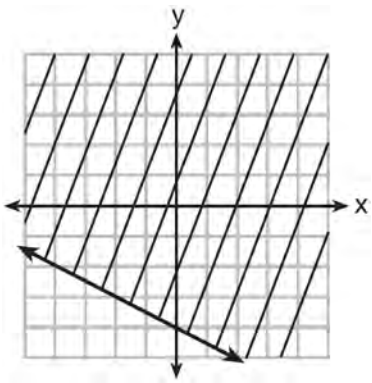
212 On the set of axes below, graph the inequality $2x + y > 1$.



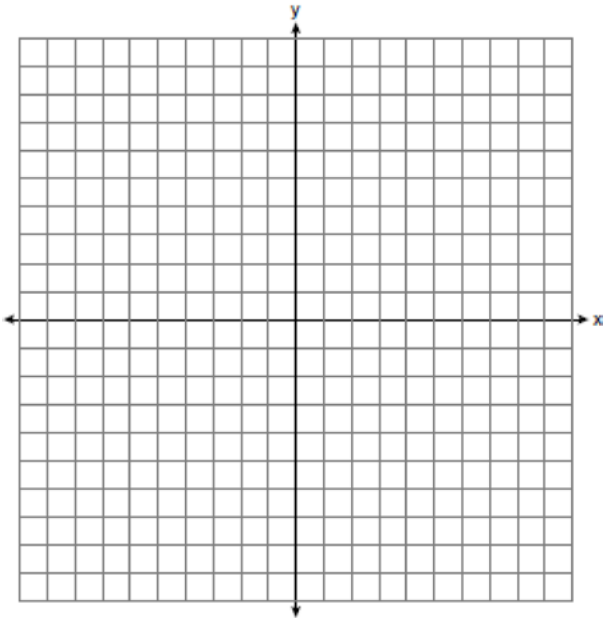
213 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



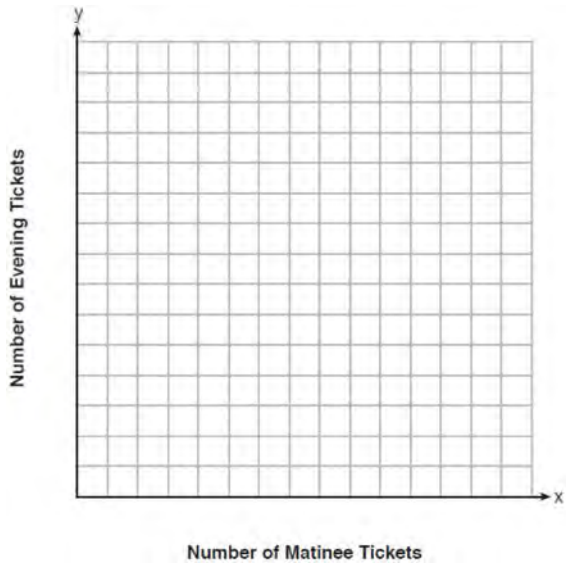
214 Shawn incorrectly graphed the inequality $-x - 2y \geq 8$ as shown below.



Explain Shawn's mistake. Graph the inequality correctly on the set of axes below.



215 Myranda received a movie gift card for $100 to her local theater. Matinee tickets cost $7.50 each and evening tickets cost $12.50 each. If x represents the number of matinee tickets she could purchase, and y represents the number of evening tickets she could purchase, write an inequality that represents all the possible ways Myranda could spend her gift card on movies at the theater. On the set of axes below, graph this inequality.

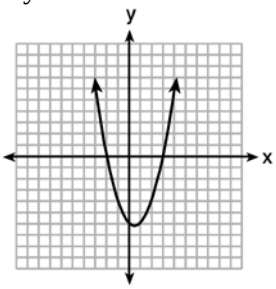


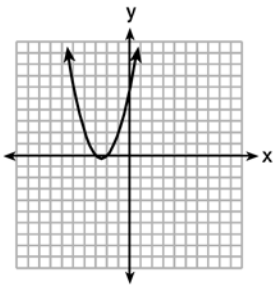
What is the maximum number of matinee tickets Myranda could purchase with her gift card? Explain your answer.

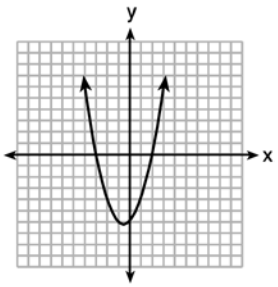
QUADRATICS

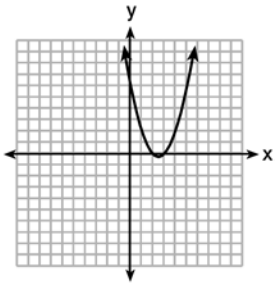
A.REI.B.4: SOLVING QUADRATICS

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

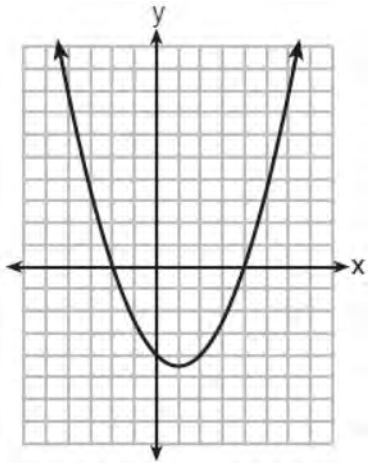
1) 

2) 

3) 

4) 

217 The graph of $y = \frac{1}{2}x^2 - x - 4$ is shown below. The points $A(-2,0)$, $B(0,-4)$, and $C(4,0)$ lie on this graph.

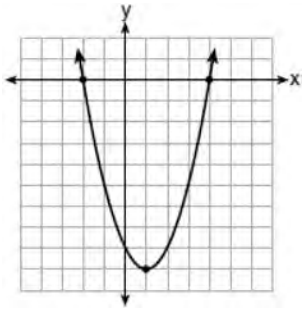


Which of these points can determine the zeros of the equation $y = \frac{1}{2}x^2 - x - 4$?

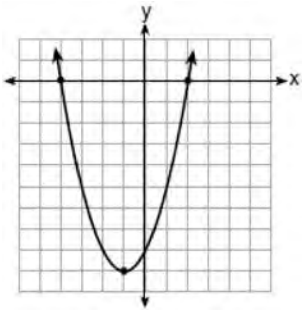
1) *A*, only
2) *B*, only
3) *A* and *C*, only
4) *A*, *B*, and *C*

218 Which function has zeros of -4 and 2?

1) $f(x) = x^2 + 7x - 8$

2) 

3) $g(x) = x^2 - 7x - 8$

4) 

219 The solution to $2x^2 = 72$ is

1) $\{9, 4\}$
2) $\{-4, 9\}$
3) $\{6\}$
4) $\{\pm 6\}$

220 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

221 Solve $5x^2 = 180$ algebraically.

222 Solve $6x^2 - 42 = 0$ for the exact values of x.

223 Solve the quadratic equation below for the exact values of x.

$$4x^2 - 5 = 75$$

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

1) $\frac{36}{25}$
2) $\frac{25}{36}$
3) $-\frac{6}{5}$
4) $-\frac{5}{6}$

225 The solutions to $(x + 4)^2 - 2 = 7$ are

1) $-4 \pm \sqrt{5}$
2) $4 \pm \sqrt{5}$
3) –1 and –7
4) 1 and 7

226 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) $-7 \pm \sqrt{3}$

227 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) $9x^2 - 6x + 1 = 5$

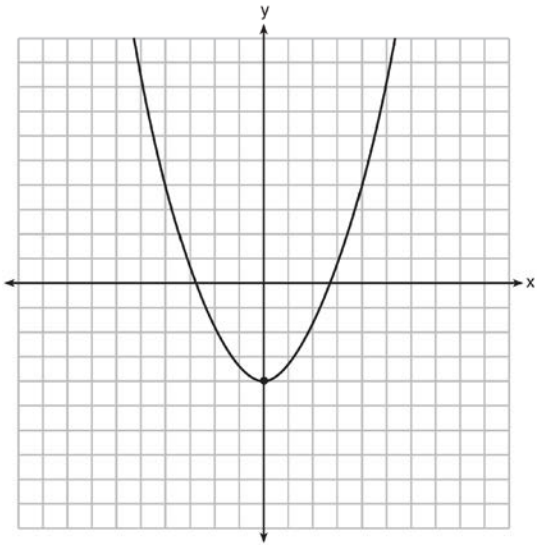
228 What is the solution of the equation $2(x+2)^2 - 4 = 28$?

1) 6, only
2) 2, only
3) 2 and –6
4) 6 and –2

229 What are the solutions to the equation $3(x-4)^2 = 27$?

1) 1 and 7
2) –1 and –7
3) $4 \pm \sqrt{24}$
4) $-4 \pm \sqrt{24}$

230 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.

231 What is the solution set of the equation $(x-2)(x-a) = 0$?

1) –2 and a
2) –2 and $-a$
3) 2 and a
4) 2 and $-a$

232 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) $(2x+3)(x-1) = 0$

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

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

234 Solve $x^2 - 9x = 36$ algebraically for all values of x.

235 Solve $x^2 - 8x - 9 = 0$ algebraically. Explain the first step you used to solve the given equation.

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

237 Solve the equation for y: $(y-3)^2 = 4y - 12$

Algebra I Regents Exam Questions by State Standard: Topic

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

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

240 Solve $6x^2 + 5x - 6 = 0$ algebraically for the exact values of x.

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

242 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

243 Janice is asked to solve $0 = 64x^2 + 16x - 3$. She begins the problem by writing the following steps:

Line 1 $0 = 64x^2 + 16x - 3$
Line 2 $0 = B^2 + 2B - 3$
Line 3 $0 = (B + 3)(B - 1)$

Use Janice's procedure to solve the equation for x. Explain the method Janice used to solve the quadratic equation.

244 The quadratic equation $x^2 - 6x = 12$ is rewritten in the form $(x + p)^2 = q$, where q is a constant. What is the value of p?
1) -12
2) -9
3) -3
4) 9

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

246 Which equation is equivalent to $x^2 - 6x + 4 = 0$?
1) $(x - 3)^2 = -4$
2) $(x - 3)^2 = 5$
3) $(x - 3)^2 = 6$
4) $(x - 3)^2 = 9$

247 When solving the equation $x^2 - 8x - 7 = 0$ by completing the square, which equation is a step in the process?
1) $(x - 4)^2 = 9$
2) $(x - 4)^2 = 23$
3) $(x - 8)^2 = 9$
4) $(x - 8)^2 = 23$

248 When solving $x^2 - 10x - 13 = 0$ by completing the square, which equation is a step in the process?
1) $(x-5)^2 = 38$
2) $(x-5)^2 = 12$
3) $(x-10)^2 = 38$
4) $(x-10)^2 = 12$

249 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) $(x+3)^2 = 16$

250 Which equation has the same solution as $x^2 + 8x - 33 = 0$?
1) $(x+4)^2 = 49$
2) $(x-4)^2 = 49$
3) $(x+4)^2 = 17$
4) $(x-4)^2 = 17$

251 When using the method of completing the square, which equation is equivalent to $x^2 - 12x - 10 = 0$?
1) $(x+6)^2 = -26$
2) $(x+6)^2 = 46$
3) $(x-6)^2 = -26$
4) $(x-6)^2 = 46$

252 When completing the square for $x^2 - 18x + 77 = 0$, which equation is a correct step in this process?
1) $(x-9)^2 = 4$
2) $(x-3)^2 = 2$
3) $x = \pm 13$
4) $x - 9 = \pm 9$

253 The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?
1) $(x-3)^2 = 6$
2) $(x-3)^2 = -6$
3) $(x-3)^2 = 3$
4) $(x-3)^2 = -3$

254 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) $-2 \pm 4\sqrt{5}$

255 What are the solutions to the equation $x^2 - 8x = 10$?
1) $4 \pm \sqrt{10}$
2) $4 \pm \sqrt{26}$
3) $-4 \pm \sqrt{10}$
4) $-4 \pm \sqrt{26}$

256 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) $x = -4 \pm 2\sqrt{2}$

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

258 Express the equation $x^2-8x=-41$ in the form $(x-p)^2=q$.

259 Solve the following equation by completing the square: $x^2+4x=2$

260 Solve the equation $x^2-6x=15$ by completing the square.

261 Determine the exact values of x for $x^2-8x-5=0$ by completing the square.

262 Use the method of completing the square to determine the exact values of x for the equation $x^2-8x+6=0$.

263 Use the method of completing the square to determine the exact values of x for the equation $x^2+6x-41=0$. Express your answer in simplest radical form.

264 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.

265 The roots of $x^2-5x-4=0$ are

1) 1 and 4
2) $\frac{5\pm\sqrt{41}}{2}$
3) -1 and -4
4) $\frac{-5\pm\sqrt{41}}{2}$

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

1) $3\pm2\sqrt{7}$
2) $-3\pm2\sqrt{7}$
3) $3\pm4\sqrt{14}$
4) $-3\pm4\sqrt{14}$

267 Solve for x to the *nearest tenth*: $x^2+x-5=0$.

268 Use the quadratic formula to solve $x^2-4x+1=0$ for x. Round the solutions to the *nearest hundredth*.

269 Solve $x^2+3x-9=0$ algebraically for all values of x. Round your answer to the *nearest hundredth*.

270 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x. Round your answers to the *nearest hundredth*.

271 Solve $3x^2 - 5x - 7 = 0$ algebraically for all values of x, rounding to the *nearest tenth*.

272 Solve $3d^2 - 8d + 3 = 0$ algebraically for all values of d, rounding to the *nearest tenth*.

273 Solve $4w^2 + 12w - 44 = 0$ algebraically for w, to the *nearest hundredth*.

274 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.
a) State two different methods Fred could use to solve the equation $f(x) = 0$.
b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

A.REI.B.4: USING THE DISCRIMINANT

275 How many real-number solutions does $4x^2 + 2x + 5 = 0$ have?
1) one
2) two
3) zero
4) infinitely many

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

277 Is the solution to the quadratic equation written below rational or irrational? Justify your answer.
$$0 = 2x^2 + 3x - 10$$

A.CED.A.1: MODELING QUADRATICS

278 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) $j^2 - 2j = 783$

279 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?
1) $(x + 1)^2 - 8x = 17$
2) $(x - 1)^2 - 8x = 17$
3) $x^2 - 8(x + 1) = 17$
4) $x^2 - 8(x - 1) = 17$

A.CED.A.1: GEOMETRIC APPLICATIONS OF QUADRATICS

280 The length of a rectangular patio is 7 feet more than its width, w. The area of a patio, $A(w)$, can be represented by the function
1) $A(w) = w + 7$
2) $A(w) = w^2 + 7w$
3) $A(w) = 4w + 14$
4) $A(w) = 4w^2 + 28w$

281 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96. Write an equation that models this situation. Determine Kelly's age algebraically. State the difference between Julia's and Kelly's ages, in years.

282 The length of a rectangular flat-screen television is six inches less than twice its width, x. If the area of the television screen is 1100 square inches, which equation can be used to determine the width, in inches?

1) $x(2x - 6) = 1100$
2) $x(6 - 2x) = 1100$
3) $2x + 2(2x - 6) = 1100$
4) $2x + 2(6 - 2x) = 1100$

283 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?

1) $(10 + x)(12 + x) = 120$
2) $(10 + x)(12 + x) = 180$
3) $(15 + x)(18 + x) = 180$
4) $(15)(18) = 120 + x^2$

284 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?

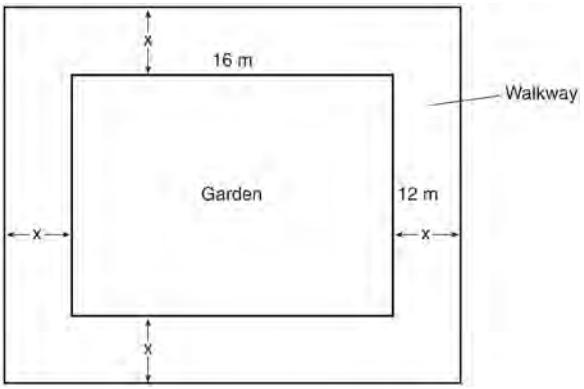
1) $8^2 + (x + 1) = x^2$
2) $x^2 + 8^2 = (x + 1)^2$
3) $8^2 + (x + 2) = x^2$
4) $x^2 + 8^2 = (x + 2)^2$

285 A movie theater's popcorn box is a rectangular prism with a base that measures 6 inches by 4 inches and has a height of 8 inches. To create a larger box, both the length and the width will be increased by x inches. The height will remain the same. Which function represents the volume, $V(x)$, of the larger box?

1) $V(x) = (6 + x)(4 + x)(8 + x)$
2) $V(x) = (6 + x)(4 + x)(8)$
3) $V(x) = (6 + x) + (4 + x) + (8 + x)$
4) $V(x) = (6 + x) + (4 + x) + (8)$

286 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*.

287 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.

288 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by *x*, and the area of the garden is 108 square meters. Determine, algebraically, the dimensions of the garden in meters.

289 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.

290 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign. Solve this equation algebraically to determine the dimensions of this sign, in inches.

291 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.

292 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*.

F.IF.C.8: VERTEX FORM OF A QUADRATIC

293 In the function $f(x) = (x-2)^2 + 4$, the minimum value occurs when *x* is
1) –2
2) 2
3) –4
4) 4

294 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

295 Which equation is equivalent to $y = x^2 + 24x - 18$?
1) $y = (x+12)^2 - 162$
2) $y = (x+12)^2 + 126$
3) $y = (x-12)^2 - 162$
4) $y = (x-12)^2 + 126$

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

1) $f(x) = (3x + 6)^2 - 25$
2) $f(x) = 3(x + 6)^2 - 25$
3) $f(x) = 3(x + 2)^2 - 1$
4) $f(x) = 3(x + 2)^2 + 7$

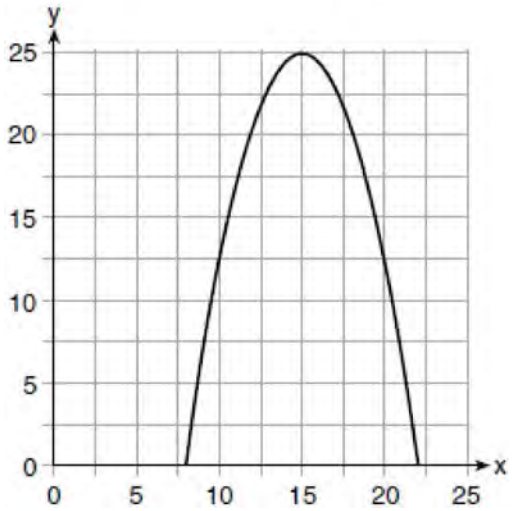
297 Which equation is equivalent to $y - 34 = x(x - 12)$?

1) $y = (x - 17)(x + 2)$
2) $y = (x - 17)(x - 2)$
3) $y = (x - 6)^2 + 2$
4) $y = (x - 6)^2 - 2$

298 Which equation and ordered pair represent the correct vertex form and vertex for $j(x) = x^2 - 12x + 7$?

1) $j(x) = (x - 6)^2 + 43,\ (6, 43)$
2) $j(x) = (x - 6)^2 + 43,\ (-6, 43)$
3) $j(x) = (x - 6)^2 - 29,\ (6, -29)$
4) $j(x) = (x - 6)^2 - 29,\ (-6, -29)$

299 The graph of a quadratic function is shown below.



An equation that represents the function could be

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

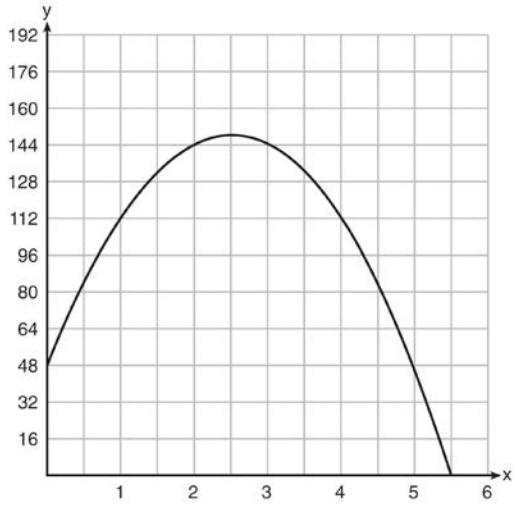
300 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

301 Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.

302 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.

F.IF.B.4: GRAPHING QUADRATIC FUNCTIONS

303 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) $0 \le x \le 2.5$
2) $0 < x < 5.5$
3) $2.5 < x < 5.5$
4) $x \ge 2$

304 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
1) 0
2) 2
3) 4.9
4) 50

305 The height of a ball Doreen tossed into the air can be modeled by the function $h(x) = -4.9x^2 + 6x + 5$, where *x* is the time elapsed in seconds, and $h(x)$ is the height in meters. The number 5 in the function represents
1) the initial height of the ball
2) the time at which the ball reaches the ground
3) the time at which the ball was at its highest point
4) the maximum height the ball attained when thrown in the air

306 A ball is thrown into the air from the top of a building. The height, $h(t)$, of the ball above the ground *t* seconds after it is thrown can be modeled by $h(t) = -16t^2 + 64t + 80$. How many seconds after being thrown will the ball hit the ground?
1) 5
2) 2
3) 80
4) 144

307 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?
1) $0 \le t \le 1.5$
2) $0 \le t \le 9$
3) $0 \le h(t) \le 1.5$
4) $0 \le h(t) \le 9$

308 The height of a rocket, at selected times, is shown in the table below.

Time (sec)	0	1	2	3	4	5	6	7
Height (ft)	180	260	308	324	308	260	180	68

Based on these data, which statement is *not* a valid conclusion?

1) The rocket was launched from a height of 180 feet.
2) The maximum height of the rocket occurred 3 seconds after launch.
3) The rocket was in the air approximately 6 seconds before hitting the ground.
4) The rocket was above 300 feet for approximately 2 seconds.

309 Ian throws a ball up in the air and lets it fall to the ground. The height of the ball, $h(t)$, is modeled by the equation $h(t) = -16t^2 + 6t + 3$, with $h(t)$ measured in feet, and time, t, measured in seconds. The number 3 in $h(t)$ represents

1) the maximum height of the ball
2) the height from which the ball is thrown
3) the number of seconds it takes for the ball to reach the ground
4) the number of seconds it takes for the ball to reach its maximum height

310 When an apple is dropped from a tower 256 feet high, the function $h(t) = -16t^2 + 256$ models the height of the apple, in feet, after t seconds. Determine, algebraically, the number of seconds it takes the apple to hit the ground.

311 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$. How many feet did the object fall between one and two seconds after it was dropped? Determine, algebraically, how many seconds it will take for the object to reach the ground.

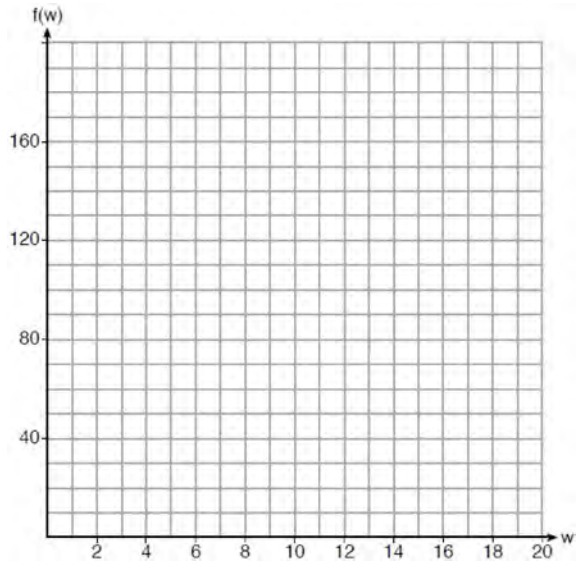
312 A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where t is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

313 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer. State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

314 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected. State the height of the platform, in feet. State the coordinates of the vertex. Explain what it means in the context of the problem. State the entire interval over which the ball's height is *decreasing*.

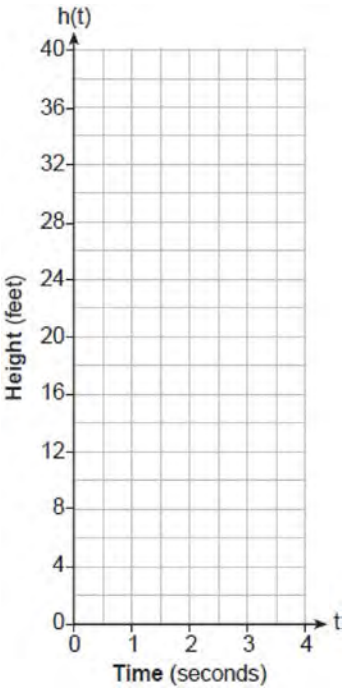
315 An Air Force pilot is flying at a cruising altitude of 9000 feet and is forced to eject from her aircraft. The function $h(t) = -16t^2 + 128t + 9000$ models the height, in feet, of the pilot above the ground, where t is the time, in seconds, after she is ejected from the aircraft. Determine and state the vertex of $h(t)$. Explain what the second coordinate of the vertex represents in the context of the problem. After the pilot was ejected, what is the maximum number of feet she was above the aircraft's cruising altitude? Justify your answer.

316 Paul plans to have a rectangular garden adjacent to his garage. He will use 36 feet of fence to enclose three sides of the garden. The area of the garden, in square feet, can be modeled by $f(w) = w(36 - 2w)$, where w is the width in feet. On the set of axes below, sketch the graph of $f(w)$.



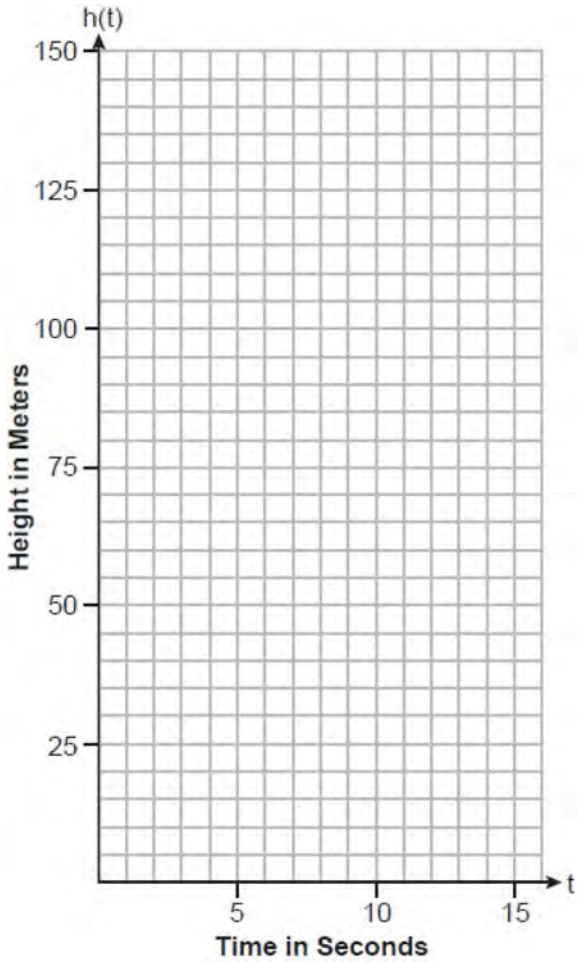
Explain the meaning of the vertex in the context of the problem.

317 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds. Graph $h(t)$ on the set of axes below.



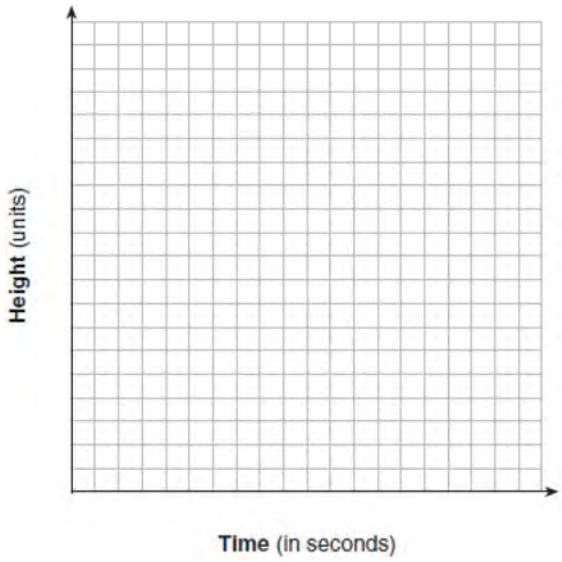
What is the maximum height, in feet, that the golf ball reaches on this hit? How many seconds does it take the golf ball to hit the ground?

318 The path of a rocket is modeled by the function $h(t) = -4.9t^2 + 49t$, where h is the height, in meters, above the ground and t is the time, in seconds, after the rocket is launched. Sketch the graph on the set of axes below.



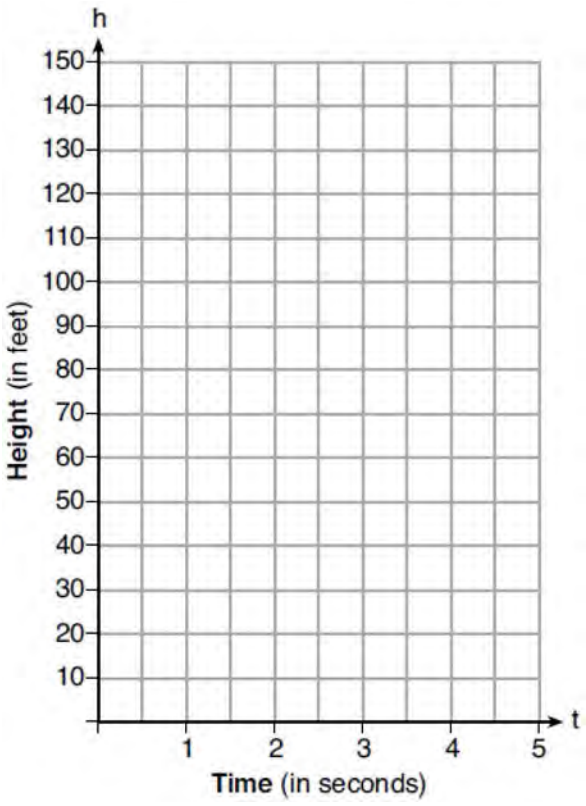
State the vertex of this function. Explain what the vertex means in the context of this situation.

319 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



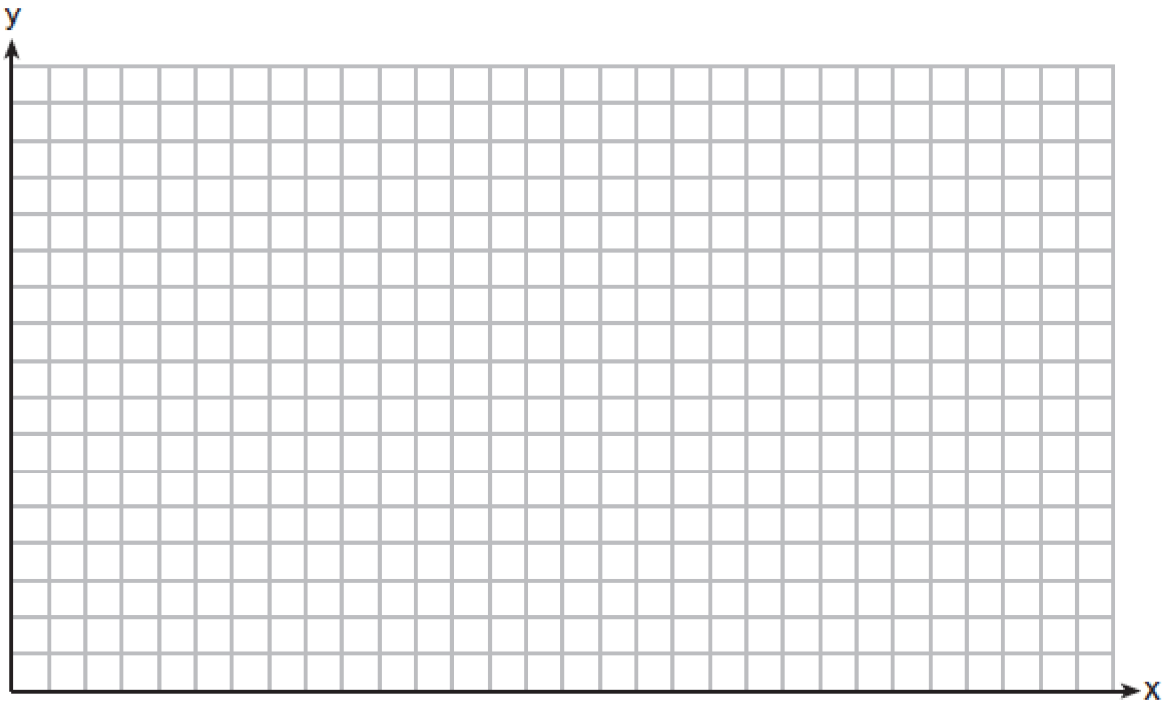
State the coordinates of the vertex and explain its meaning in the context of the problem.

320 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

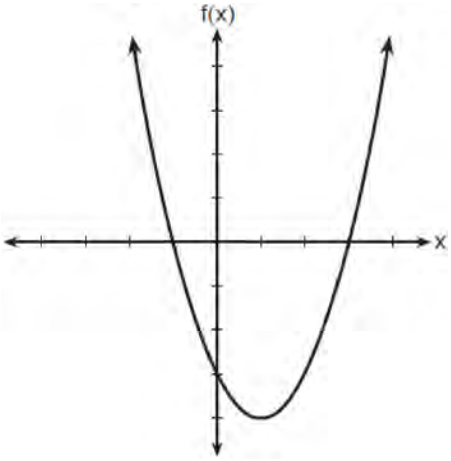
321 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in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



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.

F.IF.C.7: GRAPHING QUADRATIC FUNCTIONS

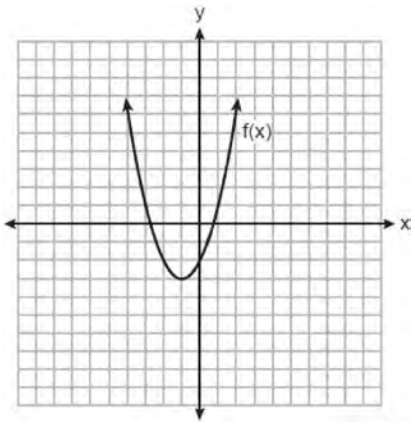
322 The function f is graphed on the set of axes below.



What is a possible factorization of this function?

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

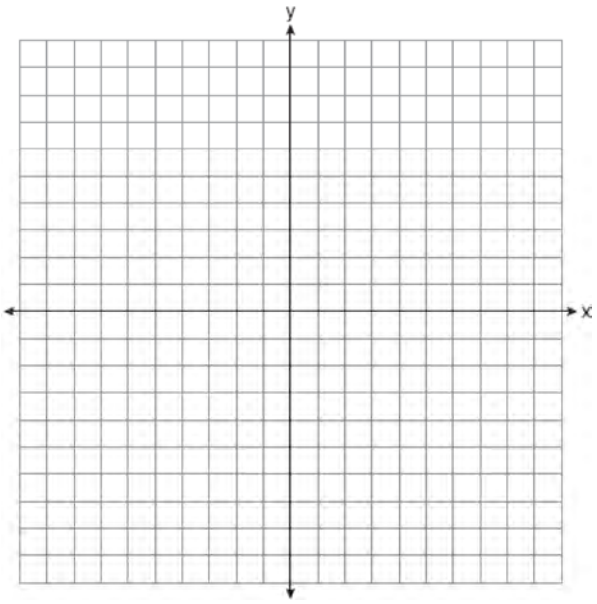
323 The function $f(x)$ is graphed on the set of axes below.



What is the equation of the axis of symmetry for $f(x)$?

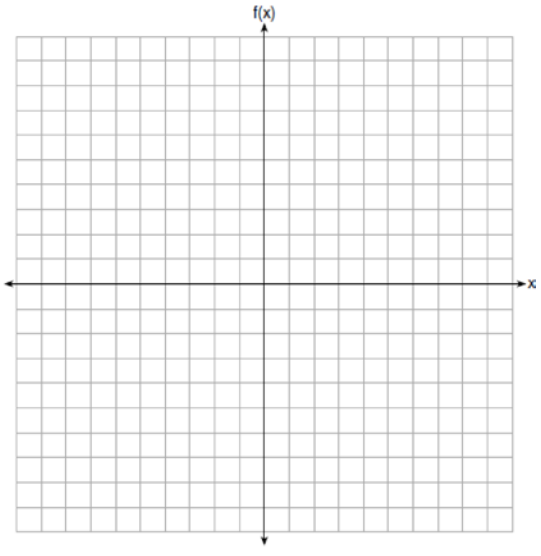
1) $x = -1$
2) $x = -3$
3) $y = -1$
4) $y = -3$

324 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



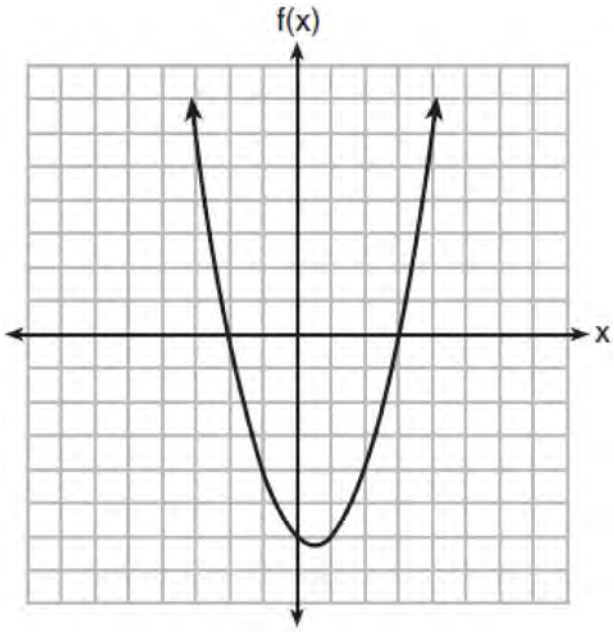
State the equation of the axis of symmetry.

325 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

326 The graph of the function $f(x) = ax^2 + bx + c$ is given below.



Could the factors of $f(x)$ be $(x + 2)$ and $(x - 3)$? Based on the graph, explain why or why *not*.

327 If the zeros of a quadratic function, *F*, are –3 and 5, what is the equation of the axis of symmetry of *F*? Justify your answer.

F.IF.C.9: COMPARING QUADRATIC FUNCTIONS

328 The quadratic functions $r(x)$ and $q(x)$ are given below.

x	$r(x)$
–4	–12
–3	–15
–2	–16
–1	–15
0	–12
1	7

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

The function with the *smaller* minimum value is

1) $q(x)$, and the value is –9
2) $q(x)$, and the value is –1
3) $r(x)$, and the value is –16
4) $r(x)$, and the value is –2

329 Three quadratic functions are given below.

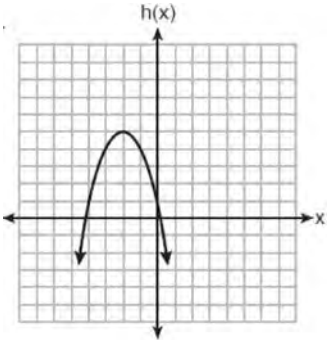
I.

$$f(x) = (x + 2)^2 + 5$$

II.

x	–4	–3	–2	–1	0	1
g(x)	–3	2	5	5	2	–3

III.



Which of these functions have the same vertex?

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

330 Which quadratic function has the largest maximum?

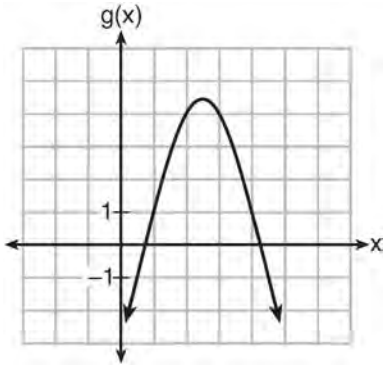
1) $h(x) = (3-x)(2+x)$

2)

x	f(x)
−1	−3
0	5
1	9
2	9
3	5
4	−3

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

4)



331 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 $-1 \le x \le 1$, 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 $g(x) = 0$.

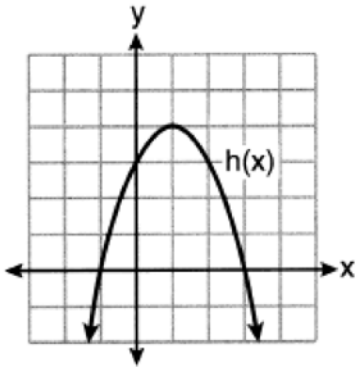
332 Which statement is true about the quadratic functions $g(x)$, shown in the table below, and $f(x) = (x-3)^2 + 2$?

x	**g(x)**
0	4
1	−1
2	−4
3	−5
4	−4
5	−1
6	4

1) They have the same vertex.
2) They have the same zeros.
3) They have the same axis of symmetry.
4) They intersect at two points.

333 Four quadratic functions are shown below.

x	f(x)
−4	−4
−2	4
−1	5
0	4
2	−4



$g(x) = -(x-4)^2 + 5$

$j(x) = -\frac{1}{2}x^2 + x + 4$

Which statement is true?

1) The maximum of $f(x)$ is less than the maximum of $j(x)$.
2) The maximum of $g(x)$ is less than the maximum of $h(x)$.
3) The maximum of $f(x)$ equals the maximum of $g(x)$.
4) The maximum of $h(x)$ equals the maximum of $j(x)$.

334 Which quadratic function has the largest maximum over the set of real numbers?

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

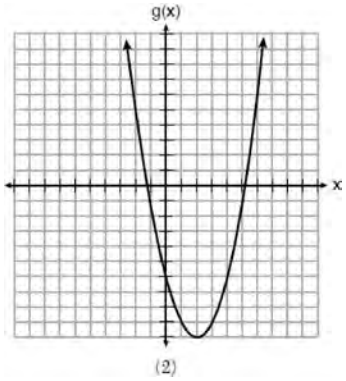
x	k(x)
−1	−1
0	3
1	5
2	5
3	3
4	−1

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

x	h(x)
−2	−9
−1	−3
0	1
1	3
2	3
3	1

335 Which of the quadratic functions below has the *smallest* minimum value?

1) $h(x) = x^2 + 2x - 6$

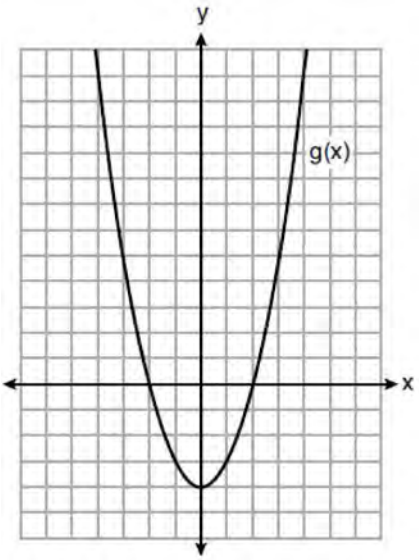
2) 

3) $k(x) = (x + 5)(x + 2)$

4)

x	f(x)
−1	−2
0	−5
1	−6
2	−5
3	−2

336 Which statement is true about the functions $f(x)$ and $g(x)$, given below?



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

1) The minimum value of $g(x)$ is greater than the maximum value of $f(x)$.
2) $f(x)$ and $g(x)$ have the same y-intercept.
3) $f(x)$ and $g(x)$ have the same roots.
4) $f(x) = g(x)$ when $x = -4$.

337 Which quadratic function has the *smallest* minimum value?

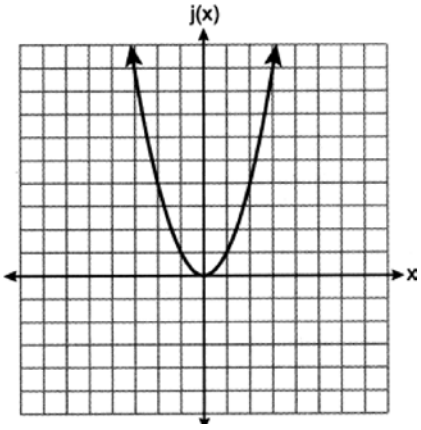
1) $f(x) = 6x^2 + 5x - 2$

2)

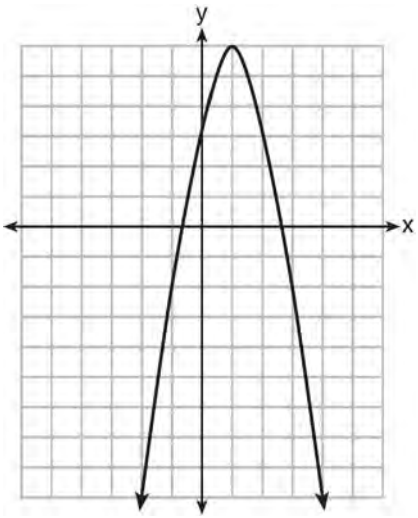
x	h(x)
0	6
1	2
2	0
3	0
4	2
5	6

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

4)



338 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.

POWERS

A.APR.A.1: POWERS OF POWERS

339 Which expression is equivalent to $(-4x^2)^3$?

1) $-12x^6$
2) $-12x^5$
3) $-64x^6$
4) $-64x^5$

340 Which expression is *not* equivalent to $\left(5^{2x}\right)^3$?

1) $\left(5^x\right)^6$
2) $\left(5^{3x}\right)^2$
3) $\left(5^5\right)^x$
4) $\left(5^2\right)^{3x}$

341 Three expressions are written below.

A. $(2xy^2)^3$
B. $(2x)^3y^6$
C. $(2x^2y^2)(4xy^3)$

Which expressions are equivalent to $8x^3y^6$?

1) *A* and *B*, only
2) *B* and *C*, only
3) *A* and *C*, only
4) *A*, *B*, and *C*

342 Three expressions are shown below.

I. $(x^3)^3$
II. $x^4 \bullet x^5$
III. $x^{10} \bullet x^{-1}$

Which expressions are equivalent for all positive values of x?

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

A.SSE.B.3: MODELING EXPONENTIAL FUNCTIONS

343 The expression $300(4)^{x+3}$ is equivalent to

1) $300(4)^x(4)^3$
2) $300(4^x)^3$
3) $300(4)^x + 300(4)^3$
4) $300^x(4)^3$

344 A computer application generates a sequence of musical notes using the function $f(n) = 6(16)^n$, where n is the number of the note in the sequence and $f(n)$ is the note frequency in hertz. Which function will generate the same note sequence as $f(n)$?

1) $g(n) = 12(2)^{4n}$
2) $h(n) = 6(2)^{4n}$
3) $p(n) = 12(4)^{2n}$
4) $k(n) = 6(8)^{2n}$

345 Nora inherited a savings account that was started by her grandmother 25 years ago. This scenario is modeled by the function $A(t) = 5000(1.013)^{t+25}$, where $A(t)$ represents the value of the account, in dollars, t years after the inheritance. Which function below is equivalent to $A(t)$?

1) $A(t) = 5000[(1.013^t)]^{25}$
2) $A(t) = 5000[(1.013)^t + (1.013)^{25}]$
3) $A(t) = (5000)^t(1.013)^{25}$
4) $A(t) = 5000(1.013)^t(1.013)^{25}$

346 Mario's $15,000 car depreciates in value at a rate of 19% per year. The value, V, after t years can be modeled by the function $V = 15,000(0.81)^t$. Which function is equivalent to the original function?

1) $V = 15,000(0.9)^{9t}$
2) $V = 15,000(0.9)^{2t}$
3) $V = 15,000(0.9)^{\frac{t}{9}}$
4) $V = 15,000(0.9)^{\frac{t}{2}}$

347 The number of bacteria grown in a lab can be modeled by $P(t) = 300 \bullet 2^{4t}$, where t is the number of hours. Which expression is equivalent to $P(t)$?

1) $300 \bullet 8^t$
2) $300 \bullet 16^t$
3) $300^t \bullet 2^4$
4) $300^{2t} \bullet 2^{2t}$

348 In an organism, the number of cells, $C(d)$, after d days can be represented by the function $C(d) = 120 \bullet 2^{3d}$. This function can also be expressed as

1) $C(d) = 240^{3d}$
2) $C(d) = 960 \bullet 2^d$
3) $C(d) = 120 \bullet 6^d$
4) $C(d) = 120 \bullet 8^d$

349 The population of a city can be modeled by $P(t) = 3810(1.0005)^{7t}$, where $P(t)$ is the population after t years. Which function is approximately equivalent to $P(t)$?

1) $P(t) = 3810(0.1427)^t$
2) $P(t) = 3810(1.0035)^t$
3) $P(t) = 26,670(0.1427)^t$
4) $P(t) = 26,670(1.0035)^t$

350 The growth of a certain organism can be modeled by $C(t) = 10(1.029)^{24t}$, where $C(t)$ is the total number of cells after t hours. Which function is approximately equivalent to $C(t)$?

1) $C(t) = 240(.083)^{24t}$
2) $C(t) = 10(.083)^t$
3) $C(t) = 10(1.986)^t$
4) $C(t) = 240(1.986)^{\frac{t}{24}}$

351 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

352 Materials A and B decay over time. The function for the amount of material A is $A(t) = 1000(0.5)^{2t}$ and for the amount of material B is $B(t) = 1000(0.25)^t$, where t represents time in days. On which day will the amounts of material be equal?

1) initial day, only
2) day 2, only
3) day 5, only
4) every day

353 A laboratory technician used the function $t(m) = 2(3)^{2m+1}$ to model her research. Consider the following expressions:

I. $6(3)^{2m}$ II. $6(6)^{2m}$ III. $6(9)^{m}$

The function $t(m)$ is equivalent to

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

354 Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over t weeks can be defined by the function $f(t) = (8) \cdot 2^t$. Jessica finds that the growth function over t weeks is $g(t) = 2^{t+3}$. Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks. Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

A.CED.A.1: MODELING EXPONENTIAL FUNCTIONS

355 The Ebola virus has an infection rate of 11% per day as compared to the SARS virus, which has a rate of 4% per day. If there were one case of Ebola and 30 cases of SARS initially reported to authorities and cases are reported each day, which statement is true?

1) At day 10 and day 53 there are more Ebola cases.
2) At day 10 and day 53 there are more SARS cases.
3) At day 10 there are more SARS cases, but at day 53 there are more Ebola cases.
4) At day 10 there are more Ebola cases, but at day 53 there are more SARS cases.

356 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.

357 A car was purchased for $25,000. Research shows that the car has an average yearly depreciation rate of 18.5%. Create a function that will determine the value, $V(t)$, of the car t years after purchase. Determine, to the *nearest cent*, how much the car will depreciate from year 3 to year 4.

358 Marilyn collects old dolls. She purchases a doll for $450. Research shows this doll's value will increase by 2.5% each year. Write an equation that determines the value, V, of the doll t years after purchase. Assuming the doll's rate of appreciation remains the same, will the doll's value be doubled in 20 years? Justify your reasoning.

359 On the day Alexander was born, his father invested $5000 in an account with a 1.2% annual growth rate. Write a function, $A(t)$, that represents the value of this investment t years after Alexander's birth. Determine, to the *nearest dollar*, how much more the investment will be worth when Alexander turns 32 than when he turns 17.

F.BF.A.1: MODELING EXPONENTIAL FUNCTIONS

360 Joe deposits $4000 into a certificate of deposit (CD) at his local bank. The CD earns 3% interest, compounded annually. The value of the CD in x years can be found using the function

1) $f(x) = 4000 + 0.3x$
2) $f(x) = 4000 + 0.03x$
3) $f(x) = 4000(1.3)^x$
4) $f(x) = 4000(1.03)^x$

361 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) $3000(1 - 0.02)^{18}$

362 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) $f(t) = (9.05 \times 10^6)(1 - 0.031)^7$

363 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?

1) $A = 1000(1 - 0.013)^2$
2) $A = 1000(1 + 0.013)^2$
3) $A = 1000(1 - 1.3)^2$
4) $A = 1000(1 + 1.3)^2$

364 A high school sponsored a badminton tournament. After each round, one-half of the players were eliminated. If there were 64 players at the start of the tournament, which equation models the number of players left after 3 rounds?

1) $y = 64(1 - .5)^3$
2) $y = 64(1 + .5)^3$
3) $y = 64(1 - .3)^{0.5}$
4) $y = 64(1 + .3)^{0.5}$

365 Emily was given $600 for her high school graduation. She invested it in an account that earns 2.4% interest per year. If she does *not* make any deposits or withdrawals, which expression can be used to determine the amount of money that will be in the account after 4 years?

1) $600(1 + 0.24)^4$
2) $600(1 - 0.24)^4$
3) $600(1 + 0.024)^4$
4) $600(1 - 0.024)^4$

366 Sunny purchases a new car for $29,873. The car depreciates 20% annually. Which expression can be used to determine the value of the car after *t* years?

1) $29,873(.20)^t$
2) $29,873(20)^t$
3) $29,873(1-.20)^t$
4) $29,873(1+.20)^t$

367 A student invests $500 for 3 years in a savings account that earns 4% interest per year. No further deposits or withdrawals are made during this time. Which statement does *not* yield the correct balance in the account at the end of 3 years?

1) $500(1.04)^3$
2) $500(1-.04)^3$
3) $500(1+.04)(1+.04)(1+.04)$
4) $500+500(.04)+520(.04)+540.8(.04)$

368 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.

F.LE.A.2: MODELING EXPONENTIAL FUNCTIONS

369 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) (°F)	150	108	78	56	41

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

1) $150(0.85)^m$
2) $150(1.15)^m$
3) $150(0.85)^{m-1}$
4) $150(1.15)^{m-1}$

370 Marc bought a new laptop for $1250. He kept track of the value of the laptop over the next three years, as shown in the table below.

Years After Purchase	**Value in Dollars**
1	1000
2	800
3	640

Which function can be used to determine the value of the laptop for *x* years after the purchase?

1) $f(x) = 1000(1.2)^x$
2) $f(x) = 1000(0.8)^x$
3) $f(x) = 1250(1.2)^x$
4) $f(x) = 1250(0.8)^x$

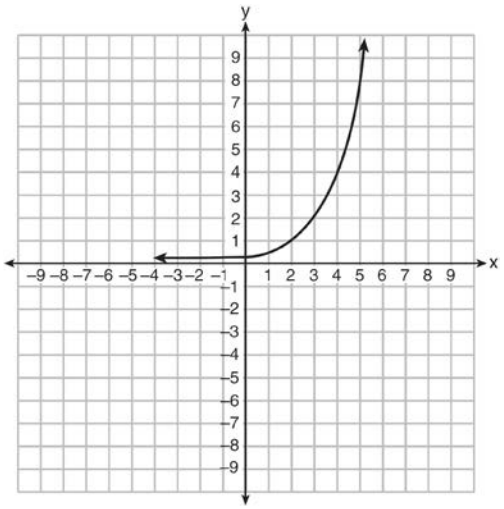
371 Jill invests $400 in a savings bond. The value of the bond, $V(x)$, in hundreds of dollars after x years is illustrated in the table below.

x	V(x)
0	4
1	5.4
2	7.29
3	9.84

Which equation and statement illustrate the approximate value of the bond in hundreds of dollars over time in years?

1) $V(x) = 4(0.65)^x$ and it grows.
2) $V(x) = 4(0.65)^x$ and it decays.
3) $V(x) = 4(1.35)^x$ and it grows.
4) $V(x) = 4(1.35)^x$ and it decays.

372 Write an exponential equation for the graph shown below.



Explain how you determined the equation.

373 Mike knows that $(3, 6.5)$ and $(4, 17.55)$ are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function. First, he subtracts 6.5 from 17.55 to get 11.05. Next, he adds 11.05 and 17.55 to get 28.6. He states that $(5, 28.6)$ is a point on $g(x)$. Is he correct? Explain your reasoning.

F.LE.B.5: MODELING EXPONENTIAL FUNCTIONS

374 Mike uses the equation $b = 1300(2.65)^x$ to determine the growth of bacteria in a laboratory setting. The exponent represents

1) the total number of bacteria currently present
2) the percent at which the bacteria are growing
3) the initial amount of bacteria
4) the number of time periods

375 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

376 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%

377 A population of bacteria can be modeled by the function $f(t) = 1000(0.98)^t$, where t represents the time since the population started decaying, and $f(t)$ represents the population of the remaining bacteria at time t. What is the rate of decay for this population?
1) 98%
2) 2%
3) 0.98%
4) 0.02%

378 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?
1) 0.02% decay
2) 0.02% growth
3) 2% decay
4) 2% growth

379 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?
1) It decreases 78% per year.
2) It decreases 22% per year.
3) It increases 78% per year.
4) It increases 22% per year.

380 Jim uses the equation $A = P(1 + 0.05)^t$ to find the amount of money in an account, A, of an investment, P, after t years. For this equation, which phrase describes the yearly rate of change?
1) decreasing by 5%
2) decreasing by 0.05%
3) increasing by 5%
4) increasing by 0.05%

381 In the equation $A = P(1 \pm r)^t$, A is the total amount, P is the principal amount, r is the annual interest rate, and t is the time in years. Which statement correctly relates information regarding the annual interest rate for each given equation?
1) For $A = P(1.025)^t$, the principal amount of money is increasing at a 25% interest rate.
2) For $A = P(1.0052)^t$, the principal amount of money is increasing at a 52% interest rate.
3) For $A = P(0.86)^t$, the principal amount of money is decreasing at a 14% interest rate.
4) For $A = P(0.68)^t$, the principal amount of money is decreasing at a 68% interest rate.

382 The equation $V(t) = 12,000(0.75)^t$ represents the value of a motorcycle t years after it was purchased. Which statement is true?
1) The motorcycle cost $9000 when purchased.
2) The motorcycle cost $12,000 when purchased.
3) The motorcycle's value is decreasing at a rate of 75% each year.
4) The motorcycle's value is decreasing at a rate of 0.25% each year.

383 The 2014 winner of the Boston Marathon runs as many as 120 miles per week. During the last few weeks of his training for an event, his mileage can be modeled by $M(w) = 120(.90)^{w-1}$, where w represents the number of weeks since training began. Which statement is true about the model $M(w)$?
1) The number of miles he runs will increase by 90% each week.
2) The number of miles he runs will be 10% of the previous week.
3) $M(w)$ represents the total mileage run in a given week.
4) w represents the number of weeks left until his marathon.

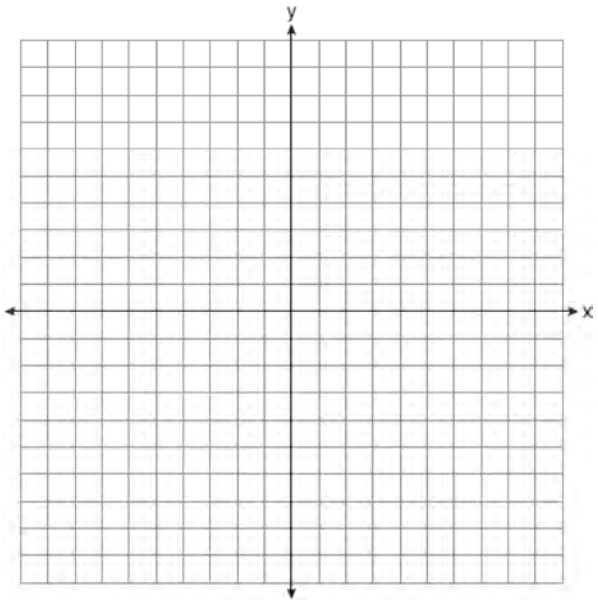
384 The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where x represents the number of years since being discovered. What is the percent of change each year? Explain how you arrived at your answer.

385 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

386 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.

F.IF.C.7: GRAPHING EXPONENTIAL FUNCTIONS

387 Graph the function $f(x) = 2^x - 7$ on the set of axes below.



If $g(x) = 1.5x - 3$, determine if $f(x) > g(x)$ when $x = 4$. Justify your answer.

POLYNOMIALS

A.REI.D.10: IDENTIFYING SOLUTIONS

388 The solution of an equation with two variables, x and y, is
1) the set of all x values that make $y = 0$
2) the set of all y values that make $x = 0$
3) the set of all ordered pairs, (x,y), that make the equation true
4) the set of all ordered pairs, (x,y), where the graph of the equation crosses the y-axis

389 Which statement best describes the solutions of a two-variable equation?
1) The ordered pairs must lie on the graphed equation.
2) The ordered pairs must lie near the graphed equation.
3) The ordered pairs must have $x = 0$ for one coordinate.
4) The ordered pairs must have $y = 0$ for one coordinate.

390 Mrs. Rossano asked her students to explain why $(3,-4)$ is a solution to $2y + 3x = 1$. Three student responses are given below.
Andrea:
"When the equation is graphed on a calculator, the point can be found within its table."
Bill:
"Substituting $x = 3$ and $y = -4$ into the equation makes it true."
Christine:
"The graph of the line passes through the point $(3,-4)$."
Which students are correct?
1) Andrea and Bill, only
2) Bill and Christine, only
3) Andrea and Christine, only
4) Andrea, Bill, and Christine

391 Which linear equation represents a line that passes through the point $(-3,-8)$?
1) $y = 2x - 2$
2) $y = 2x - 8$
3) $y = 2x + 13$
4) $y = 2x - 14$

392 If point $(K,-5)$ lies on the line whose equation is $3x + y = 7$, then the value of K is
1) -8
2) -4
3) 22
4) 4

393 The point $(3,w)$ is on the graph of $y = 2x + 7$. What is the value of w?
1) -2
2) -4
3) 10
4) 13

394 Which ordered pair does *not* fall on the line formed by the other three?
1) $(16,18)$
2) $(12,12)$
3) $(9,10)$
4) $(3,6)$

395 Which ordered pair below is *not* a solution to $f(x) = x^2 - 3x + 4$?
1) $(0,4)$
2) $(1.5,1.75)$
3) $(5,14)$
4) $(-1,6)$

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

397 Which ordered pair does *not* represent a point on the graph of $y = 3x^2 - x + 7$?
1) $(-1.5,15.25)$
2) $(0.5,7.25)$
3) $(1.25,10.25)$
4) $(2.5,23.25)$

398 Which point is *not* in the solution set of the equation $3y + 2 = x^2 - 5x + 17$?
1) $(-2, 10)$
2) $(-1, 7)$
3) $(2, 3)$
4) $(5, 5)$

399 Which point is a solution to $y = x^3 - 2x$?
1) $(-3, -21)$
2) $(-2, 10)$
3) $(1, 1)$
4) $(4, 2)$

400 Which ordered pair would *not* be a solution to $y = x^3 - x$?
1) $(-4, -60)$
2) $(-3, -24)$
3) $(-2, -6)$
4) $(-1, -2)$

A.APR.A.1: OPERATIONS WITH POLYNOMIALS

401 The expression $\left(3x^2 + 4x - 8\right) + 2(11 - 5x)$ is equivalent to
1) $3x^2 - x + 5$
2) $3x^2 - x + 14$
3) $3x^2 - 6x + 14$
4) $3x^2 + 14x + 14$

402 Which expression is equivalent to $2(x^2 - 1) + 3x(x - 4)$?
1) $5x^2 - 5$
2) $5x^2 - 6$
3) $5x^2 - 12x - 1$
4) $5x^2 - 12x - 2$

403 Which polynomial is twice the sum of $4x^2 - x + 1$ and $-6x^2 + x - 4$?
1) $-2x^2 - 3$
2) $-4x^2 - 3$
3) $-4x^2 - 6$
4) $-2x^2 + x - 5$

404 If $y = 3x^3 + x^2 - 5$ and $z = x^2 - 12$, which polynomial is equivalent to $2(y + z)$?
1) $6x^3 + 4x^2 - 34$
2) $6x^3 + 3x^2 - 17$
3) $6x^3 + 3x^2 - 22$
4) $6x^3 + 2x^2 - 17$

405 The expression $3(x + 4) - (2x + 7)$ is equivalent to
1) $x + 5$
2) $x - 10$
3) $x - 3$
4) $x + 11$

406 Which expression is equivalent to $2(3g - 4) - (8g + 3)$?
1) $-2g - 1$
2) $-2g - 5$
3) $-2g - 7$
4) $-2g - 11$

407 When the expression $2x(x - 4) - 3(x + 5)$ is written in simplest form, the result is
1) $2x^2 - 11x - 15$
2) $2x^2 - 11x + 5$
3) $2x^2 - 3x - 19$
4) $2x^2 - 3x + 1$

408 The expression $3(x^2 - 1) - (x^2 - 7x + 10)$ is equivalent to
1) $2x^2 - 7x + 7$
2) $2x^2 + 7x - 13$
3) $2x^2 - 7x + 9$
4) $2x^2 + 7x - 11$

409 The expression $(-x^2 + 3x - 7) - (4x^2 + 5x - 2)$ is equivalent to
1) $-5x^2 - 2x - 9$
2) $-5x^2 - 2x - 5$
3) $-5x^2 + 8x - 9$
4) $-5x^2 + 8x - 5$

410 The expression $(5x^2 - x + 4) - 3(x^2 - x - 2)$ is equivalent to
1) $2x^2 - 2x + 2$
2) $2x^2 + 2x + 10$
3) $2x^4 - 2x^2 + 2$
4) $2x^4 - 2x^2 + 10$

411 The expression $3(x^2 + 2x - 3) - 4(4x^2 - 7x + 5)$ is equivalent to
1) $-13x - 22x + 11$
2) $-13x^2 + 34x - 29$
3) $19x^2 - 22x + 11$
4) $19x^2 + 34x - 29$

412 If $C = 2a^2 - 5$ and $D = 3 - a$, then $C - 2D$ equals
1) $2a^2 + a - 8$
2) $2a^2 - a - 8$
3) $2a^2 + 2a - 11$
4) $2a^2 - a - 11$

413 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) $5x^2 - x + 1$

414 Express in simplest form:
$(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

415 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

416 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

417 Subtract $3x(x - 2y)$ from $6(x^2 - xy)$ and express your answer as a monomial.

418 Which expression is equivalent to $(x + 4)^2(x + 4)^3$?
1) $(x + 4)^6$
2) $(x + 4)^5$
3) $(x^2 + 16)^6$
4) $(x^2 + 16)^5$

419 The expression $\frac{1}{3}x(6x^2 - 3x + 9)$ is equivalent to
1) $2x^2 - x + 3$
2) $2x^2 + 3x + 3$
3) $2x^3 - x^2 + 3x$
4) $2x^3 + 3x^2 + 3x$

420 The expression $(m-3)^2$ is equivalent to
1) m^2+9
2) m^2-9
3) m^2-6m+9
4) m^2-6m-9

421 What is the product of $(2x+7)$ and $(x-3)$?
1) $2x^2-21$
2) $2x^2+x-21$
3) $2x^2+4x-21$
4) $2x^2+13x-21$

422 When written in standard form, the product of $(3+x)$ and $(2x-5)$ is
1) $3x-2$
2) $2x^2+x-15$
3) $2x^2-11x-15$
4) $6x-15+2x^2-5x$

423 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) $3x^2-14x+14$

424 The product of (x^2+3x+9) and $(x-3)$ is
1) x^3-27
2) x^2+4x+6
3) $x^3-6x^2-18x-27$
4) $-6x^4+x^3-18x^2-27$

425 What is the product of $2x+3$ and $4x^2-5x+6$?
1) $8x^3-2x^2+3x+18$
2) $8x^3-2x^2-3x+18$
3) $8x^3+2x^2-3x+18$
4) $8x^3+2x^2+3x+18$

426 When $(2x-3)^2$ is subtracted from $5x^2$, the result is
1) $x^2-12x-9$
2) $x^2-12x+9$
3) $x^2+12x-9$
4) $x^2+12x+9$

427 Which expression is *not* equivalent to $-4x^3+x^2-6x+8$?
1) $x^2(-4x+1)-2(3x-4)$
2) $x(-4x^2-x+6)+8$
3) $-4x^3+(x-2)(x-4)$
4) $-4(x^3-2)+x(x-6)$

428 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) $6x^2-6x-11$

429 The length, width, and height of a rectangular box are represented by $2x$, $3x+1$, and $5x-6$, respectively. When the volume is expressed as a polynomial in standard form, what is the coefficient of the 2nd term?
1) -13
2) 13
3) -26
4) 26

430 Given:

$$A = x + 5$$

$$B = x^2 - 18$$

Express $A^2 + B$ in standard form.

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

432 Write the expression $5x + 4x^2(2x + 7) - 6x^2 - 9x$ as a polynomial in standard form.

433 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?

434 Express $(3x - 4)(x + 7) - \frac{1}{4}x^2$ as a trinomial in standard form.

A.SSE.A.2: FACTORING POLYNOMIALS

435 Which expression is equivalent to $x^2 + 5x - 6$?
1) $(x + 3)(x - 2)$
2) $(x + 2)(x - 3)$
3) $(x - 6)(x + 1)$
4) $(x + 6)(x - 1)$

436 The expression $x^2 - 10x + 24$ is equivalent to
1) $(x + 12)(x - 2)$
2) $(x - 12)(x + 2)$
3) $(x + 6)(x + 4)$
4) $(x - 6)(x - 4)$

437 David correctly factored the expression $m^2 - 12m - 64$. Which expression did he write?
1) $(m - 8)(m - 8)$
2) $(m - 8)(m + 8)$
3) $(m - 16)(m + 4)$
4) $(m + 16)(m - 4)$

438 The trinomial $x^2 - 14x + 49$ can be expressed as
1) $(x - 7)^2$
2) $(x + 7)^2$
3) $(x - 7)(x + 7)$
4) $(x - 7)(x + 2)$

439 Which expression is equivalent to $2x^2 + 8x - 10$?
1) $2(x - 1)(x + 5)$
2) $2(x + 1)(x - 5)$
3) $2(x - 1)(x - 5)$
4) $2(x + 1)(x + 5)$

440 Which expression is *not* equivalent to $2x^2 + 10x + 12$?
1) $(2x + 4)(x + 3)$
2) $(2x + 6)(x + 2)$
3) $(2x + 3)(x + 4)$
4) $2(x + 3)(x + 2)$

441 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

442 The area of a rectangle is represented by $3x^2 - 10x - 8$. Which expression can also be used to represent the area of the same rectangle?
1) $(3x + 2)(x - 4)$
2) $(3x + 2)(x + 4)$
3) $(3x + 4)(x - 2)$
4) $(3x - 4)(x + 2)$

443 When written in factored form, $4w^2 - 11w - 3$ is equivalent to
1) $(2w + 1)(2w - 3)$
2) $(2w - 1)(2w + 3)$
3) $(4w + 1)(w - 3)$
4) $(4w - 1)(w + 3)$

444 Which product is equivalent to $4x^2 - 3x - 27$?
1) $(2x + 9)(2x - 3)$
2) $(2x - 9)(2x + 3)$
3) $(4x + 9)(x - 3)$
4) $(4x - 9)(x + 3)$

445 When factored completely, $x^3 - 13x^2 - 30x$ is
1) $x(x + 3)(x - 10)$
2) $x(x - 3)(x - 10)$
3) $x(x + 2)(x - 15)$
4) $x(x - 2)(x + 15)$

446 When factored completely, $-x^3 + 10x^2 + 24x$ is
1) $-x(x + 4)(x - 6)$
2) $-x(x - 4)(x - 6)$
3) $-x(x + 2)(x - 12)$
4) $-x(x - 2)(x + 12)$

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

448 Factor $2x^2 + 16x - 18$ completely.

449 Factor completely: $3y^2 - 12y - 288$

A.SSE.A.2: FACTORING THE DIFFERENCE OF PERFECT SQUARES

450 The expression $4x^2 - 25$ is equivalent to
1) $(4x - 5)(x + 5)$
2) $(4x + 5)(x - 5)$
3) $(2x + 5)(2x - 5)$
4) $(2x - 5)(2x - 5)$

451 The expression $49x^2 - 36$ is equivalent to
1) $(7x - 6)^2$
2) $(24.5x - 18)^2$
3) $(7x - 6)(7x + 6)$
4) $(24.5x - 18)(24.5x + 18)$

452 The expression $9m^2 - 100$ is equivalent to
1) $(3m - 10)(3m + 10)$
2) $(3m - 10)(3m - 10)$
3) $(3m - 50)(3m + 50)$
4) $(3m - 50)(3m - 50)$

453 The expression $36x^2 - 9$ is equivalent to
1) $(6x - 3)^2$
2) $(18x - 4.5)^2$
3) $(6x + 3)(6x - 3)$
4) $(18x + 4.5)(18x - 4.5)$

454 Which expression is equivalent to $16x^2 - 36$?
1) $4(2x - 3)(2x - 3)$
2) $4(2x + 3)(2x - 3)$
3) $(4x - 6)(4x - 6)$
4) $(4x + 6)(4x + 6)$

455 The expression $16x^2 - 81$ is equivalent to
1) $(8x - 9)(8x + 9)$
2) $(8x - 9)(8x - 9)$
3) $(4x - 9)(4x + 9)$
4) $(4x - 9)(4x - 9)$

456 Which expression is equivalent to $18x^2 - 50$?
1) $2(3x + 5)^2$
2) $2(3x - 5)^2$
3) $2(3x - 5)(3x + 5)$
4) $2(3x - 25)(3x + 25)$

457 Which expression is equivalent to $36x^2 - 100$?
1) $4(3x - 5)(3x - 5)$
2) $4(3x + 5)(3x - 5)$
3) $2(9x - 25)(9x - 25)$
4) $2(9x + 25)(9x - 25)$

458 The expression $x^4 - 16$ is equivalent to
1) $(x^2 + 8)(x^2 - 8)$
2) $(x^2 - 8)(x^2 - 8)$
3) $(x^2 + 4)(x^2 - 4)$
4) $(x^2 - 4)(x^2 - 4)$

459 The expression $w^4 - 36$ is equivalent to
1) $(w^2 - 18)(w^2 - 18)$
2) $(w^2 + 18)(w^2 - 18)$
3) $(w^2 - 6)(w^2 - 6)$
4) $(w^2 + 6)(w^2 - 6)$

460 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) $(p + 3)(p - 3)(p + 3)(p - 3)$

461 Which expression is equivalent to $y^4 - 100$?
1) $(y^2 - 10)^2$
2) $(y^2 - 50)^2$
3) $(y^2 + 10)(y^2 - 10)$
4) $(y^2 + 50)(y^2 - 50)$

462 Which expression is equivalent to $16x^4 - 64$?
1) $(4x^2 - 8)^2$
2) $(8x^2 - 32)^2$
3) $(4x^2 + 8)(4x^2 - 8)$
4) $(8x^2 + 32)(8x^2 - 32)$

463 Factor $18x^2 - 2$ completely.

464 Factor $36 - 4x^2$ completely.

465 Factor completely: $4x^3 - 49x$

466 Factor $x^4 - 16$ completely.

467 Factor the expression $x^4 - 36x^2$ completely.

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

A.APR.B.3: ZEROS OF POLYNOMIALS

469 What are the zeros of $f(x) = (2x - 4)(3x + 4)$?
1) $\left\{-\frac{4}{3}, 2\right\}$
2) $\{-4, 4\}$
3) $\left\{-2, \frac{4}{3}\right\}$
4) $\{-4, 2\}$

470 The zeros of the function $p(x) = x^2 - 2x - 24$ are
1) –8 and 3
2) –6 and 4
3) –4 and 6
4) –3 and 8

471 The zeros of the function $f(x) = x^2 - 5x - 6$ are
1) –1 and 6
2) 1 and –6
3) 2 and –3
4) –2 and 3

472 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

473 The zeros of the function $f(x) = 2x^2 - 4x - 6$ are
1) 3 and –1
2) 3 and 1
3) –3 and 1
4) –3 and –1

474 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

475 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

476 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) $f(x) = (x - 5)(x - 6)$

477 The zeros of a polynomial function are –2, 4, and 0. What are all the factors of this function?
1) $(x + 2)$ and $(x - 4)$
2) $(x - 2)$ and $(x + 4)$
3) $x, (x + 2),$ and $(x - 4)$
4) $x, (x - 2),$ and $(x + 4)$

478 What are the zeros of $m(x) = x(x^2 - 16)$?
1) –4 and 4, only
2) –8 and 8, only
3) $-4, 0,$ and 4
4) $-8, 0,$ and 8

479 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) $y = x^2 - 10x + 24$

480 If $f(x) = 2x^2 + x - 3$, which equation can be used to determine the zeros of the function?
1) $0 = (2x - 3)(x + 1)$
2) $0 = (2x + 3)(x - 1)$
3) $0 = 2x(x + 1) - 3$
4) $0 = 2x(x - 1) - 3(x + 1)$

481 Determine all the zeros of $m(x) = x^2 - 4x + 3$, algebraically.

482 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$. Explain what the zeros represent on the graph of $r(x)$.

483 Find the zeros of $f(x) = (x - 3)^2 - 49$, algebraically.

484 If the zeros of the function $g(x)$ are $\{-3, 0, 4\}$, which function could represent $g(x)$?
1) $g(x) = (x + 3)(x - 4)$
2) $g(x) = (x - 3)(x + 4)$
3) $g(x) = x(x + 3)(x - 4)$
4) $g(x) = x(x - 3)(x + 4)$

485 Which polynomial function has zeros at –3, 0, and 4?
1) $f(x) = (x + 3)(x^2 + 4)$
2) $f(x) = (x^2 - 3)(x - 4)$
3) $f(x) = x(x + 3)(x - 4)$
4) $f(x) = x(x - 3)(x + 4)$

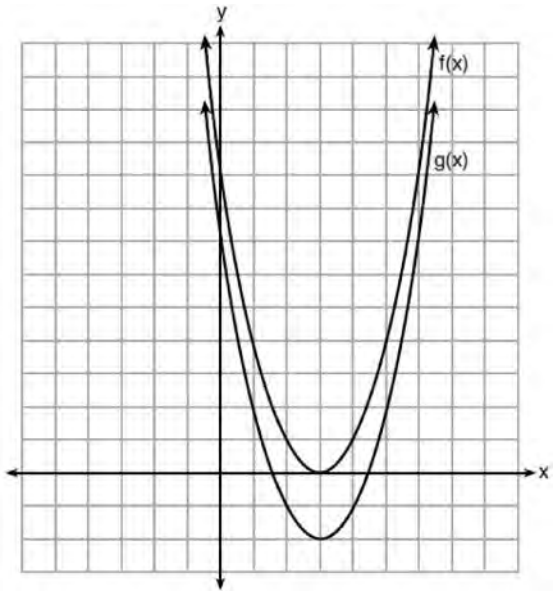
486 Explain how to determine the zeros of $f(x) = (x + 3)(x - 1)(x - 8)$. State the zeros of the function.

F.BF.B.3: GRAPHING POLYNOMIAL FUNCTIONS

487 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

Algebra I Regents Exam Questions by State Standard: Topic

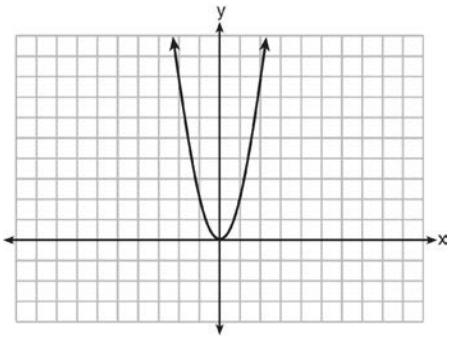
488 The functions $f(x) = x^2 - 6x + 9$ and $g(x) = f(x) + k$ are graphed below.



Which value of k would result in the graph of $g(x)$?

1) 0
2) 2
3) −3
4) −2

489 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

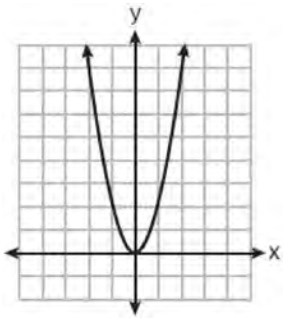
1) wider and opens downward
2) wider and opens upward
3) narrower and opens downward
4) narrower and opens upward

490 What would be the order of these quadratic functions when they are arranged from the narrowest graph to the widest graph?

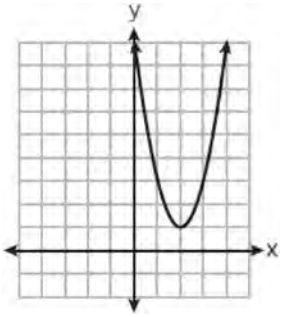
$f(x) = -5x^2 \quad g(x) = 0.5x^2 \quad h(x) = 3x^2$

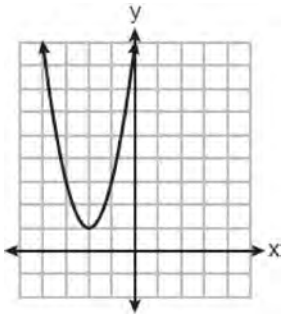
1) $f(x), g(x), h(x)$
2) $g(x), h(x), f(x)$
3) $h(x), f(x), g(x)$
4) $f(x), h(x), g(x)$

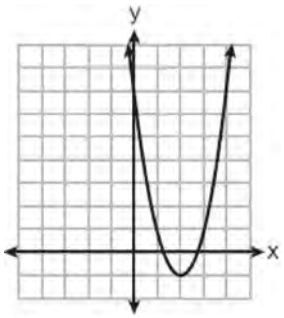
491 The graph of $y = f(x)$ is shown below.

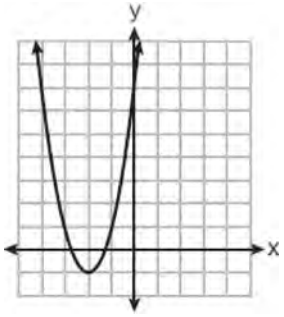


Which graph represents $y = f(x - 2) + 1$?

1) 

2) 

3) 

4) 

492 Compared to the graph of $f(x) = x^2$, the graph of $g(x) = (x-2)^2 + 3$ is the result of translating $f(x)$
1) 2 units up and 3 units right
2) 2 units down and 3 units up
3) 2 units right and 3 units up
4) 2 units left and 3 units right

493 If $f(x) = x^2$, which function is the result of shifting $f(x)$ 3 units left and 2 units down?
1) $g(x) = (x+2)^2 - 3$
2) $g(x) = (x-2)^2 + 3$
3) $g(x) = (x+3)^2 - 2$
4) $g(x) = (x-3)^2 + 2$

494 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 $g(x)$?
1) $2(x-3)^2 - 1$
2) $2(x+3)^2 - 1$
3) $2x^2 + 2$
4) $2x^2 - 4$

495 Given: $f(x) = (x-2)^2 + 4$
$g(x) = (x-5)^2 + 4$
When compared to the graph of $f(x)$, the graph of $g(x)$ is
1) shifted 3 units to the left
2) shifted 3 units to the right
3) shifted 5 units to the left
4) shifted 5 units to the right

496 Josh graphed the function $f(x) = -3(x-1)^2 + 2$. He then graphed the function $g(x) = -3(x-1)^2 - 5$ on the same coordinate plane. The vertex of $g(x)$ is
1) 7 units below the vertex of $f(x)$
2) 7 units above the vertex of $f(x)$
3) 7 units to the right of the vertex of $f(x)$
4) 7 units to the left of the vertex of $f(x)$

497 If the parent function of $f(x)$ is $p(x) = x^2$, then the graph of the function $f(x) = (x-k)^2 + 5$, where $k > 0$, would be a shift of
1) k units to the left and a move of 5 units up
2) k units to the left and a move of 5 units down
3) k units to the right and a move of 5 units up
4) k units to the right and a move of 5 units down

498 When the function $f(x) = x^2$ is multiplied by the value a, where $a > 1$, the graph of the new function, $g(x) = ax^2$
1) opens upward and is wider
2) opens upward and is narrower
3) opens downward and is wider
4) opens downward and is narrower

499 Caitlin graphs the function $f(x) = ax^2$, where a is a positive integer. If Caitlin multiplies a by –2, when compared to $f(x)$, the new graph will become
1) narrower and open downward
2) narrower and open upward
3) wider and open downward
4) wider and open upward

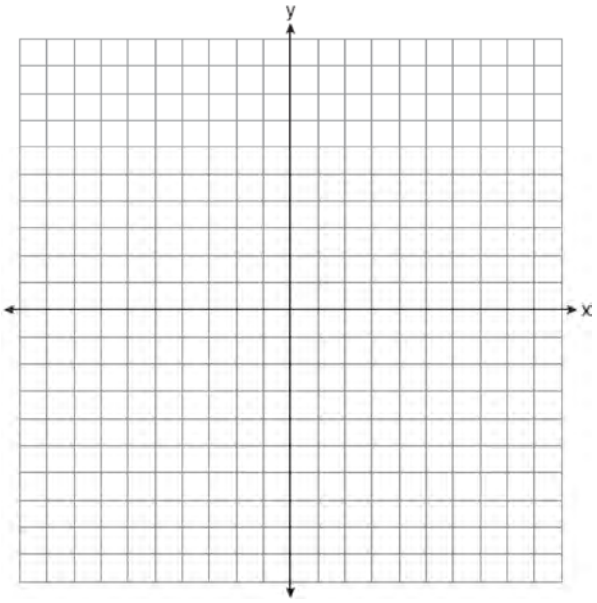
500 How does the graph of $f(x) = 3(x-2)^2 + 1$ compare to the graph of $g(x) = x^2$?
1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 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.

501 In the functions $f(x) = kx^2$ and $g(x) = |kx|$, k is a positive integer. If k is replaced by $\frac{1}{2}$, which statement about these new functions is true?
1) The graphs of both $f(x)$ and $g(x)$ become wider.
2) The graph of $f(x)$ becomes narrower and the graph of $g(x)$ shifts left.
3) The graphs of both $f(x)$ and $g(x)$ shift vertically.
4) The graph of $f(x)$ shifts left and the graph of $g(x)$ becomes wider.

502 Describe the transformations performed on the graph of $f(x) = x^2$ to obtain the graph of $g(x)$ when $g(x) = (x-3)^2 - 4$.

503 A student is given the functions $f(x) = (x+1)^2$ and $g(x) = (x+3)^2$. Describe the transformation that maps $f(x)$ onto $g(x)$.

504 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.]



RADICALS

N.RN.B.3: OPERATIONS WITH RADICALS

505 Which expression represents an irrational number?

1) $\sqrt{16} + \sqrt{1}$
2) $\sqrt{25} + \sqrt{4}$
3) $\sqrt{36} + \sqrt{7}$
4) $\sqrt{49} + \sqrt{9}$

506 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 $W = \frac{1}{\sqrt{2}}$

507 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) $P + L$

508 The product of $\sqrt{576}$ and $\sqrt{684}$ is

1) irrational because both factors are irrational
2) rational because both factors are rational
3) irrational because one factor is irrational
4) rational because one factor is rational

509 Which expression results in a rational number?

1) $\sqrt{2} \cdot \sqrt{18}$
2) $5 \cdot \sqrt{5}$
3) $\sqrt{2} + \sqrt{2}$
4) $3\sqrt{2} + 2\sqrt{3}$

510 Which expression results in a rational number?
1) $\sqrt{121} - \sqrt{21}$
2) $\sqrt{25} \bullet \sqrt{50}$
3) $\sqrt{36} \div \sqrt{225}$
4) $3\sqrt{5} + 2\sqrt{5}$

511 Given the following expressions:

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

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

Which expression(s) result in an irrational number?
1) II, only
2) III, only
3) I, III, IV
4) II, III, IV

512 If $x = 2$, $y = 3\sqrt{2}$, and $w = 2\sqrt{8}$, which expression results in a rational number?
1) $x + y$
2) $y - w$
3) $(w)(y)$
4) $y \div x$

513 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.

514 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.

515 Is the product of two irrational numbers always irrational? Justify your answer.

516 Is the product of $\sqrt{16}$ and $\frac{4}{7}$ rational or irrational? Explain your reasoning.

517 State whether the product of $\sqrt{3}$ and $\sqrt{9}$ is rational or irrational. Explain your answer.

518 Is the product of $\sqrt{1024}$ and –3.4 rational or irrational? Explain your reasoning.

519 Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

520 Is the product of $\sqrt{8}$ and $\sqrt{98}$ rational or irrational? Justify your answer.

521 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.

522 State whether $2\sqrt{3}+6$ is rational or irrational. Explain your answer.

523 Is the sum of $3\sqrt{2}$ and $4\sqrt{2}$ rational or irrational? Explain your answer.

524 State whether $7-\sqrt{2}$ is rational or irrational. Explain your answer.

525 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3}+\frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

526 Classify the expression $\frac{2}{\sqrt{144}}+\frac{\sqrt{169}}{3}$ as rational or irrational. Explain your reasoning.

527 Given: $A=\sqrt{363}$ and $B=\sqrt{27}$
Explain why $A+B$ is irrational. Explain why $A \bullet B$ is rational.

528 A teacher wrote the following set of numbers on the board:

$$a=\sqrt{20} \quad b=2.5 \quad c=\sqrt{225}$$

Explain why $a+b$ is irrational, but $b+c$ is rational.

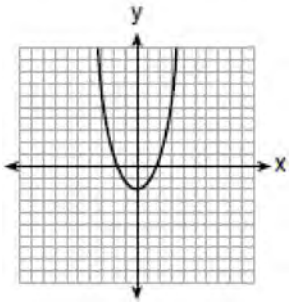
529 What is the sum of $3x\sqrt{7}$ and $2x\sqrt{7}$?

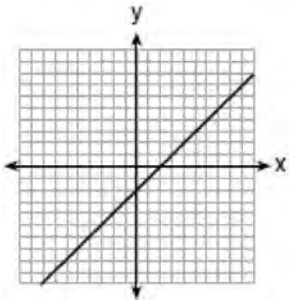
1) $5x\sqrt{7}$
2) $5x^2\sqrt{7}$
3) $5x\sqrt{14}$
4) $5x^2\sqrt{14}$

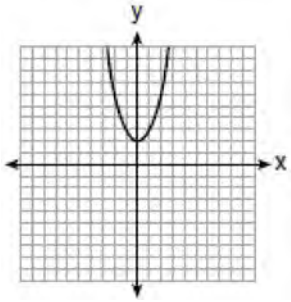
530 Rationalize: $\frac{3}{2\sqrt{6}}$

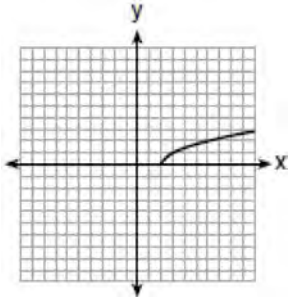
F.IF.C.7: GRAPHING ROOT FUNCTIONS

531 Which graph represents $y = \sqrt{x-2}$?

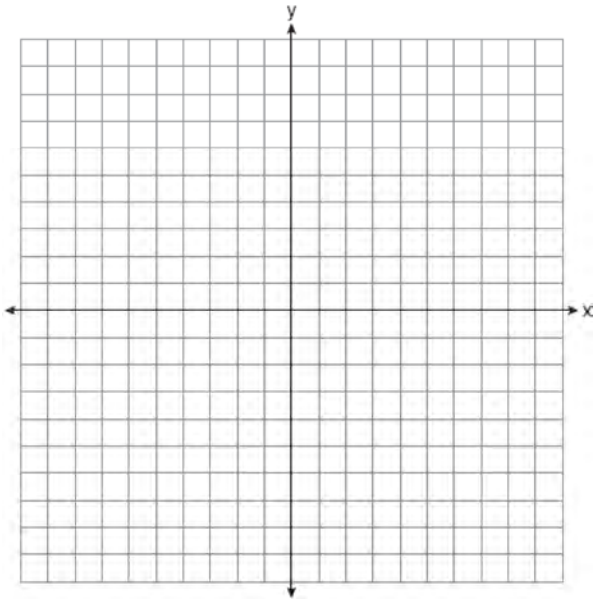
1) 

2) 

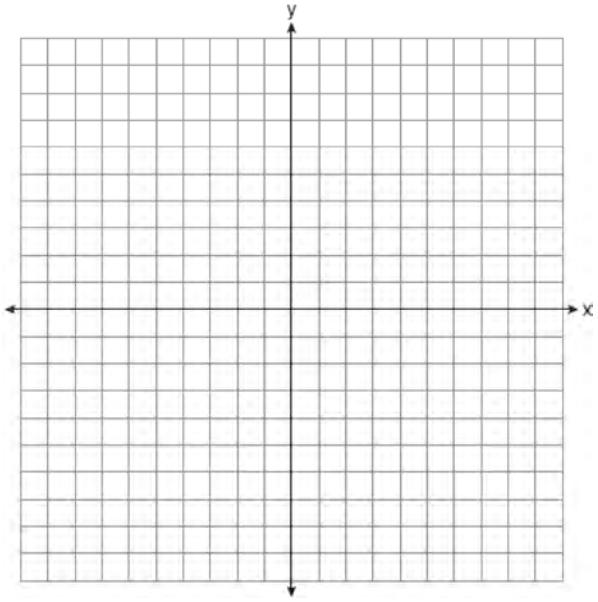
3) 

4) 

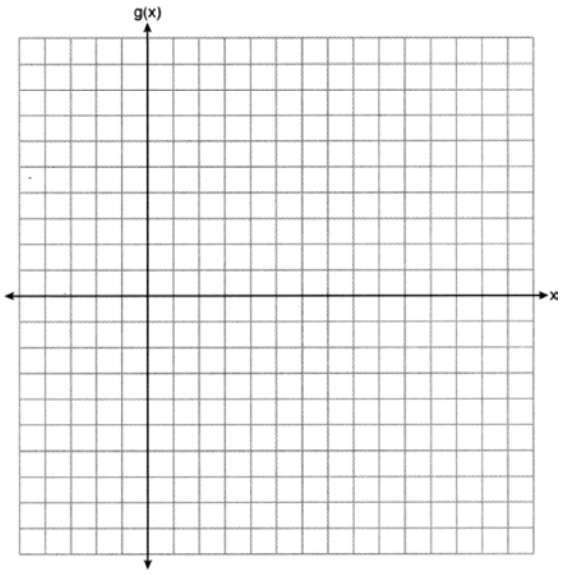
532 Draw the graph of $y = \sqrt{x} - 1$ on the set of axes below.



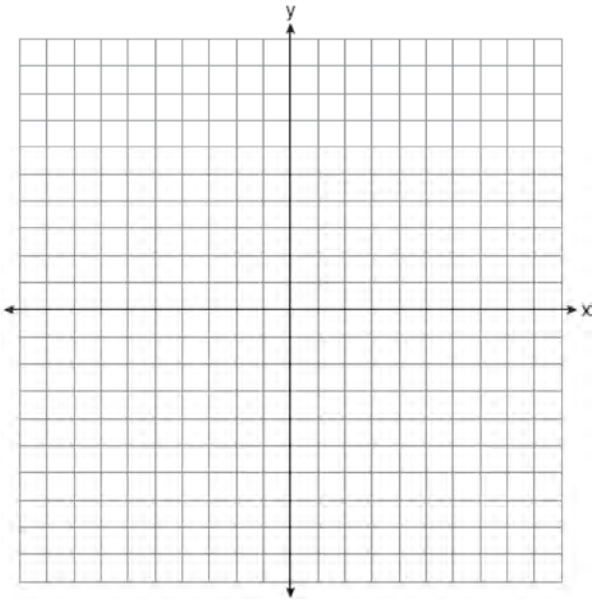
533 Graph $f(x) = \sqrt{x+2}$ over the domain $-2 \le x \le 7$.



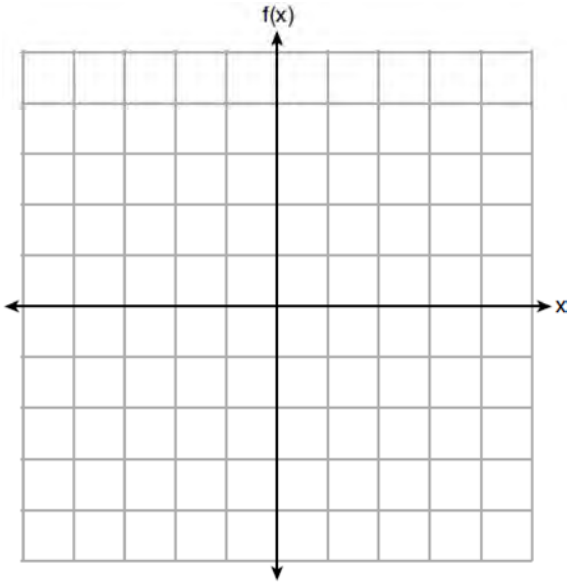
534 Graph the function $g(x) = \sqrt{x+3}$ on the set of axes below.



535 Graph the function $y = -\sqrt{x+3}$ on the set of axes below.



536 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.



A.REI.6: SOLVING LINEAR SYSTEMS

537 A system of equations is shown below.

Equation *A*: $5x + 9y = 12$

Equation *B*: $4x - 3y = 8$

Which method eliminates one of the variables?

1) Multiply equation *A* by $-\frac{1}{3}$ and add the result to equation *B*.
2) Multiply equation *B* by 3 and add the result to equation *A*.
3) Multiply equation *A* by 2 and equation *B* by –6 and add the results together.
4) Multiply equation *B* by 5 and equation *A* by 4 and add the results together.

538 Using the substitution method, Vito is solving the following system of equations algebraically:

$$y + 3x = -4$$

$$2x - 3y = -21$$

Which equivalent equation could Vito use?

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

539 Which system of equations will yield the same solution as the system below?

$$x - y = 3$$

$$2x - 3y = -1$$

1) $-2x - 2y = -6$

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

   $2x - 3y = -1$
3) $2x - 2y = 6$

   $2x - 3y = -1$
4) $3x + 3y = 9$

   $2x - 3y = -1$

540 Which system of linear equations has the same solution as the one shown below?

$$x - 4y = -10$$

$$x + y = 5$$

1) $5x = 10$

   $x + y = 5$
2) $-5y = -5$

   $x + y = 5$
3) $-3x = -30$

   $x + y = 5$
4) $-5y = -5$

   $x - 4y = -10$

541 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) $6x + 6y = 48$

   $6x + 2y = 8$

542 Which system of equations has the same solutions as the system below?

$$3x - y = 7$$

$$2x + 3y = 12$$

1) $6x - 2y = 14$

   $-6x + 9y = 36$
2) $18x - 6y = 42$

   $4x + 6y = 24$
3) $-9x - 3y = -21$

   $2x + 3y = 12$
4) $3x - y = 7$

   $x + y = 2$

543 Which system has the same solution as the system below?

$$x + 3y = 10$$
$$-2x - 2y = 4$$

1) $-x + y = 6$
$2x + 6y = 20$
2) $-x + y = 14$
$2x + 6y = 20$
3) $x + y = 6$
$2x + 6y = 20$
4) $x + y = 14$
$2x + 6y = 20$

544 A system of equations is given below.

$$x + 2y = 5$$
$$2x + y = 4$$

Which system of equations does *not* have the same solution?

1) $3x + 6y = 15$
$2x + y = 4$
2) $4x + 8y = 20$
$2x + y = 4$
3) $x + 2y = 5$
$6x + 3y = 12$
4) $x + 2y = 5$
$4x + 2y = 12$

545 Which pair of equations could *not* be used to solve the following equations for x and y?

$$4x + 2y = 22$$
$$-2x + 2y = -8$$

1) $4x + 2y = 22$
$2x - 2y = 8$
2) $4x + 2y = 22$
$-4x + 4y = -16$
3) $12x + 6y = 66$
$6x - 6y = 24$
4) $8x + 4y = 44$
$-8x + 8y = -8$

546 Which system of equations does *not* have the same solution as the system below?

$$4x + 3y = 10$$
$$-6x - 5y = -16$$

1) $-12x - 9y = -30$
$12x + 10y = 32$
2) $20x + 15y = 50$
$-18x - 15y = -48$
3) $24x + 18y = 60$
$-24x - 20y = -64$
4) $40x + 30y = 100$
$36x + 30y = -96$

547 What is the solution to the system of equations below?

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

1) no solution
2) infinite solutions
3) $(-1, 6)$
4) $\left(\frac{1}{2}, 9\right)$

548 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

1) $(-14.0, -1.4)$
2) $(-6.8, 5.0)$
3) $(1.9, 4.6)$
4) $(6.0, 5.4)$

549 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.

550 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

551 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.

A.CED.A.3: MODELING LINEAR SYSTEMS

552 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) $m + f = 3.95$
   $f + 0.005 = m$

553 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?

1) $a + c = 150$

   $10.25a + 7.75c = 1470$
2) $a + c = 1470$

   $10.25a + 7.75c = 150$
3) $a + c = 150$

   $7.75a + 10.25c = 1470$
4) $a + c = 1470$

   $7.75a + 10.25c = 150$

554 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?

1) $3.50H + 2.50P = 43$

   $H + P = 14$
2) $3.50P + 2.50H = 43$

   $P + H = 14$
3) $3.50H + 2.50P = 14$

   $H + P = 43$
4) $3.50P + 2.50H = 14$

   $P + H = 43$

555 Lizzy has 30 coins that total $4.80. All of her coins are dimes, D, and quarters, Q. Which system of equations models this situation?

1) $D + Q = 4.80$

   $.10D + .25Q = 30$
2) $D + Q = 30$

   $.10D + .25Q = 4.80$
3) $D + Q = 30$

   $.25D + .10Q = 4.80$
4) $D + Q = 4.80$

   $.25D + .10Q = 30$

556 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

557 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

558 A fence was installed around the edge of a rectangular garden. The length, l, of the fence was 5 feet less than 3 times its width, w. The amount of fencing used was 90 feet. Write a system of equations or write an equation using one variable that models this situation. Determine algebraically the dimensions, in feet, of the garden.

559 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.*

560 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90. Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

561 There are two parking garages in Beacon Falls. Garage *A* charges $7.00 to park for the first 2 hours, and each additional hour costs $3.00. Garage *B* charges $3.25 per hour to park. When a person parks for at least 2 hours, write equations to model the cost of parking for a total of *x* hours in Garage *A* and Garage *B.* Determine algebraically the number of hours when the cost of parking at both garages will be the same.

562 Jim had a bag of coins. The number of nickels, *n*, and the number of quarters, *q*, totaled 28 coins. The combined value of the coins was $4. Write a system of equations that models this situation. Use your system of equations to algebraically determine both the number of quarters, *q*, and the number of nickels, *n*, that Jim had in the bag. Jim was given an additional $3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

563 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?

564 For a class picnic, two teachers went to the same store to purchase drinks. One teacher purchased 18 juice boxes and 32 bottles of water, and spent $19.92. The other teacher purchased 14 juice boxes and 26 bottles of water, and spent $15.76. Write a system of equations to represent the costs of a juice box, *j*, and a bottle of water, *w*. Kara said that the juice boxes might have cost 52 cents each and that the bottles of water might have cost 33 cents each. Use your system of equations to justify that Kara's prices are *not* possible. Solve your system of equations to determine the actual cost, in dollars, of each juice box and each bottle of water.

565 At Bea's Pet Shop, the number of dogs, *d*, is initially five less than twice the number of cats, *c*. If she decides to add three more of each, the ratio of cats to dogs will be $\frac{3}{4}$. Write an equation or system of equations that can be used to find the number of cats and dogs Bea has in her pet shop. Could Bea's Pet Shop initially have 15 cats and 20 dogs? Explain your reasoning. Determine algebraically the number of cats and the number of dogs Bea initially had in her pet shop.

566 Dylan has a bank that sorts coins as they are dropped into it. A panel on the front displays the total number of coins inside as well as the total value of these coins. The panel shows 90 coins with a value of $17.55 inside of the bank. If Dylan only collects dimes and quarters, write a system of equations in two variables or an equation in one variable that could be used to model this situation. Using your equation or system of equations, algebraically determine the number of quarters Dylan has in his bank. Dylan's mom told him that she would replace each one of his dimes with a quarter. If he uses all of his coins, determine if Dylan would then have enough money to buy a game priced at $20.98 if he must also pay an 8% sales tax. Justify your answer.

567 At the present time, Mrs. Bee's age is six years more than four times her son's age. Three years ago, she was seven times as old as her son was then. If *b* represents Mrs. Bee's age now and *s* represents her son's age now, write a system of equations that could be used to model this scenario. Use this system of equations to determine, algebraically, the ages of both Mrs. Bee and her son now. Determine how many years from now Mrs. Bee will be three times as old as her son will be then.

568 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11. Using *c* for the cost of a cheeseburger and *f* for the cost of medium fries, write a system of equations that models this situation. The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer. Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

569 Allysa spent $35 to purchase 12 chickens. She bought two different types of chickens. Americana chickens cost $3.75 each and Delaware chickens cost $2.50 each. Write a system of equations that can be used to determine the number of Americana chickens, *A*, and the number of Delaware chickens, *D*, she purchased. Determine algebraically how many of each type of chicken Allysa purchased. Each Americana chicken lays 2 eggs per day and each Delaware chicken lays 1 egg per day. Allysa only sells eggs by the full dozen for $2.50. Determine how much money she expects to take in at the end of the first week with her 12 chickens.

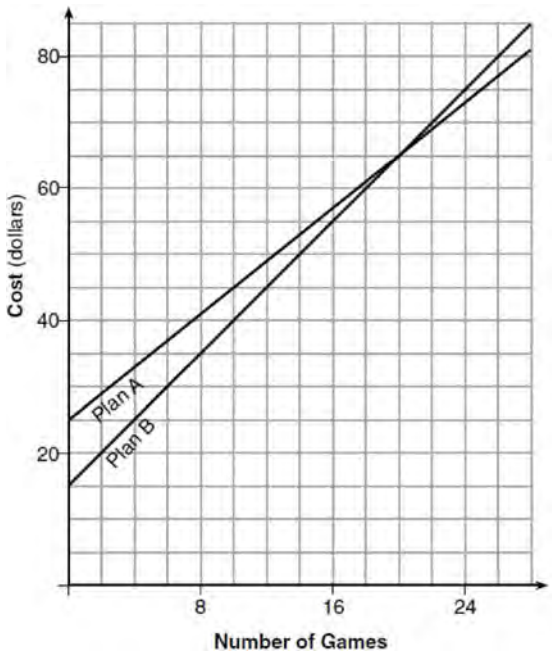
570 At a local garden shop, the price of plants includes sales tax. The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28. If *l* is the cost of a large plant and *m* is the cost of a medium plant, write a system of equations that models this situation. Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer. Determine algebraically both the cost of a large plant and the cost of a medium plant.

571 An ice cream shop sells small and large sundaes. One day, 30 small sundaes and 50 large sundaes were sold for $420. Another day, 15 small sundaes and 35 large sundaes were sold for $270. Sales tax is included in all prices. If *x* is the cost of a small sundae and *y* is the cost of a large sundae, write a system of equations to represent this situation. Peyton thinks that small sundaes cost $2.75 and large sundaes cost $6.75. Is Peyton correct? Justify your answer. Using your equations, determine algebraically the cost of one small sundae and the cost of one large sundae.

572 At an amusement park, the cost for an adult admission is *a*, and for a child the cost is *c*. For a group of six that included two children, the cost was $325.94. For a group of five that included three children, the cost was $256.95. All ticket prices include tax. Write a system of equations, in terms of *a* and *c*, that models this situation. Use your system of equations to determine the exact cost of each type of ticket algebraically. Determine the cost for a group of four that includes three children.

573 Dana went shopping for plants to put in her garden. She bought three roses and two daisies for $31.88. Later that day, she went back and bought two roses and one daisy for $18.92. If *r* represents the cost of one rose and *d* represents the cost of one daisy, write a system of equations that models this situation. Use your system of equations to algebraically determine both the cost of one rose and the cost of one daisy. If Dana had waited until the plants were on sale, she would have paid $4.50 for each rose and $6.50 for each daisy. Determine the total amount of money she would have saved by buying all of her flowers during the sale.

574 The graph below models the cost of renting video games with a membership in Plan *A* and Plan *B*.



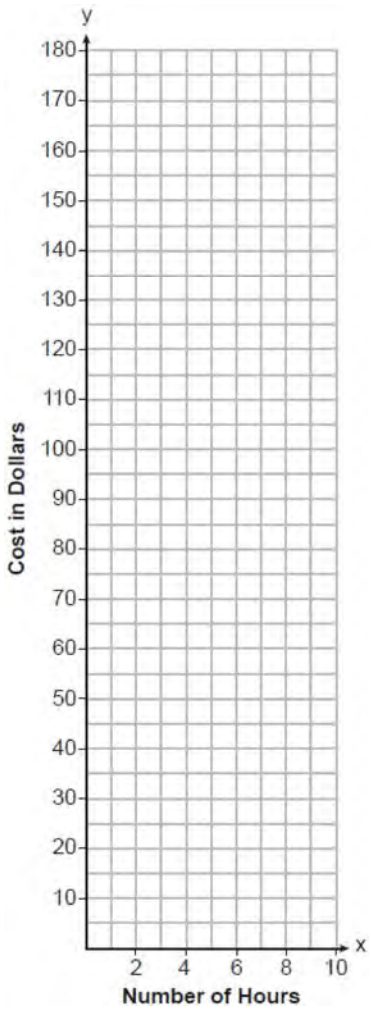
Explain why Plan *B* is the better choice for Dylan if he only has $50 to spend on video games, including a membership fee. Bobby wants to spend $65 on video games, including a membership fee. Which plan should he choose? Explain your answer.

A.REI.C.6: GRAPHING LINEAR SYSTEMS

575 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.

576 Lydia wants to take art classes. She compares the cost at two art centers. Center *A* charges $25 per hour and a registration fee of $25. Center *B* charges $15 per hour and a registration fee of $75. Lydia plans to take *x* hours of classes. Write an equation that models this situation, where *A* represents the total cost of Center *A*. Write an equation that models this situation, where *B* represents the total cost of Center *B*. If Lydia wants to take 10 hours of classes, use your equations to determine which center will cost *less*. Graph your equations for Center *A* and Center *B* on the set of axes below.



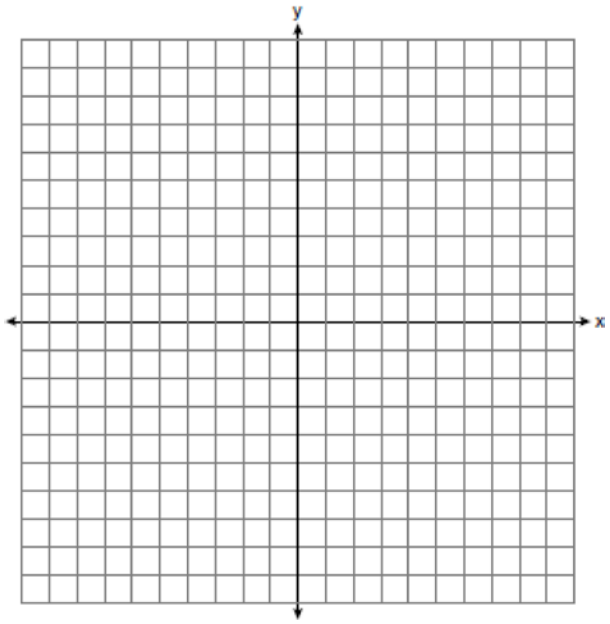
State the number of hours of classes when the centers will cost the same.

577 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.

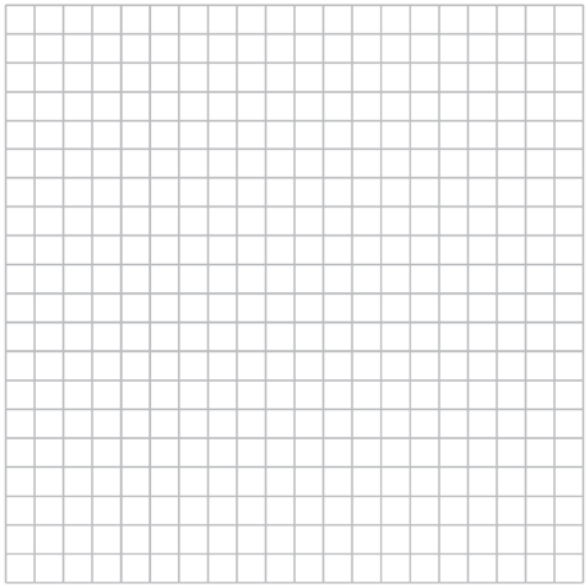
a) In function notation, write $A(x)$ to represent the total cost of attending carnival *A* and going on *x* rides. In function notation, write $B(x)$ to represent the total cost of attending carnival *B* and going on *x* rides.

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.]

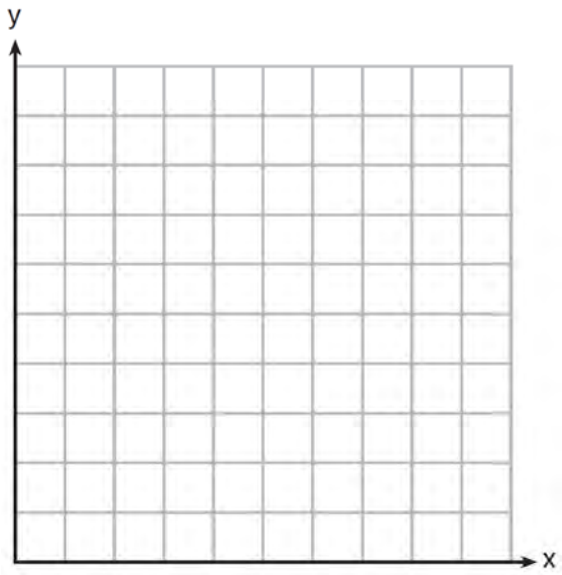
c) Marnie wants to go on five rides. Determine which carnival would have the lower total cost. Justify your answer.



578 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.

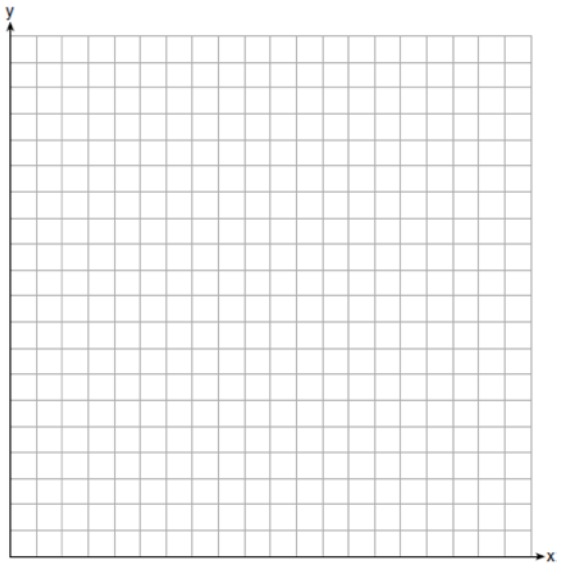


579 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for $19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for $24. Let *x* equal the price of one package of cupcakes and *y* equal the price of one package of brownies. Write a system of equations that describes the given situation. On the set of axes below, graph the system of equations.



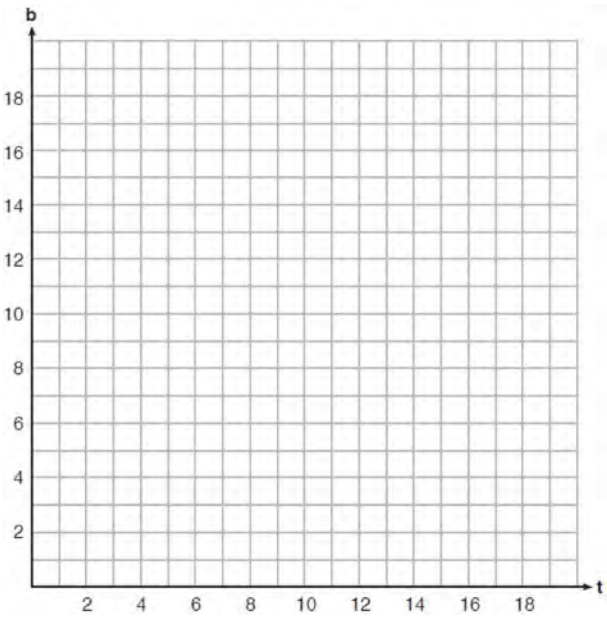
Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

580 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year. Write a system of equations to model this situation, where *x* represents the number of years since 2010. Graph this system of equations on the set of axes below.



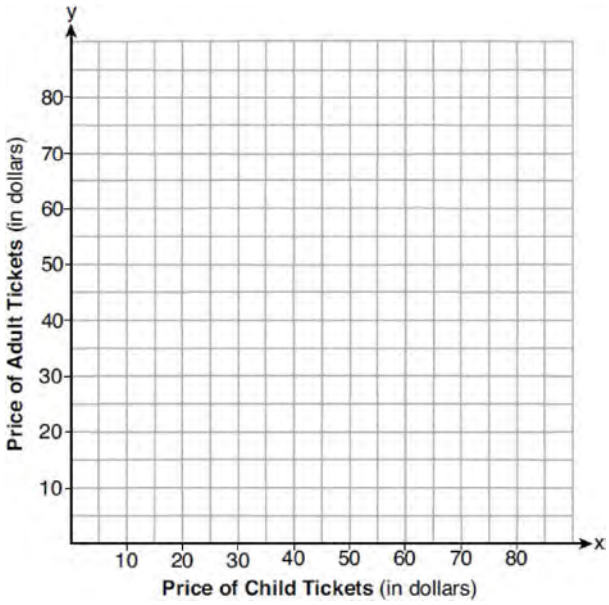
Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

581 A recreation center ordered a total of 15 tricycles and bicycles from a sporting goods store. The number of wheels for all the tricycles and bicycles totaled 38. Write a linear system of equations that models this scenario, where *t* represents the number of tricycles and *b* represents the number of bicycles ordered. On the set of axes below, graph this system of equations.



Based on your graph of this scenario, could the recreation center have ordered 10 tricycles? Explain your reasoning.

582 Two families went to Rollercoaster World. The Brown family paid $170 for 3 children and 2 adults. The Peckham family paid $360 for 4 children and 6 adults. If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation. Graph your system of equations on the set of axes below.



State the coordinates of the point of intersection. Explain what each coordinate of the point of intersection means in the context of the problem.

A.CED.A.3: MODELING SYSTEMS OF LINEAR INEQUALITIES

583 During summer vacation, Ben decides to sell hot dogs and pretzels on a food cart in Manhattan. It costs Ben $0.50 for each hot dog and $0.40 for each pretzel. He has only $100 to spend each day on hot dogs and pretzels. He wants to sell at least 200 items each day. If h is the number of hot dogs and p is the number of pretzels, which inequality would be part of a system of inequalities used to determine the total number of hot dogs and pretzels Ben can sell?

1) $h + p \leq 200$
2) $h + p \geq 200$
3) $0.50h + 0.40p \geq 200$
4) $0.50h + 0.40p \leq 200$

584 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?

1) $m + g \leq 40$

   $12m + 14g \geq 250$
2) $m + g \geq 40$

   $12m + 14g \leq 250$
3) $m + g \leq 40$

   $12m + 14g \leq 250$
4) $m + g \geq 40$

   $12m + 14g \geq 250$

585 Gretchen has $50 that she can spend at the fair. Ride tickets cost $1.25 each and game tickets cost $2 each. She wants to go on a minimum of 10 rides and play at least 12 games. Which system of inequalities represents this situation when r is the number of ride tickets purchased and g is the number of game tickets purchased?

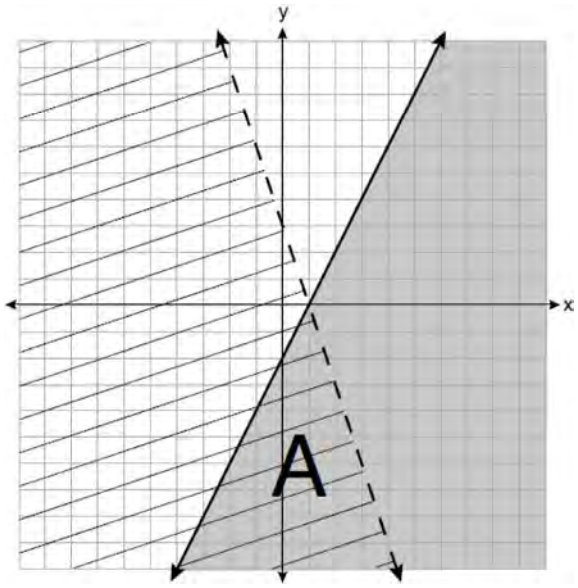
1) $1.25r + 2g < 50$
   $r \leq 10$
   $g > 12$
2) $1.25r + 2g \leq 50$
   $r \geq 10$
   $g \geq 12$
3) $1.25r + 2g \leq 50$
   $r \geq 10$
   $g > 12$
4) $1.25r + 2g < 50$
   $r \leq 10$
   $g \geq 12$

586 A high school drama club is putting on their annual theater production. There is a maximum of 800 tickets for the show. The costs of the tickets are $6 before the day of the show and $9 on the day of the show. To meet the expenses of the show, the club must sell at least $5,000 worth of tickets.
a) Write a system of inequalities that represent this situation.
b) The club sells 440 tickets before the day of the show. Is it possible to sell enough additional tickets on the day of the show to at least meet the expenses of the show? Justify your answer.

587 A drama club is selling tickets to the spring musical. The auditorium holds 200 people. Tickets cost $12 at the door and $8.50 if purchased in advance. The drama club has a goal of selling at least $1000 worth of tickets to Saturday's show. Write a system of inequalities that can be used to model this scenario. If 50 tickets are sold in advance, what is the minimum number of tickets that must be sold at the door so that the club meets its goal? Justify your answer.

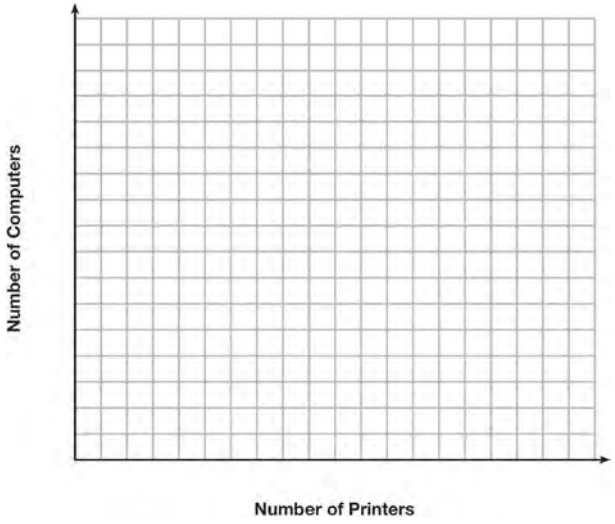
588 The drama club is running a lemonade stand to raise money for its new production. A local grocery store donated cans of lemonade and bottles of water. Cans of lemonade sell for $2 each and bottles of water sell for $1.50 each. The club needs to raise at least $500 to cover the cost of renting costumes. The students can accept a maximum of 360 cans and bottles. Write a system of inequalities that can be used to represent this situation. The club sells 144 cans of lemonade. What is the *least* number of bottles of water that must be sold to cover the cost of renting costumes? Justify your answer.

589 A system of inequalities is graphed on the set of axes below.



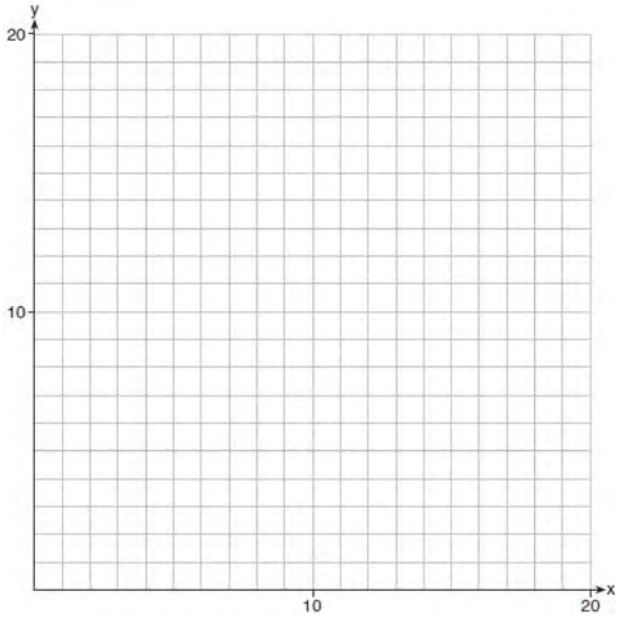
State the system of inequalities represented by the graph. State what region *A* represents. State what the entire gray region represents.

590 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.

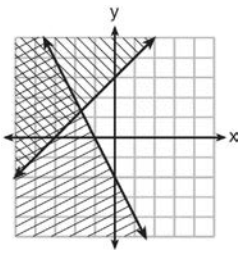
591 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at 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.

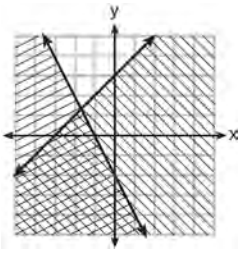


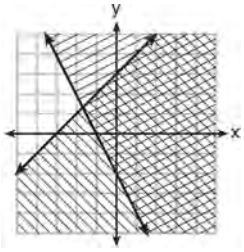
Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

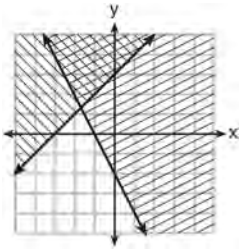
A.REI.D.12: GRAPHING SYSTEMS OF LINEAR INEQUALITIES

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

1) 

2) 

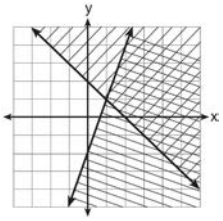
3) 

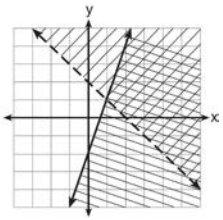
4) 

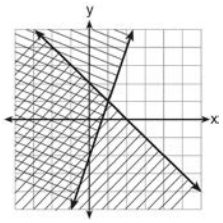
593 Given: $y + x > 2$

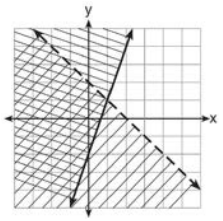
$y \le 3x - 2$

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

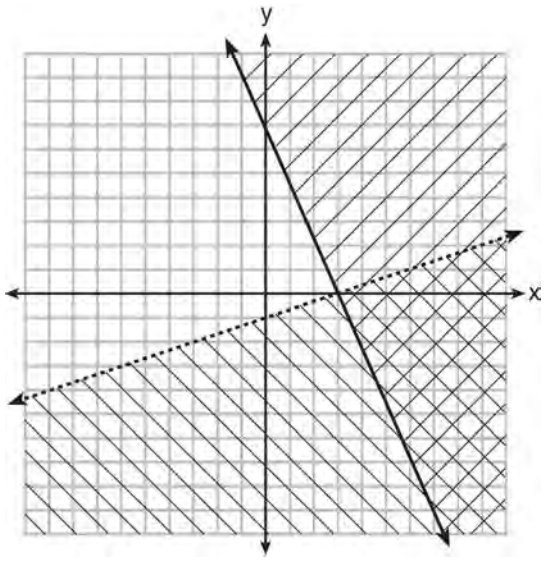
1) 

2) 

3) 

4) 

594 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) $(-3,5)$

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

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

596 Which point is a solution to the system below?

$2y < -12x + 4$

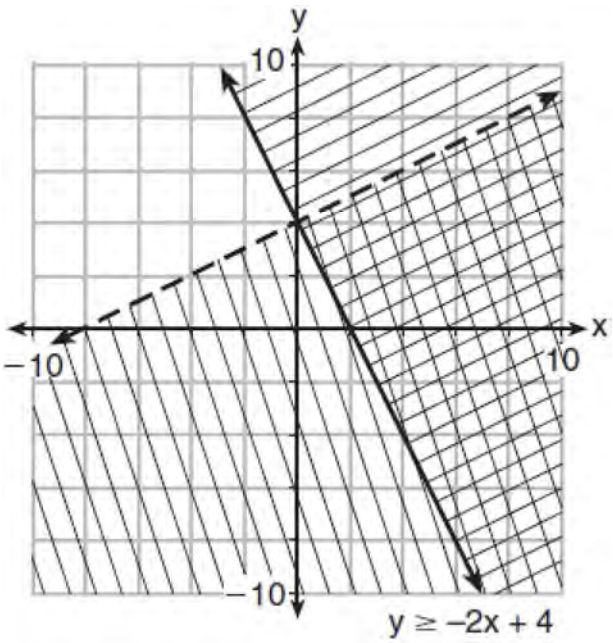
$y < -6x + 4$

1) $\left(1, \frac{1}{2}\right)$
2) $(0,6)$
3) $\left(-\frac{1}{2}, 5\right)$
4) $(-3,2)$

597 First consider the system of equations $y = -\frac{1}{2}x + 1$ and $y = x - 5$. Then consider the system of inequalities $y > -\frac{1}{2}x + 1$ and $y < x - 5$. When comparing the number of solutions in each of these systems, which statement is true?

1) Both systems have an infinite number of solutions.
2) The system of equations has more solutions.
3) The system of inequalities has more solutions.
4) Both systems have only one solution.

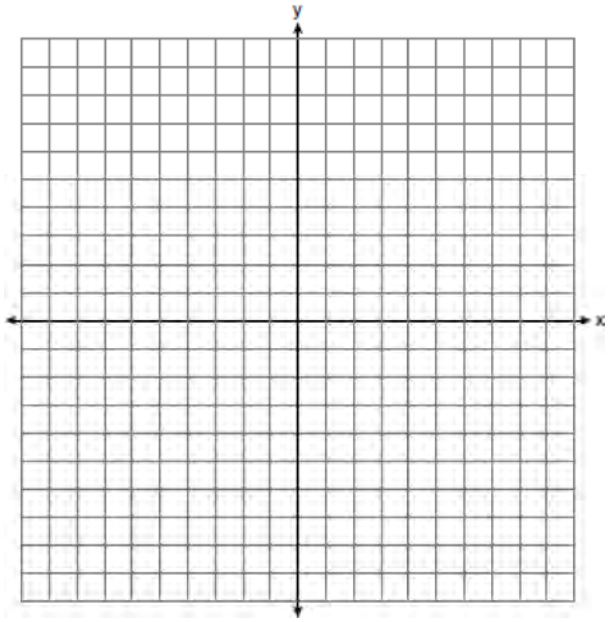
598 Determine if the point $(0,4)$ is a solution to the system of inequalities graphed below. Justify your answer.



599 Graph the following systems of inequalities on the set of axes below:

$$2y \geq 3x - 16$$

$$y + 2x > -5$$



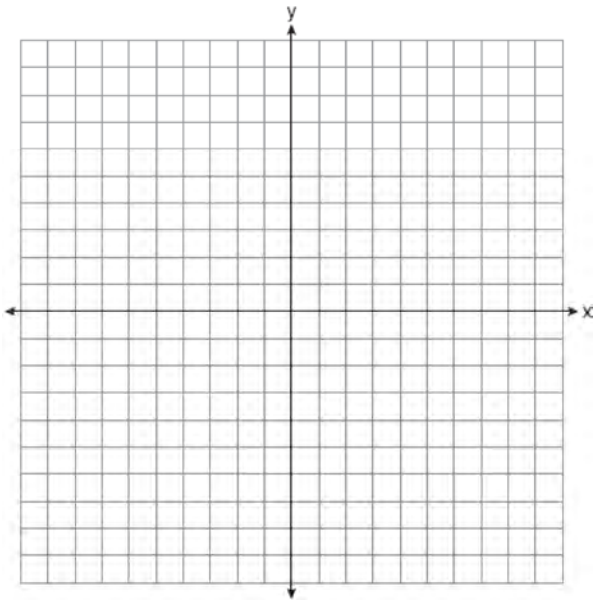
Based upon your graph, explain why $(6,1)$ is a solution to this system and why $(-6,7)$ is *not* a solution to this system.

600 Given: $3y - 9 \le 12$

$y < -2x - 4$

Graph the system of inequalities on the set of axes below

.



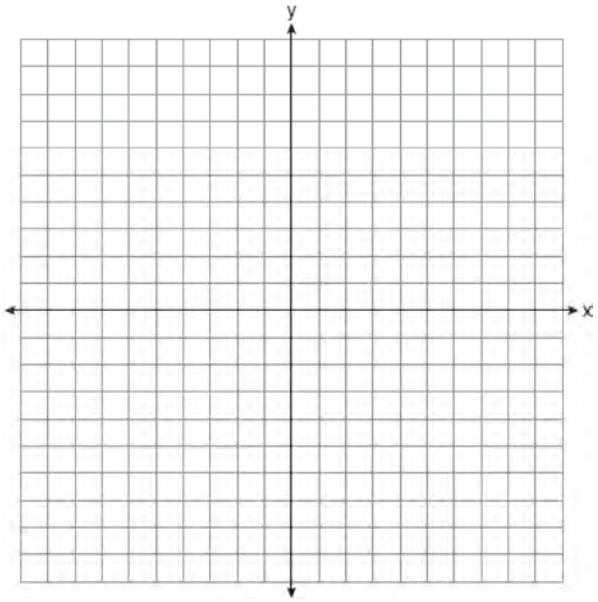
State the coordinates of a point that satisfies both inequalities. Justify your answer.

601 On the set of axes below, graph the following system of inequalities:

$2x - y > 4$

$x + 3y > 6$

Label the solution set *S*.

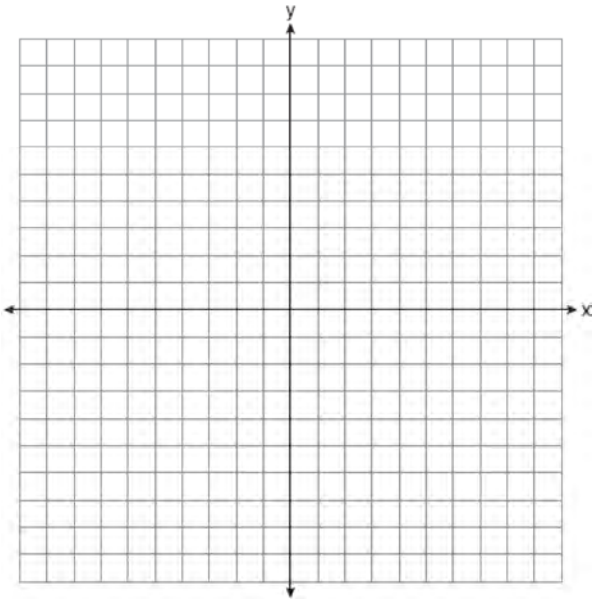


Is $(4,2)$ a solution to this system? Justify your answer.

602 Graph the system of inequalities on the set of axes below:

$$y \leq -\frac{3}{4}x + 5$$

$$3x - 2y > 4$$

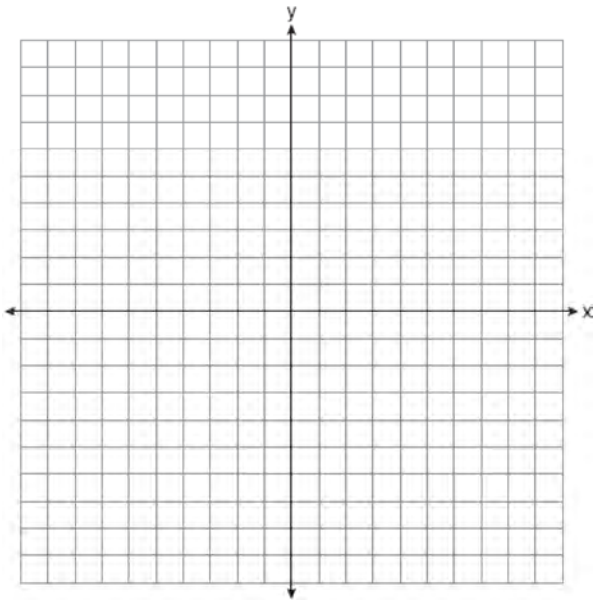


Is $(6,3)$ a solution to the system of inequalities? Explain your answer.

603 On the set of axes below, graph the following system of inequalities:

$$2y + 3x \leq 14$$

$$4x - y < 2$$



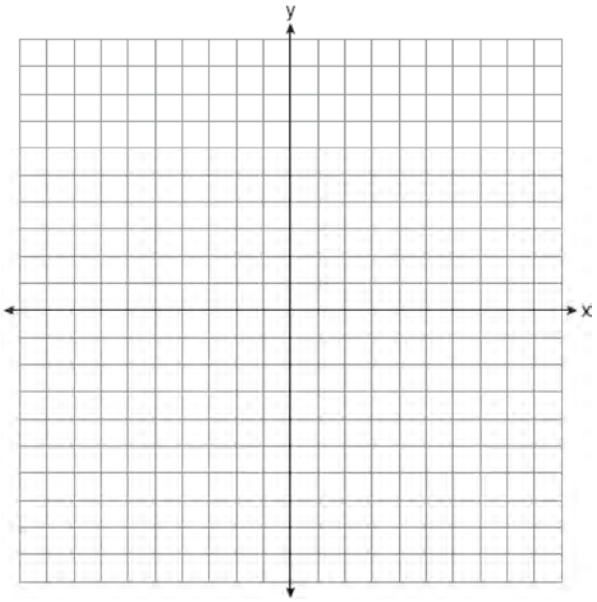
Determine if the point $(1,2)$ is in the solution set. Explain your answer.

604 Graph the following system of inequalities on the set of axes below:

$$-2y < 3x + 12$$

$$x \geq -3$$

Label the solution set *S*.

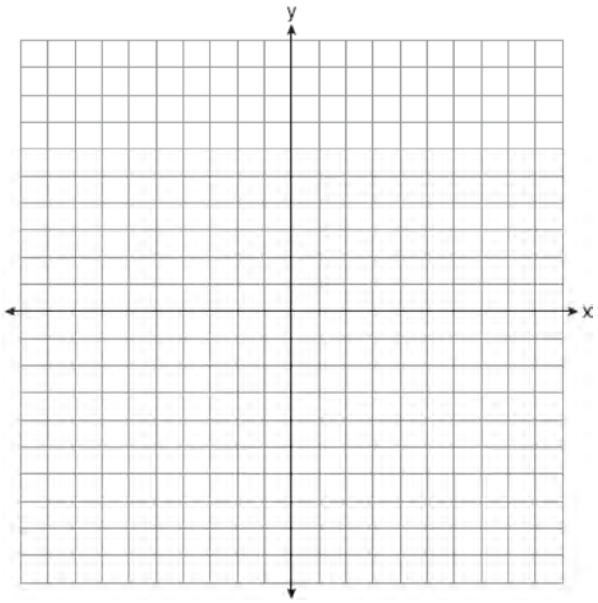


Allison thinks that $(2, -9)$ is a solution to this system. Determine if Allison is correct. Justify your answer.

605 Solve the system of inequalities graphically on the set of axes below. Label the solution set *S*.

$$2x + 3y < 9$$

$$2y \geq 4x + 6$$

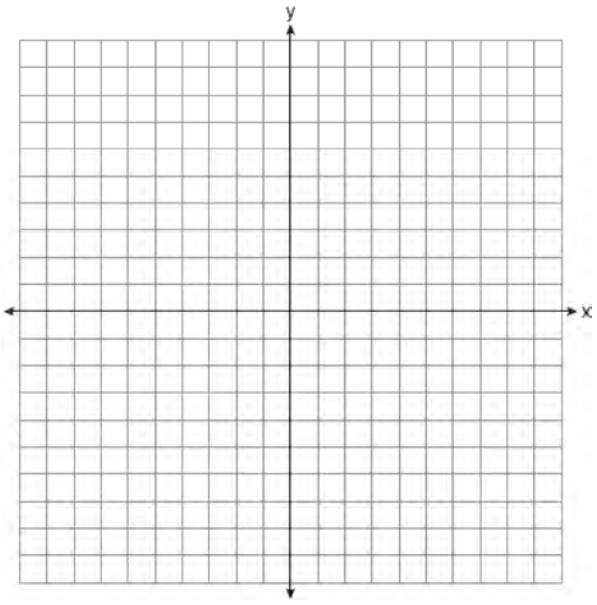


Determine if the point $(0, 3)$ is a solution to this system of inequalities. Justify your answer.

606 Solve the system of inequalities graphically on the set of axes below. Label the solution set *S*.

$$y + 3x < 5$$

$$1 \geq 2x - y$$

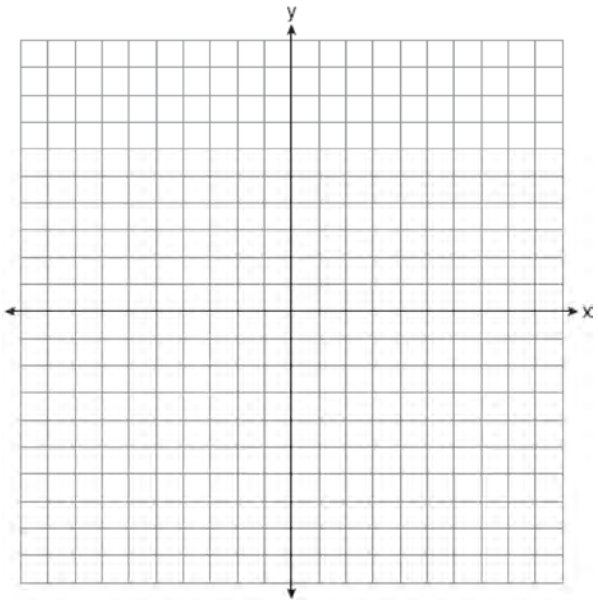


Is the point $(-5, 0)$ in the solution set? Explain your answer.

607 On the set of axes below, graph the following system of inequalities:

$$2x + y \geq 8$$

$$y - 5 < 3x$$

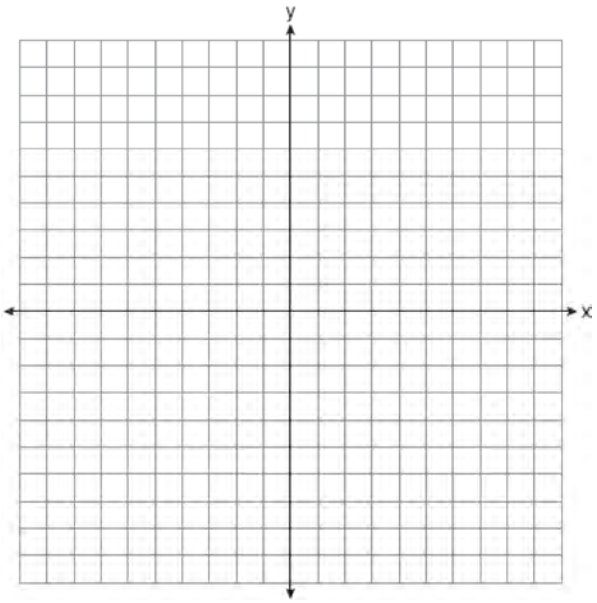


Determine if the point $(1, 8)$ is in the solution set. Explain your answer.

608 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$

$$3x + 4y + 4 \geq 0$$



Stephen says the point $(0,0)$ is a solution to this system. Determine if he is correct, and explain your reasoning.

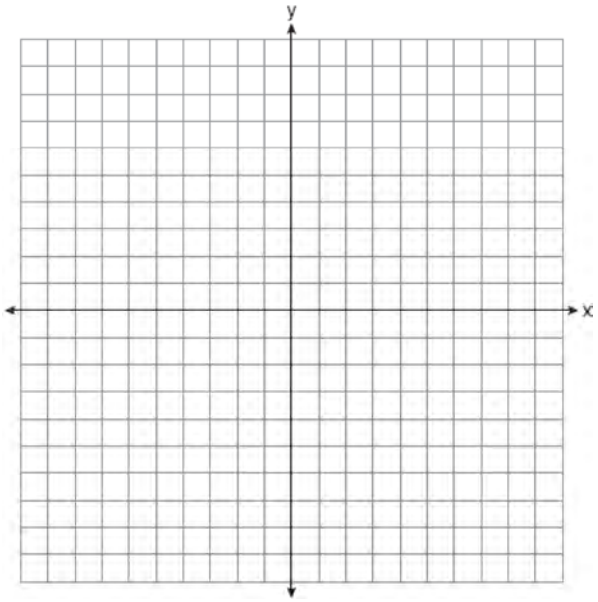
609 Solve the following system of inequalities graphically on the set of axes below.

$$2x + 3y \geq -6$$

$$x < 3y + 6$$

Label the solution set *S*.

.

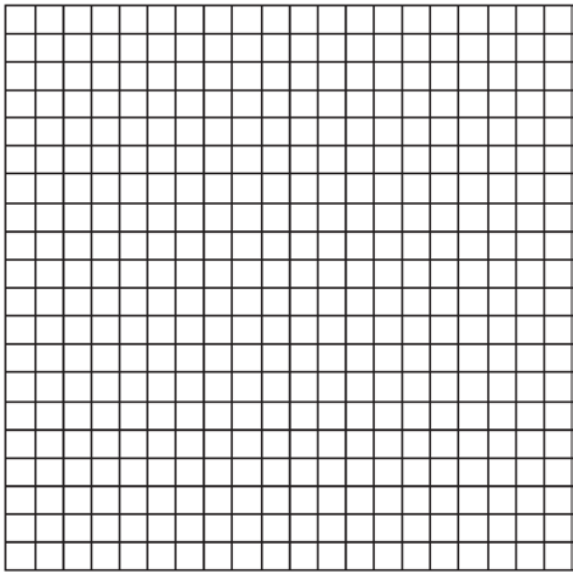


Is the point $(4,-2)$ in the solution set? Explain your answer.

610 Solve the following system of inequalities graphically on the grid below and label the solution *S*.

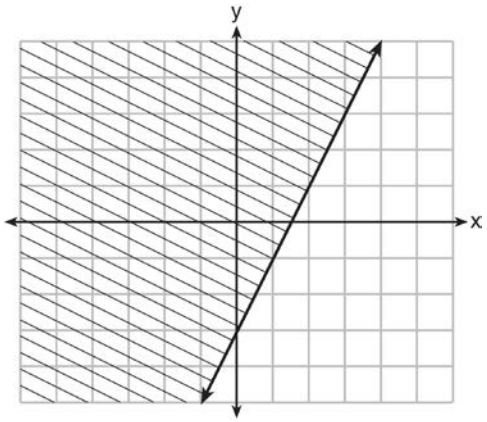
$$3x + 4y > 20$$

$$x < 3y - 18$$



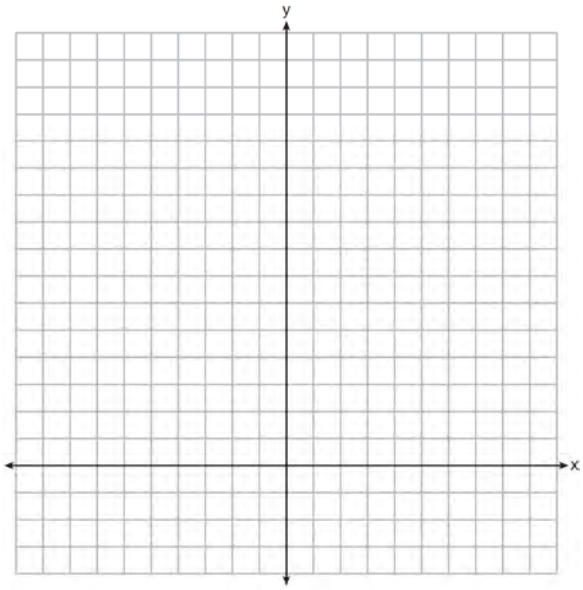
Is the point $(3, 7)$ in the solution set? Explain your answer.

611 The graph of an inequality is shown below.



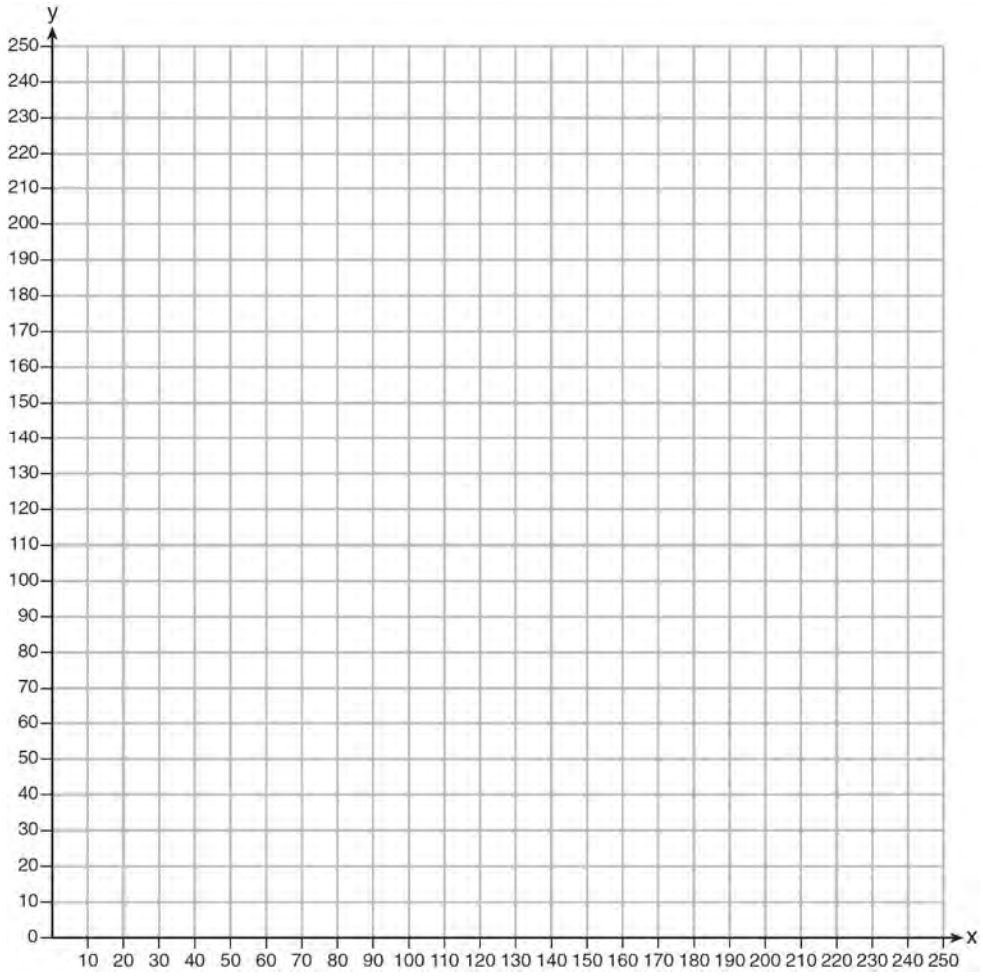
a) Write the inequality represented by the graph.
b) On the same set of axes, graph the inequality $x + 2y < 4$.
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2, 1)$ is in the solution set for this system of inequalities. Determine and state whether you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

612 The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14. Graph the inequalities that represent this scenario on the set of axes below.



Kai says that the point $(6,2)$ is a solution to this system. Determine if he is correct and explain your reasoning.

613 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost $12.50 and child tickets cost $6.25. The cinema's goal is to sell at least $1500 worth of tickets for the theater. Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, *x*, and child tickets, *y*, that would satisfy the cinema's goal. Graph the solution to this system of inequalities on the set of axes below. Label the solution with an *S*. Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.



A.REI.C.7: QUADRATIC-LINEAR SYSTEMS

614 A quadratic function and a linear function are graphed on the same set of axes. Which situation is *not* possible?

1) The graphs do not intersect.
2) The graphs intersect in one point.
3) The graphs intersect in two points.
4) The graphs intersect in three points.

615 Solve the following systems of equations algebraically for all values of *x* and *y*:

$$y = x^2 + 5x - 17$$

$$x - y = 5$$

A.REI.D.11: QUADRATIC-LINEAR SYSTEMS

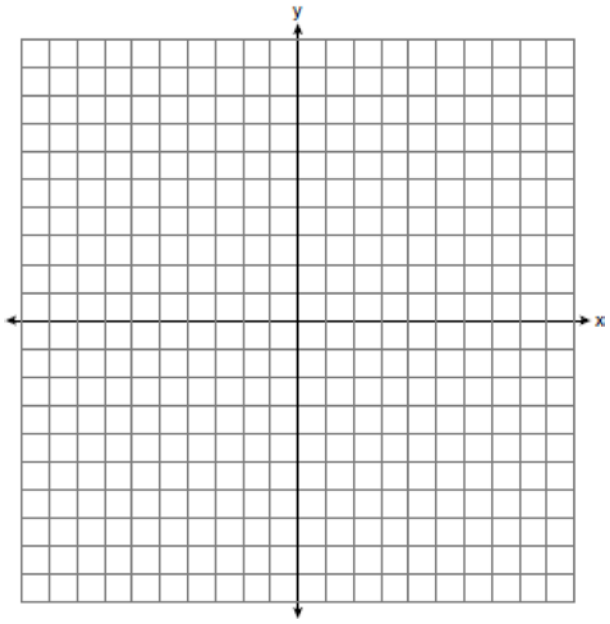
616 If $f(x) = x^2 + 2x + 1$ and $g(x) = 7x - 5$, for which values of x is $f(x) = g(x)$?
1) -1 and 6
2) -6 and -1
3) -3 and -2
4) 2 and 3

617 If $f(x) = x^2 - 2x - 8$ and $g(x) = \frac{1}{4}x - 1$, for which values 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

618 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

619 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.

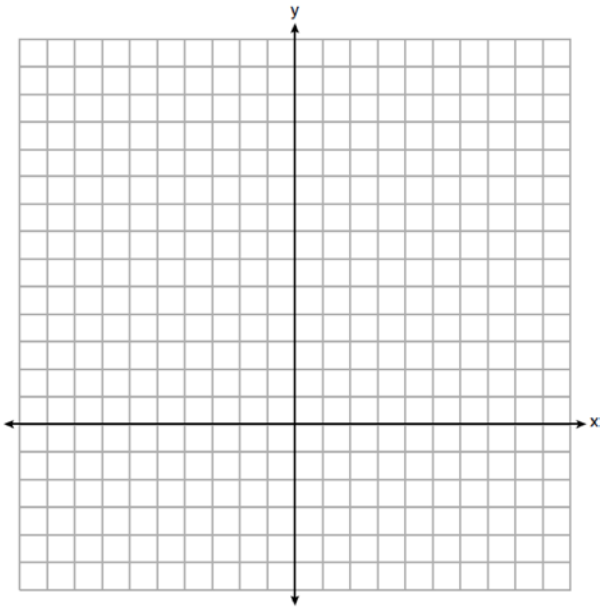
620 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



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

621 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

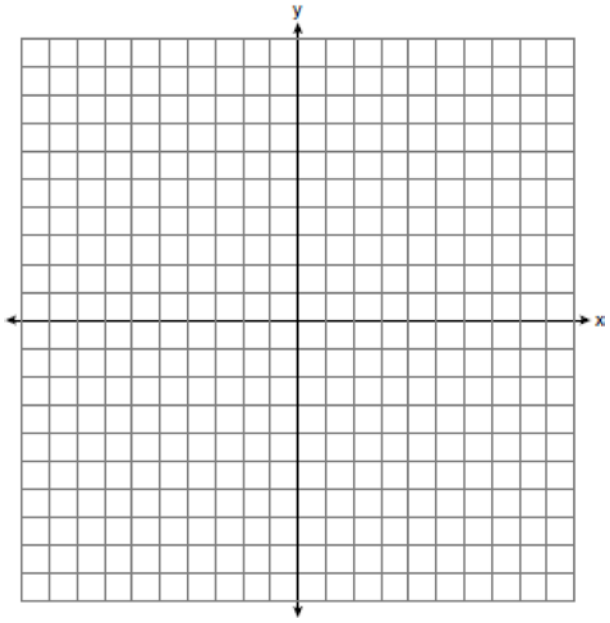
$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$



Determine and state all values of x for which $f(x) = g(x)$.

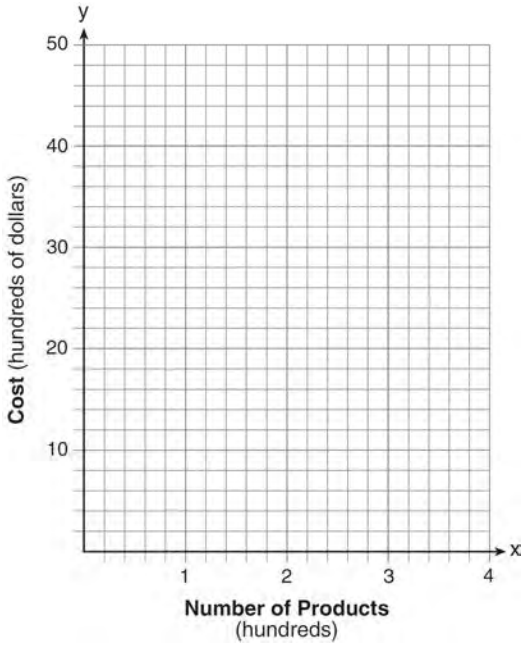
622 Graph $f(x)$ and $g(x)$ on the set of axes below.

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



Based on your graph, state *one* value of x that satisfies $f(x) = g(x)$. Explain your reasoning.

623 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.

624 Given: $g(x) = 2x^2 + 3x + 10$

$k(x) = 2x + 16$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*. Explain why you chose the method you used to solve this quadratic equation.

A.REI.D.11: OTHER SYSTEMS

625 Given: $f(x) = \frac{2}{3}x - 4$ and $g(x) = \frac{1}{4}x + 1$

Four statements about this system are written below.

I. $f(4) = g(4)$

II. When $x = 12$, $f(x) = g(x)$.

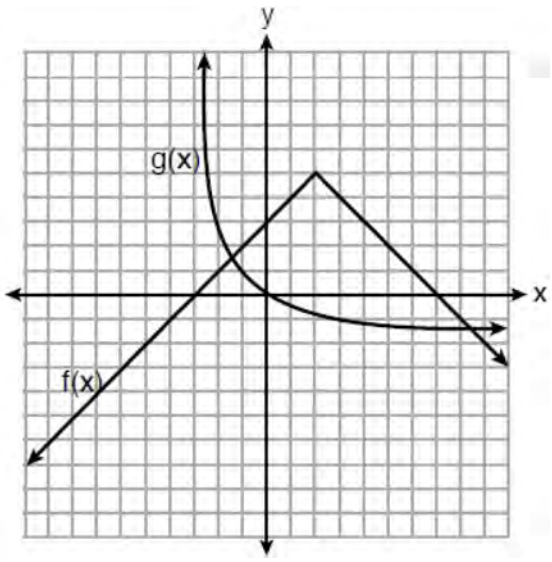
III. The graphs of $f(x)$ and $g(x)$ intersect at $(12, 4)$.

IV. The graphs of $f(x)$ and $g(x)$ intersect at $(4, 12)$.

Which statement(s) are true?

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

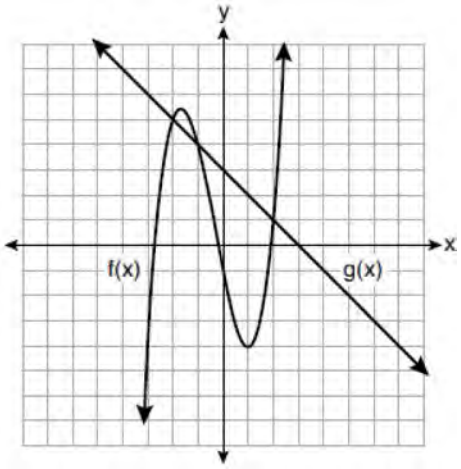
626 The functions $f(x)$ and $g(x)$ are graphed below.



Based on the graph, the solutions to the equation $f(x) = g(x)$ are

1) the x-intercepts
2) the y-intercepts
3) the x-values of the points of intersection
4) the y-values of the points of intersection

627 The functions $f(x)$ and $g(x)$ are graphed on the set of axes below.



For which value of x is $f(x) \neq g(x)$?

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

628 If $f(x) = 2x + 6$ and $g(x) = |x|$ are graphed on the same coordinate plane, for which value of x is $f(x) = g(x)$?

1) 6
2) 2
3) -2
4) -6

629 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.

630 The graphs of the functions $f(x) = |x - 3| + 1$ and $g(x) = 2x + 1$ are drawn. Which statement about these functions is true?

1) The solution to $f(x) = g(x)$ is 3.
2) The solution to $f(x) = g(x)$ is 1.
3) The graphs intersect when $y = 1$.
4) The graphs intersect when $x = 3$.

631 Which value of x results in equal outputs for $j(x) = 3x - 2$ and $b(x) = |x + 2|$?

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

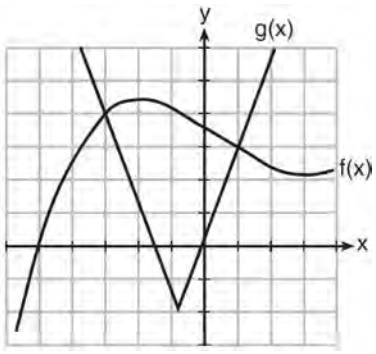
632 Given the functions $h(x) = \frac{1}{2}x + 3$ and $j(x) = |x|$, which value of x makes $h(x) = j(x)$?

1) -2
2) 2
3) 3
4) -6

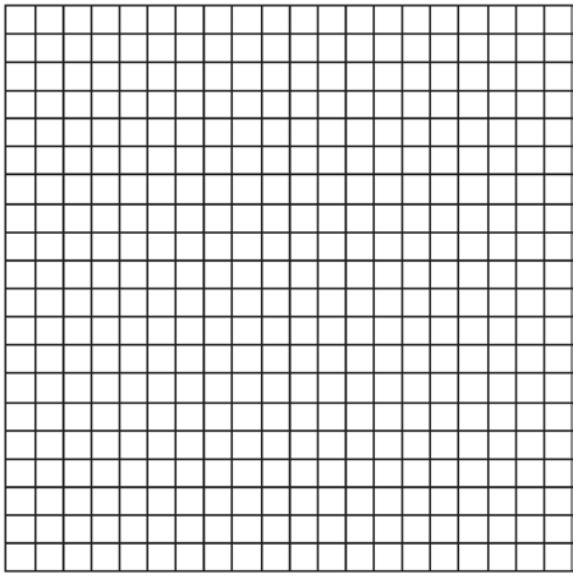
633 Which pair of equations would have $(-1,2)$ as a solution?

1) $y = x + 3$ and $y = 2^x$
2) $y = x - 1$ and $y = 2x$
3) $y = x^2 - 3x - 2$ and $y = 4x + 6$
4) $2x + 3y = -4$ and $y = -\frac{1}{2}x - \frac{3}{2}$

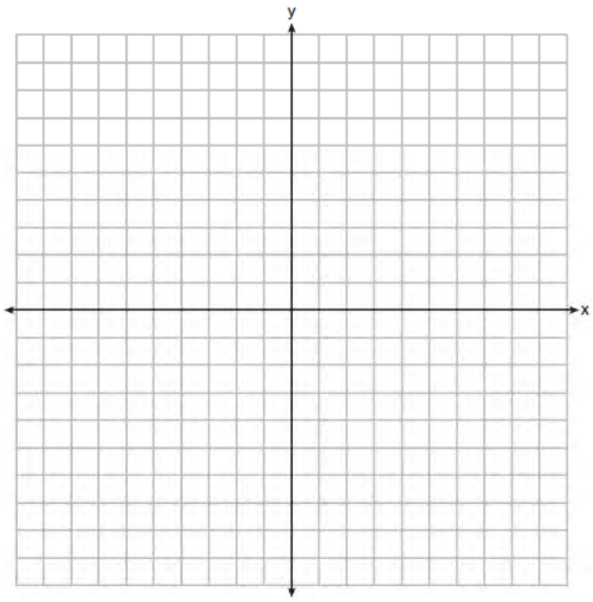
634 The graph below shows two functions, $f(x)$ and $g(x)$. State all the values of x for which $f(x) = g(x)$.



635 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below. Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

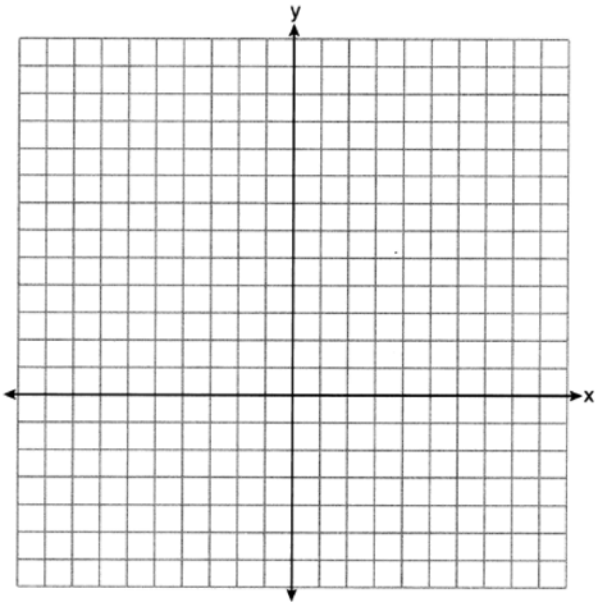


636 Graph $f(x) = |x| + 1$ and $g(x) = -x^2 + 6x + 1$ on the set of axes below.



Based on your graph, determine all values of x for which $f(x) = g(x)$.

637 On the set of axes below, graph $f(x) = x^2 - 1$ and $g(x) = 3^x$.



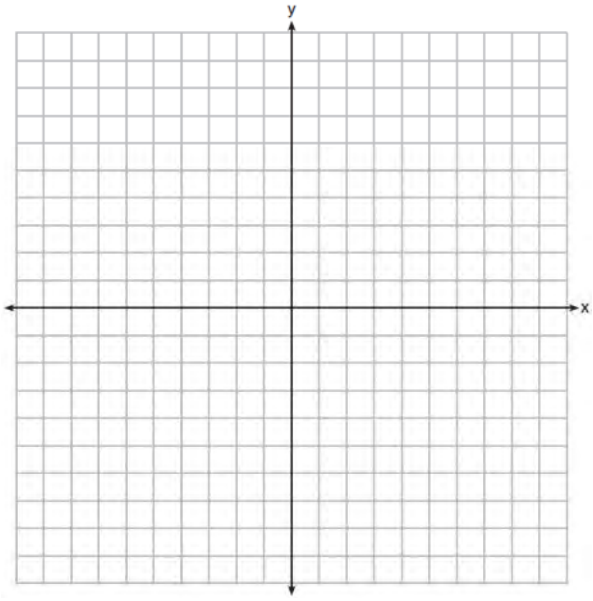
Based on your graph, for how many values of x does $f(x) = g(x)$? Explain your reasoning.

638 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

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

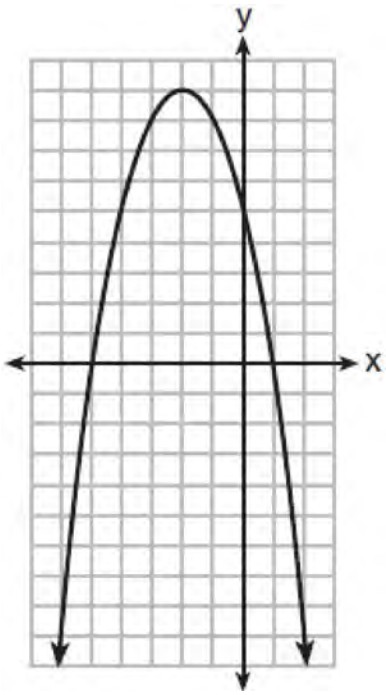


How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

FUNCTIONS

F.IF.A.1: DEFINING FUNCTIONS

639 A relation is graphed on the set of axes below.



Based on this graph, the relation is

1) a function because it passes the horizontal line test
2) a function because it passes the vertical line test
3) not a function because it fails the horizontal line test
4) not a function because it fails the vertical line test

640 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

641 Which table represents a function?

1)

x	y
2	–3
3	0
4	–3
2	1

2)

x	y
1	2
1	3
1	4
1	5

3)

x	y
–3	0
–2	1
–3	2
2	3

4)

x	y
–2	–4
0	2
2	4
4	6

642 Which table could represent a function?

1)

x	f(x)
1	4
2	2
3	4
2	6

2)

x	g(x)
1	2
2	4
3	6
4	2

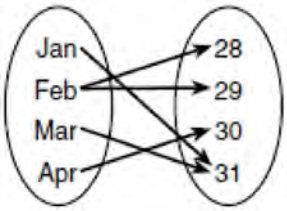
3)

x	h(x)
2	6
0	4
1	6
2	2

4)

x	k(x)
2	2
3	2
4	6
3	6

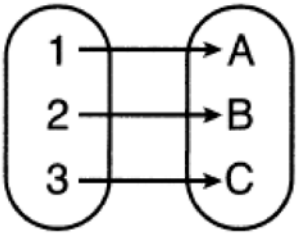
643 A mapping is shown in the diagram below.

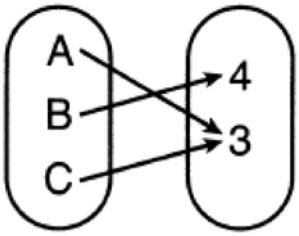


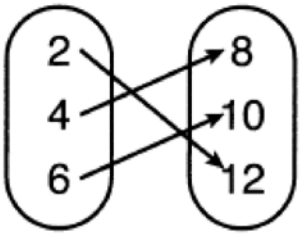
This mapping is

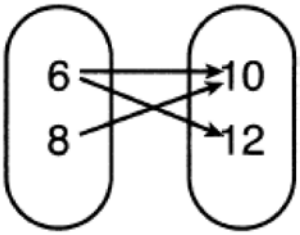
1) a function, because Feb has two outputs, 28 and 29
2) a function, because two inputs, Jan and Mar, result in the output 31
3) not a function, because Feb has two outputs, 28 and 29
4) not a function, because two inputs, Jan and Mar, result in the output 31

644 Which relation is *not* a function?

1)


2)


3)


4)


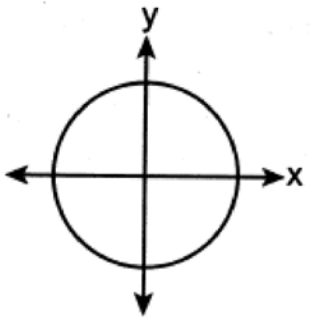
645 Which relation is a function?

1) $\{(1,3),(2,1),(3,1),(4,7)\}$

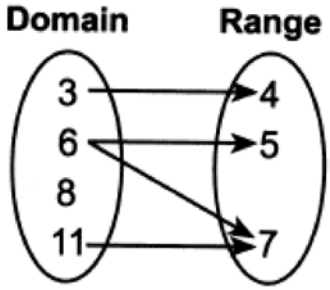
2)

Input	Output
−6	−2
−4	2
7	3
7	5

3)



4)

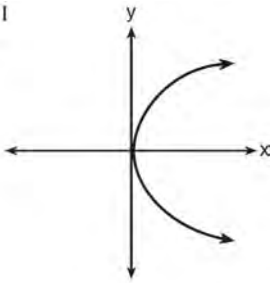


646 Which representations are functions?

I

x	y
2	6
3	−12
4	7
5	5
2	−6

III



II $\{(1,1),(2,1),(3,2),(4,3),(5,5),(6,8),(7,13)\}$

IV $y = 2x + 1$

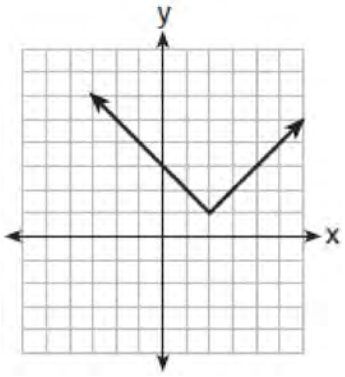
1) I and II
2) II and IV
3) III, only
4) IV, only

647 Which relation does *not* represent a function?

1)

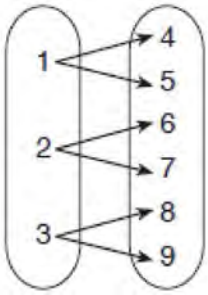
x	1	2	3	4	5	6
y	3.2	4	5.1	6	7.4	8.8

2)



3) $y = 3\sqrt{x+1} - 2$

4)

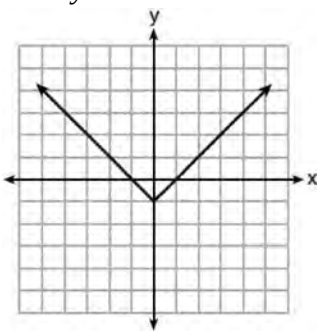


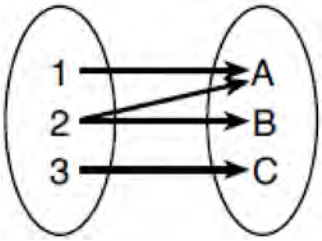
648 Which relation is *not* a function?

1)

x	y
–10	–2
–6	2
–2	6
1	9
5	13

2) $3x + 2y = 4$

3) 

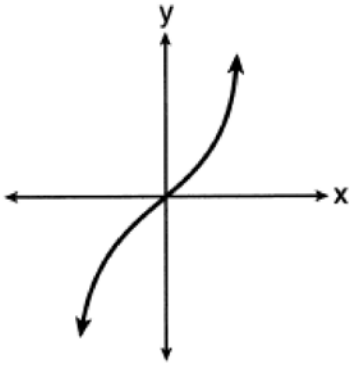
4) 

649 Which relation is a function?

1)

x	y
–1	1
0	0
1	1
1	2
2	4
3	9

2) $y = \begin{cases} x, & -1 < x \le 2 \\ x^2, & 2 \le x < 4 \end{cases}$

3) 

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

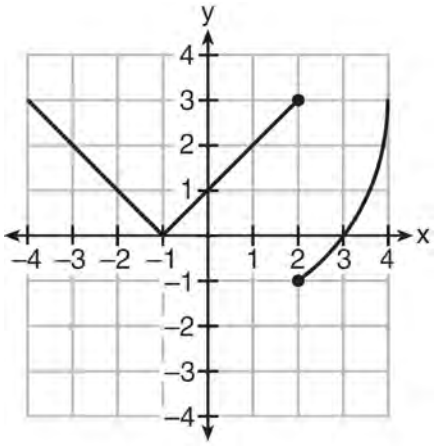
650 Given the relation $R = \{(-4,2),(3,6),(x,8),(-1,4)\}$
Which value of x would make this relation a function?
1) –4
2) –1
3) 3
4) 0

651 Given the relation: $\{(0,4),(2,6),(4,8),(x,7)\}$
Which value of x will make this relation a function?
1) 0
2) 2
3) 6
4) 4

652 A function is defined as $\{(0,1),(2,3),(5,8),(7,2)\}$. Isaac is asked to create one more ordered pair for the function. Which ordered pair can he add to the set to keep it a function?

1) $(0,2)$
2) $(5,3)$
3) $(7,0)$
4) $(1,3)$

653 Marcel claims that the graph below represents a function.



State whether Marcel is correct. Justify your answer.

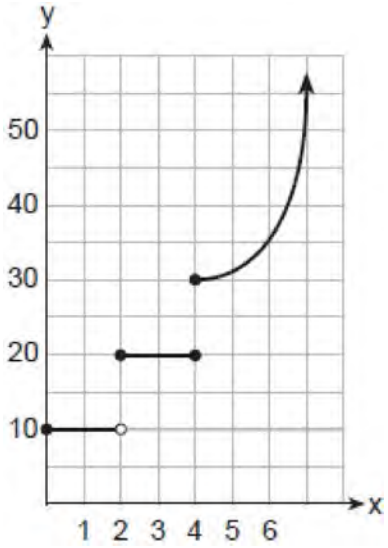
654 A function is shown in the table below.

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.

655 The two relations shown below are *not* functions.

Relation I:

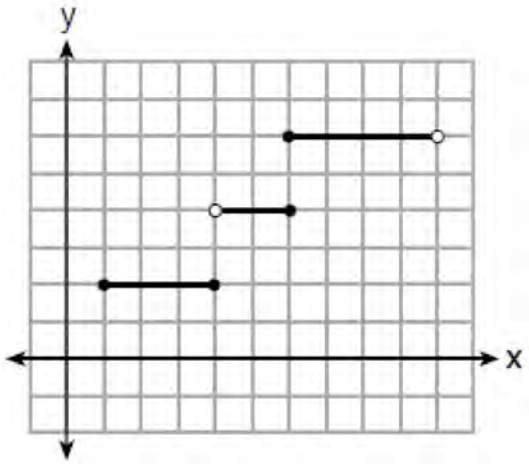


Relation II:

$\{(-5,-2),(-4,0),(-2,1),(-1,3),(-4,4)\}$

Explain how you could change each relation so that they each become a function.

656 Four relations are shown below.



I

$\{(1,2),(2,5),(3,8),(2,-5),(1,-2)\}$

II

x	y
–4	1
0	3
4	5
6	6

III

$y = x^2$

IV

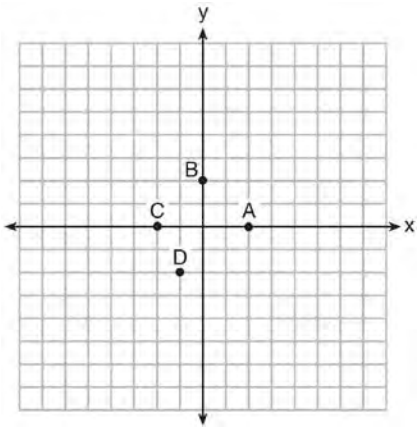
State which relation(s) are functions. Explain why the other relation(s) are *not* functions.

657 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.

658 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil. Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value. Determine if either one is correct, and justify your answer completely.

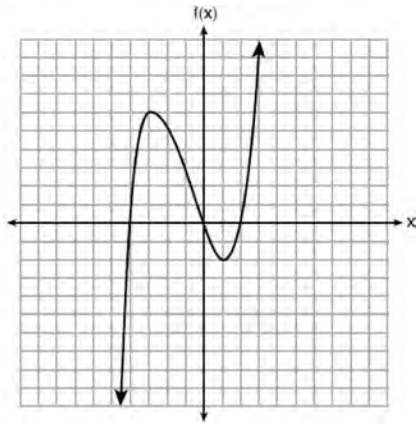
F.IF.A.2: FUNCTIONAL NOTATION

659 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

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



What is the value of $f(-3)$?
1) 6
2) 2
3) –2
4) –4

661 If $f(x) = 4x + 5$, what is the value of $f(-3)$?
1) –2
2) –7
3) 17
4) 4

662 If $f(x) = \frac{3x+4}{2}$, then $f(8)$ is
1) 21
2) 16
3) 14
4) 4

663 Given $f(x) = -3x^2 + 10$, what is the value of $f(-2)$?
1) –26
2) –2
3) 22
4) 46

664 The function $g(x)$ is defined as $g(x) = -2x^2 + 3x$. The value of $g(-3)$ is
1) –27
2) –9
3) 27
4) 45

665 If $g(x) = -x^2 - x + 5$, then $g(-4)$ is equal to
1) –15
2) –7
3) 17
4) 25

666 A function is defined as $K(x) = 2x^2 - 5x + 3$. The value of $K(-3)$ is
1) 54
2) 36
3) 0
4) −18

667 If $f(x) = \frac{1}{2}x^2 - \left(\frac{1}{4}x + 3\right)$, what is the value of $f(8)$?
1) 11
2) 17
3) 27
4) 33

668 If $k(x) = 2x^2 - 3\sqrt{x}$, then $k(9)$ is
1) 315
2) 307
3) 159
4) 153

669 If $f(x) = 2(3^x) + 1$, what is the value of $f(2)$?
1) 13
2) 19
3) 37
4) 54

670 If $f(x) = \frac{\sqrt{2x+3}}{6x-5}$, then $f\left(\frac{1}{2}\right) =$
1) 1
2) −2
3) −1
4) $-\frac{13}{3}$

671 Given $f(x) = 3x - 5$, which statement is true?
1) $f(0) = 0$
2) $f(3) = 4$
3) $f(4) = 3$
4) $f(5) = 0$

672 If $f(n) = (n-1)^2 + 3n$, which statement is true?
1) $f(3) = -2$
2) $f(-2) = 3$
3) $f(-2) = -15$
4) $f(-15) = -2$

673 If $f(x) = x^2 + 2x + 1$ and $g(x) = 3x + 5$, then what is the value of $f(1) - g(3)$?
1) 10
2) 8
3) −10
4) −8

674 If $f(x) = x^2 + 3x$, then which statement is true?
1) $f(1) = f(-1)$
2) $f(2) = f(-2)$
3) $f(1) = f(2)$
4) $f(-1) = f(-2)$

675 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 ±4. Who is correct?
1) Lynn, only
2) Jude, only
3) Anne, only
4) Both Lynn and Jude

676 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

677 If $g(x) = -4x^2 - 3x + 2$, determine $g(-2)$.

678 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.

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

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.

F.IF.A.2: EVALUATING FUNCTIONS

679 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?
1) 37.27
2) 27.16
3) 17.06
4) 10.11

F.IF.A.2: DOMAIN AND RANGE

680 The domain of the function $f(x) = x^2 + x - 12$ is
1) $(-\infty, -4]$
2) $(-\infty, \infty)$
3) $[-4, 3]$
4) $[3, \infty)$

681 What is the domain of the relation shown below?
$\{(4,2),(1,1),(0,0),(1,-1),(4,-2)\}$
1) $\{0,1,4\}$
2) $\{-2,-1,0,1,2\}$
3) $\{-2,-1,0,1,2,4\}$
4) $\{-2,-1,0,0,1,1,1,2,4,4\}$

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

683 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 $f(x) > 0$.

684 The range of the function $f(x) = |x + 3| - 5$ is
1) $[-5, \infty)$
2) $(-5, \infty)$
3) $[3, \infty)$
4) $(3, \infty)$

685 If the function $f(x) = x^2$ has the domain $\{0, 1, 4, 9\}$, what is its range?
1) $\{0, 1, 2, 3\}$
2) $\{0, 1, 16, 81\}$
3) $\{0, -1, 1, -2, 2, -3, 3\}$
4) $\{0, -1, 1, -16, 16, -81, 81\}$

686 If the domain of the function $f(x) = 2x^2 - 8$ is $\{-2, 3, 5\}$, then the range is
1) $\{-16, 4, 92\}$
2) $\{-16, 10, 42\}$
3) $\{0, 10, 42\}$
4) $\{0, 4, 92\}$

687 The function $f(x) = 2x^2 + 6x - 12$ has a domain consisting of the integers from -2 to 1, inclusive. Which set represents the corresponding range values for $f(x)$?
1) $\{-32, -20, -12, -4\}$
2) $\{-16, -12, -4\}$
3) $\{-32, -4\}$
4) $\{-16, -4\}$

688 If $f(x) = x^2 + 2$, which interval describes the range of this function?
1) $(-\infty, \infty)$
2) $[0, \infty)$
3) $[2, \infty)$
4) $(-\infty, 2]$

689 What is the range of the function $f(x) = (x - 4)^2 + 1$?
1) $x > 4$
2) $x \geq 4$
3) $f(x) > 1$
4) $f(x) \geq 1$

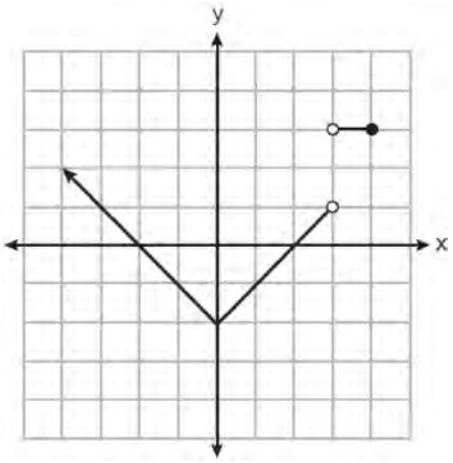
690 The range of $f(x) = x^2 + 2x - 5$ is the set of all real numbers
1) less than or equal to -6
2) greater than or equal to -6
3) less than or equal to -1
4) greater than or equal to -1

691 The range of the function $f(x) = x^2 + 2x - 8$ is all real numbers
1) less than or equal to -9
2) greater than or equal to -9
3) less than or equal to -1
4) greater than or equal to -1

692 Which interval represents the range of the function $h(x) = 2x^2 - 2x - 4$?
1) $(0.5, \infty)$
2) $(-4.5, \infty)$
3) $[0.5, \infty)$
4) $[-4.5, \infty)$

693 The range of the function defined as $y = 5^x$ is
1) $y < 0$
2) $y > 0$
3) $y \leq 0$
4) $y \geq 0$

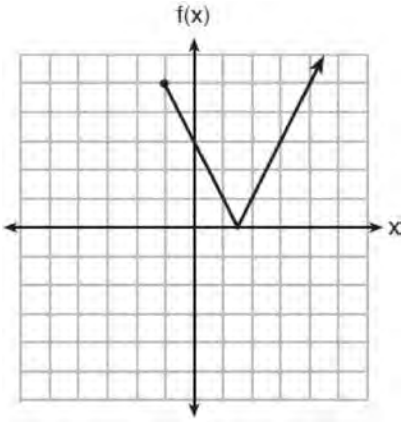
694 Bryan said that the piecewise function graphed below has a domain of all real numbers.



State *two* reasons why Bryan is *incorrect*.

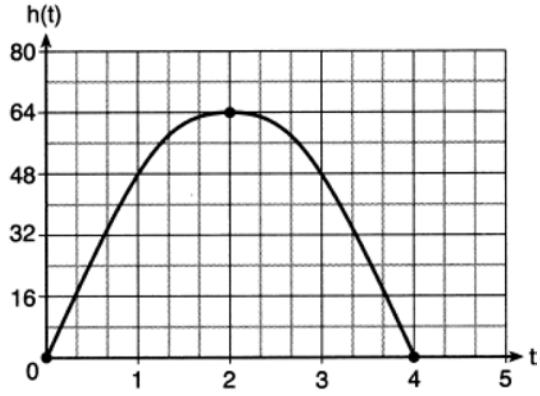
F.IF.B.5: DOMAIN AND RANGE

695 The function $f(x)$ is graphed below.



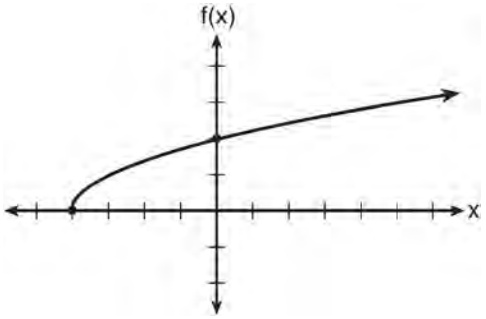
The domain of this function is
1) all positive real numbers
2) all positive integers
3) $x \geq 0$
4) $x \geq -1$

696 The diagram below shows the graph of $h(t)$, which models the height, in feet, of a rocket t seconds after it was shot into the air.



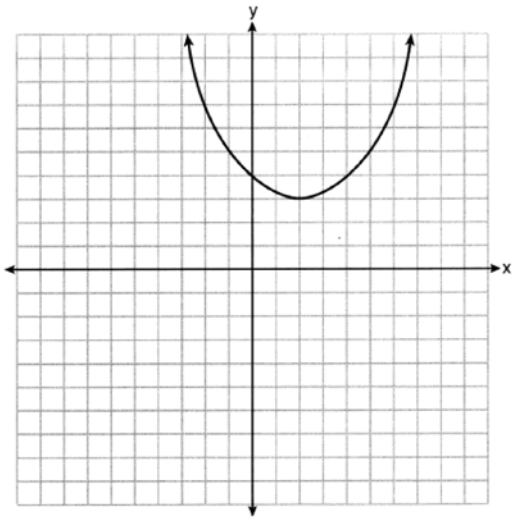
The domain of $h(t)$ is
1) $(0,4)$
2) $[0,4]$
3) $(0,64)$
4) $[0,64]$

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



The domain of the function is
1) $\{x \mid x > 0\}$
2) $\{x \mid x \geq 0\}$
3) $\{x \mid x > -4\}$
4) $\{x \mid x \geq -4\}$

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



State the domain of this function. State the range of this function.

699 Skyler mows lawns in the summer. The function $f(x)$ is used to model the amount of money earned, where x is the number of lawns completely mowed. A reasonable domain for this function would be
1) real numbers
2) rational numbers
3) irrational numbers
4) natural numbers

700 Which domain is most appropriate for a function that represents the number of items, $f(x)$, placed into a laundry basket each day, x, for the month of January?
1) integers
2) whole numbers
3) rational numbers
4) irrational numbers

701 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

702 Which domain would be the most appropriate to use for a function that compares the number of emails sent (x) to the amount of data used for a cell phone plan (y)?
1) integers
2) whole numbers
3) rational numbers
4) irrational numbers

703 A dolphin jumps out of the water and then back into the water. His jump could be graphed on a set of axes where x represents time and y represents distance above or below sea level. The domain for this graph is best represented using a set of
1) integers
2) positive integers
3) real numbers
4) positive real numbers

704 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
1) positive integers
2) positive real numbers
3) both positive and negative integers
4) both positive and negative real numbers

705 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
1) integers
2) rational numbers
3) nonnegative integers
4) nonnegative rational numbers

706 The function $G(m)$ represents the amount of gasoline consumed by a car traveling m miles. An appropriate domain for this function would be
1) integers
2) rational numbers
3) nonnegative integers
4) nonnegative rational numbers

707 A grocery store sells packages of beef. The function $C(w)$ represents the cost, in dollars, of a package of beef weighing w pounds. The most appropriate domain for this function would be
1) integers
2) rational numbers
3) positive integers
4) positive rational numbers

708 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 $c(x)$?
1) integers
2) positive real numbers
3) positive rational numbers
4) whole numbers

709 A store manager is trying to determine if they should continue to sell a particular brand of nails. To model their profit, they use the function $p(n)$, where n is the number of boxes of these nails sold in a day. A reasonable domain for this function would be
1) nonnegative integers
2) rational numbers
3) real numbers
4) integers

710 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?
1) rational numbers greater than zero
2) whole numbers greater than or equal to one
3) integers less than or equal to zero
4) whole numbers less than or equal to one

711 At an ice cream shop, the profit, $P(c)$, is modeled by the function $P(c) = 0.87c$, where c represents the number of ice cream cones sold. An appropriate domain for this function is
1) an integer ≤ 0
2) an integer ≥ 0
3) a rational number ≤ 0
4) a rational number ≥ 0

712 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) $\{\ldots -2, -1, 0, 1, 2, 3, \ldots\}$
2) $\{-2, -1, 0, 1, 2, 3\}$
3) $\{0, \frac{1}{2}, 1, 1\frac{1}{2}, 2, 2\frac{1}{2}\}$
4) $\{0, 1, 2, 3, \ldots\}$

713 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) $-3 \le t \le 3$
2) $0 \le t \le 3$
3) $0 \le h(t) \le 144$
4) all real numbers

714 A population of paramecia, P, can be modeled using the exponential function $P(t) = 3(2)^t$, where t is the number of days since the population was first observed. Which domain is most appropriate to use to determine the population over the course of the first two weeks?
1) $t \ge 0$
2) $t \le 2$
3) $0 \le t \le 2$
4) $0 \le t \le 14$

F.BF.A.1: OPERATIONS WITH FUNCTIONS

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

716 Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

F.LE.A.1: FAMILIES OF FUNCTIONS

717 One characteristic of all linear functions is that they change by
1) equal factors over equal intervals
2) unequal factors over equal intervals
3) equal differences over equal intervals
4) unequal differences over equal intervals

718 Which situation can be modeled by a linear function?
1) The population of bacteria triples every day.
2) The value of a cell phone depreciates at a rate of 3.5% each year.
3) An amusement park allows 50 people to enter every 30 minutes.
4) A baseball tournament eliminates half of the teams after each round.

719 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

720 Which situation could be modeled as a linear equation?
1) The value of a car decreases by 10% every year.
2) The number of fish in a lake doubles every 5 years.
3) Two liters of water evaporate from a pool every day.
4) The amount of caffeine in a person's body decreases by $\frac{1}{3}$ every 2 hours.

721 Which situation could be modeled by a linear function?
1) The value of a car depreciates by 7% annually.
2) A gym charges a $50 initial fee and then $30 monthly.
3) The number of bacteria in a lab doubles weekly.
4) The amount of money in a bank account increases by 0.1 % monthly.

722 Which situation is *not* a linear function?
1) A gym charges a membership fee of $10.00 down and $10.00 per month.
2) A cab company charges $2.50 initially and $3.00 per mile.
3) A restaurant employee earns $12.50 per hour.
4) A $12,000 car depreciates 15% per year.

723 One Saturday afternoon, three friends decided to keep track of the number of text messages they received each hour from 8 a.m. to noon. The results are shown below.
Emily said that the number of messages she received increased by 8 each hour.
Jessica said that the number of messages she received doubled every hour.
Chris said that he received 3 messages the first hour, 10 the second hour, none the third hour, and 15 the last hour.
Which of the friends' responses best classifies the number of messages they received each hour as a linear function?
1) Emily, only
2) Jessica, only
3) Emily and Chris
4) Jessica and Chris

724 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?
1) I, only
2) II, only
3) I and III
4) II and III

725 Which situation represents exponential growth?
1) Aidan adds $10 to a jar each week.
2) A pine tree grows 1.5 feet per year.
3) Ella earns $20 per hour babysitting.
4) The number of people majoring in computer science doubles every 5 years.

726 Which scenario represents exponential growth?
1) A water tank is filled at a rate of 2 gallons/minute.
2) A vine grows 6 inches every week.
3) A species of fly doubles its population every month during the summer.
4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.

727 Which of the three situations given below is best modeled by an exponential function?
I. A bacteria culture doubles in size every day.
II. A plant grows by 1 inch every 4 days.
III. The population of a town declines by 5% every 3 years.
1) I, only
2) II, only
3) I and II
4) I and III

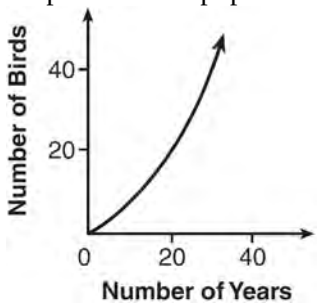
728 Ian is saving up to buy a new baseball glove. Every month he puts $10 into a jar. Which type of function best models the total amount of money in the jar after a given number of months?
1) linear
2) exponential
3) quadratic
4) square root

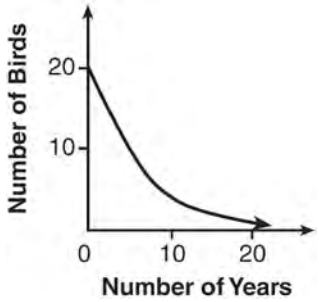
729 The highest possible grade for a book report is 100. The teacher deducts 10 points for each day the report is late. Which kind of function describes this situation?
1) linear
2) quadratic
3) exponential growth
4) exponential decay

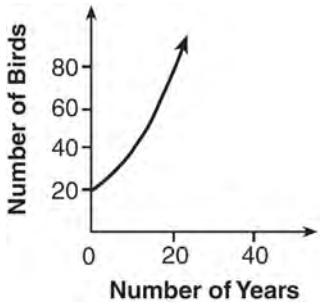
730 Sara was asked to solve this word problem: "The product of two consecutive integers is 156. What are the integers?" What type of equation should she create to solve this problem?
1) linear
2) quadratic
3) exponential
4) absolute value

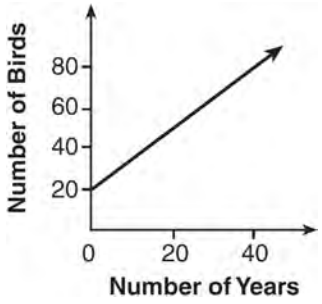
731 Eric deposits $500 in a bank account that pays 3.5% interest, compounded yearly. Which type of function should he use to determine how much money he will have in the account at the end of 10 years?
1) linear
2) quadratic
3) absolute value
4) exponential

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

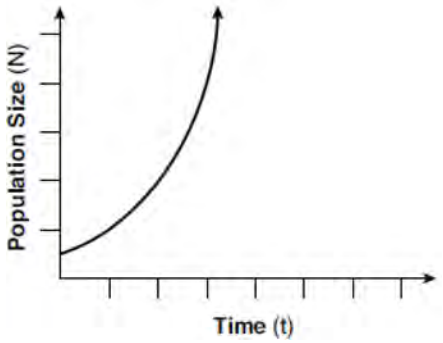
1) 

2) 

3) 

4) 

733 Which type of function is shown in the graph below?



1) linear
2) exponential
3) square root
4) absolute value

734 The tables below show the values of four different functions for given values of x.

x	f(x)
1	12
2	19
3	26
4	33

x	g(x)
1	–1
2	1
3	5
4	13

x	h(x)
1	9
2	12
3	17
4	24

x	k(x)
1	–2
2	4
3	14
4	28

Which table represents a linear function?·

1) $f(x)$
2) $g(x)$
3) $h(x)$
4) $k(x)$

735 Tables of values for four functions are shown below.

x	f(x)
0	6
1	7
2	10
3	15
4	22

x	h(x)
0	1
1	2
2	4
3	8
4	16

x	g(x)
0	0
1	−2
2	−2
3	0
4	4

x	j(x)
0	2
1	5
2	8
3	11
4	14

Which table best represents an exponential function?

1) $f(x)$
2) $g(x)$
3) $h(x)$
4) $j(x)$

736 During physical education class, Andrew recorded the exercise times in minutes and heart rates in beats per minute (bpm) of four of his classmates. Which table best represents a linear model of exercise time and heart rate?

1) Student 1

Exercise Time (in minutes)	Heart Rate (bpm)
0	60
1	65
2	70
3	75
4	80

2) Student 2

Exercise Time (in minutes)	Heart Rate (bpm)
0	62
1	70
2	83
3	88
4	90

3) Student 3

Exercise Time (in minutes)	Heart Rate (bpm)
0	58
1	65
2	70
3	75
4	79

4) Student 4

Exercise Time (in minutes)	Heart Rate (bpm)
0	62
1	65
2	66
3	73
4	75

Algebra I Regents Exam Questions by State Standard: Topic

737 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

738 Which table of values represents an exponential relationship?

1)

x	f(x)
1	6
2	9
3	12
4	15
5	18

2)

x	h(x)
1	2
2	7
3	12
4	17
5	22

3)

x	k(x)
1	4
2	16
3	64
4	256
5	1024

4)

x	p(x)
1	–9.5
2	–12
3	–14.5
4	–17
5	–19.5

739 Thirty-two teams are participating in a basketball tournament. Only the winning teams in each round advance to the next round, as shown in the table below.

Number of Rounds Completed, x	0	1	2	3	4	5
Number of Teams Remaining, $f(x)$	32	16	8	4	2	1

Which function type best models the relationship between the number of rounds completed and the number of teams remaining?

1) absolute value
2) exponential
3) linear
4) quadratic

740 The function f is shown in the table below.

x	f(x)
0	1
1	3
2	9
3	27

Which type of function best models the given data?

1) exponential growth function
2) exponential decay function
3) linear function with positive rate of change
4) linear function with negative rate of change

741 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

742 Caleb claims that the ordered pairs shown in the table below are from a nonlinear function.

x	f(x)
0	2
1	4
2	8
3	16

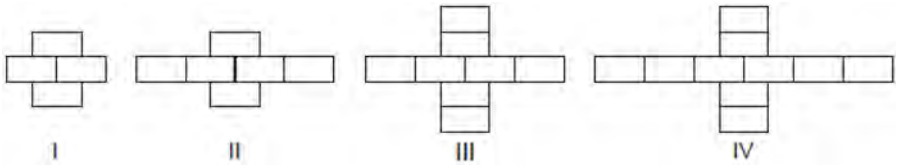
State if Caleb is correct. Explain your reasoning.

743 The function, $t(x)$, is shown in the table below.

x	t(x)
–3	10
–1	7.5
1	5
3	2.5
5	0

Determine whether $t(x)$ is linear or exponential. Explain your answer.

744 Breanna creates the pattern of blocks below in her art class.



A friend tells her that the number of blocks in the pattern is increasing exponentially. Is her friend correct? Explain your reasoning.

745 Consider the pattern of squares shown below:

Which type of model, linear or exponential, should be used to determine how many squares are in the *n*th pattern? Explain your answer.

746 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.

747 The number of people who attended a school's last six basketball games increased as the team neared the state sectional games. The table below shows the data.

Game	13	14	15	16	17	18
Attendance	348	435	522	609	696	783

State the type of function that best fits the given data. Justify your choice of a function type.

748 The table below shows the value of a particular car over time.

Time (years)	**Value** (dollars)
0	20,000
5	10,550
10	5570
15	2940
20	1550

Determine whether a linear or exponential function is more appropriate for modeling this data. Explain your choice.

F.LE.A.2: FAMILIES OF FUNCTIONS

749 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) $F(x) = 2x + 3$

750 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) $f(t) = 25(t+1)$

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

1) $p(t) = 3(100)^t$
2) $p(t) = 100(3)^t$
3) $p(t) = 3t + 100$
4) $p(t) = 100t + 3$

F.LE.A.3: FAMILIES OF FUNCTIONS

752 Which function will have the greatest value when $x > 1$?

1) $g(x) = 2(5)^x$
2) $f(x) = 2x + 5$
3) $h(x) = 2x^2 + 5$
4) $k(x) = 2x^3 + 5$

753 As x increases beyond 25, which function will have the largest value?

1) $f(x) = 1.5^x$
2) $g(x) = 1.5x + 3$
3) $h(x) = 1.5x^2$
4) $k(x) = 1.5x^3 + 1.5x^2$

754 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

755 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 $g(x) = 3^x$?

1) 7
2) 8
3) 9
4) 10

756 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

757 The table below shows the weights of Liam's pumpkin, $l(w)$, and Patricia's pumpkin, $p(w)$, over a four-week period where w represents the number of weeks. Liam's pumpkin grows at a constant rate. Patricia's pumpkin grows at a weekly rate of approximately 52%.

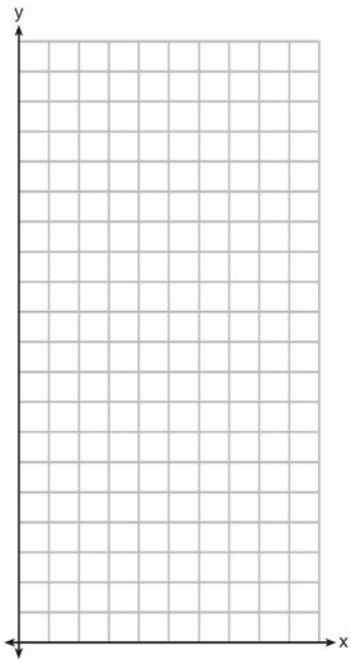
Weeks w	**Weight in Pounds** l(w)	**Weight in Pounds** p(w)
6	2.4	2.5
7	5.5	3.8
8	8.6	5.8
9	11.7	8.8

Assume the pumpkins continue to grow at these rates through week 13. When comparing the weights of both Liam's and Patricia's pumpkins in week 10 and week 13, which statement is true?

1) Liam's pumpkin will weigh more in week 10 and week 13.
2) Patricia's pumpkin will weigh more in week 10 and week 13.
3) Liam's pumpkin will weigh more in week 10, and Patricia's pumpkin will weigh more in week 13.
4) Patricia's pumpkin will weigh more in week 10, and Liam's pumpkin will weigh more in week 13.

758 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week. Write a function in terms of x to model each option of saving. Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

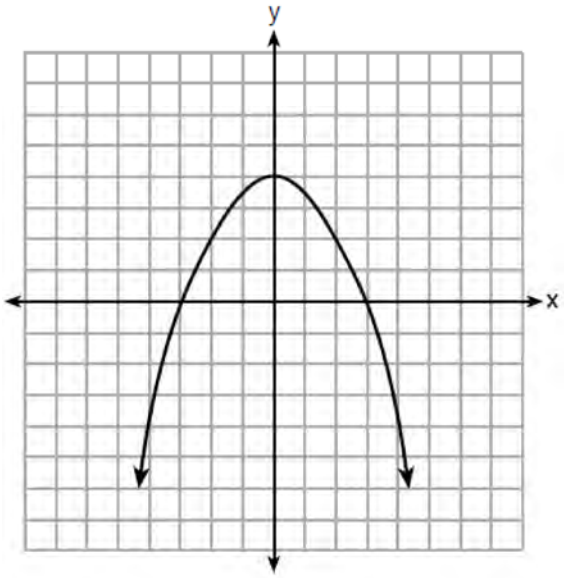
759 Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



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

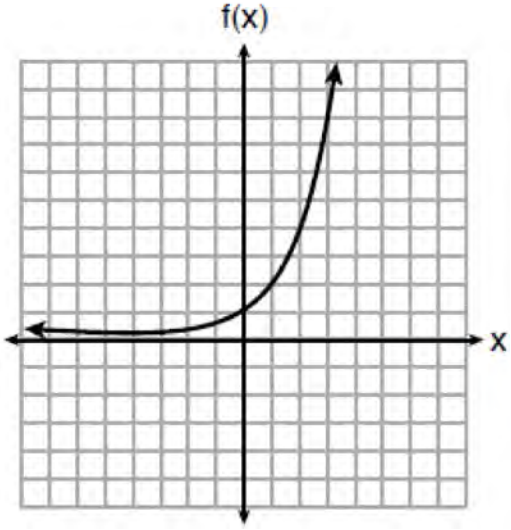
F.BF.B.3: TRANSFORMATIONS WITH FUNCTIONS

760 The graph of the function $p(x)$ is represented below. On the same set of axes, sketch the function $p(x + 2)$.



F.IF.C.9: COMPARING FUNCTIONS

761 Three functions are shown below.



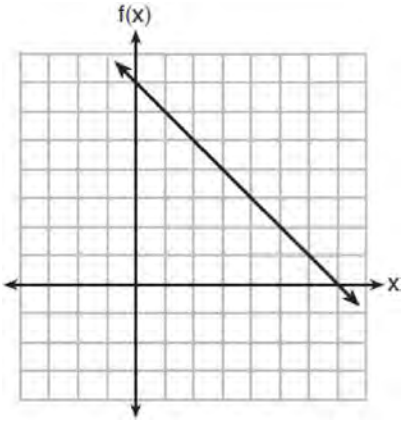
$g(x) = 3^x + 2$

x	h(x)
–5	30
–4	14
–3	6
–2	2
–1	0
0	–1
1	–1.5
2	–1.75

Which statement is true?

1) The y-intercept for $h(x)$ is greater than the y-intercept for $f(x)$.
2) The y-intercept for $f(x)$ is greater than the y-intercept for $g(x)$.
3) The y-intercept for $h(x)$ is greater than the y-intercept for both $g(x)$ and $f(x)$.
4) The y-intercept for $g(x)$ is greater than the y-intercept for both $f(x)$ and $h(x)$.

762 The functions $f(x)$, $q(x)$, and $p(x)$ are shown below.



$$q(x) = (x-1)^2 - 6$$

x	p(x)
2	5
3	4
4	3
5	4
6	5

When the input is 4, which functions have the same output value?

1) $f(x)$ and $q(x)$, only
2) $f(x)$ and $p(x)$, only
3) $q(x)$ and $p(x)$, only
4) $f(x)$, $q(x)$, and $p(x)$

763 Which function has the largest *y*-intercept?

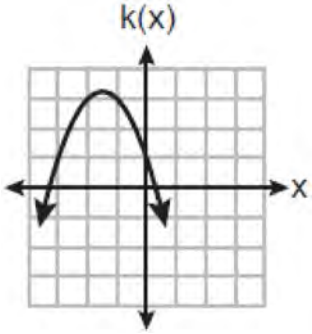
1) $f(x) = -4x - 1$

2)

x	h(x)
–1	1.5
0	2
1	3
2	5

3) $g(x) = |x| + 3$

4)



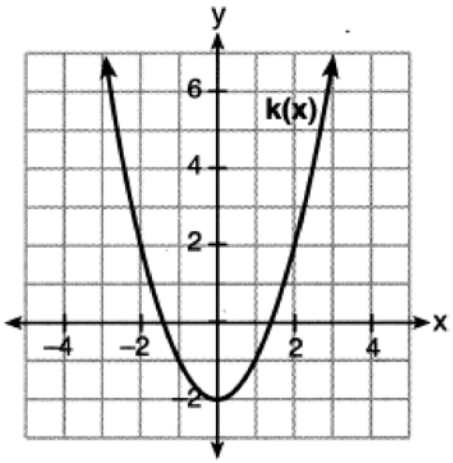
764 Which function has the *smallest y*-intercept value?

1)

x	g(x)
–2	3
0	1
1	0
3	–2

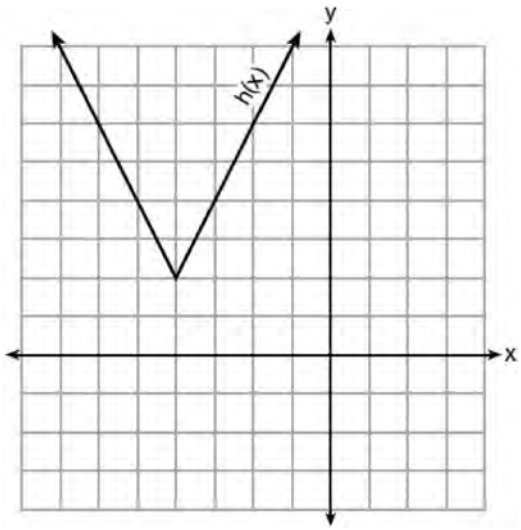
2) $h(x) = \sqrt{x} - 3$

3)



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

765 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?

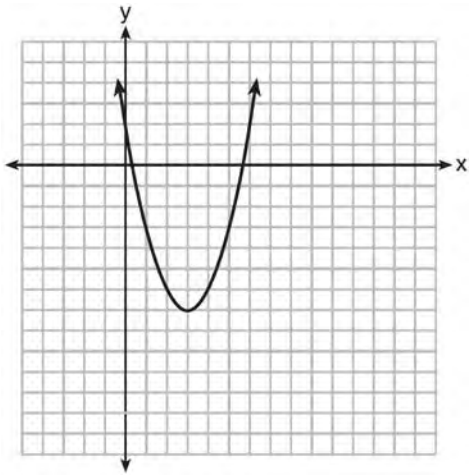
I. $g(x)$ has a lower minimum value than $h(x)$.

II. For all values of x, $h(x) < g(x)$.

III. For any value of x, $g(x) \neq h(x)$.

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

766 The graph representing a function is shown below.

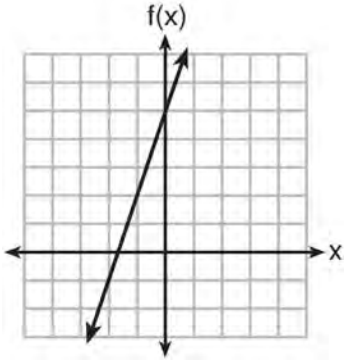


Which function has a minimum that is *less* than the one shown in the graph?

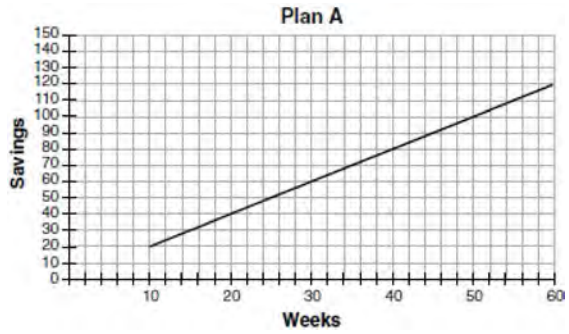
1) $y = x^2 - 6x + 7$
2) $y = |x + 3| - 6$
3) $y = x^2 - 2x - 10$
4) $y = |x - 8| + 2$

767 Which function has the greatest y-intercept?

1) $f(x) = 3x$
2) $2x + 3y = 12$
3) the line that has a slope of 2 and passes through $(1, -4)$
4)



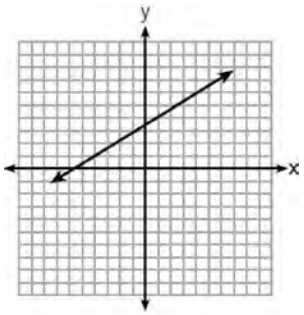
768 Nancy works for a company that offers two types of savings plans. Plan *A* is represented on the graph below.

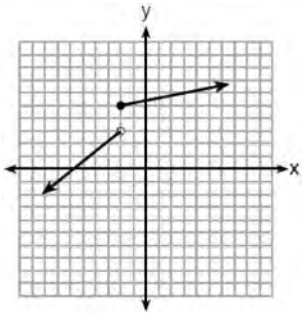


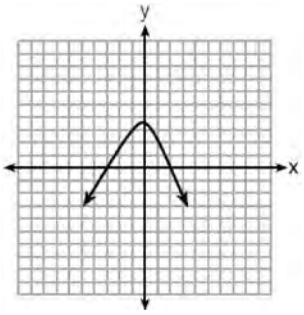
Plan *B* is represented by the function $f(x) = 0.01 + 0.05x^2$, where *x* is the number of weeks. Nancy wants to have the highest savings possible after a year. Nancy picks Plan *B*. Her decision is

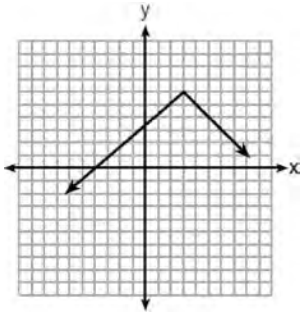
1) correct, because Plan *B* is an exponential function and will increase at a faster rate
2) correct, because Plan *B* is a quadratic function and will increase at a faster rate
3) incorrect, because Plan *A* will have a higher value after 1 year
4) incorrect, because Plan *B* is a quadratic function and will increase at a slower rate

769 Which graph does *not* represent a function that is always increasing over the entire interval $-2 < x < 2$?

1)


2)


3)


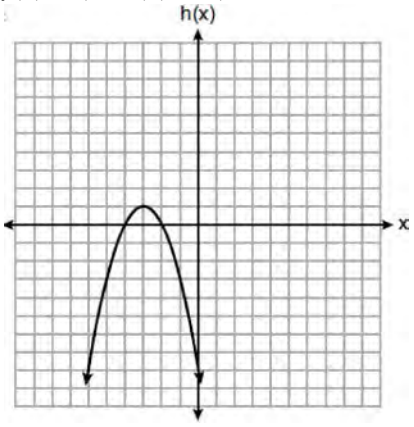
4)


770 Three functions are shown below.

A: $g(x) = -\frac{3}{2}x + 4$

B: $f(x) = (x + 2)(x + 6)$

C:



Which statement is true?

1) *B* and *C* have the same zeros.
2) *A* and *B* have the same *y*-intercept.
3) *B* has a minimum and *C* has a maximum.
4) *C* has a maximum and *A* has a minimum.

771 For which function is the value of the *y*-intercept the *smallest*?

1)

x	f(x)
−4	5
−2	4
0	3
2	2
4	1

2) $g(x) = |x| + 4$

3)

x	h(x)
−1	3
0	2
1	3
2	6
3	11

4) $k(x) = 5^x$

772 Which function has the *smallest y*-intercept?

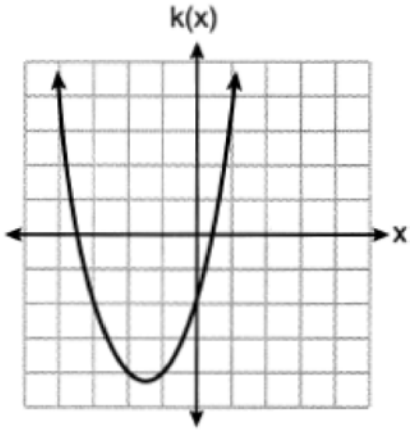
1) $g(x) = 2x - 6$

2)

x	h(x)
–2	$\frac{1}{4}$
–1	$\frac{1}{2}$
0	1
1	2
2	4

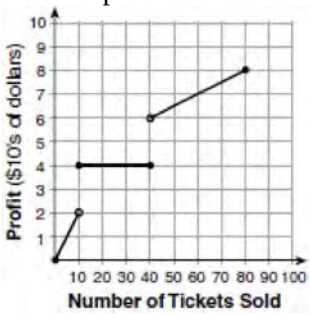
3) $f(x) = \sqrt{x} - 2$

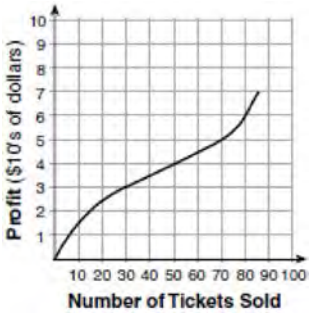
4)

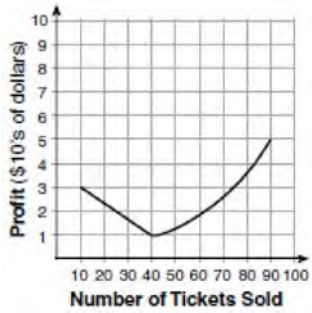


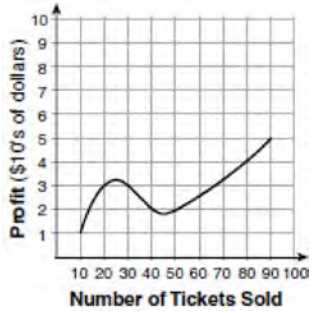
F.IF.B.4: RELATING GRAPHS TO EVENTS

773 To keep track of his profits, the owner of a carnival booth decided to model his ticket sales on a graph. He found that his profits only declined when he sold between 10 and 40 tickets. Which graph could represent his profits?

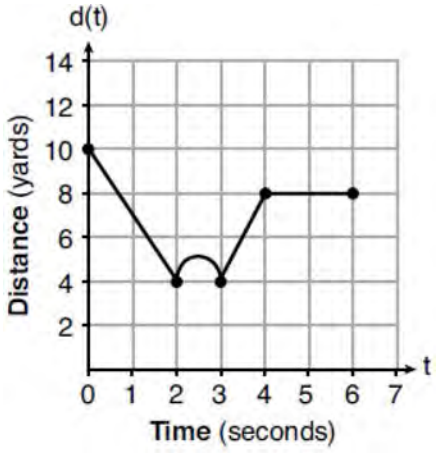
1) 

2) 

3) 

4) 

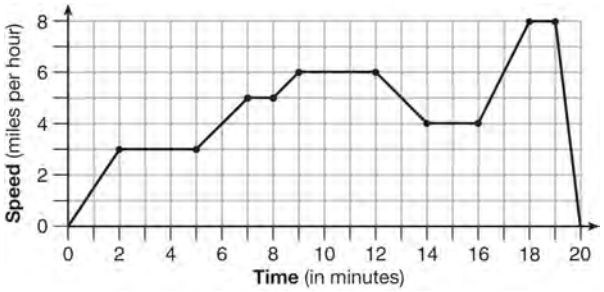
774 A child is playing outside. The graph below shows the child's distance, $d(t)$, in yards from home over a period of time, t, in seconds.



Which interval represents the child constantly moving closer to home?

1) $0 \le t \le 2$
2) $2 \le t \le 3$
3) $3 \le t \le 4$
4) $4 \le t \le 6$

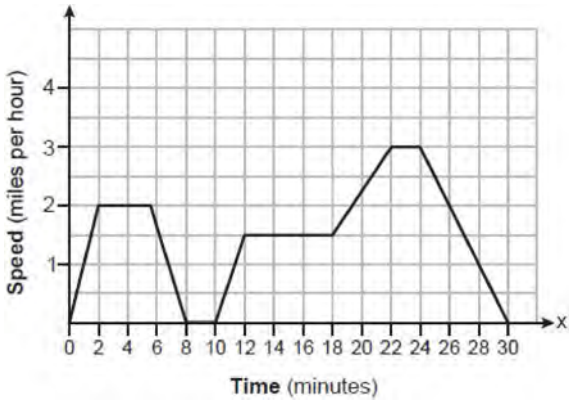
775 The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.



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.

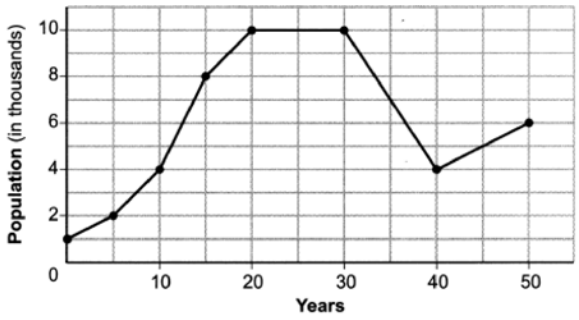
776 The graph below represents a dog walker's speed during his 30-minute walk around the neighborhood.



Which statement best describes what the dog walker was doing during the 12-18 minute interval of his walk?

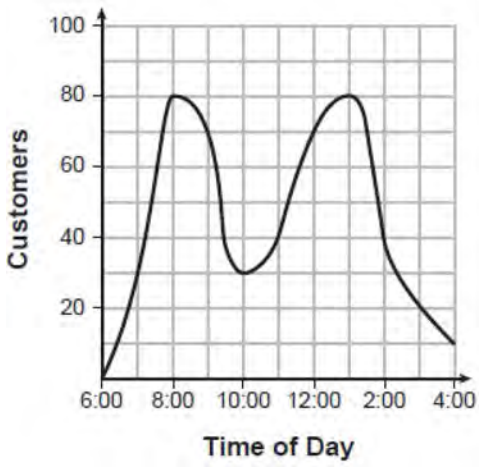
1) He was walking at a constant rate.
2) He was increasing his speed.
3) He was decreasing his speed.
4) He was standing still.

777 Anessa is studying the changes in population in a town. The graph below shows the population over 50 years.



State the entire interval during which the population remained constant. State the maximum population of the town over the 50-year period. Determine the average rate of change from year 30 to year 40. Explain what your average rate of change means from year 30 to year 40 in the context of the problem.

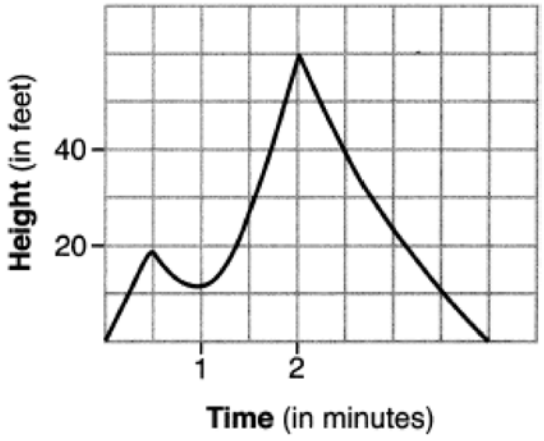
778 A café owner tracks the number of customers during business hours. The graph below models the data.



Based on the graph, the café owner saw a continual

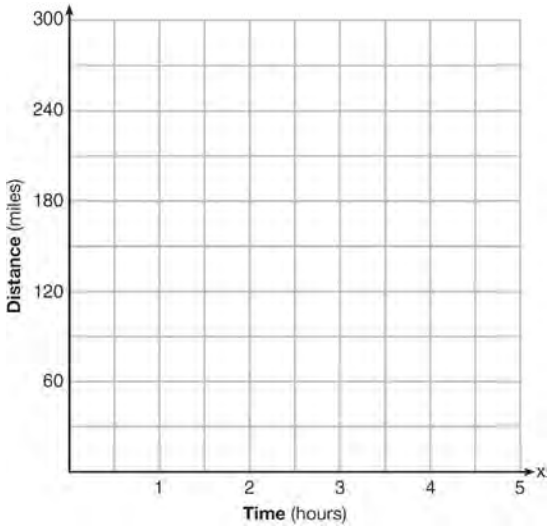
1) increase in customers from 6:00 to 11:00
2) increase in customers from 12:00 to 3:00
3) decrease in customers from 1:00 to 4:00
4) decrease in customers from 11:00 to 2:00

779 The graph below models the height of Sam's kite over a period of time.

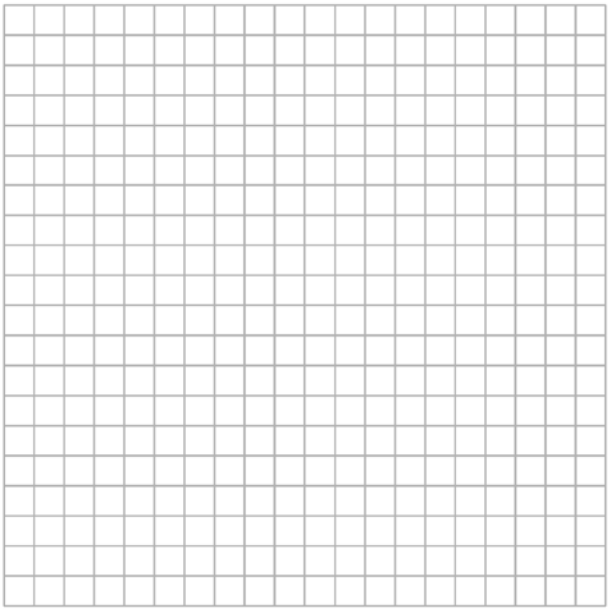


Explain what the zeros of the graph represent in the context of the situation. State the time intervals over which the height of the kite is increasing. State the maximum height, in feet, that the kite reaches.

780 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.

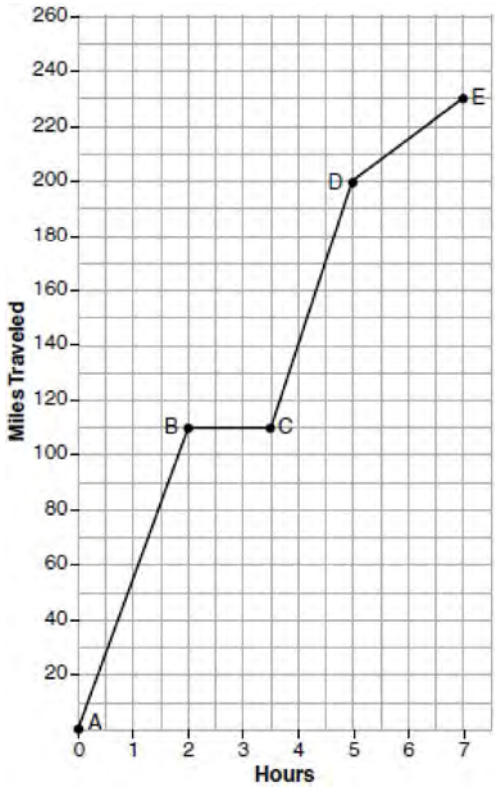


781 During a snowstorm, a meteorologist tracks the amount of accumulating snow. For the first three hours of the storm, the snow fell at a constant rate of one inch per hour. The storm then stopped for two hours and then started again at a constant rate of one-half inch per hour for the next four hours.
a) On the grid below, draw and label a graph that models the accumulation of snow over time using the data the meteorologist collected.



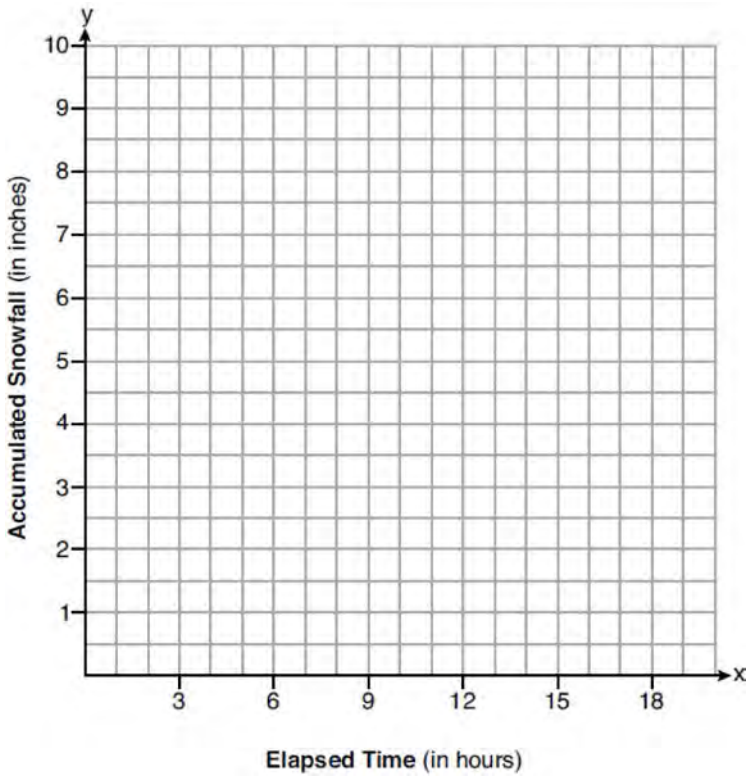
b) If the snowstorm started at 6 p.m., how much snow had accumulated by midnight?

782 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



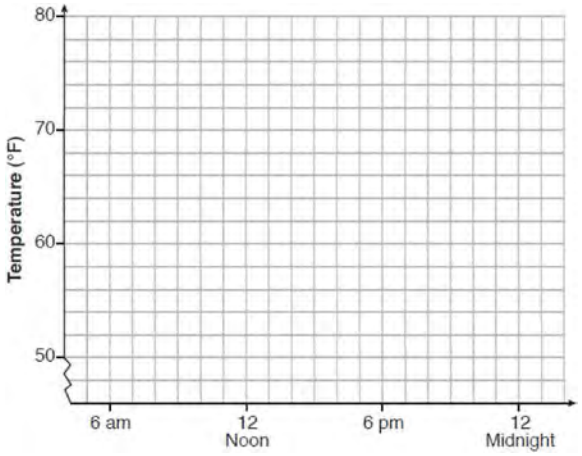
Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning. Explain what might have happened in the interval between *B* and *C*. Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

783 A snowstorm started at midnight. For the first 4 hours, it snowed at an average rate of one-half inch per hour. The snow then started to fall at an average rate of one inch per hour for the next 6 hours. Then it stopped snowing for 3 hours. Then it started snowing again at an average rate of one-half inch per hour for the next 4 hours until the storm was over. On the set of axes below, graph the amount of snow accumulated over the time interval of the storm.



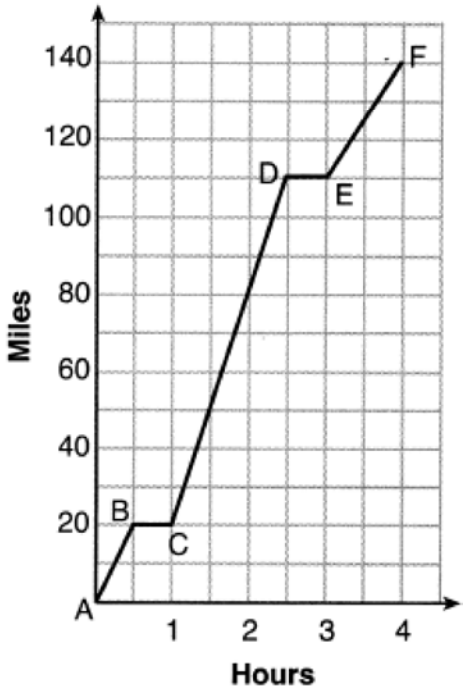
Determine the average rate of snowfall over the length of the storm. State the rate, to the *nearest hundredth of an inch per hour*.

784 One spring day, Elroy noted the time of day and the temperature, in degrees Fahrenheit. His findings are stated below.
At 6 a.m., the temperature was 50°F. For the next 4 hours, the temperature rose 3° per hour. The next 6 hours, it rose 2° per hour. The temperature then stayed steady until 6 p.m. For the next 2 hours, the temperature dropped 1° per hour. The temperature then dropped steadily until the temperature was 56°F at midnight.
On the set of axes below, graph Elroy's data.



State the entire time interval for which the temperature was increasing. Determine the average rate of change, in degrees per hour, from 6:00 p.m. to midnight.

785 Thomas took a 140-mile bus trip to visit his grandparents. His trip is outlined on the graph below.

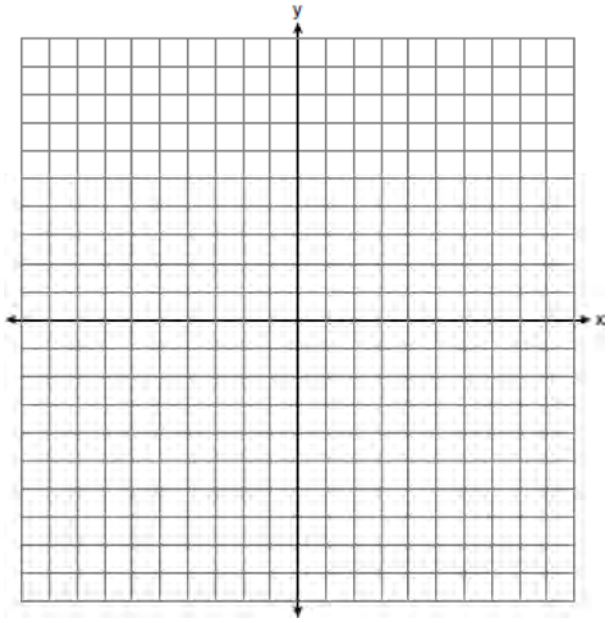


Explain what might have happened in the interval between *D* and *E*. State the interval in which the bus traveled the fastest. State how many miles per hour the bus was traveling during this interval. What was the average rate of speed, in miles per hour, for Thomas' entire bus trip?

F.IF.C.7: GRAPHING ABSOLUTE VALUE FUNCTIONS

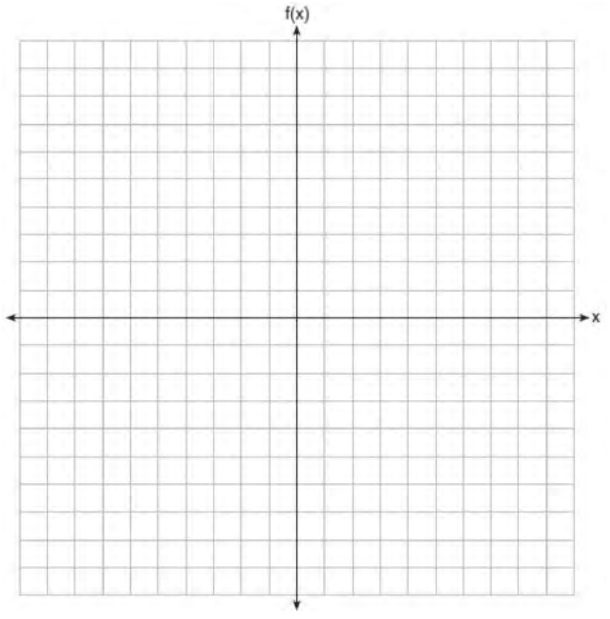
786 What is the *minimum* value of the function $y = |x + 3| - 2$?
1) –2
2) 2
3) 3
4) –3

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

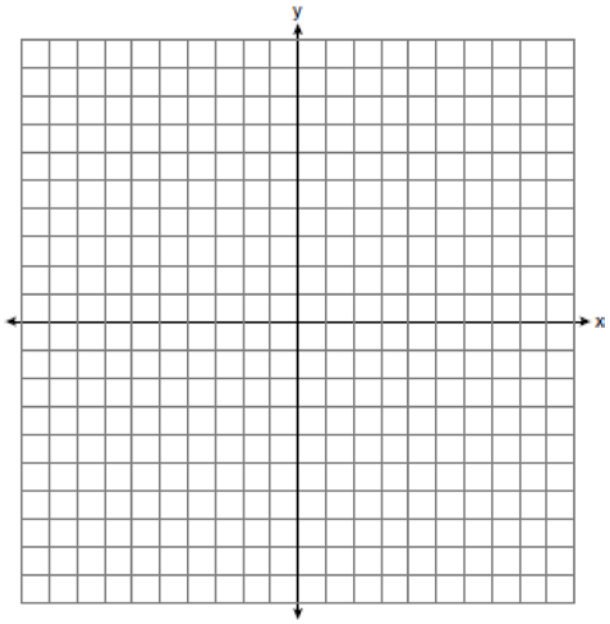


State the range of the function. State the domain over which the function is increasing.

788 On the set of axes below, graph $f(x) = |x - 3| + 2$.



789 Graph the function $f(x) = \left|\frac{1}{2}x + 3\right|$ over the interval $-8 \le x \le 0$.



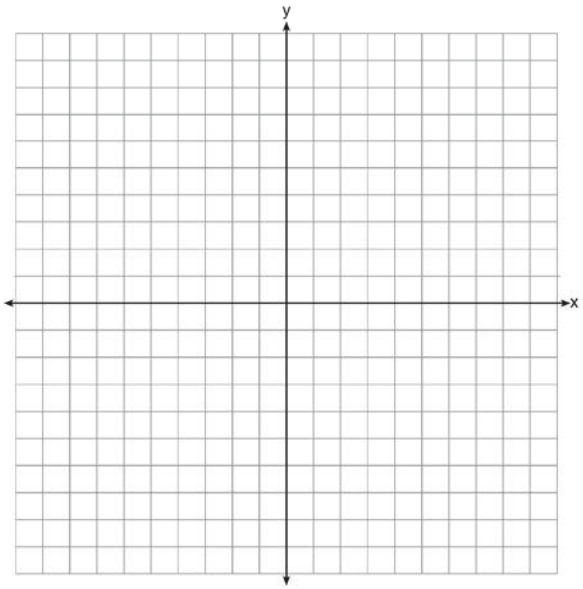
F.BF.B.3: GRAPHING ABSOLUTE VALUE FUNCTIONS

790 The function $f(x) = |x|$ is multiplied by k to create the new function $g(x) = k|x|$. Which statement is true about the graphs of $f(x)$ and $g(x)$ if $k = \frac{1}{2}$?

1) $g(x)$ is a reflection of $f(x)$ over the y-axis.
2) $g(x)$ is a reflection of $f(x)$ over the x-axis.
3) $g(x)$ is wider than $f(x)$.
4) $g(x)$ is narrower than $f(x)$.

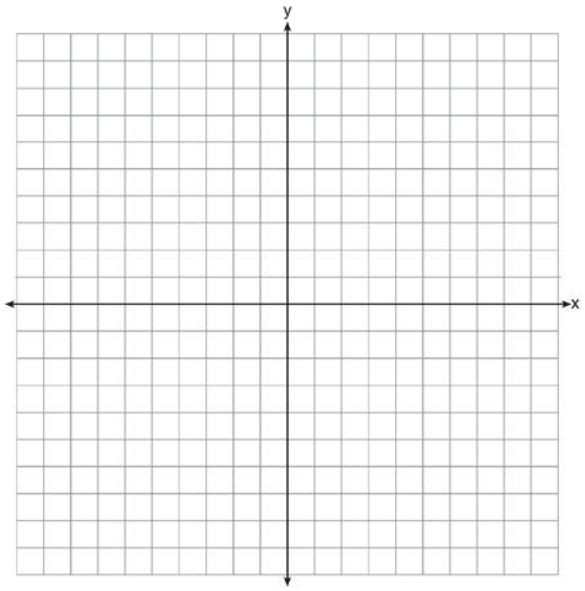
791 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.
$g(x) = |x - a|$
$h(x) = |x| - a$

792 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 $h(x)$?

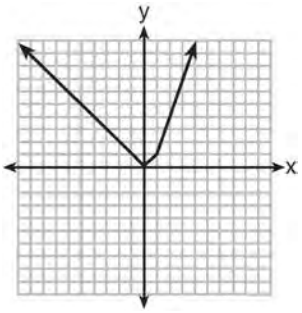
793 Graph the function $y = |x - 3|$ on the set of axes below.

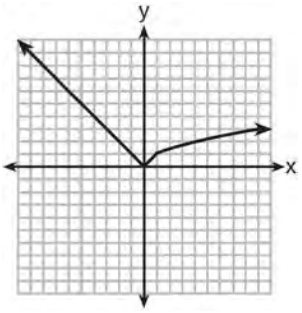


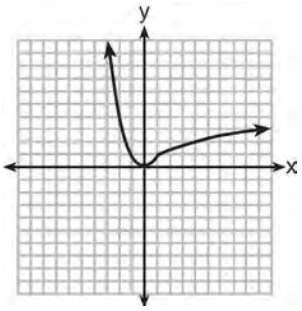
Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

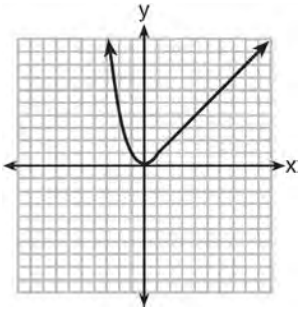
F.IF.C.7: GRAPHING PIECEWISE-DEFINED FUNCTIONS

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

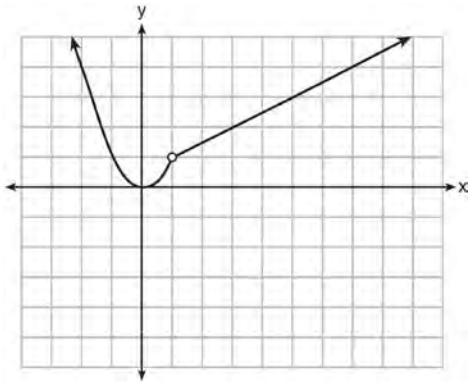
1) 

2) 

3) 

4) 

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

796 When the function $g(x) = \begin{cases} 5x, x \leq 3 \\ x^2 + 4, x > 3 \end{cases}$ is graphed correctly, how should the points be drawn on the graph for an x-value of 3?

1) open circles at $(3, 15)$ and $(3, 13)$
2) closed circles at $(3, 15)$ and $(3, 13)$
3) an open circle at $(3, 15)$ and a closed circle at $(3, 13)$
4) a closed circle at $(3, 15)$ and an open circle at $(3, 13)$

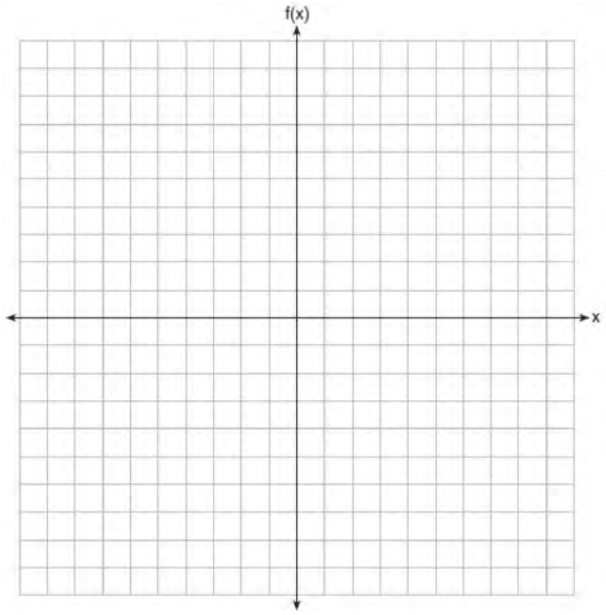
797 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \le 3 \end{cases}$$

State the value of $f(3)$. Justify your answer.

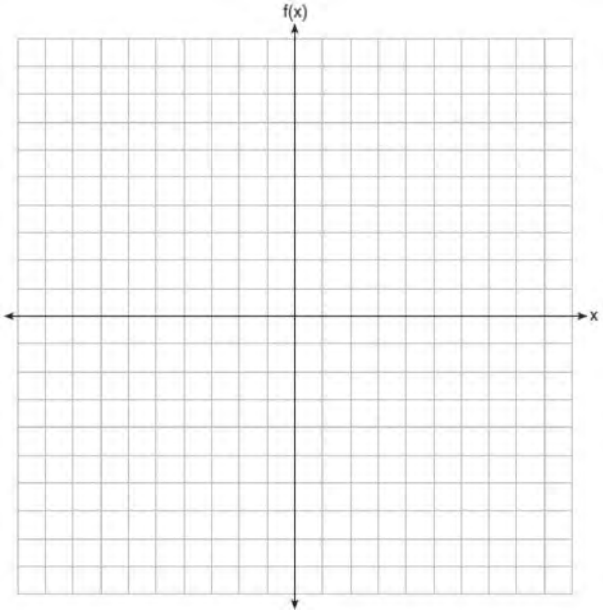
798 On the set of axes below, graph the piecewise function:

$$f(x) = \begin{cases} -\frac{1}{2}x, & x < 2 \\ x, & x \ge 2 \end{cases}$$



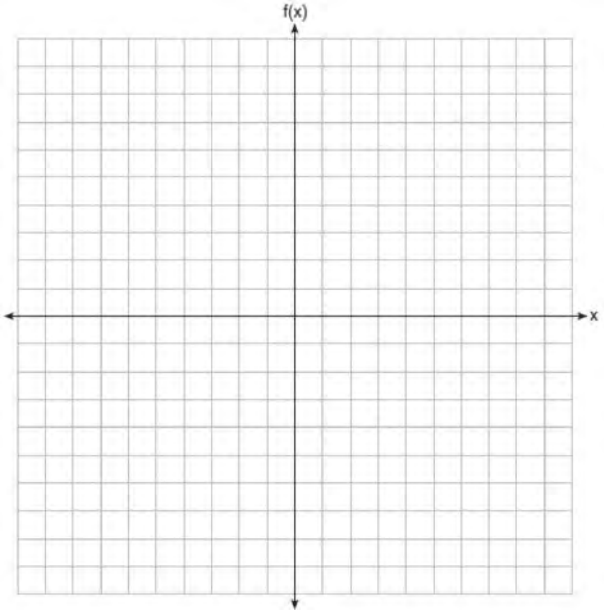
799 Graph the following function on the set of axes below.

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

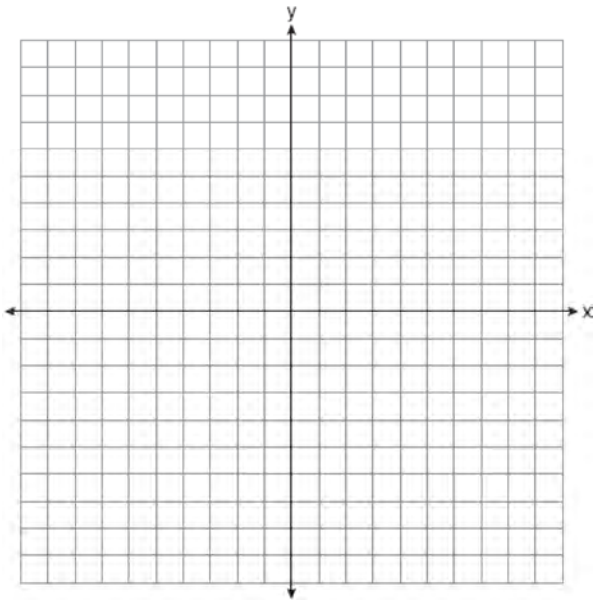


800 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$



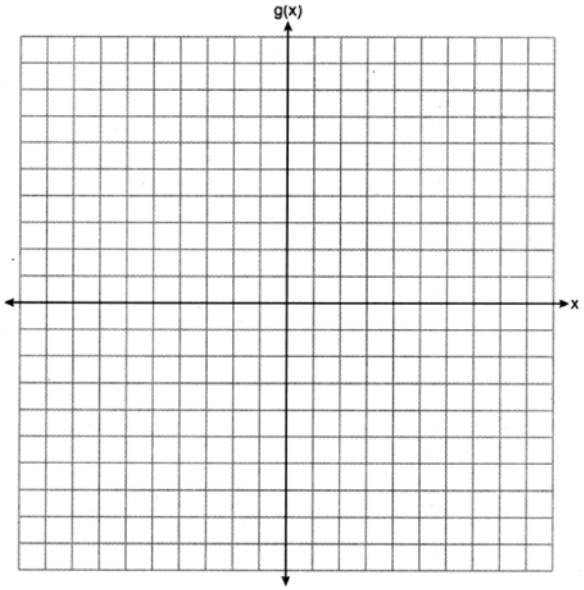
801 Graph the function: $h(x) = \begin{cases} 2x - 3, & x < 0 \\ x^2 - 4x - 5, & 0 \le x \le 5 \end{cases}$



802 The function g is defined as

$$g(x) = \begin{cases} |x + 3|, & x < -2 \\ x^2 + 1, & -2 \le x \le 2 \end{cases}$$

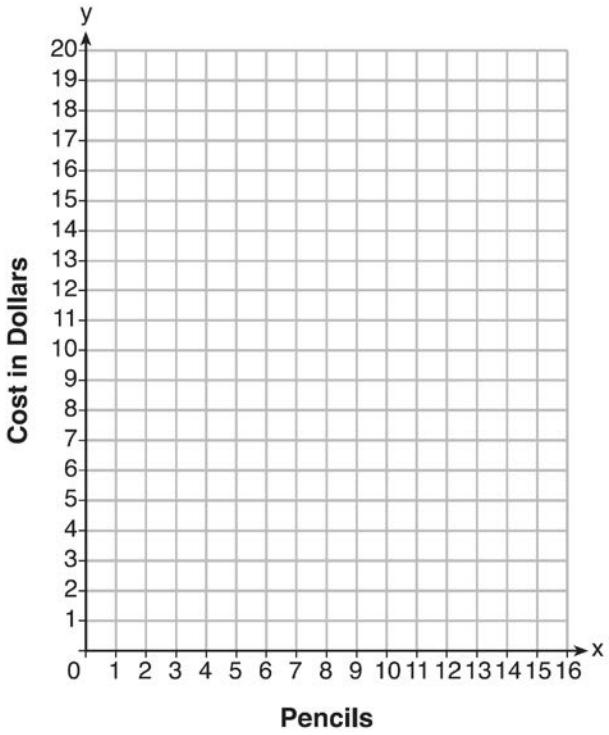
On the set of axes below, graph $g(x)$.



803 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.

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

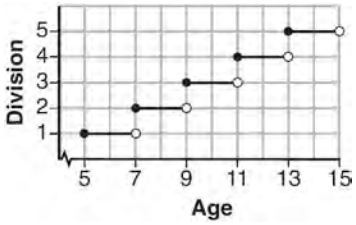
Create a graph of c on the axes below.

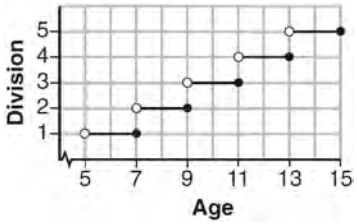


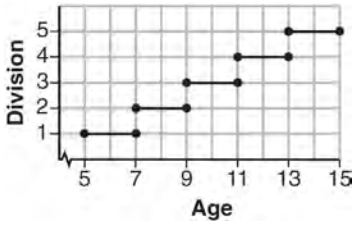
A customer brings 8 pencils to the cashier. The cashier suggests that the total cost to purchase 10 pencils would be less expensive. State whether the cashier is correct or incorrect. Justify your answer.

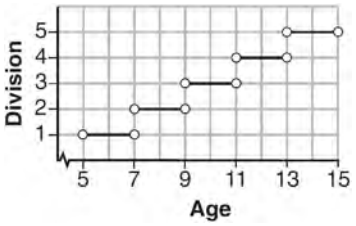
F.IF.C.7: GRAPHING STEP FUNCTIONS

804 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)


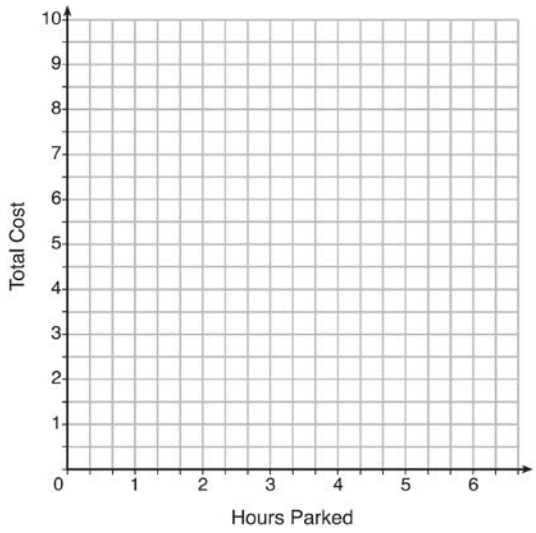
3)


4)


805 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.

SEQUENCES

F.IF.A.3: SEQUENCES

806 The first term in a sequence is 5 and the fifth term is 17. What is the common difference?
1) 2.4
2) 12
3) 3
4) 4

807 Given the following three sequences:
I. $2, 4, 6, 8, 10\ldots$
II. $2, 4, 8, 16, 32\ldots$
III. $a, a+2, a+4, a+6, a+8\ldots$
Which ones are arithmetic sequences?
1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

808 Determine the common difference of the arithmetic sequence in which $a_1 = 3$ and $a_4 = 15$.

809 What is a common ratio of the geometric sequence whose first term is 5 and third term is 245?
1) 7
2) 49
3) 120
4) 240

810 If $x \neq 0$, then the common ratio of the sequence $x, 2x^2, 4x^3, 8x^4, 16x^5, \ldots$ is
1) $2x$
2) 2
3) x
4) $\frac{1}{2}x$

811 Determine and state whether the sequence $1, 3, 9, 27, \ldots$ displays exponential behavior. Explain how you arrived at your decision.

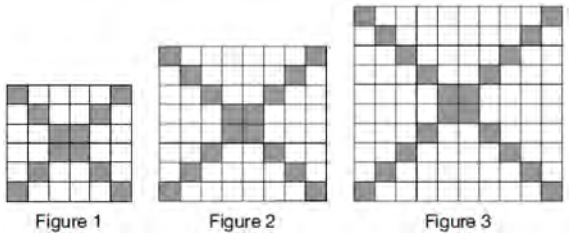
F.BF.A.1: SEQUENCES

812 Given: the sequence $4, 7, 10, 13, \ldots$
When using the arithmetic sequence formula $a_n = a_1 + (n-1)d$ to determine the 10th term, which variable would be replaced with the number 3?
1) a_1
2) n
3) a_n
4) d

813 In a sequence, the first term is 4 and the common difference is 3. The fifth term of this sequence is
1) –11
2) –8
3) 16
4) 19

814 On the main floor of the Kodak Hall at the Eastman Theater, the number of seats per row increases at a constant rate. Steven counts 31 seats in row 3 and 37 seats in row 6. How many seats are there in row 20?
1) 65
2) 67
3) 69
4) 71

815 The shaded boxes in the figures below represent a sequence.



If figure 1 represents the first term and this pattern continues, how many shaded blocks will be in figure 35?
1) 55
2) 148
3) 420
4) 805

816 The 24th term of the sequence $-5, -11, -17, -23, \ldots$ is
1) –149
2) –143
3) 133
4) 139

817 Determine the common difference of the arithmetic sequence in which $a_1 = 5$ and $a_5 = 17$. Determine the 21st term of this sequence.

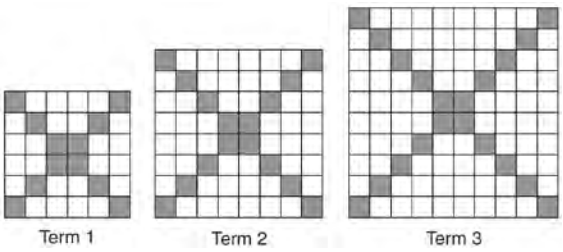
818 For the sequence $-27, -12, 3, 18, \ldots$, the expression that defines the nth term where $a_1 = -27$ is

1) $15 - 27n$
2) $15 - 27(n - 1)$
3) $-27 + 15n$
4) $-27 + 15(n - 1)$

819 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 nth term of this sequence?

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

820 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 nth term?

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

821 In a geometric sequence, the first term is 4 and the common ratio is -3. The fifth term of this sequence is

1) 324
2) 108
3) -108
4) -324

822 The eleventh term of the sequence $3, -6, 12, -24, \ldots$, is

1) -3072
2) -6144
3) 3072
4) 6144

GRAPHS AND STATISTICS

S.ID.A.2: CENTRAL TENDENCY AND DISPERSION

823 The following table shows the heights, in inches, of the players on the opening-night roster of the 2015-2016 New York Knicks.

84	80	87	75	77	79	80	74	76	80	80	82	82

The population standard deviation of these data is approximately

1) 3.5
2) 13
3) 79.7
4) 80

824 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.

825 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*

826 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.

827 Donna and Andrew compared their math final exam scores from grade 8 through grade 12. Their scores are shown below.

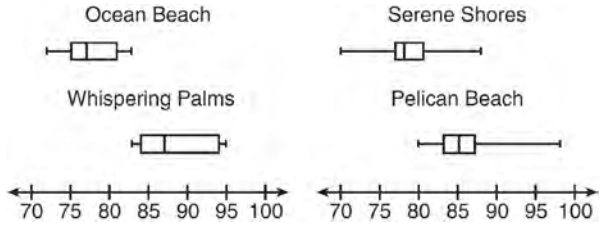
Donna	
8th	90
9th	92
10th	87
11th	94
12th	95

Andrew	
8th	78
9th	96
10th	87
11th	94
12th	93

Which statement about their final exam scores is correct?

1) Andrew has a higher mean than Donna.
2) Donna and Andrew have the same median.
3) Andrew has a larger interquartile range than Donna.
4) The 3rd quartile for Donna is greater than the 3rd quartile for Andrew.

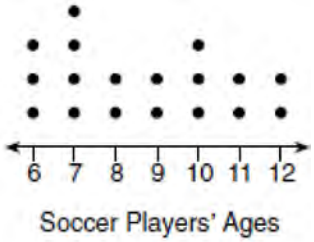
828 Corinne is planning a beach vacation in July and is analyzing the daily high temperatures for her potential destination. She would like to choose a destination with a high median temperature and a small interquartile range. She constructed box plots shown in the diagram below.



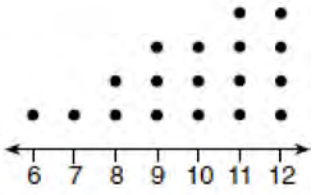
Which destination has a median temperature above 80 degrees and the smallest interquartile range?

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

829 Noah conducted a survey on sports participation. He created the following two dot plots to represent the number of students participating, by age, in soccer and basketball.



Soccer Players' Ages



Basketball Players' Ages

Which statement about the given data sets is correct?

1) The data for soccer players are skewed right.
2) The data for soccer players have less spread than the data for basketball players.
3) The data for basketball players have the same median as the data for soccer players.
4) The data for basketball players have a greater mean than the data for soccer players.

830 The ages of the last 16 United States presidents on their first inauguration day are shown in the table below.

51	54	51	60
62	43	55	56
61	52	69	64
46	54	47	70

Determine the interquartile range for this set of data.

831 The students in Mrs. Lankford's 4th and 6th period Algebra classes took the same test. The results of the scores are shown in the following table:

	$\bar{x}$	σ_x	***n***	**min**	Q_1	**med**	Q_3	**max**
4th Period	77.75	10.79	20	58	69	76.5	87.5	96
6th Period	78.4	9.83	20	59	71.5	78	88	96

Based on these data, which class has the larger spread of test scores? Explain how you arrived at your answer.

832 Santina is considering a vacation and has obtained high-temperature data from the last two weeks for Miami and Los Angeles.

Miami	76	75	83	73	60	66	76
	81	83	85	83	87	80	80

Los Angeles	74	63	65	67	65	65	65
	62	62	72	69	64	64	61

Which location has less variability in temperatures? Explain how you arrived at your answer.

S.ID.A.3: CENTRAL TENDENCY AND DISPERSION

833 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.

834 The 15 members of the French Club sold candy bars to help fund their trip to Quebec. The table below shows the number of candy bars each member sold.

Number of Candy Bars Sold				
0	35	38	41	43
45	50	53	53	55
68	68	68	72	120

When referring to the data, which statement is *false*?

1) The mode is the best measure of central tendency for the data.
2) The data have two outliers.
3) The median is 53.
4) The range is 120.

835 The heights, in inches, of 12 students are listed below.

61,67,72,62,65,59,60,79,60,61,64,63

Which statement best describes the spread of these data?

1) The set of data is evenly spread.
2) The median of the data is 59.5.
3) The set of data is skewed because 59 is the only value below 60.
4) 79 is an outlier, which would affect the standard deviation of these data.

S.ID.B.5: FREQUENCY TABLES

836 An outdoor club conducted a survey of its members. The members were asked to state their preference between skiing and snowboarding. Each member had to pick one. Of the 60 males, 45 stated they preferred to snowboard. Twenty-two of the 60 females preferred to ski. What is the relative frequency that a male prefers to ski?

1) 0.125
2) $0.2\overline{5}$
3) $0.\overline{333}$
4) $0.\overline{405}$

837 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?

1) 15
2) 25
3) 40
4) 60

838 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?

1) 14%
2) 28%
3) 33%
4) 58%

839 Students were asked to name their favorite sport from a list of basketball, soccer, or tennis. The results are shown in the table below.

	Basketball	Soccer	Tennis
Girls	42	58	20
Boys	84	41	5

What percentage of the students chose soccer as their favorite sport?

1) 39.6%
2) 41.4%
3) 50.4%
4) 58.6%

840 Jenna took a survey of her senior class to see whether they preferred pizza or burgers. The results are summarized in the table below.

	Pizza	Burgers
Male	23	42
Female	31	26

Of the people who preferred burgers, approximately what percentage were female?

1) 21.3
2) 38.2
3) 45.6
4) 61.9

841 A middle school conducted a survey of students to determine if they spent more of their time playing games or watching videos on their tablets. The results are shown in the table below.

	Playing Games	Watching Videos	Total
Boys	138	46	184
Girls	54	142	196
Total	192	188	380

Of the students who spent more time playing games on their tablets, approximately what percent were boys?

1) 41
2) 56
3) 72
4) 75

842 A survey was given to 12th-grade students of West High School to determine the location for the senior class trip. The results are shown in the table below.

	Niagara Falls	Darien Lake	New York City
Boys	56	74	103
Girls	71	92	88

To the *nearest percent*, what percent of the boys chose Niagara Falls?

1) 12
2) 24
3) 44
4) 56

843 Mrs. Smith's math class surveyed students to determine their favorite flavors of soft ice cream. The results are shown in the table below.

	Chocolate	Vanilla	Twist
Juniors	42	27	45
Seniors	67	42	21

Of the students who preferred chocolate, approximately what percentage were seniors?

1) 27.5
2) 44.7
3) 51.5
4) 61.5

844 At Berkeley Central High School, a survey was conducted to see if students preferred cheeseburgers, pizza, or hot dogs for lunch. The results of this survey are shown in the table below.

	Cheeseburgers	Pizza	Hot Dogs
Females	32	44	24
Males	36	30	34

Based on this survey, what percent of the students preferred pizza?

1) 30
2) 37
3) 44
4) 74

845 Some adults were surveyed to find out if they would prefer to buy a sports utility vehicle (SUV) or a sports car. The results of the survey are summarized in the table below.

	SUV	Sports Car	Totals
Male	21	38	59
Female	135	46	181
Totals	156	84	240

Of the number of adults that preferred sports cars, approximately what percent were males?

1) 15.8
2) 45.2
3) 64.4
4) 82.6

846 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?

847 The sixth-grade classes at West Road Elementary School were asked to vote on the location of their class trip. The results are shown in the table below.

	Playland	Splashdown	Fun Central
Boys	38	53	25
Girls	39	46	37

Determine, to the *nearest percent*, the percentage of girls who voted for Splashdown.

848 A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences		
	Comedy	**Drama**
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

849 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop			
Don't Like Pop			
Total			

850 Julia surveyed 150 of her classmates at City Middle School to determine their favorite animals. Of the 150 students, 46% were male. Forty-two students said their favorite animal was a horse, and of those students were female. Of the 60 students who said dolphins were their favorite animal, 30% were male. Using this information, complete the two-way frequency table below.

	Horse	Dolphin	Penguin	Total
Male				
Female				
Total				

S.ID.A.1: FREQUENCY HISTOGRAMS

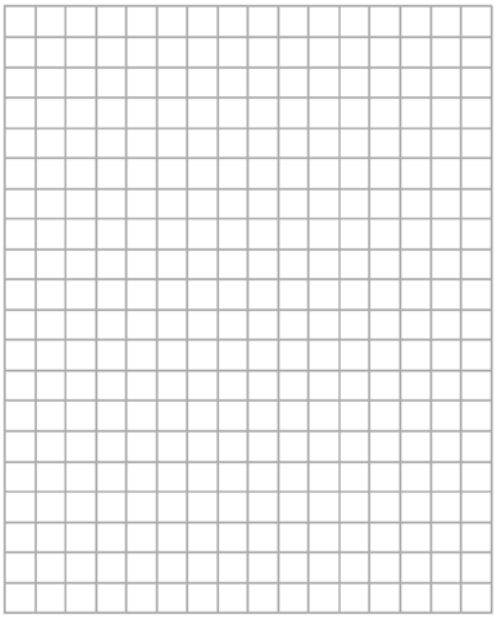
851 The heights, in feet, of former New York Knicks basketball players are listed below.

6.4 6.9 6.3 6.2 6.3 6.0 6.1 6.3 6.8 6.2
6.5 7.1 6.4 6.3 6.5 6.5 6.4 7.0 6.4 6.3
6.2 6.3 7.0 6.4 6.5 6.5 6.5 6.0 6.2

Using the heights given, complete the frequency table below.

Interval	Frequency
6.0-6.1	
6.2-6.3	
6.4-6.5	
6.6-6.7	
6.8-6.9	
7.0-7.1	

Based on the frequency table created, draw and label a frequency histogram on the grid below.

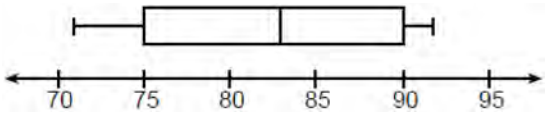


Determine and state which interval contains the upper quartile. Justify your response.

S.ID.A.1: BOX PLOTS

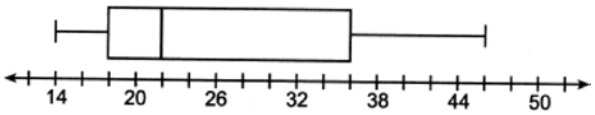
852 Which statistic can *not* be determined from a box plot representing the scores on a math test in Mrs. DeRidder's algebra class?
1) the lowest score
2) the median score
3) the highest score
4) the score that occurs most frequently

853 The box plot below summarizes the data for the average monthly high temperatures in degrees Fahrenheit for Orlando, Florida.



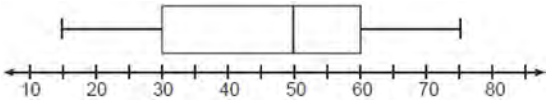
The third quartile is
1) 92
2) 90
3) 83
4) 71

854 What is the value of the third quartile in the box plot shown below?



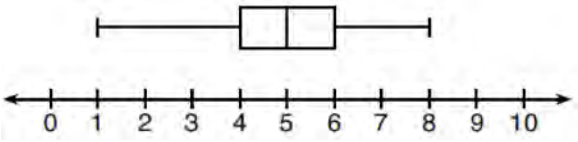
1) 18
2) 22
3) 36
4) 46

855 A box plot is shown below.



Which number represents the third quartile?
1) 30
2) 50
3) 60
4) 75

856 What is the range of the box plot shown below?

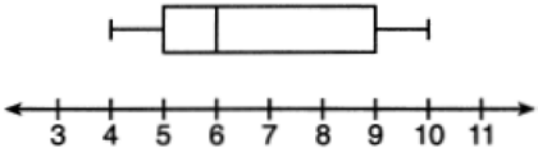


1) 7
2) 2
3) 3
4) 4

857 Below are two representations of data.

A: 2, 5, 5, 6, 6, 6, 7, 8, 9

B:



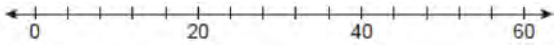
Which statement about *A* and *B* is true?
1) median of *A* > median of *B*
2) range of *A* < range of *B*
3) upper quartile of *A* < upper quartile of *B*
4) lower quartile of *A* > lower quartile of *B*

858 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

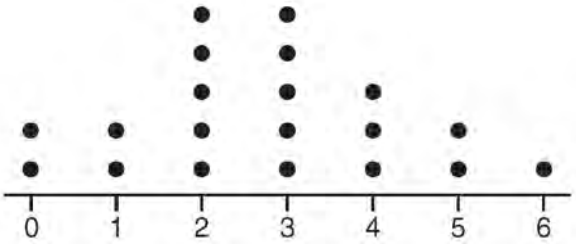
Using an appropriate scale on the number line below, construct a box plot for the 15 values.

859 The data set 20, 36, 52, 56, 24, 16, 40, 4, 28 represents the number of books purchased by nine book club members in a year. Construct a box plot for these data on the number line below.



S.ID.A.1: DOT PLOTS

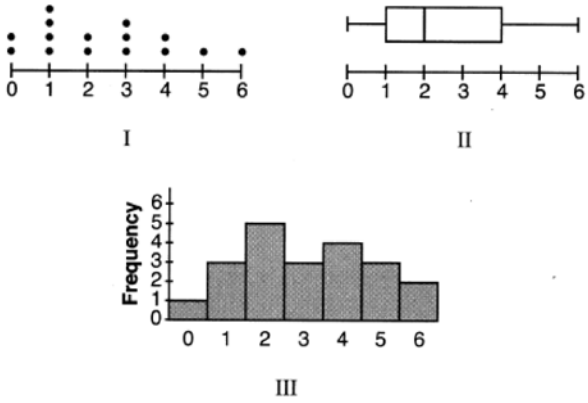
860 The dot plot shown below represents the number of pets owned by students in a class.



Which statement about the data is *not* true?

1) The median is 3.
2) The interquartile range is 2.
3) The mean is 3.
4) The data contain no outliers.

861 Different ways to represent data are shown below.



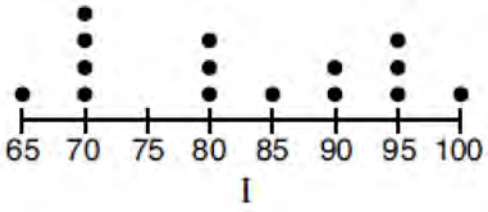
Which data representations have a median of 2?

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

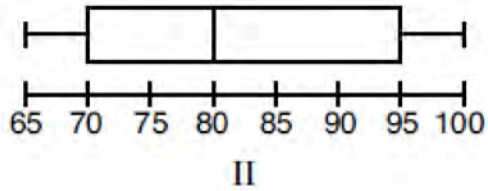
862 Given the following data set:

65, 70, 70, 70, 70, 80, 80, 80, 85, 90, 90, 95, 95, 95, 100

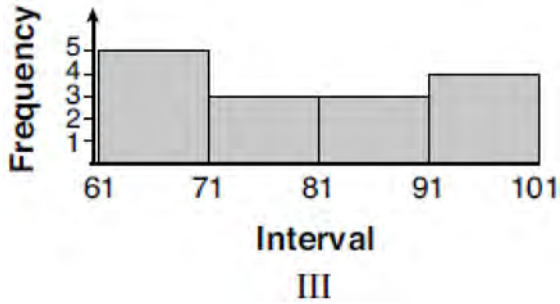
Which representations are correct for this data set?



I



II



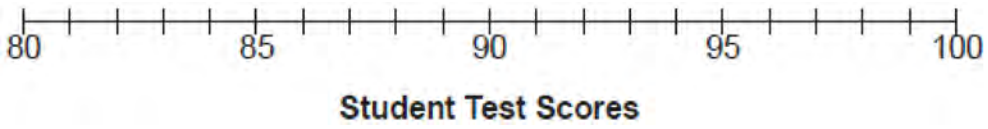
III

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

863 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

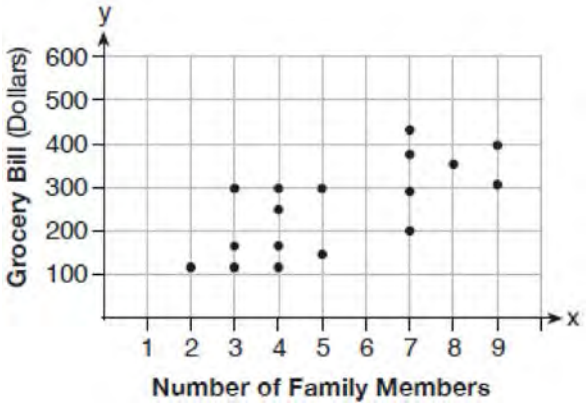
On the number line below, create a dot plot to model the data.



State the median test score for the data set.

S.ID.B.6: SCATTER PLOTS

864 The scatter plot below shows the relationship between the number of members in a family and the amount of the family's weekly grocery bill.



The most appropriate prediction of the grocery bill for a family that consists of six members is
1) $100
2) $300
3) $400
4) $500

S.ID.C.9: ANALYSIS OF DATA

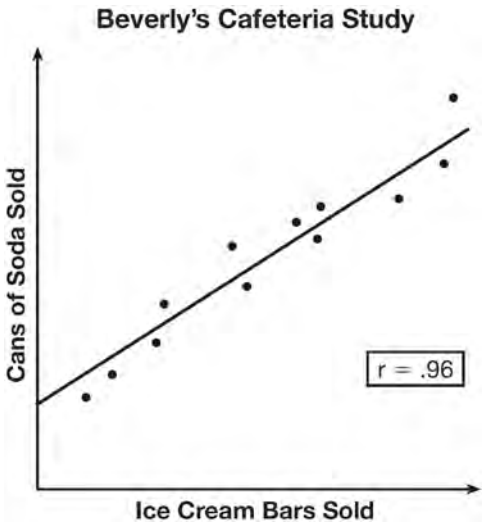
865 What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?
1) positive correlation, but not causal
2) positive correlation, and causal
3) negative correlation, but not causal
4) negative correlation, and causal

866 Which correlation shows a causal relationship?
1) The more minutes an athlete is on the playing field, the more goals he scores.
2) The more gasoline that you purchase at the pump, the more you pay.
3) The longer a shopper stays at the mall, the more purchases she makes.
4) As the price of a gift increases, the size of the gift box increases.

867 Which situation does *not* describe a causal relationship?

1) The higher the volume on a radio, the louder the sound will be.
2) The faster a student types a research paper, the more pages the paper will have.
3) The shorter the distance driven, the less gasoline that will be used.
4) The slower the pace of a runner, the longer it will take the runner to finish the race.

868 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

869 The data obtained from a random sample of track athletes showed that as the foot size of the athlete decreased, the average running speed decreased. Which statement is best supported by the data?

1) Smaller foot sizes cause track athletes to run slower.
2) The sample of track athletes shows a causal relationship between foot size and running speed.
3) The sample of track athletes shows a correlation between foot size and running speed.
4) There is no correlation between foot size and running speed in track athletes.

S.ID.B.6: REGRESSION

870 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) $y = 14.1x + 5.8$

871 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*.)

872 Omar has a piece of rope. He ties a knot in the rope and measures the new length of the rope. He then repeats this process several times. Some of the data collected are listed in the table below.

Number of Knots	4	5	6	7	8
Length of Rope (cm)	64	58	49	39	31

State, to the *nearest tenth*, the linear regression equation that approximates the length, y, of the rope after tying x knots. Explain what the y-intercept means in the context of the problem. Explain what the slope means in the context of the problem.

873 The data table below shows the median diameter of grains of sand and the slope of the beach for 9 naturally occurring ocean beaches.

Median Diameter of Grains of Sand, in Millimeters (x)	0.17	0.19	0.22	0.235	0.235	0.3	0.35	0.42	0.85
Slope of Beach, in Degrees (y)	0.63	0.7	0.82	0.88	1.15	1.5	4.4	7.3	11.3

Write the linear regression equation for this set of data, rounding all values to the *nearest thousandth*. Using this equation, predict the slope of a beach, to the *nearest tenth of a degree*, on a beach with grains of sand having a median diameter of 0.65 mm.

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

Attendance at Museum					
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.

875 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	$2900	$3080	$2500	$2380	$2200	$2700	$3000	$3620	$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*. State the correlation coefficient, r, of the data to the *nearest hundredth*. Does r indicate a strong linear relationship between the variables? Explain your reasoning.

876 The percentage of students scoring 85 or better on a mathematics final exam and an English final exam during a recent school year for seven schools is shown in the table below.

Percentage of Students Scoring 85 or Better	
Mathematics, x	**English, y**
27	46
12	28
13	45
10	34
30	56
45	67
20	42

Write the linear regression equation for these data, rounding all values to the *nearest hundredth*. State the correlation coefficient of the linear regression equation, to the *nearest hundredth*. Explain the meaning of this value in the context of these data.

877 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*. State the correlation coefficient, rounded to the *nearest hundredth*. State what this correlation coefficient indicates about the linear fit of the data.

878 The data given in the table below show some of the results of a study comparing the height of a certain breed of dog, based upon its mass.

Mass (kg)	4.5	5	4	3.5	5.5	5	5	4	4	6	3.5	5.5
Height (cm)	41	40	35	38	43	44	37	39	42	44	31	30

Write the linear regression equation for these data, where *x* is the mass and *y* is the height. Round all values to the *nearest tenth*. State the value of the correlation coefficient to the *nearest tenth*, and explain what it indicates.

879 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*. State the correlation coefficient of this line, to the *nearest hundredth*. Explain what the correlation coefficient suggests in the context of the problem.

880 Stephen collected data from a travel website. The data included a hotel's distance from Times Square in Manhattan and the cost of a room for one weekend night in August. A table containing these data appears below.

Distance From Times Square (city blocks) (x)	0	0	1	1	3	4	7	11	14	19
Cost of a Room (dollars) (y)	293	263	244	224	185	170	219	153	136	111

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*. State the correlation coefficient for this data set, to the *nearest hundredth*. Explain what the sign of the correlation coefficient suggests in the context of the problem.

881 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*. State the correlation coefficient of the data to the *nearest hundredth*. Explain what this means in the context of the problem.

882 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks **x**	**Heart Rate** (bpm) **y**
0	68
10	84
15	104
20	100
30	120

State the linear regression equation that estimates the heart rate per number of jumping jacks. State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*. Explain what the correlation coefficient suggests in the context of this problem.

883 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, x, and the percentage of accidents caused by speeding, y. Round all values to the *nearest hundredth*. State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

884 The table below shows the number of math classes missed during a school year for nine students, and their final exam scores.

Number of Classes Missed (x)	2	10	3	22	15	2	20	18	9
Final Exam Score (y)	99	72	90	35	60	80	40	43	75

Write the linear regression equation for this data set. Round all values to the *nearest hundredth*. State the correlation coefficient for your linear regression. Round your answer to the *nearest hundredth*. State what the correlation coefficient indicates about the linear fit of the data.

885 Suzanna collected information about a group of ponies and horses. She made a table showing the height, measured in hands (hh), and the weight, measured in pounds (lbs), of each pony and horse.

Height (hh) x	**Weight** (lbs) y
11	264
12	638
13	700
14	850
15	1000
16	1230
17	1495

Write the linear regression equation for this set of data. Round all values to the *nearest hundredth*. State the correlation coefficient for the linear regression. Round your answer to the *nearest hundredth*. Explain what the correlation coefficient indicates about the linear fit of the data in the context of the problem.

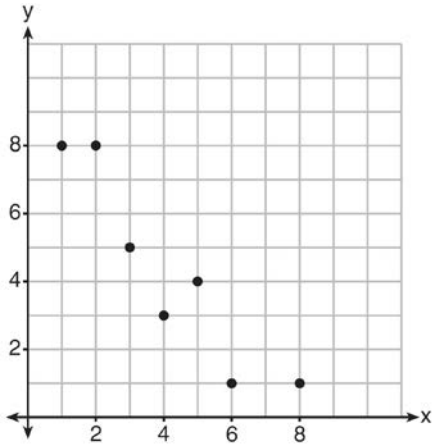
886 A software company kept a record of their annual budget for advertising and their profit for each of the last eight years. These data are shown in the table below.

Annual Advertising Budget (in thousands, $) (*x*)	**Profit** (in millions, $) (*y*)
10	2.2
13	2.4
14	3.2
16	4.6
19	5.7
24	6.9
24	7.9
28	9.3

Write the linear regression equation for this set of data. State, to the *nearest hundredth*, the correlation coefficient of these linear data. State what this correlation coefficient indicates about the linear fit of the data.

S.ID.C.8: CORRELATION COEFFICIENT

887 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

888 Bella recorded data and used her graphing calculator to find the equation for the line of best fit. She then used the correlation coefficient to determine the strength of the linear fit. Which correlation coefficient represents the strongest linear relationship?

1) 0.9
2) 0.5
3) -0.3
4) -0.8

889 The table below shows 6 students' overall averages and their averages in their math class.

Overall Student Average	92	98	84	80	75	82
Math Class Average	91	95	85	85	75	78

If a linear model is applied to these data, which statement best describes the correlation coefficient?

1) It is close to –1.
2) It is close to 1.
3) It is close to 0.
4) It is close to 0.5.

890 The table below shows the time, in hours, spent by students on electronic devices and their math test scores. The data collected model a linear regression.

Time Spent on an Electronic Device (hours)	**Math Test Score**
3	85
1	99
4	81
0	98
3	90
7	65
5	78
2	90

What is the correlation coefficient, to the *nearest hundredth*, for these data?

1) –0.98
2) –0.95
3) 0.98
4) 0.95

891 Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of -0.524. Which statement best summarizes this result?

1) There is a strong positive correlation between the variables.
2) There is a strong negative correlation between the variables.
3) There is a moderate positive correlation between the variables.
4) There is a moderate negative correlation between the variables.

892 The results of a linear regression are shown below.

$y = ax + b$

$a = -1.15785$

$b = 139.3171772$

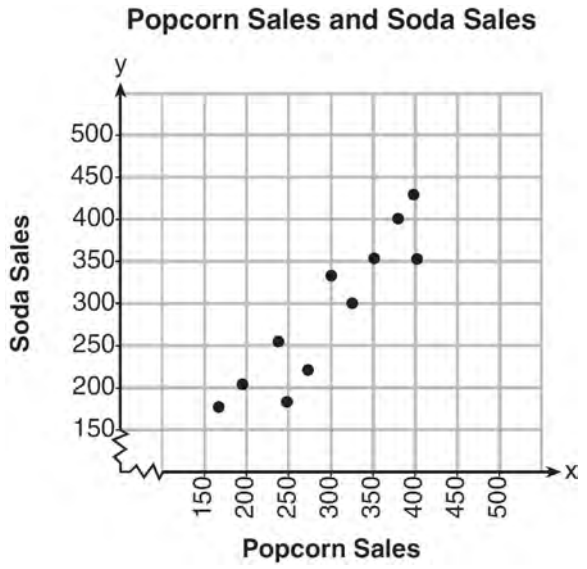
$r = -0.896557832$

$r^2 = 0.8038159461$

Which phrase best describes the relationship between x and y?

1) strong negative correlation
2) strong positive correlation
3) weak negative correlation
4) weak positive correlation

893 The scatterplot below compares the number of bags of popcorn and the number of sodas sold at each performance of the circus over one week.



Which conclusion can be drawn from the scatterplot?

1) There is a negative correlation between popcorn sales and soda sales.
2) There is a positive correlation between popcorn sales and soda sales.
3) There is no correlation between popcorn sales and soda sales.
4) Buying popcorn causes people to buy soda.

894 At Mountain Lakes High School, the mathematics and physics scores of nine students were compared as shown in the table below.

Mathematics	55	93	89	60	90	45	64	76	89
Physics	66	89	94	52	84	56	66	73	92

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data. Explain what the correlation coefficient means with regard to the context of this situation.

895 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.

Algebra I Regents Exam Questions by State Standard: Topic
Answer Section

1 ANS: 2 REF: 061702ai NAT: A.SSE.A.1 TOP: Dependent and Independent Variables
2 ANS: 3 REF: 082309ai NAT: A.SSE.A.1 TOP: Modeling Expressions
3 ANS: 3 REF: 012414ai NAT: A.SSE.A.1 TOP: Modeling Expressions
4 ANS: 1 REF: 082208ai NAT: A.SSE.A.1 TOP: Modeling Expressions
5 ANS: 2
$2x^3 + 3x^2 + 7x - 6$

REF: 082216ai NAT: A.SSE.A.1 TOP: Modeling Expressions
6 ANS:
No, –2 is the coefficient of the term with the highest power.

REF: 081628ai NAT: A.SSE.A.1 TOP: Modeling Expressions
7 ANS: 1 REF: 061905ai NAT: A.SSE.A.1 TOP: Modeling Expressions
8 ANS: 3 REF: 012303ai NAT: A.SSE.A.1 TOP: Modeling Expressions
9 ANS: 3 REF: 061819ai NAT: A.SSE.A.1 TOP: Modeling Expressions
10 ANS: 4
$4x^3 + x^2 + 2x$

REF: 012024ai NAT: A.SSE.A.1 TOP: Modeling Expressions
11 ANS: 4
$3x^4 - 4x^2 - 4$

REF: 062122ai NAT: A.SSE.A.1 TOP: Modeling Expressions
12 ANS: 2 REF: 062220ai NAT: A.SSE.A.1 TOP: Modeling Expressions
13 ANS: 4 REF: 061602ia NAT: A.SSE.A.1 TOP: Modeling Expressions
14 ANS: 2
$(x^2 - 5x)(2x + 3) = 2x^3 + 3x^2 - 10x^2 - 15x = 2x^3 - 7x^2 - 15x$

REF: 081912ai NAT: A.SSE.A.1 TOP: Modeling Expressions
15 ANS: 4 REF: 062323ai NAT: A.SSE.A.1 TOP: Modeling Expressions
16 ANS: 2 REF: 081712ai NAT: A.SSE.A.1 TOP: Modeling Expressions
17 ANS: 4 REF: 081503ai NAT: A.SSE.A.1 TOP: Modeling Expressions
18 ANS: 3 REF: 081901ai NAT: A.SSE.A.1 TOP: Modeling Expressions
19 ANS: 4 REF: 011718ai NAT: A.SSE.A.1 TOP: Modeling Expressions
20 ANS: 1 REF: 061401ai NAT: A.REI.A.1 TOP: Identifying Properties
21 ANS: 4 REF: 011801ai NAT: A.REI.A.1 TOP: Identifying Properties
22 ANS: 4 REF: 081701ai NAT: A.REI.A.1 TOP: Identifying Properties
23 ANS: 4 REF: 061909ai NAT: A.REI.A.1 TOP: Identifying Properties
24 ANS: 4 REF: 082219ai NAT: A.REI.A.1 TOP: Identifying Properties
25 ANS: 4 REF: 011908ai NAT: A.REI.A.1 TOP: Identifying Properties

26 ANS:
Commutative. This property is correct because $x + y = y + x$.

REF: 081926ai NAT: A.REI.A.1 TOP: Identifying Properties

27 ANS:
Distributive and Addition Property of Equality

REF: 012029ai NAT: A.REI.A.1 TOP: Identifying Properties

28 ANS: 4

$3x - 24 + 4x = 8x + 4$

$7x - 24 = 8x + 4$

$-28 = x$

REF: 062106ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: integral expressions

29 ANS: 2

$-2 + 8x = 3x + 8$

$5x = 10$

$x = 2$

REF: 081804ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: integral expressions

30 ANS: 2

$2 + 3(2a + 1) = 3(a + 2)$

$2 + 6a + 3 = 3a + 6$

$3a + 5 = 6$

$3a = 1$

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

REF: 012307ai NAT: A.REI.B.3 TOP: Solving Linear Equations

31 ANS: 1

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

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

$3.7x - 28 = 2.71$

$3.7x = 30.71$

$x = 8.3$

REF: 061719ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: decimals

32 ANS: 3

$$\frac{4}{3} = \frac{x+10}{15}$$

$$3x + 30 = 60$$

$$x = 10$$

REF: 081904ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: fractional expressions

33 ANS: 4

$$\frac{3}{2}\left(\frac{2}{3}(3-2x) = \frac{3}{4}\right)$$

$$3 - 2x = \frac{9}{8}$$

$$24 - 16x = 9$$

$$15 = 16x$$

$$x = \frac{15}{16}$$

REF: 012416ai NAT: A.REI.B.3 TOP: Solving Linear Equations

34 ANS: 1

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

$$6x - 12 = 12$$

$$6x = 24$$

$$x = 4$$

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

35 ANS: 2

$$\frac{x-3}{4} + \frac{8}{12} = \frac{17}{12}$$

$$\frac{x-3}{4} = \frac{9}{12}$$

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

$$x - 3 = 3$$

$$x = 6$$

REF: 012005ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: fractional expressions

36 ANS: 1

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

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

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

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

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

37 ANS: 2

$$\frac{3}{5}\left(x+\frac{4}{3}\right)=1.04$$

$$3\left(x+\frac{4}{3}\right)=5.2$$

$$3x+4=5.2$$

$$3x=1.2$$

$$x=0.4$$

REF: 011905ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: decimals

38 ANS: 2

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

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

$$15-40x=768$$

$$-40x=753$$

$$x=-18.825$$

REF: 081713ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: fractional expressions

39 ANS: 2

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

$$10x - 20 = 15$$

$$10x = 35$$

$$x = 3.5$$

REF: 082304ai NAT: A.REI.B.3 TOP: Solving Linear Equations

40 ANS: 4

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

$$10(3x - 24) = 3(16x - 12)$$

$$30x - 240 = 48x - 36$$

$$-204 = 18x$$

$$x = -11.\overline{3}$$

REF: 011822ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: fractional expressions

41 ANS: 3

$10(x-5) = -15$ $4 + 2(x-2) = 9$ $\frac{1}{3}x = \frac{3}{2}$

$10x - 50 = -15$ $4 + 2x - 4 = 9$ $x = \frac{9}{2}$

$10x = 35$ $2x = 9$

$x = \frac{7}{2}$ $x = \frac{9}{2}$

REF: 082217ai NAT: A.REI.B.3 TOP: Solving Linear Equations

42 ANS:

$$-2.4(x + 1.4) = 6.8x - 22.68$$

$$-2.4x - 3.36 = 6.8x - 22.68$$

$$19.32 = 9.2x$$

$$2.1 = x$$

REF: 062325ai NAT: A.REI.B.3 TOP: Solving Linear Equations

43 ANS:

$18 - 2(x + 5) = 12x$

$18 - 2x - 10 = 12x$

$8 = 14x$

$x = \frac{8}{14} = \frac{4}{7}$

REF: 061830ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: fractional expressions

44 ANS:

$-12\left(-\frac{2}{3}(x + 12) + \frac{2}{3}x = -\frac{5}{4}x + 2\right)$

$8(x + 12) - 8x = 15x - 24$

$8x + 96 - 8x = 15x - 24$

$120 = 15x$

$8 = x$

REF: 061925ai NAT: A.REI.B.3 TOP: Solving Linear Equations
KEY: fractional expressions

45 ANS: 3 REF: 081616ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

46 ANS: 2 REF: 061915ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

47 ANS: 2 REF: 061416ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

48 ANS: 1 REF: 062213ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

49 ANS: 3 REF: 081614ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

50 ANS:

$15x + 36 = 10x + 48$

$5x = 12$

$x = 2.4$

REF: 011531ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

51 ANS:

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

$45x = 15$

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

REF: spr1305ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

52 ANS:
$1.25x + 0.55(x + 4) + 0.75(x - 2) = 16$ $1.25x + 0.55x + 2.2 + 0.75x - 1.5 = 16$

$2.55x + 0.7 = 16$

$2.55x = 15.3$

$x = 6$

REF: 062134ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

53 ANS:
$1000 - 60x = 600 - 20x$. $1000 - 60(10) = 400$. Ian is incorrect because $I = 1000 - 6(16) = 40 \neq 0$

$40x = 400$

$x = 10$

REF: 011737ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

54 ANS: 4 REF: 061422ai NAT: A.CED.A.2 TOP: Modeling Linear Equations

55 ANS: 4 REF: 081508ai NAT: A.CED.A.2 TOP: Modeling Linear Equations

56 ANS:
$b = 2(a + 15)$

REF: 082229ai NAT: A.CED.A.2 TOP: Modeling Linear Equations

57 ANS:
$C = 1.29 + .99(s - 1)$ No, because $C = 1.29 + .99(52 - 1) = 51.78$

REF: 011730ai NAT: A.CED.A.2 TOP: Modeling Linear Equations

58 ANS: 3 REF: 011606ai NAT: A.CED.A.4 TOP: Transforming Formulas

59 ANS: 3 REF: 011704ai NAT: A.CED.A.4 TOP: Transforming Formulas

60 ANS: 1
$Ax + By = C$

$By = C - Ax$

$y = \frac{C - Ax}{B}$

REF: 062211ai NAT: A.CED.A.4 TOP: Transforming Formulas

61 ANS: 2
$v^2 - u^2 = 2as$

$\frac{v^2 - u^2}{2s} = \frac{2as}{2s}$

$\frac{v^2 - u^2}{2s} = a$

REF: 012408ai NAT: A.CED.A.4 TOP: Transforming Formulas

62 ANS: 4 REF: 061823ai NAT: A.CED.A.4 TOP: Transforming Formulas

63 ANS: 4

$2A = (b_1 + b_2)h$

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

REF: 062315ai NAT: A.CED.A.4 TOP: Transforming Formulas

64 ANS: 4

$V = \frac{1}{2}a(b + c)h$

$2V = a(b + c)h$

$\frac{2V}{ah} = b + c$

$\frac{2V}{ah} - c = b$

REF: 082224ai NAT: A.CED.A.4 TOP: Transforming Formulas

65 ANS: 2

$\frac{Q}{mC} = T_f - T_i$

$\frac{Q}{mC} + T_i = T_f$

REF: 012318ai NAT: A.CED.A.4 TOP: Transforming Formulas

66 ANS: 3 REF: 061723ai NAT: A.CED.A.4 TOP: Transforming Formulas

67 ANS: 2

$P = I^2R$

$I^2 = \frac{P}{R}$

$I = \sqrt{\frac{P}{R}}$

REF: 011920ai NAT: A.CED.A.4 TOP: Transforming Formulas

68 ANS: 1 REF: 011516ai NAT: A.CED.A.4 TOP: Transforming Formulas

69 ANS: 2

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

$$2d = at^2$$

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

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

REF: 061519ai NAT: A.CED.A.4 TOP: Transforming Formulas

70 ANS: 1

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

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

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

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

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

71 ANS: 4

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

$$x - 1 = 2a$$

$$x = 2a + 1$$

REF: 062223ai NAT: A.CED.A.4 TOP: Transforming Formulas

72 ANS:

$$\frac{S}{180} = n - 2$$

$$\frac{S}{180} + 2 = n$$

REF: 061631ai NAT: A.CED.A.4 TOP: Transforming Formulas

73 ANS:

$$2S = n(a + b)$$

$$\frac{2S}{n} = a + b$$

$$\frac{2S}{n} - a = b$$

REF: 012032ai NAT: A.CED.A.4 TOP: Transforming Formulas

74 ANS:

$9C = 5F - 160$

$F = \dfrac{9C + 160}{5}$

REF: 062131ai NAT: A.CED.A.4 TOP: Transforming Formulas

75 ANS:

$9K = 5F + 2298.35$

$F = \dfrac{9K - 2298.35}{5}$

REF: 081829ai NAT: A.CED.A.4 TOP: Transforming Formulas

76 ANS:

$at = v_f - v_i$

$at + v_i = v_f$

REF: 081928ai NAT: A.CED.A.4 TOP: Transforming Formulas

77 ANS:

$2d = t(v_i + v_f)$

$\dfrac{2d}{t} = v_i + v_f$

$\dfrac{2d}{t} - v_i = v_f$

REF: 082328ai NAT: A.CED.A.4 TOP: Transforming Formulas

78 ANS:

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

$3V = \pi r^2 h$

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

REF: 061930ai NAT: A.CED.A.4 TOP: Transforming Formulas

79 ANS:

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

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

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

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

REF: 081727ai NAT: A.CED.A.4 TOP: Transforming Formulas

80 ANS:

$$F_g = \frac{GM_1M_2}{r^2}$$

$$r^2 = \frac{GM_1M_2}{F_g}$$

$$r = \sqrt{\frac{GM_1M_2}{F_g}}$$

REF: 011830ai NAT: A.CED.A.4 TOP: Transforming Formulas

81 ANS:

$$4ax + 12 - 3ax = 25 + 3a$$

$$ax = 13 + 3a$$

$$x = \frac{13 + 3a}{a}$$

REF: 081632ai NAT: A.CED.A.4 TOP: Transforming Formulas

82 ANS:

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

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

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

REF: 081434ai NAT: A.CED.A.4 TOP: Transforming Formulas

83 ANS:

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

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

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

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

84 ANS: 4 REF: 011924ai NAT: N.Q.A.1 TOP: Conversions
KEY: dimensional analysis

85 ANS: 4 REF: 012323ai NAT: N.Q.A.1 TOP: Conversions

86 ANS: 1 REF: 062222ai NAT: N.Q.A.1 TOP: Conversions
KEY: dimensional analysis

87 ANS: 1 REF: 082324ai NAT: N.Q.A.1 TOP: Conversions

88 ANS: 2 REF: 082221ai NAT: N.Q.A.1 TOP: Conversions

89 ANS: 4 REF: 061720ai NAT: N.Q.A.1 TOP: Conversions
KEY: dimensional analysis

90 ANS: 2 REF: 011502ai NAT: N.Q.A.1 TOP: Conversions
KEY: dimensional analysis

91 ANS: 2 REF: 062309ai NAT: N.Q.A.1 TOP: Conversions
KEY: dimensional analysis

92 ANS: 2 REF: 012422ai NAT: N.Q.A.1 TOP: Conversions

93 ANS: 3 REF: 081812ai NAT: N.Q.A.1 TOP: Conversions
KEY: dimensional analysis

94 ANS: 2

$\frac{22.7\text{ m}}{\text{hr}} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{1.609\text{ km}}{1\text{ m}} = \frac{0.6\text{ km}}{\text{min}}$

REF: 062123ai NAT: N.Q.A.1 TOP: Conversions KEY: dimensional analysis

95 ANS: 1

$\frac{91\text{ cm}}{\text{day}} \times \frac{1\text{ day}}{24\text{ hrs}} \times \frac{1\text{ inch}}{2.54\text{ cm}} \approx \frac{1.49\text{ in}}{\text{hr}}$

REF: 061924ai NAT: N.Q.A.1 TOP: Conversions KEY: dimensional analysis

96 ANS: 1

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

REF: 061608ai NAT: N.Q.A.1 TOP: Conversions KEY: dimensional analysis

97 ANS: 1

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

REF: 011710ai NAT: N.Q.A.1 TOP: Conversions KEY: formula

98 ANS: 1

I. $10\text{ mi}\left(\frac{1.609\text{ km}}{1\text{ mi}}\right) = 16.09\text{ km}$; II. $44880\text{ ft}\left(\frac{1\text{ mi}}{5280\text{ ft}}\right)\left(\frac{1.609\text{ km}}{1\text{ mi}}\right) \approx 13.6765\text{ km}$; III. $15560\text{ yd}\left(\frac{3\text{ ft}}{1\text{ yd}}\right)\left(\frac{1\text{ mi}}{5280\text{ ft}}\right)\left(\frac{1.609\text{ km}}{1\text{ mi}}\right) \approx 14.225\text{ km}$

REF: 061815ai NAT: N.Q.A.1 TOP: Conversions KEY: dimensional analysis

99 ANS:

$\frac{4\text{ pints}}{\text{day}} \times \frac{2\text{ cups}}{1\text{ pint}} \times \frac{8\text{ ounces}}{1\text{ cup}} \times \frac{7\text{ days}}{\text{week}} = \frac{448\text{ ounces}}{\text{week}}$

REF: 012027ai NAT: N.Q.A.1 TOP: Conversions KEY: dimensional analysis

100 ANS:

$12\text{ km}\left(\frac{0.62\text{ m}}{1\text{ km}}\right) = 7.44\text{ m}$ $\frac{26.2\text{ m}}{7.44\text{ mph}} \approx 3.5\text{ hours}$

REF: 011726ai NAT: N.Q.A.1 TOP: Conversions KEY: dimensional analysis

101 ANS:

$\frac{2}{40} = \frac{5.75}{x}$ $\frac{5280}{115} \approx 46$

$x = 115$

REF: 081730ai NAT: N.Q.A.1 TOP: Conversions

102 ANS: 3 REF: 081609ai NAT: N.Q.A.1 TOP: Using Rate

103 ANS: 4 REF: 081909ai NAT: N.Q.A.1 TOP: Using Rate

104 ANS:

The rate of speed is expressed in $\frac{\text{feet}}{\text{minute}}$ because speed$=\frac{\text{distance}}{\text{time}}$.

REF: 011827ai NAT: A.CED.A.2 TOP: Speed

105 ANS:

$610 - 55(4) = 390$ $\frac{390}{65} = 6$ $4 + 6 = 10$ $610 - 55(2) = 500$ $\frac{500}{65} \approx 7.7$ $10 - (2 + 7.7) \approx 0.3$

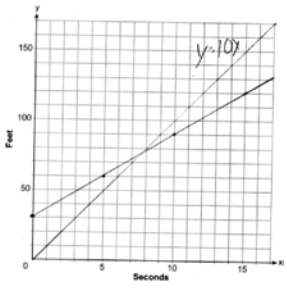
REF: 081733ai NAT: A.CED.A.2 TOP: Speed

106 ANS:

$\frac{762 - 192}{92 - 32} = \frac{570}{60} = 9.5$ $y = 9.5x$ $T = 192 + 9.5(120 - 32) = 1028$

REF: 061635ai NAT: A.CED.A.2 TOP: Speed

107 ANS:



$y = 10x$ $10x = 6x + 30$

$y = 6x + 30$ $4x = 30$

$x = 7.5$

REF: 012337ai NAT: A.CED.A.2 TOP: Speed

108 ANS: 4

(1) $\frac{6-1}{1971-1898} = \frac{5}{73} \approx .07$ (2) $\frac{14-6}{1985-1971} = \frac{8}{14} \approx .57$ (3) $\frac{24-14}{2006-1985} = \frac{10}{21} \approx .48$ (4) $\frac{35-24}{2012-2006} = \frac{11}{6} \approx 1.83$

REF: 011613ai NAT: F.IF.B.6 TOP: Rate of Change

109 ANS: 4

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

REF: 081414ai NAT: F.IF.B.6 TOP: Rate of Change

110 ANS: 3

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

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

111 ANS: 4

$\frac{53-1129}{2013-2006} \approx -153.71$

REF: 082323ai NAT: F.IF.B.6 TOP: Rate of Change

112 ANS:

$\frac{238-112}{4-2} = 63 \text{ mph}$

REF: 012427ai NAT: F.IF.B.6 TOP: Rate of Change

113 ANS: 1 REF: 061603ai NAT: F.IF.B.6 TOP: Rate of Change

114 ANS: 2

The slope of a line connecting $(5, 19)$ and $(10, 20)$ is lowest.

REF: 081705ai NAT: F.IF.B.6 TOP: Rate of Change

115 ANS: 1
The graph is steepest between hour 0 and hour 1.

REF: 081601ai NAT: F.IF.B.6 TOP: Rate of Change
116 ANS: 1 REF: 081515ai NAT: F.IF.B.6 TOP: Rate of Change
117 ANS: 1

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

$$70 > 60$$

REF: 061418ai NAT: F.IF.B.6 TOP: Rate of Change
118 ANS: 1 REF: 011721ai NAT: F.IF.B.6 TOP: Rate of Change
119 ANS: 2
From 1996-2012, the average rate of change was positive for three age groups.

REF: 011824ai NAT: F.IF.B.6 TOP: Rate of Change
120 ANS: 1

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

REF: 011521ai NAT: F.IF.B.6 TOP: Rate of Change
121 ANS: 2

$$\left(\frac{\$1824-1140}{3-0\text{ yr}}\right)\left(\frac{1\text{ yr}}{12\text{ m}}\right) = \frac{\$19}{\text{m}}$$

REF: 062105ai NAT: F.IF.B.6 TOP: Rate of Change
122 ANS: 4
Over the interval $0 \le x \le 3$, 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 $g(x) = \frac{3-0}{3-0} = \frac{3}{3} = 1$.

REF: spr1301ai NAT: F.IF.B.6 TOP: Rate of Change
123 ANS: 4
1) $y = 3x + 2$; 2) $\frac{-5-2}{3-2} = -7$; 3) $y = -2x + 3$; 4) $y = -3x + 5$

REF: 081615ai NAT: F.IF.B.6 TOP: Rate of Change
124 ANS:

$$\frac{480-140}{7-2} = 68\text{ mph}$$

REF: 011731ai NAT: F.IF.B.6 TOP: Rate of Change

125 ANS:
$\frac{3.41 - 6.26}{9 - 3} = -0.475$

REF: 081827ai NAT: F.IF.B.6 TOP: Rate of Change

126 ANS:
$\frac{33 - 1}{12 - 1} \approx 2.9$ $\frac{36 - 11}{15 - 6} \approx 2.8$ The interval 1 a.m. to 12 noon has the greater rate.

REF: 061929ai NAT: F.IF.B.6 TOP: Rate of Change

127 ANS:
$\frac{100 - 40}{4 - 1} = 20$

REF: 062227ai NAT: F.IF.B.6 TOP: Rate of Change

128 ANS:
During 1960-1965 the graph has the steepest slope.

REF: 011628ai NAT: F.IF.B.6 TOP: Rate of Change

129 ANS:
$2 < t < 6$ and $14 < t < 15$ because horizontal lines have zero slope.

REF: 011928ai NAT: F.IF.B.6 TOP: Rate of Change

130 ANS:
The set of integers includes negative numbers, so is not an appropriate domain for time; for $(0, 6)$, the hourly rate is increasing, or for $(0, 14)$, the total numbers of shoes is increasing; $\frac{120 - 0}{6 - 14} = -15$, 15 fewer shoes were sold each hour between the sixth and fourteenth hours.

REF: 011836ai NAT: F.IF.B.6 TOP: Rate of Change

131 ANS:
6-12; 9-12; $\frac{74 - 92}{24 - 12} = -\frac{3}{2}$; The temperature drops 3° every 2 hours.

REF: 062334ai NAT: F.IF.B.6 TOP: Rate of Change

132 ANS:
There are 20 rabbits at $x = 0$ and they are growing 1.4% per day. $\frac{p(100) - p(50)}{100 - 50} \approx 0.8$

REF: 061833ai NAT: F.IF.B.6 TOP: Rate of Change

133 ANS: 4
$P(c) = (.50 + .25)c - 9.96 = .75c - 9.96$

REF: 011807ai NAT: F.BF.A.1 TOP: Modeling Linear Functions

134 ANS: 2 REF: 062101ai NAT: F.BF.A.1 TOP: Modeling Linear Functions

135 ANS: 2 REF: 062203ai NAT: F.BF.A.1 TOP: Modeling Linear Functions

136 ANS: 4 REF: 011523ai NAT: F.BF.A.1 TOP: Modeling Linear Functions

137 ANS:
$f(x) = 6.50x + 4(12)$

REF: 061526ai NAT: F.BF.A.1 TOP: Modeling Linear Functions
138 ANS:
$T(d) = 2d + 28$ $T(6) = 2(6) + 28 = 40$

REF: 081532ai NAT: F.BF.A.1 TOP: Modeling Linear Functions
139 ANS:
$p(x) = 0.035x + 300$ $p(8250) = 0.035(8250) + 300 = 588.75$

REF: 011833ai NAT: F.BF.A.1 TOP: Modeling Linear Functions
140 ANS:
$A(n) = 175 - 2.75n$ $0 = 175 - 2.75n$ After 63 weeks, Caitlin will not have enough money to rent another movie.

$2.75n = 175$

$n = 63.6$

REF: 061435ai NAT: F.BF.A.1 TOP: Modeling Linear Functions
141 ANS: 4 REF: 081604ai NAT: F.LE.A.2 TOP: Modeling Linear Functions
142 ANS:
$h(n) = 1.5(n - 1) + 3$

REF: 081525ai NAT: F.LE.A.2 TOP: Modeling Linear Functions
143 ANS:
$f(x) = 0.75x + 4.50$. Each card costs 75¢ and start-up costs were $4.50.

REF: 011735ai NAT: F.LE.A.2 TOP: Modeling Linear Functions
144 ANS: 2 REF: 011709ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
145 ANS: 3 REF: 061407ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
146 ANS: 2 REF: 011501ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
147 ANS: 3 REF: 061817ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
148 ANS: 3 REF: 061501ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
149 ANS: 2 REF: 061704ai NAT: S.ID.C.7 TOP: Modeling Linear Functions
150 ANS: 2 REF: 081402ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
151 ANS: 4 REF: 081709ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
152 ANS: 2 REF: 012403ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
153 ANS: 2 REF: 081817ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
154 ANS:
The slope represents the amount paid each month and the *y*-intercept represents the initial cost of membership.

REF: 011629ai NAT: F.LE.B.5 TOP: Modeling Linear Functions
155 ANS:
There is 2 inches of snow every 4 hours.

REF: 061630ai NAT: S.ID.C.7 TOP: Modeling Linear Functions

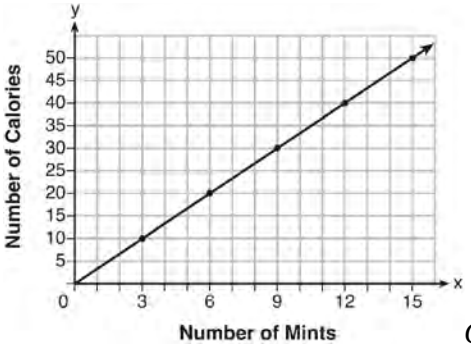
156 ANS:
The height of the balloon increases 30.5 ft per min. The balloon starts at a height of 8.7 ft.

REF: 062127ai NAT: S.ID.C.7 TOP: Modeling Linear Functions

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

158 ANS: 2 REF: 011602ai NAT: A.CED.A.2 TOP: Graphing Linear Functions

159 ANS:



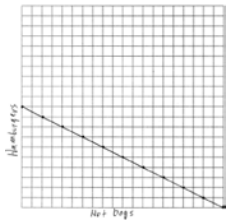
$C(x) = \frac{10}{3}x$ $180 = \frac{10}{3}x$

$540 = 10x$

$54 = x$

REF: fall1308ai NAT: A.CED.A.2 TOP: Graphing Linear Functions

160 ANS:



$1.25x + 2.5y = 25$

$x + 2y = 20$

There are 11 combinations, as each dot represents a possible combination.

REF: 081737ai NAT: A.CED.A.2 TOP: Graphing Linear Functions

161 ANS: 1
$4x - 5(0) = 40$

$4x = 40$

$x = 10$

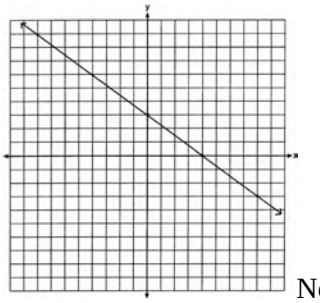
REF: 081408ai NAT: F.IF.B.4 TOP: Graphing Linear Functions

162 ANS: 4
$y + 3 = 6(0)$

$y = -3$

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

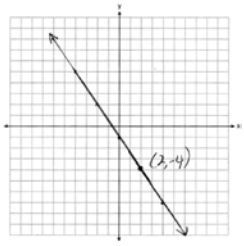
163 ANS:



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

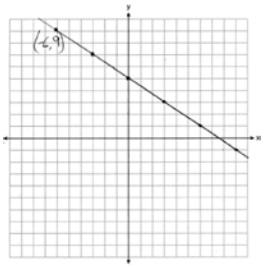
REF: 061429ai NAT: F.IF.B.4 TOP: Graphing Linear Functions

164 ANS:



REF: 081927ai NAT: F.IF.B.4 TOP: Graphing Linear Functions

165 ANS:



$(-6,9)$ is a solution to the equation because it falls on the line.

REF: 012428ai NAT: F.IF.B.4 TOP: Graphing Linear Functions

166 ANS:

The data is continuous, i.e. a fraction of a cookie may be eaten.

REF: 081729ai NAT: F.IF.B.4 TOP: Graphing Linear Functions

167 ANS: 1

$$y+3=-\frac{4}{3}(x-6)$$

$$3y+9=-4x+24$$

$$3y=-4x+15$$

REF: 082321ai NAT: A.REI.D.10 TOP: Writing Linear Equations
KEY: other forms

168 ANS: 4

$m = \frac{7-3}{2--1} = \frac{4}{3}$

REF: fall2302ai NAT: A.REI.D.10 TOP: Writing Linear Equations
KEY: other forms

169 ANS: 4

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

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

$5 = b$

REF: 011511ai NAT: A.REI.D.10 TOP: Writing Linear Equations
KEY: other forms

170 ANS: 3

$m = \frac{3--7}{2-4} = -5 \quad 3 = (-5)(2) + b \quad y = -5x + 13$ represents the line passing through the points $(2,3)$ and $(4,-7)$. The $b = 13$
fourth equation may be rewritten as $y = 5x - 13$, so is a different line.

REF: 081720ai NAT: A.REI.D.10 TOP: Writing Linear Equations
KEY: other forms

171 ANS:

$m = \frac{4-1}{-3-6} = \frac{3}{-9} = -\frac{1}{3} \quad y - y_1 = m(x - x_1)$

$4 = -\frac{1}{3}(-3) + b \qquad y - 4 = -\frac{1}{3}(x + 3)$

$4 = 1 + b$

$3 = b$

$y = -\frac{1}{3}x + 3$

REF: 061629ai NAT: A.REI.D.10 TOP: Writing Linear Equations
KEY: other forms

172 ANS: 1

$2h + 8 > 3h - 6$

$14 > h$

$h < 14$

REF: 081607ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

173 ANS: 4

$3x + 2 \le 5x - 20$

$22 \le 2x$

$11 \le x$

REF: 061609ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

174 ANS: 4

$4p + 2 < 2p + 10$

$2p < 8$

$p < 4$

REF: 061801ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

175 ANS: 2

$-3(x - 6) > 2x - 2$

$-3x + 18 > 2x - 2$

$20 > 5x$

$4 > x$

REF: 082310ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

176 ANS: 4

$2x - 7 > 2.5x + 3$

$-10 > 0.5x$

$-20 > x$

REF: 012418ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

177 ANS: 1

$\frac{3}{2}b < 12$

$b < 12\left(\frac{2}{3}\right)$

$b < 8$

REF: 062207ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

178 ANS: 1

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

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

$9 < x$

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

179 ANS: 1

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

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

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

REF: 081711ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

180 ANS: 3

$$-\frac{2}{5}x \geq \frac{1}{3}x+11$$

$$-\frac{11}{15}x \geq 11$$

$$-\frac{15}{11}\left(-\frac{11}{15}x\right) \leq \left(-\frac{15}{11}\right)11$$

$$x \leq -15$$

REF: 062322ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

181 ANS: 4

$$a+7b > -8b$$

$$a > -15b$$

REF: 061913ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

182 ANS:

$$1.8-0.4y \geq 2.2-2y$$

$$1.6y \geq 0.4$$

$$y \geq 0.25$$

REF: 011727ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

183 ANS:

$$3600+1.02x < 2000+1.04x$$

$$1600 < 0.02x$$

$$80000 < x$$

REF: 011925ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

184 ANS:

$$4y-12 \leq 8y+4$$

$$-16 \leq 4y$$

$$-4 \leq y$$

REF: 062125ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

185 ANS:

$-3\left(-\frac{2}{3}x + 6 > -12\right)$

$2x - 18 < 36$

$2x < 54$

$x < 27$

REF: 012327ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

186 ANS:

$\frac{2}{3} < \frac{x}{5}$

$\frac{10}{3} < x$

REF: 081929ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

187 ANS:

$b(x - 3) \geq ax + 7b$

$bx - 3b \geq ax + 7b$

$bx - ax \geq 10b$

$x(b - a) \geq 10b$

$x \leq \frac{10b}{b - a}$

REF: 011631ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

188 ANS: 1

$7x + 2 \geq 58$

$7x \geq 56$

$x \geq 8$

REF: 012003ai NAT: A.REI.B.3 TOP: Interpreting Solutions

189 ANS: 4

$47 - 4x < 7$

$-4x < -40$

$x > 10$

REF: 061713ai NAT: A.REI.B.3 TOP: Interpreting Solutions

190 ANS: 2

$-2(x-5) < 10$

$x - 5 > -5$

$x > 0$

REF: 011817ai NAT: A.REI.B.3 TOP: Interpreting Solutions

191 ANS:

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

$12 \le 2x$

$6 \le x$

REF: 081430ai NAT: A.REI.B.3 TOP: Interpreting Solutions

192 ANS:

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

$-8x < 8$

$x > -1$

REF: 061530ai NAT: A.REI.B.3 TOP: Interpreting Solutions

193 ANS:

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

$-a - 9 > -12$

$-a > -3$

$a < 3$

REF: 061427ai NAT: A.REI.B.3 TOP: Interpreting Solutions

194 ANS:

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

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

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

$12 \le 2x$

$6 \le x$

REF: 081534ai NAT: A.REI.B.3 TOP: Interpreting Solutions

195 ANS: 4 REF: 081505ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

196 ANS: 2 REF: 062314ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

197 ANS: 2 REF: 062107ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

198 ANS: 3 REF: 011513ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

199 ANS: 1 REF: 012412ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

200 ANS: 1

$116(30) + 439L \le 6500$

$439L \le 3020$

$L \le 6.879$

REF: 011904ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

201 ANS:

$6.25a + 4.5(45) \le 550$ 55 shirts

$6.25a + 202.5 \le 550$

$6.25a \le 347.50$

$a \le 55.6$

REF: 012026ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

202 ANS:

$135 + 72x \ge 580$ 7

$72x \ge 445$

$x \ge 6.2$

REF: 081833ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

203 ANS:

$1.99x + 2.50(x + 2) + 2(2.99) \le 25$ 3 pounds of grapes

$1.99x + 2.50x + 5 + 5.98 \le 25$

$4.49x \le 14.02$

$x \le \frac{1402}{449}$

REF: 082235ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities

204 ANS: 1 REF: 061806ai NAT: A.CED.A.3 TOP: Modeling Linear Inequalities

205 ANS: 3 REF: 062205ai NAT: A.CED.A.3 TOP: Modeling Linear Inequalities

206 ANS:

$8x + 11y \ge 200$ $8x + 11(15) \ge 200$

$8x + 165 \ge 200$

$8x \ge 35$

$x \ge 4.375$

5 hours

REF: fall1309ai NAT: A.CED.A.3 TOP: Modeling Linear Inequalities

207 ANS:
$A(x) = 5x + 50$ $5x + 50 < 6x + 25$ 26 shirts

$B(x) = 6x + 25$ $25 < x$

REF: 061933ai NAT: A.CED.A.3 TOP: Modeling Linear Inequalities

208 ANS:
$15.79x + 5.69y \le 125$ $15.79x + 5.69(9) \le 125$ 4 cases can be bought. Buying 5 cases totals more than $125.

$$15.79x \le 73.79$$

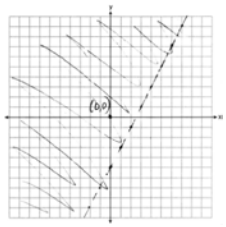
$$x \le 4.7$$

REF: 082333ai NAT: A.CED.A.3 TOP: Modeling Linear Inequalities

209 ANS: 1 REF: 061505ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

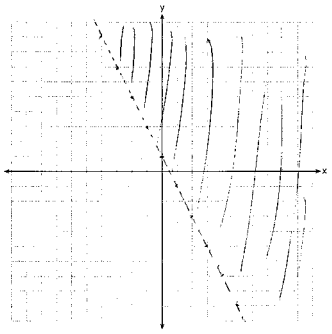
210 ANS: 2 REF: 011605ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

211 ANS:



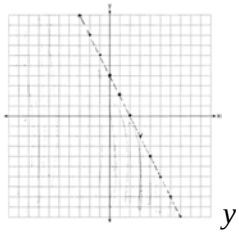
REF: 011729ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

212 ANS:



REF: 081526ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

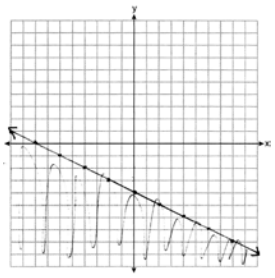
213 ANS:



$y < -2x + 4$

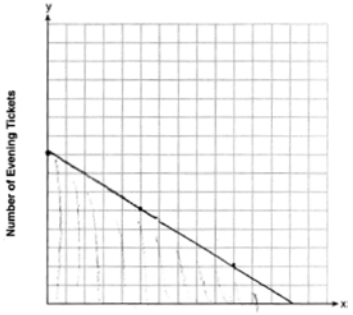
REF: 061730ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

214 ANS:



REF: 081634ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

215 ANS:



$7.5x + 12.5y \le 100$ 13, because $7.5(13) \le 100$ and $7.5(14) > 100$.

REF: 011935ai NAT: A.REI.D.12 TOP: Graphing Linear Inequalities

216 ANS: 3 REF: spr1302ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: graph

217 ANS: 3 REF: 011909ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: graph

218 ANS: 4 REF: 011706ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: graph

219 ANS: 4

$2x^2 = 72$

$x^2 = 36$

$x = \pm 6$

REF: 062318ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

220 ANS: 3 REF: 081403ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

221 ANS:

$5x^2 = 180$

$x^2 = 36$

$x = \pm 6$

REF: 061928ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

222 ANS:

$6x^2 = 42$

$x^2 = 7$

$x = \pm\sqrt{7}$

REF: 081931ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

223 ANS:

$4x^2 = 80$

$x^2 = 20$

$x = \pm\sqrt{20}$

REF: 011932ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

224 ANS: 4

$36x^2 = 25$

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

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

REF: 011715ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

225 ANS: 3

$(x+4)^2 = 9$

$x + 4 = \pm 3$

$x = -1, -7$

REF: 012015ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

226 ANS: 3 REF: 081523ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

227 ANS: 1 REF: 061521ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

228 ANS: 3

$2(x+2)^2 = 32$

$(x+2)^2 = 16$

$x+2 = \pm 4$

$x = -6, 2$

REF: 061619ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

229 ANS: 1

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

$(x-4)^2 = 9$

$x-4 = \pm 3$

$x = 1, 7$

REF: 011814ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

230 ANS:

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

$x^2 - 8 = 0$

$x^2 = 8$

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

REF: fall1306ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: taking square roots

231 ANS: 3 REF: 011702ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

232 ANS: 4 REF: 011503ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

233 ANS: 1

$3x^2 + 10x - 8 = 0$

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

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

REF: 081619ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

234 ANS:

$x^2 - 9x - 36 = 0$

$(x - 12)(x + 3) = 0$

$x = 12, -3$

REF: 082329ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

235 ANS:

$x^2 - 8x - 9 = 0$ I factored the quadratic.

$(x - 9)(x + 1) = 0$

$x = 9, -1$

REF: 011927ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

236 ANS:

$x^2 + 10x + 24 = (x + 4)(x + 6) = (x + 6)(x + 4)$. 6 and 4

REF: 081425ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

237 ANS:

$y^2 - 6y + 9 = 4y - 12$

$y^2 - 10y + 21 = 0$

$(y - 7)(y - 3) = 0$

$y = 7, 3$

REF: 011627ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

Algebra I Regents Exam Questions by State Standard: Topic
Answer Section

238 ANS:

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

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

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

REF: 061433ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

239 ANS:

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

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

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

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

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

REF: 011529ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

240 ANS:

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

$x = -\frac{3}{2}, \frac{2}{3}$

REF: 062230ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

241 ANS:

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

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

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

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

REF: fall1305ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

242 ANS:

$2x^2 + 5x - 42 = 0$ Agree, as shown by solving the equation by factoring.

$(x + 6)(2x - 7) = 0$

$$x = -6, \frac{7}{2}$$

REF: 061628ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

243 ANS:

$0 = (B + 3)(B - 1)$ Janice substituted B for $8x$, resulting in a simpler quadratic. Once factored, Janice substituted

$0 = (8x + 3)(8x - 1)$

$x = -\frac{3}{8}, \frac{1}{8}$

$8x$ for B.

REF: 081636ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: factoring

244 ANS: 3

$x^2 - 6x = 12$

$x^2 - 6x + 9 = 12 + 9$

$(x - 3)^2 = 21$

REF: 061812ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

245 ANS: 2

$x^2 - 6x = 12$

$x^2 - 6x + 9 = 12 + 9$

$(x - 3)^2 = 21$

REF: 061408ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

246 ANS: 2

$x^2 - 6x + 9 = -4 + 9$

$x^2 - 6x + 9 = 5$

$(x - 3)^2 = 5$

REF: 082320ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

247 ANS: 2

$x^2 - 8x = 7$

$x^2 - 8x + 16 = 7 + 16$

$(x - 4)^2 = 23$

REF: 011614ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

248 ANS: 1

$x^2 - 10x + 25 = 13 + 25$

$(x - 5)^2 = 38$

REF: 082215ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

249 ANS: 4

$x^2 + 6x = 7$

$x^2 + 6x + 9 = 7 + 9$

$(x + 3)^2 = 16$

REF: 011517ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

250 ANS: 1

$x^2 + 8x = 33$

$x^2 + 8x + 16 = 33 + 16$

$(x + 4)^2 = 49$

REF: 011915ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

251 ANS: 4

$x^2 - 12x + 36 = 10 + 36$

$(x - 6)^2 = 46$

REF: 012319ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

252 ANS: 1

$x^2 - 18x + 81 = -77 + 81$

$(x - 9)^2 = 4$

REF: 062306ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

253 ANS: 1

$2(x^2 - 6x + 3) = 0$

$x^2 - 6x = -3$

$x^2 - 6x + 9 = -3 + 9$

$(x - 3)^2 = 6$

REF: 011722ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

254 ANS: 2

$x^2 + 4x = 16$

$x^2 + 4x + 4 = 16 + 4$

$(x + 2)^2 = 20$

$x + 2 = \pm\sqrt{4 \cdot 5}$

$= -2 \pm 2\sqrt{5}$

REF: 061410ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

255 ANS: 2

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

$(x - 4)^2 = 26$

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

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

REF: 061722ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

256 ANS: 1

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

$(x - 4)^2 = 40$

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

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

REF: 061523ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

257 ANS: 4

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

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

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

REF: 061518ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

258 ANS:

$$x^2 - 8x + 16 = -41 + 16$$

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

REF: 012431ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

259 ANS:

$$x^2 + 4x + 4 = 2 + 4$$

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

$$x + 2 = \pm\sqrt{6}$$

$$x = -2 \pm \sqrt{6}$$

REF: 081830ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

260 ANS:

$$x^2 - 6x + 9 = 15 + 9$$

$$(x-3)^2 = 24$$

$$x - 3 = \pm\sqrt{24}$$

$$x = 3 \pm 2\sqrt{6}$$

REF: 081732ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

261 ANS:

$$x^2 - 8x = 5$$

$$x^2 - 8x + 16 = 5 + 16$$

$$(x-4)^2 = 21$$

$$x - 4 = \pm\sqrt{21}$$

$$x = 4 \pm \sqrt{21}$$

REF: 062232ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

262 ANS:

$$x^2 - 8x = -6$$

$$x^2 - 8x + 16 = -6 + 16$$

$$(x-4)^2 = 10$$

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

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

REF: 012031ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

263 ANS:

$$x^2 + 6x + 9 = 41 + 9$$

$$(x+3)^2 = 50$$

$$x + 3 = \pm\sqrt{50}$$

$$x = -3 \pm 5\sqrt{2}$$

REF: fall2304ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

264 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. $\left(\frac{6}{2}\right)^2 = 9$

REF: 081432ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

265 ANS: 2

$$\frac{5 \pm \sqrt{(-5)^2 - 4(1)(-4)}}{2(1)} = \frac{5 \pm \sqrt{41}}{2}$$

REF: 061921ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

266 ANS: 1

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

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

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

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

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

REF: fall1302ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

267 ANS:

$$x = \frac{-1 \pm \sqrt{1^2 - 4(1)(-5)}}{2(1)} = \frac{-1 \pm \sqrt{21}}{2} \approx -2.8, 1.8$$

REF: 061827ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

268 ANS:

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(1)(1)}}{2(1)} \approx 0.27, 3.73$$

REF: 012330ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

269 ANS:

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-9)}}{2(1)} = \frac{-3 \pm \sqrt{45}}{2} \approx -4.85, 1.85$$

REF: 082332ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

270 ANS:

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(-6)}}{2(3)} \approx 1.79, -1.12$$

REF: 012429ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

271 ANS:

$$\frac{5 \pm \sqrt{(-5)^2 - 4(3)(-7)}}{2(3)} = \frac{5 \pm \sqrt{109}}{6} \approx -0.9, 2.6$$

REF: 082231ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

272 ANS:

$$\frac{8 \pm \sqrt{(-8)^2 - 4(3)(3)}}{2(3)} \approx 0.5, 2.2$$

REF: 062332ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

273 ANS:

$$w^2 + 3w - 11 = 0 \quad \frac{-3 \pm \sqrt{3^2 - 4(1)(-11)}}{2(1)} = \frac{-3 \pm \sqrt{53}}{2} \approx -5.14, 2.14$$

REF: 062132ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

274 ANS:

Two of the following: quadratic formula, complete the square, factor by grouping or graphically.

$$x = \frac{-16 \pm \sqrt{16^2 - 4(4)(9)}}{2(4)} = \frac{-16 \pm \sqrt{112}}{8} \approx -0.7, -3.3$$

REF: 011634ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: quadratic formula

275 ANS: 3

$b^2 - 4ac = 2^2 - 4(4)(5) = -76$

REF: 061822ai NAT: A.REI.B.4 TOP: Using the Discriminant

276 ANS:

$b^2 - 4ac = (-2)^2 - 4(1)(5) = 4 - 20 = -16$ None

REF: 081529ai NAT: A.REI.B.4 TOP: Using the Discriminant

277 ANS:

Irrational, as 89 is not a perfect square. $3^2 - 4(2)(-10) = 89$

REF: 081828ai NAT: A.REI.B.4 TOP: Using the Discriminant

278 ANS: 3 REF: 081409ai NAT: A.CED.A.1 TOP: Modeling Quadratics

279 ANS: 4 REF: 081723ai NAT: A.CED.A.1 TOP: Modeling Quadratics

280 ANS: 2

$w(w + 7) = w^2 + 7w$

REF: 081920ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

281 ANS:

$x(2x+4) = 96 \quad 2x^2 + 4x - 96 = 0 \quad 2(6) + 4 = 16$

$x^2 + 2x - 48 = 0 \quad 16 - 6 = 10$

$(x+8)(x-6) = 0$

$x = 6$

REF: 012435ai NAT: A.CED.A.1 TOP: Modeling Quadratics

282 ANS: 1 REF: 082306ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

283 ANS: 2 REF: 011611ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

284 ANS: 4 REF: spr1304ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

285 ANS: 2 REF: 062312ai NAT: A.CED.A.2 TOP: Modeling Quadratics

286 ANS:

$(2w)(w) = 34$

$w^2 = 17$

$w \approx 4.1$

REF: 061532ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

287 ANS:

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

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

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

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

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

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

$x = 3 = \text{width}$

REF: 061434ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

288 ANS:

$108 = x(24-x) \quad 18 \times 6$

$108 = 24x - x^2$

$x^2 - 24x + 108 = 0$

$(x-18)(x-6) = 0$

$x = 18, 6$

REF: 011636ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

289 ANS:

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

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

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

$$w = 60,\ l = 100$$

REF: 081436ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

290 ANS:

$w\left(\frac{1}{2}w + 6\right) = 432$ $\frac{1}{2}w^2 + 6w = 432$ $l = \frac{1}{2}(24) + 6 = 18$

$$w^2 + 12w - 864 = 0$$

$$(w-24)(w+36) = 0$$

$$w = 24$$

REF: 012036ai NAT: A.CED.A.1 TOP: Geometric Applications of Quadratics

291 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. $(x-3)(2x) = 1.25x^2$ $1.25(8)^2 = 80$

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

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

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

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

$$x = 8$$

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

292 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. $x = \frac{-7 \pm \sqrt{7^2 - 4(1)(-13)}}{2(1)} = \frac{-7 + \sqrt{101}}{2} \approx 1.5$

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

293 ANS: 2 REF: 011601ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

294 ANS: 1

$x^2 - 12x + 7$

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

$(x-6)^2 - 29$

REF: 081520ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

295 ANS: 1

$y = x^2 + 24x + 144 - 18 - 144$

$y = (x+12)^2 - 162$

REF: 081911ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

296 ANS: 3

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

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

REF: 081621ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

297 ANS: 4

$y - 34 = x^2 - 12x$

$y = x^2 - 12x + 34$

$y = x^2 - 12x + 36 - 2$

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

REF: 011607ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

298 ANS: 3

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

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

REF: 061616ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

299 ANS: 4

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

$-12.5 = 25a$

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

REF: 061716ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

300 ANS:

$f(x) = \left(x^2 - 2x + 1\right) - 8 - 1 = (x-1)^2 - 9$ $(1, -9)$

REF: 061932ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

301 ANS:

$f(x) = x^2 - 14x + 49 - 15 - 49 = (x-7)^2 - 64$ $(7, -64)$

REF: 062130ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

302 ANS:

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

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

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

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

REF: 011536ai NAT: F.IF.C.8 TOP: Vertex Form of a Quadratic

303 ANS: 3 REF: 061409ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

304 ANS: 2

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

REF: 011811ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

305 ANS: 1

$h(0) = -4.9(0)^2 + 6(0) + 5 = 5$

REF: 011913ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

306 ANS: 1

$h(t) = 0$

$-16t^2 + 64t + 80 = 0$

$t^2 - 4t - 5 = 0$

$(t-5)(t+1) = 0$

$t = 5, -1$

REF: 081910ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

307 ANS: 1

$0 = -16t^2 + 24t$

$0 = -8t(2t - 3)$

$t = 0, \frac{3}{2}$

REF: 061724ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

308 ANS: 3
The rocket was in the air more than 7 seconds before hitting the ground.

REF: 081613ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

309 ANS: 2 REF: 012315ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

310 ANS:

$-16t^2 + 256 = 0$

$16t^2 = 256$

$t^2 = 16$

$t = 4$

REF: 061829ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

311 ANS:

$H(1) - H(2) = -16(1)^2 + 144 - (-16(2)^2 + 144) = 128 - 80 = 48$

$-16t^2 = -144$

$t^2 = 9$

$t = 3$

REF: 061633ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions

312 ANS:

$-16t^2 + 64t = 0 \quad 0 \le t \le 4$ The rocket launches at $t = 0$ and lands at $t = 4$.

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

$t = 0, 4$

REF: 081531ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

313 ANS:

$t = \frac{-b}{2a} = \frac{-64}{2(-16)} = \frac{-64}{-32} = 2$ seconds. The height decreases after reaching its maximum at $t = 2$ until it lands at

$t = 5 \; -16t^2 + 64t + 80 = 0$

$t^2 - 4t - 5 = 0$

$(t-5)(t+1) = 0$

$t = 5$

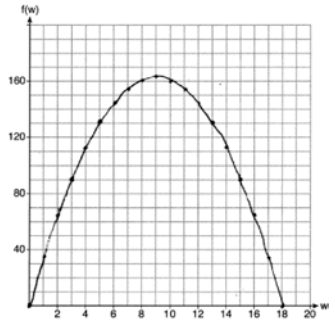
REF: 011633ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

314 ANS:
112; (3,256); At $t = 3$, the ball is 256 ft high; 3-7 seconds

REF: 062136ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

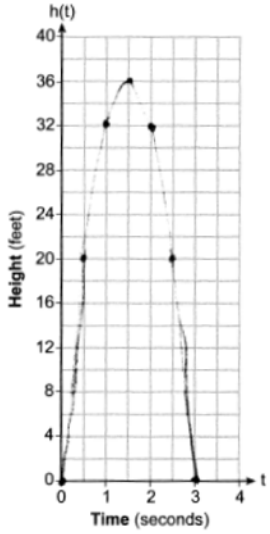
315 ANS:
$x = \frac{-128}{2(-16)} = 4 \quad h(4) = -16(4)^2 + 128(4) + 9000 = -256 + 512 + 9000 = 9256 \quad (4, 9256)$. The y coordinate represents the pilot's height above the ground after ejection. $9256 - 9000 = 256$

REF: 081736ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: key features

316 ANS:


If the garden's width is 9 ft, its area is 162 ft^2.

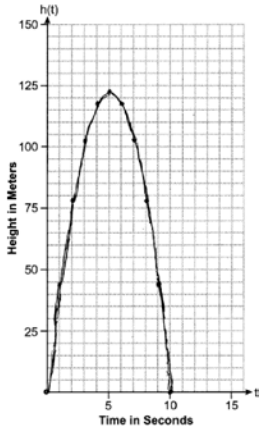
REF: 081836ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: graph

317 ANS:


36, 3

REF: 012433ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: graph

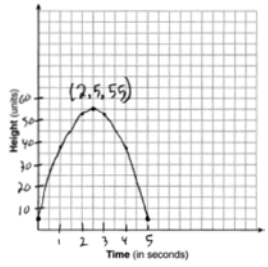
318 ANS:



$(5, 122.5)$ The rocket is at 122.5m at 5 sec.

REF: 082334ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: graph

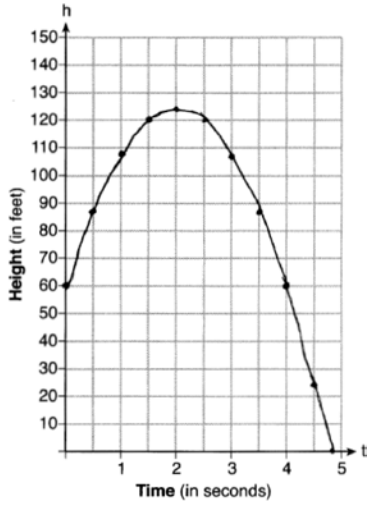
319 ANS:



The ball reaches a maximum height of 55 units at 2.5 seconds.

REF: 011736ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: graph

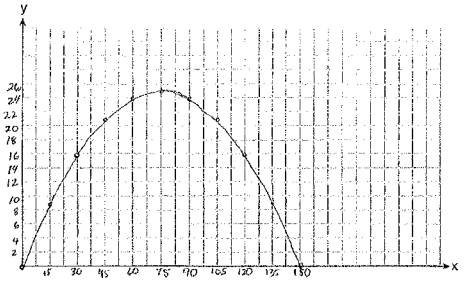
320 ANS:



$\frac{h(2)-h(0)}{2-0} = 32$

REF: 012033ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: graph

321 ANS:



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

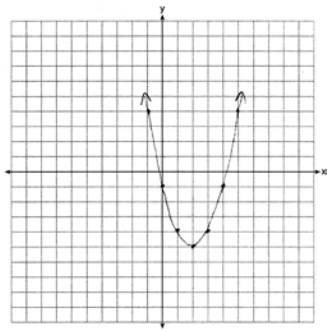
(75,25) represents the horizontal distance (75) where the football is at its greatest height (25). No, because the ball is less than 10 feet high $y = -\dfrac{1}{225}(135)^2 + \dfrac{2}{3}(135) = -81 + 90 = 9$

REF: 061537ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions
KEY: graph

322 ANS: 2 REF: 082315ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions
KEY: key features

323 ANS: 1 REF: 012413ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions

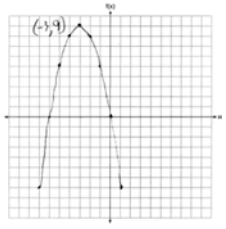
324 ANS:



$x = \dfrac{-b}{2a} = \dfrac{-(-4)}{2(1)} = \dfrac{4}{2} = 2$

REF: 061627ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions
KEY: graph

325 ANS:



REF: 061726ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions
KEY: graph

326 ANS:
Yes, because from the graph the zeroes of $f(x)$ are -2 and 3.

REF: 011832ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions
KEY: key features

327 ANS:
$x = 1 \quad \frac{-3+5}{2} = 1$

REF: 011829ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions
KEY: key features

328 ANS: 3
The minimum of $r(x)$ is -16. The minimum of $q(x)$ is -9 $\left(x = \frac{-2}{2(1)} = -1, q(-1) = -9\right)$.

REF: 081917ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

329 ANS: 3
f and h's vertex is $(-2,5)$. g's axis of symmetry is $x = -1.5$.

REF: 062319ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

330 ANS: 3
$h(x) = -x^2 + x + 6$ Maximum of $f(x) = 9$ $k(x) = -5x^2 - 12x + 4$ Maximum of $g(x) < 5$

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

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

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

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

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

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

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

$= \frac{56}{5}$

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

REF: 061514ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

331 ANS: 4

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

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

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

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

REF: 081521ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

332 ANS: 3

$x=3$

REF: 061717ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

333 ANS: 3

Maximum of $f(x)=5$ Maximum of $h(x)=4$ Maximum of $g(x)=5$ $j(x)=-\frac{1}{2}x^2+x+4$

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

$$j(1)=-\frac{1}{2}(1)^2+1+4=4\frac{1}{2}$$

REF: 062219ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

334 ANS: 2

1) $x = \dfrac{-2}{2(-1)} = 1$; 2) $h = \dfrac{3}{2}$ Using $(0,3)$, $3 = a\left(0 - \dfrac{3}{2}\right)^2 + k$; Using $(1,5)$, $5 = a\left(1 - \dfrac{3}{2}\right)^2 + k$

$y = -1^2 + 2(1) + 4 = 5$ $\qquad 3 = \dfrac{9}{4}a + k$ $\qquad 5 = \dfrac{1}{4}a + k$

vertex $(1,5)$

$k = 3 - \dfrac{9}{4}a$ $\qquad k = 5 - \dfrac{1}{4}a$

$5 - \dfrac{1}{4}a = 3 - \dfrac{9}{4}a$ $k = 5 - \dfrac{1}{4}(-1) = \dfrac{21}{4}$; 3) vertex $(5,5)$; 4) Using $c = 1$ $-9 = (-2)^2 a + (-2)b + 1$

$20 - a = 12 - 9a$ $\qquad -10 = 4a - 2b$

$8a = -8$ vertex $\left(\dfrac{3}{2}, \dfrac{21}{4}\right)$ $\qquad b = 2a + 5$

$a = -1$

$-3 = (-1)^2 a + (-1)b + 1$ $\quad 2a + 5 = a + 4$ $\quad x = \dfrac{-3}{2(-1)} = \dfrac{3}{2}$ $\qquad$ vertex $\left(\dfrac{3}{2}, \dfrac{13}{4}\right)$

$-3 = a - b + 1$ $\qquad a = -1$

$b = a + 4$ $\qquad b = -1 + 4 = 3$ $\quad y = -\left(\dfrac{3}{2}\right)^2 + 3\left(\dfrac{3}{2}\right) + 1 = -\dfrac{9}{4} + \dfrac{18}{4} + \dfrac{4}{4} = \dfrac{13}{4}$

REF: 011823ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

335 ANS: 2

1) $x = \dfrac{-2}{2(1)} = -1$, $h(-1) = (-1)^2 + 2(-1) - 6 = -7$; 2) $y = -10$; 3) $k\left(\dfrac{-5 + -2}{2}\right) = (-3.5 + 5)(-3.5 + 2) = -2.25$; 4) $y = -6$

REF: 061813ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

336 ANS: 2

The y-intercept of both $f(x)$ and $g(x)$ is -4.

REF: 012013ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

337 ANS: 1

1) $f\left(\dfrac{-5}{2(6)}\right) \approx -3.04$; 2) $h(2.5) = (2.5 - 2)(2.5 - 3) = -0.25$; 3) $g(2) = -2$; 4) 0

REF: 012320ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

338 ANS:

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

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

REF: 081429ai NAT: F.IF.C.9 TOP: Comparing Quadratic Functions

339 ANS: 3 REF: 062114ai NAT: A.APR.A.1 TOP: Powers of Powers

340 ANS: 3 REF: 062209ai NAT: A.APR.A.1 TOP: Powers of Powers
341 ANS: 1
$C = 8x^3y^5$

REF: 012419ai NAT: A.APR.A.1 TOP: Powers of Powers
342 ANS: 4
Each expression equals x^9.

REF: 082311ai NAT: A.APR.A.1 TOP: Powers of Powers
343 ANS: 1 REF: 062313ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
344 ANS: 2 REF: 011714ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
345 ANS: 4 REF: 011821ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
346 ANS: 2
$V = 15{,}000(0.81)^t = 15{,}000((0.9)^2)^t = 15{,}000(0.9)^{2t}$

REF: 081716ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
347 ANS: 2 REF: 081801ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
348 ANS: 4
$C(d) = 120 \bullet 2^{3d} = 120 \bullet \left(2^3\right)^d = 120 \bullet 8^d$

REF: 082218ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
349 ANS: 2
$(1.0005)^7 \approx 1.0035$

REF: 081913ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
350 ANS: 3
$C(t) = 10(1.029)^{24t} = 10(1.029^{24})^t \approx 10(1.986)^t$

REF: 061614ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
351 ANS: 4
$16^{2t} = n^{4t}$

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

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

REF: 011519ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
352 ANS: 4
$1000(0.5)^{2t} = 1000(0.5^2)^t = 1000(0.25)^t$

REF: 011923ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions
353 ANS: 3
$t(m) = 2(3)^{2m+1} = 2(3)^{2m}(3)^1 = 6(3)^{2m} = 6(3^2)^m = 6(9)^m$

REF: 012019ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions

354 ANS:

$f(5) = (8) \cdot 2^5 = 256 \qquad f(t) = g(t)$

$g(5) = 2^{5+3} = 256 \qquad (8) \cdot 2^t = 2^{t+3}$

$2^3 \cdot 2^t = 2^{t+3}$

$2^{t+3} = 2^{t+3}$

REF: 011632ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions

355 ANS: 3

$E(10) = 1(1.11)^{10} \approx 3 \qquad S(10) = 30(1.04)^{10} \approx 44$

$E(53) = 1(1.11)^{53} \approx 252 \quad S(53) = 30(1.04)^{53} \approx 239$

REF: 081721ai NAT: A.CED.A.1 TOP: Modeling Exponential Functions

356 ANS:

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

REF: 061529ai NAT: A.CED.A.1 TOP: Modeling Exponential Functions

357 ANS:

$V(t) = 25000(0.815)^t \quad V(3) - V(4) \approx 2503.71$

REF: 081834ai NAT: A.CED.A.1 TOP: Modeling Exponential Functions

358 ANS:

$V = 450(1.025)^t$; No, $450(1.025)^{20} < 2 \cdot 450$

REF: 011933ai NAT: A.CED.A.1 TOP: Modeling Exponential Functions

359 ANS:

$A(t) = 5000(1.012)^t \quad A(32) - A(17) \approx 1200$

REF: 081934ai NAT: A.CED.A.1 TOP: Modeling Exponential Functions

360 ANS: 4 REF: 012420ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

361 ANS: 1 REF: 011504ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

362 ANS: 3 REF: 081507ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

363 ANS: 2 REF: 061712ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

364 ANS: 1 REF: 012002ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

365 ANS: 3 REF: 082209ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

366 ANS: 3 REF: 012311ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

367 ANS: 2 REF: 061617ai NAT: F.BF.A.1 TOP: Modeling Exponential Functions

368 ANS:

$B = 3000(1.042)^t$

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

369 ANS: 1 REF: 081617ai NAT: F.LE.A.2 TOP: Modeling Exponential Functions

370 ANS: 4 REF: 011912ai NAT: F.LE.A.2 TOP: Modeling Exponential Functions

371 ANS: 3

$\frac{5.4-4}{4} = 0.35$

REF: 011802ai NAT: F.LE.A.2 TOP: Modeling Exponential Functions

372 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.

REF: 011532ai NAT: F.LE.A.2 TOP: Modeling Exponential Functions

373 ANS:

No. He found another point if $g(x)$ were a linear function.

REF: 062129ai NAT: F.LE.A.2 TOP: Modeling Exponential Functions

374 ANS: 4 REF: 062308ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

375 ANS: 3 REF: 011515ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

376 ANS: 2 REF: 061517ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

377 ANS: 2 REF: 061923ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

378 ANS: 4 REF: 011608ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

379 ANS: 2 REF: 081624ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

380 ANS: 3 REF: 082312ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

381 ANS: 3 REF: 062221ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

382 ANS: 2 REF: 012014ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

383 ANS: 3 REF: 011724ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

384 ANS:

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

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

385 ANS:

$1 - 0.85 = 0.15 = 15\%$ To find the rate of change of an equation in the form $y = ab^x$, subtract b from 1.

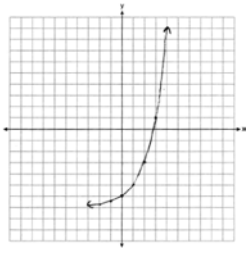
REF: 061728ai NAT: F.LE.B.5 TOP: Modeling Exponential Functions

386 ANS:

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

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

387 ANS:



Yes, $f(4) > g(4)$ because $2^4 - 7 > 1.5(4) - 3$.

REF: 011929ai NAT: F.IF.C.7 TOP: Graphing Exponential Functions

388 ANS: 3 REF: 081602ai NAT: A.REI.D.10 TOP: Identifying Solutions
389 ANS: 1 REF: 012011ai NAT: A.REI.D.10 TOP: Identifying Solutions
390 ANS: 4 REF: 062218ai NAT: A.REI.D.10 TOP: Identifying Solutions
391 ANS: 1 REF: 062303ai NAT: A.REI.D.10 TOP: Identifying Solutions
392 ANS: 4

$3K - 5 = 7$

$3K = 12$

$K = 4$

REF: 082205ai NAT: A.REI.D.10 TOP: Identifying Solutions
393 ANS: 4

$w = 2(3) + 7 = 13$

REF: 012302ai NAT: A.REI.D.10 TOP: Identifying Solutions
394 ANS: 1

$\frac{12-10}{12-9} = \frac{2}{3}$ $y - 6 = \frac{2}{3}(x - 3)$ $18 - 6 \neq \frac{2}{3}(16 - 3)$

REF: 062124ai NAT: A.REI.D.10 TOP: Identifying Solutions
395 ANS: 4

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

REF: 061808ai NAT: A.REI.D.10 TOP: Identifying Solutions
396 ANS: 4 REF: 081405ai NAT: A.REI.D.10 TOP: Identifying Solutions
397 ANS: 3

$10.25 \neq 3(1.25)^2 - 1.25 + 7$

REF: 061918ai NAT: A.REI.D.10 TOP: Identifying Solutions
398 ANS: 1

$3(10) + 2 \neq (-2)^2 - 5(-2) + 17$

$32 \neq 31$

REF: 081818ai NAT: A.REI.D.10 TOP: Identifying Solutions
399 ANS: 1

$(-3)^3 - 2(-3) = -27 + 6 = -21$

REF: 082303ai NAT: A.REI.D.10 TOP: Identifying Solutions
400 ANS: 4

$-2 \neq (-1)^3 - (-1)$

$-2 \neq 0$

REF: 011806ai NAT: A.REI.D.10 TOP: Identifying Solutions

401 ANS: 3

$\left(3x^2 + 4x - 8\right) + 22 - 10x = 3x^2 - 6x + 14$

REF: 082302ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: addition

402 ANS: 4

$2(x^2 - 1) + 3x(x - 4) = 2x^2 - 2 + 3x^2 - 12x = 5x^2 - 12x - 2$

REF: 081903ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: addition

403 ANS: 3 REF: 011813ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: addition

404 ANS: 1

$2\left(3x^3 + 2x^2 - 17\right)$

REF: 081813ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: addition

405 ANS: 1

$3(x + 4) - (2x + 7) = 3x + 12 - 2x - 7 = x + 5$

REF: 062102ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

406 ANS: 4

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

REF: 011707ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

407 ANS: 1

$2x^2 - 8x - 3x - 15$

$2x^2 - 11x - 15$

REF: 012301ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

408 ANS: 2

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

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

$2x^2 + 7x - 13$

REF: 061610ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

409 ANS: 2 REF: 012406ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

410 ANS: 2

$5x^2 - x + 4 - 3x^2 + 3x + 6 = 2x^2 + 2x + 10$

REF: 062304ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

411 ANS: 2

$3(x^2 + 2x - 3) - 4(4x^2 - 7x + 5) = 3x^2 + 6x - 9 - 16x^2 + 28x - 20 = -13x^2 + 34x - 29$

REF: 061803ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

412 ANS: 3

$2a^2 - 5 - 2(3 - a) = 2a^2 - 5 - 6 + 2a = 2a^2 + 2a - 11$

REF: 011911ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

413 ANS: 2 REF: 061403ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

414 ANS:

$5x^2 - 10$

REF: 061725ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

415 ANS:

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

REF: 011528ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

416 ANS:

$C = 3x^2 + 4 - 3\left(2x^2 + 6x - 5\right) = 3x^2 + 4 - 6x^2 - 18x + 15 = -3x^2 - 18x + 19$

REF: 061926ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

417 ANS:

$6x^2 - 6xy - (3x^2 - 6xy) = 3x^2$

REF: 062228ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: subtraction

418 ANS: 2 REF: 012309ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

419 ANS: 3 REF: 082206ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

420 ANS: 3 REF: 062217ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

421 ANS: 2

$(2x + 7)(x - 3) = 2x^2 - 6x + 7x - 21 = 2x^2 + x - 21$

REF: 082308ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

422 ANS: 2

(d) is the product, but not written in standard form.

REF: 062108ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

423 ANS: 4

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

REF: 081524ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

424 ANS: 1

$(x^2 + 3x + 9)(x - 3) = x^3 - 3x^2 + 3x^2 - 9x + 9x - 27 = x^3 - 27$

REF: 012415ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

425 ANS: 3

$(2x + 3)(4x^2 - 5x + 6) = 8x^3 - 10x^2 + 12x + 12x^2 - 15x + 18 = 8x^3 + 2x^2 - 3x + 18$

REF: 081612ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

426 ANS: 3

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

REF: 011610ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

427 ANS: 2

$x(-4x^2 - x + 6) + 8 = -4x^3 - x^2 + 6x + 8$

REF: 012016ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

428 ANS: 2 REF: 011510ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

429 ANS: 3

$\left(6x^2 + 2x\right)(5x - 6) = 30x^3 - 36x^2 + 10x^2 - 12x = 30x^3 - 26x^2 - 12x$

REF: 081824ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

430 ANS:

$(x+5)^2 + x^2 - 18 = x^2 + 10x + 25 + x^2 - 18 = 2x^2 + 10x + 7$

REF: 062329ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

431 ANS:

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

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

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

REF: 081428ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

432 ANS:

$5x + 4x^2(2x+7) - 6x^2 - 9x = -4x + 8x^3 + 28x^2 - 6x^2 = 8x^3 + 22x^2 - 4x$

REF: 081731ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

433 ANS:

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

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

REF: 061528ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

434 ANS:

$3x^2 + 21x - 4x - 28 - \frac{1}{4}x^2 = 2.75x^2 + 17x - 28$

REF: 012028ai NAT: A.APR.A.1 TOP: Operations with Polynomials
KEY: multiplication

435 ANS: 4 REF: 062204ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic

436 ANS: 4 REF: 012012ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic

437 ANS: 3 REF: 081803ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic

438 ANS: 1 REF: 061810ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic

439 ANS: 1 REF: 012314ai NAT: A.SSE.A.2 TOP: Factoring Polynomials

440 ANS: 3

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

REF: 081916ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic

441 ANS: 3 REF: 081509ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic
442 ANS: 1 REF: 011906ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic
443 ANS: 3 REF: 061917ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic
444 ANS: 3 REF: 062110ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: quadratic
445 ANS: 3 REF: 011612ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: higher power
446 ANS: 3
$-x^3 + 10x^2 + 24x = -x(x^2 - 10x - 24) = -x(x + 2)(x - 12)$

REF: 012421ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
447 ANS: 1 REF: 081415ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
KEY: higher power
448 ANS:
$2(x^2 + 8x - 9) = 2(x + 9)(x - 1)$

REF: 062331ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
449 ANS:
$3y^2 - 12y - 288$

$3(y^2 - 4y - 96)$

$3(y - 12)(y + 8)$

REF: 082232ai NAT: A.SSE.A.2 TOP: Factoring Polynomials
450 ANS: 3 REF: 081807ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: quadratic
451 ANS: 3 REF: 081703ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: quadratic
452 ANS: 1 REF: 062301ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares
453 ANS: 3 REF: 082203ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: quadratic
454 ANS: 2
$16x^2 - 36 = 4(2x + 3)(2x - 3)$

REF: 011701ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: quadratic
455 ANS: 3 REF: 081908ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: quadratic

456 ANS: 3

$18x^2 - 50 = 2(9x^2 - 25) = 2(3x - 5)(3x + 5)$

REF: 012006ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: quadratic

457 ANS: 2

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

REF: 081608ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: quadratic

458 ANS: 3 REF: 061601ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: higher power

459 ANS: 4 REF: 061901ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: higher power

460 ANS: 3 REF: 011522ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: higher power

461 ANS: 3 REF: 011809ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: higher power

462 ANS: 3 REF: 061706ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: higher power

463 ANS:

$18x^2 - 2 = 2(9x^2 - 1) = 2(3x + 1)(3x - 1)$

REF: 082331ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares

464 ANS:

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

REF: 012432ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares

465 ANS:

$4x^3 - 49x = x(4x^2 - 49) = x(2x + 7)(2x - 7)$

REF: 012331ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: higher power

466 ANS:

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

REF: 062128ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: higher power

467 ANS:

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

REF: 062231ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: higher power

468 ANS:

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

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

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

REF: 061431ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares
KEY: higher power

469 ANS: 1

$2x - 4 = 0 \quad 3x + 4 = 0$

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

REF: 062212ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

470 ANS: 3

$p(x) = x^2 - 2x - 24 = (x - 6)(x + 4) = 0$

$x = 6, -4$

REF: 061804ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

471 ANS: 1

$f(x) = x^2 - 5x - 6 = (x + 1)(x - 6) = 0$

$x = -1, 6$

REF: 061612ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

472 ANS: 4

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

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

$x = 15, -2$

REF: 061510ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

473 ANS: 1

$2x^2 - 4x - 6 = 0$

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

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

$x = 3, -1$

REF: 011609ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

474 ANS: 4

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

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

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

$x = 2, -1$

REF: 081513ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

475 ANS: 4

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

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

$x = -7, 3$

REF: 081418ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

476 ANS: 3 REF: 061412ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

477 ANS: 3 REF: 012423ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

478 ANS: 3

$m(x) = x(x + 4)(x - 4)$

REF: 082313ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

479 ANS: 2

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

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

REF: spr1303ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

480 ANS: 2 REF: 081816ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

481 ANS:

$x^2 - 4x + 3 = 0$

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

$x = 1, 3$

REF: 011826ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

482 ANS:

$x^2 + 3x - 18 = 0$ The zeros are the x-intercepts of $r(x)$.

$(x + 6)(x - 3) = 0$

$x = -6, 3$

REF: 061733ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

483 ANS:

$(x-3)^2 - 49 = 0$

$(x-3)^2 = 49$

$x - 3 = \pm 7$

$x = -4, 10$

REF: 081631ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

484 ANS: 3 REF: 012322ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

485 ANS: 3 REF: 061710ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

486 ANS:

Graph $f(x)$ and find x-intercepts, $-3, 1, 8$.

REF: 081825ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

487 ANS: 2 REF: 081501ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions

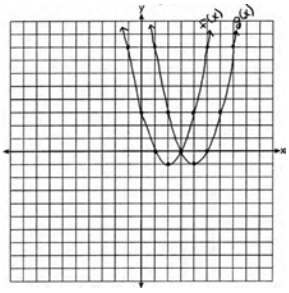
Algebra I Regents Exam Questions by State Standard: Topic
Answer Section

488 ANS: 4 REF: 012007ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
489 ANS: 1 REF: 081417ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
490 ANS: 4 REF: 082211ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
491 ANS: 1 REF: 082305ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
KEY: bimodalgraph
492 ANS: 3 REF: 081808ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
493 ANS: 3 REF: 012407ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
494 ANS: 2 REF: 011819ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
495 ANS: 2 REF: 061904ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
496 ANS: 1
$-5 - 2 = -7$

REF: 081905ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
497 ANS: 3 REF: 062113ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
498 ANS: 2 REF: 011717ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
499 ANS: 1 REF: 012310ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
500 ANS: 2 REF: 011512ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
501 ANS: 1 REF: 081706ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
502 ANS:
3 right and 4 down.

REF: 062226ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
503 ANS:
translate 2 left

REF: 082230ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
504 ANS:



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

REF: 061428ai NAT: F.BF.B.3 TOP: Graphing Polynomial Functions
505 ANS: 3 REF: 062302ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

506 ANS: 2

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

REF: 081522ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

507 ANS: 3

$\sqrt{16} + \sqrt{9} = \frac{7}{1}$ may be expressed as the ratio of two integers.

REF: 061413ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

508 ANS: 3

$\sqrt{576} = 24 \quad \sqrt{684} = 6\sqrt{19}$

REF: 011808ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

509 ANS: 1

$\sqrt{2} \cdot \sqrt{18} = \sqrt{36} = \frac{6}{1}$ may be expressed as the ratio of two integers.

REF: 061907ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

510 ANS: 3

$\sqrt{36} \div \sqrt{225} = \frac{6}{15}$ may be expressed as the ratio of two integers.

REF: 011903ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

511 ANS: 1

I. $-\frac{5}{8} + \frac{3}{5} = \frac{-1}{40}$; III. $\left(\sqrt{5}\right) \cdot \left(\sqrt{5}\right) = \frac{5}{1}$; IV. $3 \cdot \left(\sqrt{49}\right) = \frac{21}{1}$

REF: 011604ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

512 ANS: 3

$\left(2\sqrt{8}\right)\left(3\sqrt{2}\right) = 6\sqrt{16} = 24$

REF: 062109ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

513 ANS: 1 REF: 081401ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

514 ANS: 2 REF: 061508ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

515 ANS:

No. The product of $\sqrt{8}$ and $\sqrt{2}$, which are both irrational numbers, is $\sqrt{16}$, which is rational.

REF: 081930ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

516 ANS:

Rational, as $\sqrt{16} \cdot \frac{4}{7} = \frac{16}{7}$, which is the ratio of two integers.

REF: 061831ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

517 ANS:

The product is irrational because $\sqrt{27}$ can not be written as the ratio of two integers.

REF: 012030ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

518 ANS:

Rational, as $\sqrt{1024} \cdot -3.4 = 32 \cdot -3.4 = -108.8$, which is the ratio of two integers, $\frac{-1088}{10}$.

REF: 062225ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

519 ANS:

$3\sqrt{2} \cdot 8\sqrt{18} = 24\sqrt{36} = 144$ is rational, as it can be written as the ratio of two integers.

REF: 061626ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

520 ANS:

Rational, as $\sqrt{8} \cdot \sqrt{98} = 2\sqrt{2} \cdot \sqrt{49} \cdot \sqrt{2} = 2\sqrt{2} \cdot 7\sqrt{2} = 14 \cdot 2 = 28$, which is the ratio of two integers.

REF: 082227ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

521 ANS:

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

REF: 011525ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

522 ANS:

$2\sqrt{3} + 6$ is irrational because it can not be written as the ratio of two integers.

REF: 012426ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

523 ANS:
$7\sqrt{2}$ is irrational because it can not be written as the ratio of two integers.

REF: 081629ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

524 ANS:
$7 - \sqrt{2}$ is irrational because it can not be written as the ratio of two integers.

REF: 061727ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

525 ANS:
No. The sum of a rational and irrational is irrational.

REF: 011728ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

526 ANS:
$\frac{2}{\sqrt{144}} + \frac{\sqrt{169}}{3} = \frac{2}{12} + \frac{13}{3}$ The sum of two rational numbers is rational.

REF: 082325ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

527 ANS:
$A + B$ is irrational because $14\sqrt{3}$ cannot be written as the ratio of two integers. $A \bullet B$ is rational because 99 can be written as the ratio of two integers.

REF: 012329ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

528 ANS:
$a + b$ is irrational because it cannot be written as the ratio of two integers. $b + c$ is rational because it can be written as the ratio of two integers, $\frac{35}{2}$.

REF: 081725ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: classify

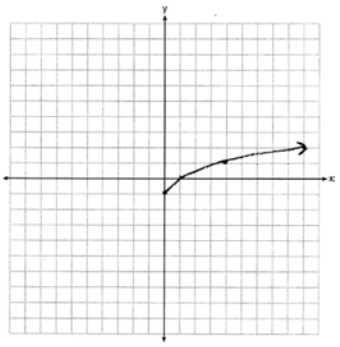
529 ANS: 1 REF: fall2301ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: addition

530 ANS:
$\frac{3}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{3\sqrt{6}}{12}$

REF: fall2303ai NAT: N.RN.B.3 TOP: Operations with Radicals
KEY: division

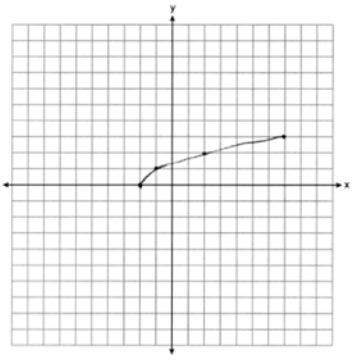
531 ANS: 4 REF: 061703ai NAT: F.IF.C.7 TOP: Graphing Root Functions
KEY: bimodalgraph

532 ANS:



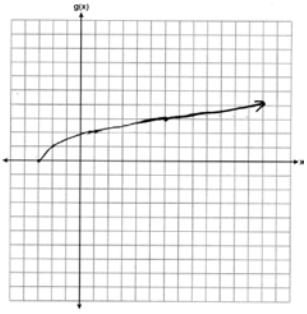
REF: 061425ai NAT: F.IF.C.7 TOP: Graphing Root Functions

533 ANS:



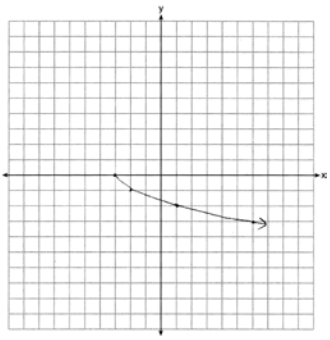
REF: 061825ai NAT: F.IF.C.7 TOP: Graphing Root Functions

534 ANS:



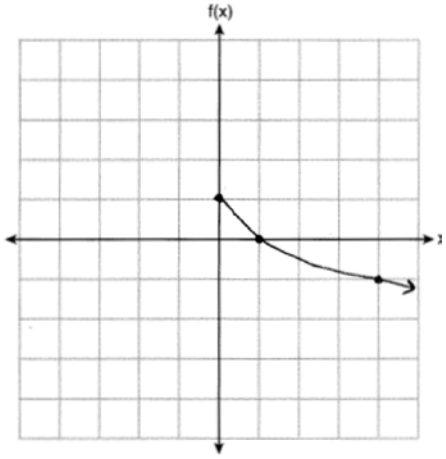
REF: 012325ai NAT: F.IF.C.7 TOP: Graphing Root Functions

535 ANS:



REF: 081625ai NAT: F.IF.C.7 TOP: Graphing Root Functions

536 ANS:



REF: 012025ai NAT: F.IF.C.7 TOP: Graphing Root Functions

537 ANS: 2 REF: 011815ai NAT: A.REI.C.6 TOP: Solving Linear Systems

538 ANS: 3

$y = -3x - 4$

$2x - 3(-3x - 4) = -21$

REF: 011922ai NAT: A.REI.C.6 TOP: Solving Linear Systems

KEY: substitution

539 ANS: 3

$2(x - y = 3)$

$2x - 2y = 6$

REF: 081822ai NAT: A.REI.C.6 TOP: Solving Linear Systems

540 ANS: 1

$x - 4y = -10 \quad x + 3 = 5 \quad 5x = 10 \quad 2 + y = 5$

$x + y = 5 \qquad x = 2 \quad x = 2 \quad y = 3$

$-5y = -15$

$y = 3$

REF: 081922ai NAT: A.REI.C.6 TOP: Solving Linear Systems

541 ANS: 2

$2(3x - y = 4)$

$6x - 2y = 8$

REF: 061414ai NAT: A.REI.C.6 TOP: Solving Linear Systems

542 ANS: 2

$6(3x - y = 7)$

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

REF: 012020ai NAT: A.REI.C.6 TOP: Solving Linear Systems

543 ANS: 2

$2x + 6y = 20 \quad x + 3(6) = 10 \quad -2x + 2y = 28 \quad -x + 6 = 14$

$-2x - 2y = 4 \qquad x = -8 \quad 2x + 6y = 20 \qquad -x = 8$

$4y = 24 \qquad\qquad 8y = 48 \qquad x = -8$

$y = 6 \qquad\qquad y = 6$

REF: 062120ai NAT: A.REI.C.6 TOP: Solving Linear Systems

544 ANS: 4 REF: 081622ai NAT: A.REI.C.6 TOP: Solving Linear Systems

545 ANS: 4 REF: 011621ai NAT: A.REI.C.6 TOP: Solving Linear Systems

546 ANS: 4

$36x + 30y = 96$

REF: 081724ai NAT: A.REI.C.6 TOP: Solving Linear Systems

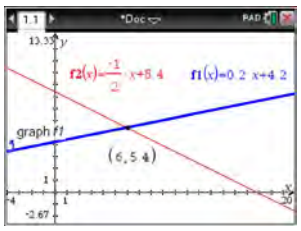
547 ANS: 1

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

$24 \neq 12$

REF: 061708ai NAT: A.REI.C.6 TOP: Solving Linear Systems
KEY: substitution

548 ANS: 4



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

$5 = .2(4)+b$ $0.8x+16.8+2x = 33.6$

$4.2 = b$ $2.8x = 16.8$

$y = 0.2x+4.2$ $x = 6$

REF: 061618ai NAT: A.REI.C.6 TOP: Solving Linear Systems
KEY: substitution

549 ANS:

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

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

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

$y = 6$ $8x = -6$

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

$8x = -6$

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

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

550 ANS:

No. There are infinite solutions.

REF: 011725ai NAT: A.REI.C.6 TOP: Solving Linear Systems
KEY: substitution

551 ANS:

$185+0.03x = 275+0.025x$

$0.005x = 90$

$x = 18000$

REF: 081427ai NAT: A.REI.C.6 TOP: Solving Linear Systems
KEY: substitution

552 ANS: 4 REF: 081419ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

553 ANS: 1 REF: 061605ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

554 ANS: 1 REF: 011803ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

555 ANS: 2 REF: 081809ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

556 ANS: 3

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

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

$0.75p = 48.75$

$p = 65$

REF: 061506ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

557 ANS: 2

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

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

$17L = 136$

$L = 8$

REF: 081510ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

558 ANS:

$l = 3w - 5 \quad 2(3w - 5) + 2w = 90 \quad l = 3(12.5) - 5$

$2l + 2w = 90 \quad 6w - 10 + 2w = 90 \quad = 37.5 - 5$

$8w = 100 \quad = 32.5$

$w = 12.5$

REF: 012335ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

559 ANS:

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

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

$4d = 9 \quad p = 5.75$

$d = 2.25$

REF: 011533ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

560 ANS:

$p + 2s = 15.95 \quad 5p + 10s = 79.75$

$3p + 5s = 45.90 \quad 6p + 10s = 91.80$

$p = 12.05$

REF: 011734ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

561 ANS:

$A(x) = 7 + 3(x - 2)$ $7 + 3(x - 2) = 6.50 + 3.25(x - 2)$

$B(x) = 3.25x$ $7 + 3x - 6 = 3.25x$

$1 = 0.25x$

$4 = x$

REF: 061834ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

562 ANS:

$n + q = 28$ $.05(28 - q) + .25q = 4$ $n + 13 = 28$ $.25x + .05x = 3$

$.05n + .25q = 4$ $1.4 - .05q + .25q = 4$ $n = 15$ $.3x = 3$

$.2q = 2.6$ $x = 10$

$q = 13$

REF: 012437ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

563 ANS:

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

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

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

$-3.15c = -31.50$

$c = 10$

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

564 ANS:

$18j + 32w = 19.92$ $14(.52) + 26(.33) = 15.86 \neq 15.76$ $7(18j + 32w = 19.92)$ $18j + 32(.24) = 19.92$

$14j + 26w = 15.76$ $9(14j + 26w = 15.76)$ $18j + 7.68 = 19.92$

$126j + 224w = 139.44$ $18j = 12.24$

$126j + 234w = 141.84$ $j = .68$

$10w = 2.4$

$w = .24$

REF: 081637ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

565 ANS:

$d = 2c - 5$; $20 \neq 2(15) - 5$ 20 dogs is not five less than twice 15 cats $\frac{c + 3}{2c - 5 + 3} = \frac{3}{4}$ $d = 2(9) - 5 = 13$

$\frac{c + 3}{d + 3} = \frac{3}{4}$ $20 \neq 25$

$4c + 12 = 6c - 6$

$18 = 2c$

$c = 9$

REF: 011837ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

566 ANS:

$10d + 25q = 1755,\ 10(90 - q) + 25q = 1755,$ no, because $20.98 \cdot 1.08 > 90 \cdot 0.25$

$d + q = 90 \qquad 900 - 10q + 25q = 1755$

$15q = 855$

$q = 57$

REF: 061837ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

567 ANS:

$b = 4s + 6 \qquad 4s + 6 - 3 = 7s - 21 \quad b = 4(8) + 6 = 38 \quad 38 + x = 3(8 + x)$

$b - 3 = 7(s - 3) \qquad 3s = 24 \qquad x + 38 = 24 + 3x$

$s = 8 \qquad 2x = 14$

$x = 7$

REF: 081837ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

568 ANS:

$4c + 3f = 16.53$ No, because $5(2.49) + 4(2.87) \neq 21.11.$ $16c + 12f = 66.12 \quad 4(2.79) + 3f = 16.53$

$5c + 4f = 21.11 \qquad \underline{15c + 12f = 63.33} \qquad 3f = 5.37$

$c = 2.79 \qquad f = 1.79$

REF: 061937ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

569 ANS:

$3.75A + 2.5D = 35 \quad 3.75(12 - D) + 2.5D = 35 \quad A + 8 = 12 \quad \dfrac{7((4)(2) + (8)(1))}{12} = 9\dfrac{1}{3} \quad 9 \cdot 2.5 = 22.50$

$A + D = 12 \quad 45 - 3.75D + 2.5D = 35 \qquad A = 4$

$-1.25D = -10$

$D = 8$

REF: 081937ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

570 ANS:

$4l + 8m = 40$ No, since $5(5.5) + 2(2.25) \neq 28 \quad 4l + 8m = 40 \quad 4(4.5) + 8m = 40$

$5l + 2m = 28 \qquad \underline{20l + 8m = 112} \qquad 8m = 22$

$16l = 72 \qquad m = 2.75$

$l = 4.5$

REF: 062137ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

571 ANS:

$30x + 50y = 420$ Peyton is wrong as $2.75(15) + 6.75(35) \neq 270$. $30x + 50y = 420$ $30x + 50(6) = 420$

$15x + 35y = 270$ $\underline{30x + 70y = 540}$ $30x = 120$

$20y = 120$ $x = 4$

$y = 6$

REF: 082237ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

572 ANS:

$4a + 2c = 325.94$ $4a + 2c = 325.94$ $4a + 2(46.99) = 325.94$ $57.99 + 3(46.99) = 198.96$

$2a + 3c = 256.95$ $\underline{4a + 6c = 513.90}$ $4a = 231.96$

$4c = 187.96$ $a = 57.99$

$c = 46.99$

REF: 062237ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

573 ANS:

$3r + 2d = 31.88$; $3r + 2(18.92 - 2r) = 31.88$; $2(5.96) + d = 18.92$; $31.88 + 18.92 - (5(4.50) + 3(6.50))$

$2r + d = 18.92$ $3r + 37.84 - 4r = 31.88$ $11.92 + d = 18.92$ $50.80 - 42$

$r = 5.96$ $d = 7$ 8.80

REF: 062337ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

574 ANS:

Plan *A*: $C = 2G + 25$, Plan *B*: $C = 2.5G + 15$. $50 = 2.5G + 15$ $50 = 2G + 25$ With Plan *B*, Dylan can rent 14

$35 = 2.5G$ $25 = 2G$

$G = 14$ $G = 12.5$

games, but with Plan *A*, Dylan can rent only 12. $65 = 2(20) + 25 = 2.5(20) + 15$ Bobby can choose either plan, as he could rent 20 games for $65 with both plans.

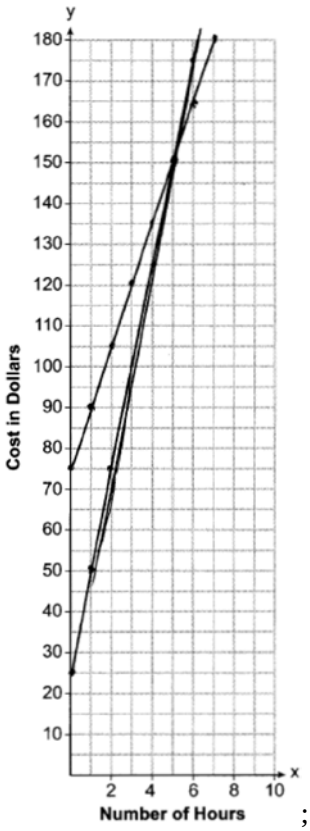
REF: 081728ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

575 ANS: 3

$15 > 5$

REF: 081502ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

576 ANS:



$a = 25x + 25$; $a = 25(10) + 25 = 275$ b will cost less; ; 5 hours

$b = 15x + 75$ $b = 15(10) + 75 = 225$

REF: 082337ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

577 ANS:

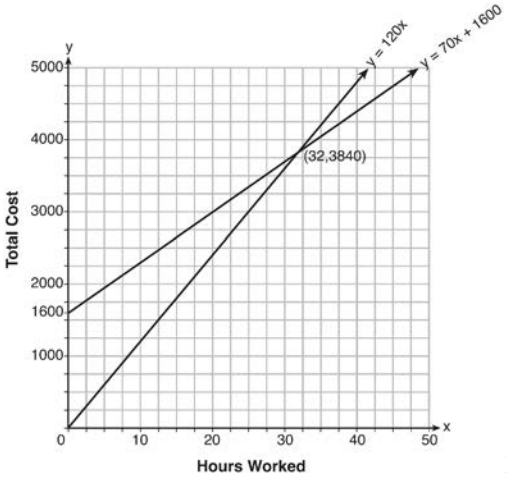
a) $A(x) = 1.50x + 6$ b) $1.50x + 6 = 2x + 2.50$ c) $A(x) = 1.50(5) + 6 = 13.50$ Carnival B has a lower cost.

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

$x = 7$

REF: spr1308ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

578 ANS:



$y = 120x$ and $y = 70x + 1600$ $\quad 120x = 70x + 1600$

$50x = 1600$

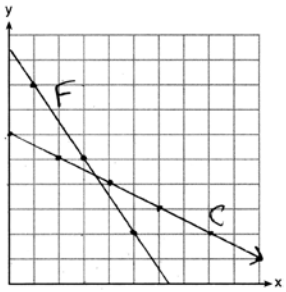
$x = 32$

$y = 120(35) = 4200$ Green Thumb is less expensive.

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

REF: fall1315ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

579 ANS:



$3x + 2y = 19$ $\quad 6x + 4y = 38$ $\quad 2(3.50) + 4y = 24$

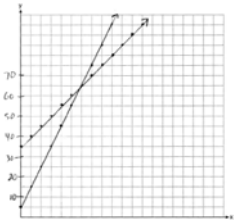
$2x + 4y = 24$ $\quad 2x + 4y = 24$ $\quad 7 + 4y = 24$

$4x = 14$ $\quad 4y = 17$

$x = 3.50$ $\quad y = 4.25$

REF: 061637ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

580 ANS:

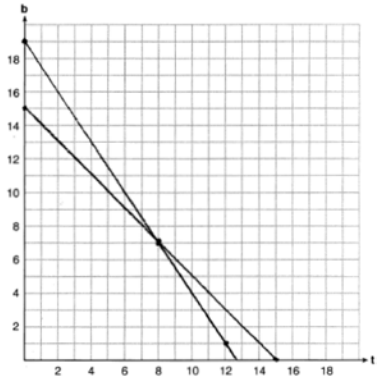


$y = 10x + 5$ In 2016, the swim team and chorus will each have 65 members.

$y = 5x + 35$

REF: 061737ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

581 ANS:

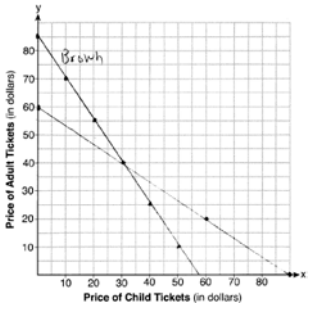


$t + b = 15$ No, because according to the graph, 8 tricycles were ordered.

$3t + 2b = 38$

REF: 011937ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

582 ANS:



$3x + 2y = 170$ $(30, 40)$ The price of a child's ticket is \$30 and the price of an adult's

$4x + 6y = 360$
ticket is \$40.

REF: 012037ai NAT: A.REI.C.6 TOP: Graphing Linear Systems

583 ANS: 2 REF: 012324ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

584 ANS: 1 REF: 061711ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

585 ANS: 2 REF: 081810ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

586 ANS:

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

$6p + 9d \ge 5000$ $2640 + 9d \ge 5000$

$9d \ge 2360$

$d \ge 262.\overline{2}$

REF: spr1306ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

587 ANS:

$x + y \le 200$ $12x + 8.50(50) \ge 1000$

$12x + 8.50y \ge 1000$ $12x + 425 \ge 1000$

$12x \ge 575$

$x \ge \frac{575}{12}$

48

REF: 081635ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

588 ANS:

$2L + 1.5W \ge 500$ $2(144) + 1.5W = 500$ 142 bottles of water must be sold to cover the cost of renting costumes.

$L + W \le 360$ $1.5W = 212$

$W = 141.\overline{3}$

REF: 011835ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

589 ANS:

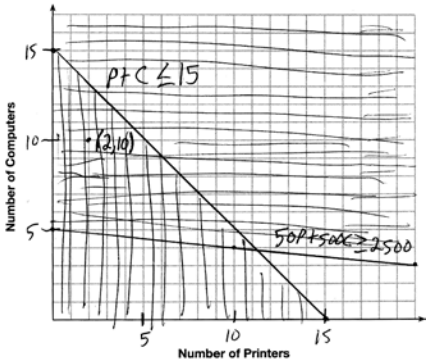
$y < -3x + 3$ Region A represents the solution set of the system. The gray region represents the solution set of

$y \le 2x - 2$

$y \le 2x - 2$.

REF: 061936ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

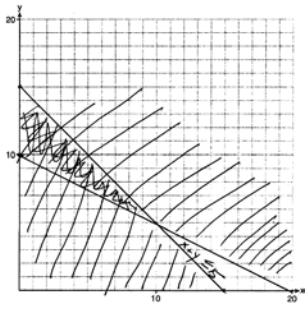
590 ANS:



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

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

591 ANS:



$x + y \le 15$ One hour at school and eleven hours at the library.

$4x + 8y \ge 80$

REF: 081437ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

592 ANS: 3 REF: 081506ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: bimodalgraph | graph

593 ANS: 2 REF: 061404ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: bimodalgraph | graph

594 ANS: 1 REF: 081407ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: solution set

595 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.

REF: fall1301ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: solution set

596 ANS: 4

$2(2) < -12(-3) + 4 \quad 4 < -6(-3) + 4$

$4 < 40 \qquad 4 < 22$

REF: 011716ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: solution set

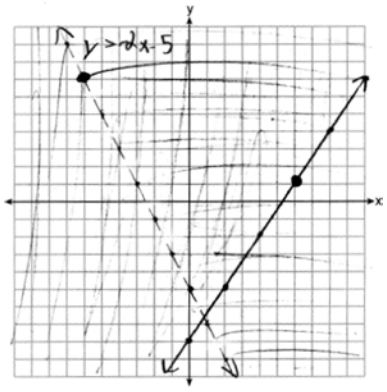
597 ANS: 3 REF: 011820ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: solution set

598 ANS:

No, because the point $(0,4)$ does not satisfy the inequality $y < \frac{1}{2}x + 4$. $4 < \frac{1}{2}(0) + 4$ is not a true statement.

REF: 011828ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: solution set

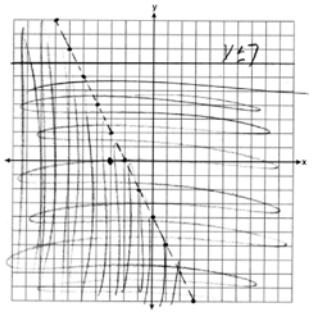
599 ANS:



(6, 1) is on a solid line. (–6, 7) is on a dashed line.

REF: 081835ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

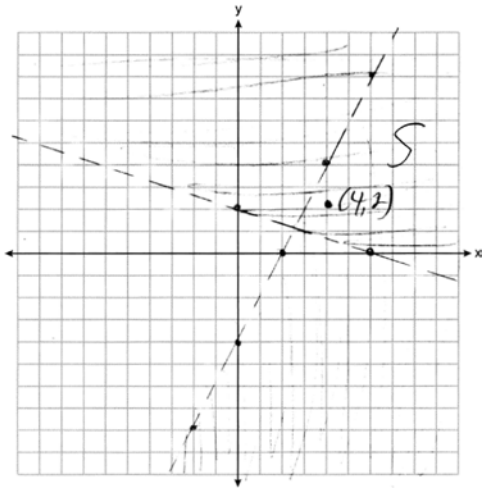
600 ANS:



(–3, 0) falls within the double-shaded area.

REF: 012336ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

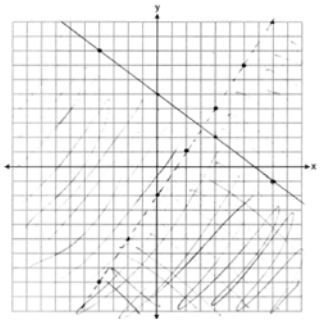
601 ANS:



Yes, as (4, 2) falls within *S*.

REF: 012436ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

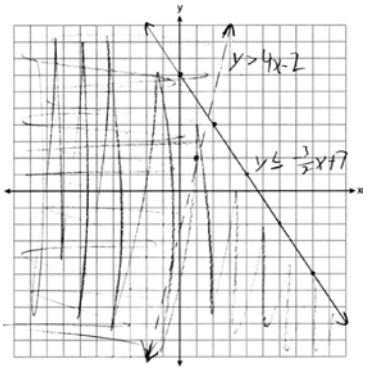
602 ANS:



No, as (6,3) does not lie in the solution set.

REF: 062135ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

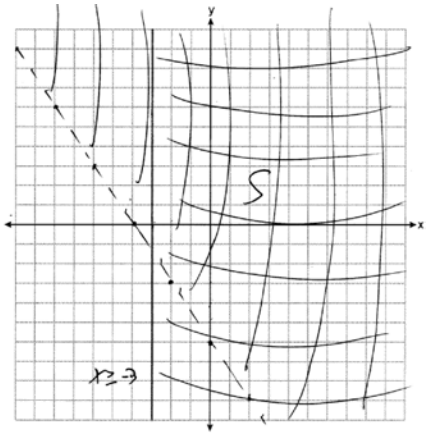
603 ANS:



(1,2) is not in the solution set since it does not fall in an area where the shadings overlap.

REF: 061835ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

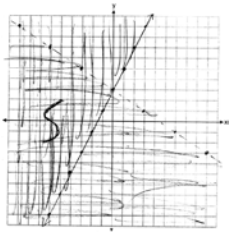
604 ANS:



No, as $-2(-9) = 3(2) + 12$.

REF: 082336ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

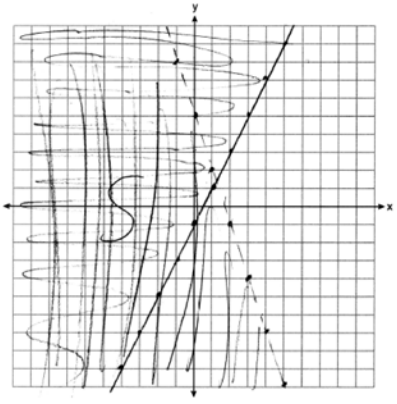
605 ANS:



No, as $2(0) + 3(3) = 9$.

REF: 062236ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

606 ANS:

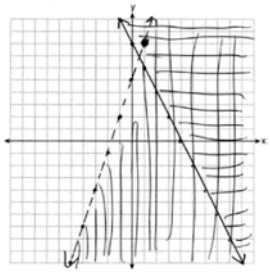


Yes, as $0 + 3(-5) < 5$

$1 \geq 2(-5) - 0$

REF: 082236ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

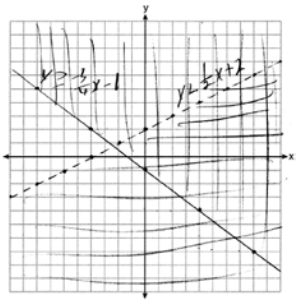
607 ANS:



No, $(1,8)$ falls on the boundary line of $y - 5 < 3x$, which is a strict inequality.

REF: 081933ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

608 ANS:

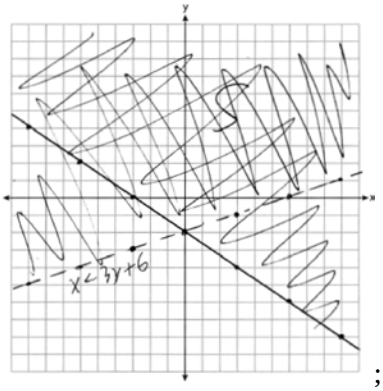


Correct, as $0 + 2(0) - 4 < 0$

$3(0) + 4(0) + 4 \geq 0$

REF: 012034ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

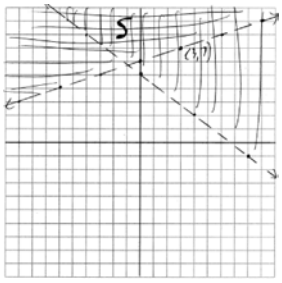
609 ANS:



; No, because $4 < 3(-2) + 6$ is false.

REF: 062335ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

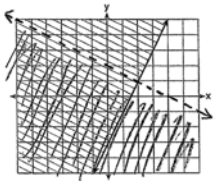
610 ANS:



No, $(3, 7)$ is on the boundary line, and not included in the solution set, because this is a strict inequality.

REF: 081735ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

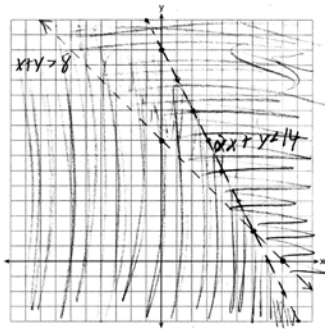
611 ANS:



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

REF: 011534ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

612 ANS:



$(6, 2)$ is not a solution as its falls on the edge of each inequality.

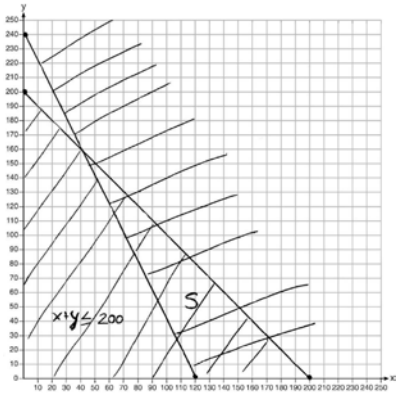
REF: 061634ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

613 ANS:

$x + y \leq 200$ Marta is incorrect because $12.5(30) + 6.25(80) < 1500$

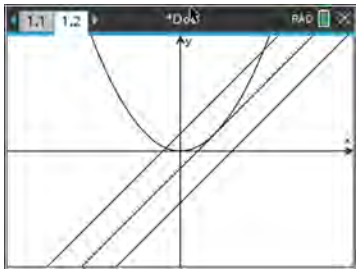
$12.5x + 6.25y \geq 1500$ $375 + 500 < 1500$

$875 < 1500$



REF: 011637ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities
KEY: graph

614 ANS: 4



REF: 062216ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

615 ANS:

$x^2 + 5x - 17 = x - 5 \quad -6 - y = 5 \quad 2 - y = 5 \quad (-6,-11),(2,-3)$

$x^2 + 4x - 12 = 0 \qquad y = -11 \qquad y = -3$

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

$x = -6, 2$

REF: fall2305ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems

616 ANS: 4

$x^2 + 2x + 1 = 7x - 5$

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

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

$x = 3, 2$

REF: 012312ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

617 ANS: 2

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

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

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

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

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

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

618 ANS:

$x^2 = x$

$x^2 - x = 0$

$x(x-1) = 0$

$x = 0, 1$

REF: 061731ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

619 ANS:

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

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

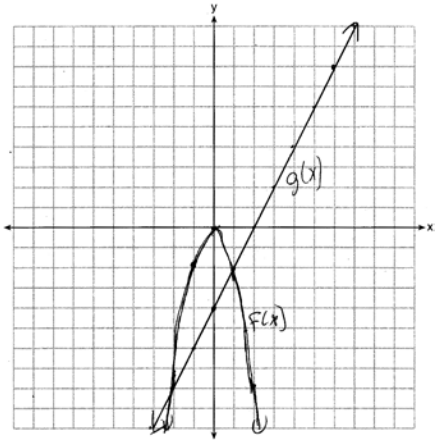
$(x-7)(x+2) = 0$

$x = 7$

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

REF: 061527ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

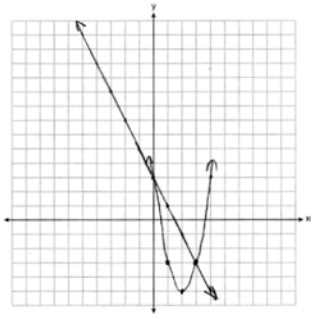
620 ANS:



$x = -2, 1$

REF: 081435ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

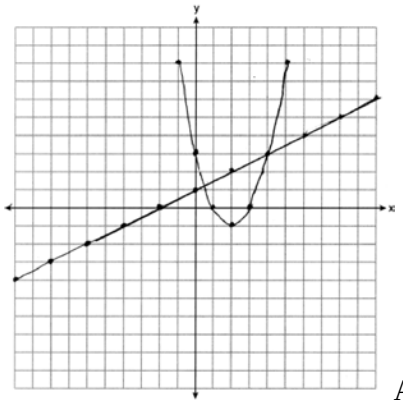
621 ANS:



$x = 0, 3$

REF: 061934ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

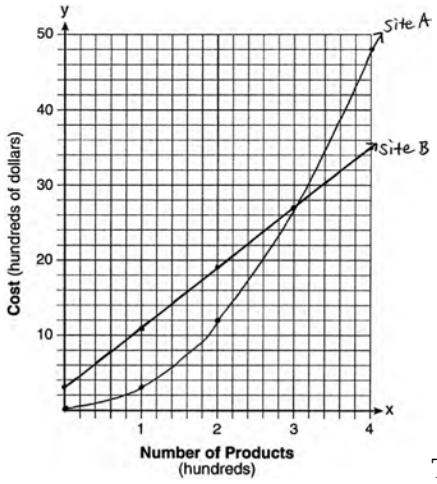
622 ANS:



At $x = \frac{1}{2}$, f intersects g.

REF: 082234ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

623 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 $x = 2$.

REF: 061437ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

624 ANS:

$2x^2 + 3x + 10 = 4x + 32$ $x = \frac{1 \pm \sqrt{(-1)^2 - 4(2)(-22)}}{2(2)} \approx -3.1, 3.6$. Quadratic formula, because the answer must be $2x^2 - x - 22 = 0$ to the nearest tenth.

REF: 061735ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

625 ANS: 4

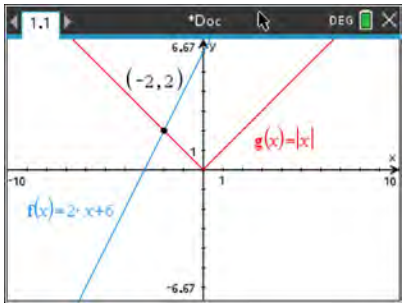
I. $f(4) = -\frac{4}{3}$ and $g(4) = 2$; II. $f(12) = 4$ and $g(12) = 4$

REF: 062111ai NAT: A.REI.D.11 TOP: Other Systems

626 ANS: 3 REF: 081819ai NAT: A.REI.D.11 TOP: Other Systems

627 ANS: 3 REF: 081914ai NAT: A.REI.D.11 TOP: Other Systems

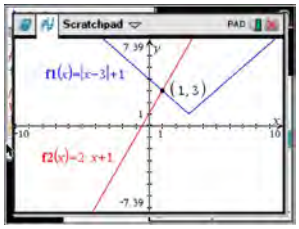
628 ANS: 3



REF: 012417ai NAT: A.REI.D.11 TOP: Other Systems

629 ANS: 3 REF: 011518ai NAT: A.REI.D.11 TOP: Other Systems

630 ANS: 2



$|x-3|+1=2x+1$ $x-3=2x$ $x-3=-2x$

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

extraneous $x=1$

REF: 061622ai NAT: A.REI.D.11 TOP: Other Systems

631 ANS: 2

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

$x+2=3x-2$

$4=2x$

$x=2$

REF: 081702ai NAT: A.REI.D.11 TOP: Other Systems

632 ANS: 1

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

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

$-6=3x$

$x+6=2x$ $-2=x$

$6=x$

REF: 011617ai NAT: A.REI.D.11 TOP: Other Systems

633 ANS: 3

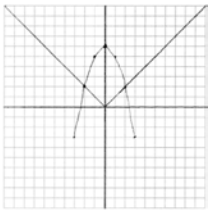
$y=(-1)^2-3(-1)-2=2,\ y=4(-1)+6=2$

REF: 011918ai NAT: A.REI.D.11 TOP: Other Systems

634 ANS:
$-3, 1$

REF: 081630ai NAT: A.REI.D.11 TOP: Other Systems

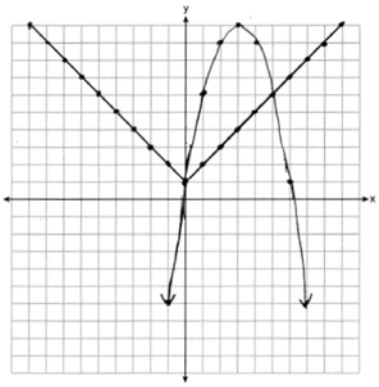
635 ANS:



Yes, because the graph of $f(x)$ intersects the graph of $g(x)$ at $x = -2$.

REF: 011733ai NAT: A.REI.D.11 TOP: Other Systems

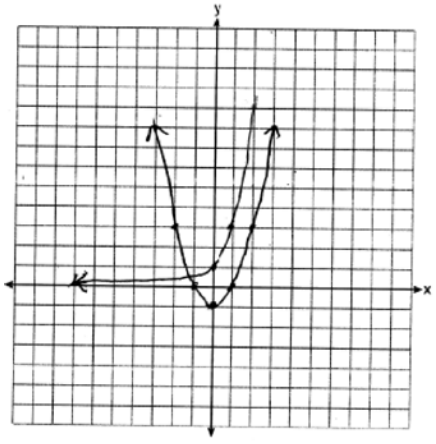
636 ANS:



$x = 0,5$

REF: 062333ai NAT: A.REI.D.11 TOP: Other Systems

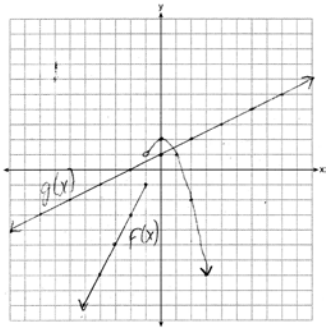
637 ANS:



$f(x) = g(x)$ for one value of x because the graphs intersect once.

REF: 062234ai NAT: A.REI.D.11 TOP: Other Systems

638 ANS:



1, because the graphs only intersect once.

REF: 061636ai NAT: A.REI.D.11 TOP: Other Systems

639 ANS: 2 REF: 011804ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: graphs

640 ANS: 3 REF: 061504ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

641 ANS: 4 REF: 081902ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

642 ANS: 2 REF: 012004ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

643 ANS: 3 REF: 061709ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

644 ANS: 4 REF: 062104ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

645 ANS: 1 REF: 012305ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: mixed

646 ANS: 2 REF: 081511ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: mixed

647 ANS: 4 REF: 011907ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: mixed

648 ANS: 4 REF: 061903ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: mixed

649 ANS: 3 REF: 062210ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: mixed

650 ANS: 4 REF: 082204ai NAT: F.IF.A.1 TOP: Defining Functions

651 ANS: 3 REF: 012402ai NAT: F.IF.A.1 TOP: Defining Functions

652 ANS: 4 REF: 061811ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

653 ANS:
No, because the relation does not pass the vertical line test.

REF: 011626ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: graphs

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

REF: 011527ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

655 ANS:
I: Change $(4, 30)$ to an open circle. II: Remove $(-4, 4)$.

REF: 062330ai NAT: F.IF.A.1 TOP: Defining Functions

656 ANS:
III and IV are functions. I, for $x = 6$, has two y-values. II, for $x = 1, 2$, has two y-values.

REF: 081826ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: graphs

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

REF: 061430ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: ordered pairs

658 ANS:
Neither is correct. Nora's reason is wrong since a circle is not a function because it fails the vertical line test. Mia is wrong since a circle is not a function because multiple values of y map to the same x-value.

REF: 011732ai NAT: F.IF.A.1 TOP: Defining Functions
KEY: graphs

659 ANS: 1 REF: 061420ai NAT: F.IF.A.2 TOP: Functional Notation

660 ANS: 1 REF: 081805ai NAT: F.IF.A.2 TOP: Functional Notation

661 ANS: 2
$f(-3) = -12 + 5 = -7$

REF: 061902ai NAT: F.IF.A.2 TOP: Functional Notation

662 ANS: 3
$f(8) = \dfrac{3(8) + 4}{2} = \dfrac{28}{2} = 14$

REF: 082201ai NAT: F.IF.A.2 TOP: Functional Notation

663 ANS: 2
$f(-2) = -3(-2)^2 + 10 = -12 + 10 = -2$

REF: 012304ai NAT: F.IF.A.2 TOP: Functional Notation

664 ANS: 1
$g(-3) = -2(-3)^2 + 3(-3) = -18 - 9 = -27$

REF: 011902ai NAT: F.IF.A.2 TOP: Functional Notation

665 ANS: 2

$g(-4) = -(-4)^2 - (-4) + 5 = -7$

REF: 062311ai NAT: F.IF.A.2 TOP: Functional Notation

666 ANS: 2

$K(-3) = 2(-3)^2 - 5(-3) + 3 = 18 + 15 + 3 = 36$

REF: 062103ai NAT: F.IF.A.2 TOP: Functional Notation

667 ANS: 3

$f(8) = \frac{1}{2}(8)^2 - \left(\frac{1}{4}(8) + 3\right) = 32 - 5 = 27$

REF: 081704ai NAT: F.IF.A.2 TOP: Functional Notation

668 ANS: 4

$k(9) = 2(9)^2 - 3\sqrt{9} = 162 - 9 = 153$

REF: 061802ai NAT: F.IF.A.2 TOP: Functional Notation

669 ANS: 2

$f(2) = 2(3^2) + 1 = 19$

REF: 012001ai NAT: F.IF.A.2 TOP: Functional Notation

670 ANS: 3

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

REF: 081512ai NAT: F.IF.A.2 TOP: Functional Notation

671 ANS: 2

$f(3) = 3(3) - 5 = 4$

REF: 062202ai NAT: F.IF.A.2 TOP: Functional Notation

672 ANS: 2

$f(-2) = (-2 - 1)^2 + 3(-2) = 9 - 6 = 3$

REF: 081605ai NAT: F.IF.A.2 TOP: Functional Notation

673 ANS: 3

$f(1) = 1^2 + 2(1) + 1 = 4$

$g(3) = 3(3) + 5 = 14$

$f(1) - g(3) = -10$

REF: 012410ai NAT: F.IF.A.2 TOP: Functional Notation

674 ANS: 4
$f(-1) = f(-2) = -2$

REF: 082318ai NAT: F.IF.A.2 TOP: Functional Notation
675 ANS: 1
$f(3) = -2(3)^2 + 32 = -18 + 32 = 14$

REF: 061705ai NAT: F.IF.A.2 TOP: Functional Notation
676 ANS: 1
$25,000(0.86)^2 - 25,000(0.86)^3 = 18490 - 15901.40 = 2588.60$

REF: 011508ai NAT: F.IF.A.2 TOP: Functional Notation
677 ANS:
$g(-2) = -4(-2)^2 - 3(-2) + 2 = -16 + 6 + 2 = -8$

REF: 081925ai NAT: F.IF.A.2 TOP: Functional Notation
678 ANS:
$w(52) - w(38)$ $15(x - 40) + 400 = 445$ Since $w(x) > 400$, $x > 40$. I substituted 445 for $w(x)$ and solved for x.

$15(52 - 40) + 400 - 10(38)$ $15(x - 40) = 45$

$180 + 400 - 380$ $x - 40 = 3$

200 $x = 43$

REF: 061534ai NAT: F.IF.A.2 TOP: Functional Notation
679 ANS: 3
$119.67(0.61)^5 - 119.67(0.61)^3 \approx 17.06$

REF: 011603ai NAT: F.IF.A.2 TOP: Evaluating Functions
680 ANS: 2 REF: 062320ai NAT: F.IF.A.2 TOP: Domain and Range
681 ANS: 1 REF: 081710ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: limited domain
682 ANS: 1
$f(2) = 0$

$f(6) = 8$

REF: 081411ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: limited domain
683 ANS: 4
$\frac{1}{3}$ of a positive number +9 is a positive number.

REF: 061417ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: real domain, linear
684 ANS: 1 REF: 012018ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: real domain, absolute value

685 ANS: 2 REF: 081806ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: limited domain

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

REF: 011812ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: limited domain

687 ANS: 2
$f(-2) = f(-1) = -16,\ f(0) = -12,\ f(1) = -4$

REF: 011914ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: limited domain

688 ANS: 3 REF: 061816ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: real domain, quadratic

689 ANS: 4
Vertex $(4, 1)$

REF: 012424ai NAT: F.IF.A.2 TOP: Domain and Range

690 ANS: 2
$x = \dfrac{-2}{2(1)} = -1;\ \ f(-1) = (-1)^2 + 2(-1) - 5 = -6$

REF: 082316ai NAT: F.IF.A.2 TOP: Domain and Range

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

REF: 061611ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: real domain, quadratic

692 ANS: 4
$x = \dfrac{-(-2)}{2(2)} = 0.5\ \ h(0.5) = -4.5$

REF: 081923ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: real domain, quadratic

693 ANS: 2 REF: 011619ai NAT: F.IF.A.2 TOP: Domain and Range
KEY: real domain, exponential

694 ANS:
The function is not defined at $x = 3$ or $x > 4$.

REF: 082327ai NAT: F.IF.A.2 TOP: Domain and Range

695 ANS: 4 REF: 011917ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: graph

696 ANS: 2 REF: 082222ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: graph

697 ANS: 4 REF: 061509ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: graph

698 ANS:
Domain is reals. Range is $y \geq 3$.

REF: 062229ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: graph

699 ANS: 4 REF: 012313ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

700 ANS: 2 REF: 062206ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

701 ANS: 2 REF: 011506ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

702 ANS: 2 REF: 062116ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

703 ANS: 4
Time is continuous and positive.

REF: 081921ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

704 ANS: 1 REF: 011615ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

705 ANS: 4 REF: 061623ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

706 ANS: 4 REF: 082322ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

707 ANS: 4 REF: 061920ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

708 ANS: 4 REF: 011719ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

709 ANS: 1 REF: 062324ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

710 ANS: 2 REF: 081620ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

711 ANS: 2 REF: 061821ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

712 ANS: 4
There are no negative or fractional cars.

REF: 061402ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

713 ANS: 2

$0 = -16t^2 + 144$

$16t^2 = 144$

$t^2 = 9$

$t = 3$

REF: 081423ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

714 ANS: 4 REF: 012021ai NAT: F.IF.B.5 TOP: Domain and Range
KEY: context

715 ANS: 2

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

REF: 081406ai NAT: F.BF.A.1 TOP: Operations with Functions

716 ANS:

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

REF: 061625ai NAT: F.BF.A.1 TOP: Operations with Functions

717 ANS: 3 REF: 061721ai NAT: F.LE.A.1 TOP: Families of Functions

718 ANS: 3 REF: 061911ai NAT: F.LE.A.1 TOP: Families of Functions

719 ANS: 3 REF: 081412ai NAT: F.LE.A.1 TOP: Families of Functions

720 ANS: 3 REF: 012017ai NAT: F.LE.A.1 TOP: Families of Functions

721 ANS: 2 REF: 082213ai NAT: F.LE.A.1 TOP: Families of Functions

722 ANS: 4 REF: 061814ai NAT: F.LE.A.1 TOP: Families of Functions

723 ANS: 1 REF: 012308ai NAT: F.LE.A.1 TOP: Families of Functions

724 ANS: 1 REF: 011623ai NAT: F.LE.A.1 TOP: Families of Functions

725 ANS: 4 REF: 012405ai NAT: F.LE.A.1 TOP: Families of Functions

726 ANS: 3 REF: 011711ai NAT: F.LE.A.1 TOP: Families of Functions

727 ANS: 4

II is linear.

REF: 081823ai NAT: F.LE.A.1 TOP: Families of Functions

728 ANS: 1 REF: 011805ai NAT: F.LE.A.1 TOP: Families of Functions

729 ANS: 1 REF: 081717ai NAT: F.LE.A.1 TOP: Families of Functions

730 ANS: 2 REF: 061624ai NAT: F.LE.A.1 TOP: Families of Functions

731 ANS: 4 REF: 062117ai NAT: F.LE.A.1 TOP: Families of Functions

732 ANS: 3 REF: 081410ai NAT: F.LE.A.1 TOP: Families of Functions
KEY: bimodalgraph

733 ANS: 2 REF: 081907ai NAT: F.LE.A.1 TOP: Families of Functions

734 ANS: 1 REF: 061606ai NAT: F.LE.A.1 TOP: Families of Functions

735 ANS: 3

$h(x) = 2^x$

REF: 082317ai NAT: F.LE.A.1 TOP: Families of Functions

736 ANS: 1 REF: 081802ai NAT: F.LE.A.1 TOP: Families of Functions

Algebra I Regents Exam Questions by State Standard: Topic
Answer Section

737 ANS: 3 REF: 011505ai NAT: F.LE.A.1 TOP: Families of Functions
738 ANS: 3
$y = 4^x$

REF: 062208ai NAT: F.LE.A.1 TOP: Families of Functions
739 ANS: 2 REF: 012316ai NAT: F.LE.A.1 TOP: Families of Functions
740 ANS: 1 REF: 061906ai NAT: F.LE.A.1 TOP: Families of Functions
741 ANS: 4 REF: 061406ai NAT: F.LE.A.1 TOP: Families of Functions
742 ANS:
Yes, because $f(x)$ does not have a constant rate of change.

REF: 061826ai NAT: F.LE.A.1 TOP: Families of Functions
743 ANS:
Linear, because the function has a constant rate of change.

REF: 011625ai NAT: F.LE.A.1 TOP: Families of Functions
744 ANS:
No, because the number of blocks is increasing by a constant amount.

REF: 062327ai NAT: F.LE.A.1 TOP: Families of Functions
745 ANS:
Exponential, because the function does not have a constant rate of change.

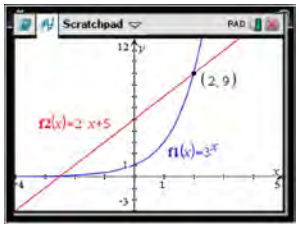
REF: 081627ai NAT: F.LE.A.1 TOP: Families of Functions
746 ANS:
Exponential, because the function does not grow at a constant rate.

REF: 081527ai NAT: F.LE.A.1 TOP: Families of Functions
747 ANS:
Linear, because the function grows at a constant rate.
$\frac{435-348}{14-13} = \frac{522-435}{15-14} = \frac{609-522}{16-15} = \frac{696-609}{17-16} = \frac{783-696}{18-17} = \frac{87}{1}$

REF: 011926ai NAT: F.LE.A.1 TOP: Families of Functions
748 ANS:
Exponential, as the value decreases by about 47%/year.

REF: 082226ai NAT: F.LE.A.1 TOP: Families of Functions
749 ANS: 3 REF: 061415ai NAT: F.LE.A.2 TOP: Families of Functions
750 ANS: 2 REF: 061513ai NAT: F.LE.A.2 TOP: Families of Functions
751 ANS: 2 REF: 081714ai NAT: F.LE.A.2 TOP: Families of Functions
752 ANS: 1 REF: 062307ai NAT: F.LE.A.3 TOP: Families of Functions
753 ANS: 1 REF: 081618ai NAT: F.LE.A.3 TOP: Families of Functions

754 ANS: 1



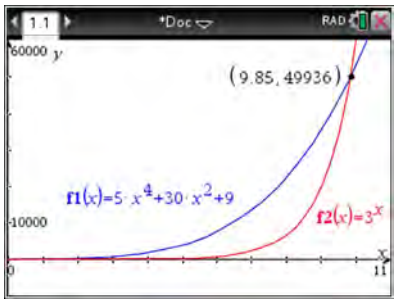
$f(-1) < g(-1)$

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

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

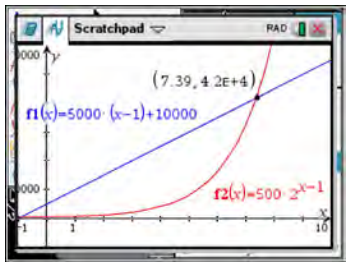
REF: 061515ai NAT: F.LE.A.3 TOP: Families of Functions

755 ANS: 3



REF: 061621ai NAT: F.LE.A.3 TOP: Families of Functions

756 ANS: 3



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

REF: 081518ai NAT: F.LE.A.3 TOP: Families of Functions

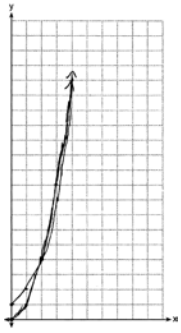
757 ANS: 3

$l(w) = 3.1w - 16.2$, $l(10) = 3.1(10) - 16.2 = 14.8$, $l(13) = 3.1(13) - 16.2 = 24.1$; $p(w) = 2.5(1.52)^{w-6}$, $p(10) = 2.5(1.52)^{10-6} \approx 13.3$, $p(13) = 2.5(1.52)^{13-6} \approx 46.9$

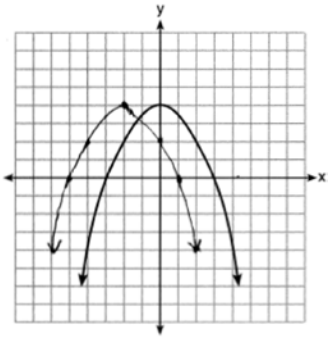
REF: 011916ai NAT: F.LE.A.3 TOP: Families of Functions

758 ANS:
$f(x) = 10 + 100x$, $g(x) = 10(2)^x$; both, since $f(7) = 10 + 100(7) = 710$ and $g(7) = 10(2)^7 = 1280$

REF: 061736ai NAT: F.LE.A.3 TOP: Families of Functions

759 ANS:

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

REF: 081533ai NAT: F.LE.A.3 TOP: Families of Functions

760 ANS:


REF: 061828ai NAT: F.BF.B.3 TOP: Transformations with Functions

761 ANS: 4
The y-intercept for $f(x)$ is $(0,1)$. The y-intercept for $g(x)$ is $(0,3)$. The y-intercept for $h(x)$ is $(0,-1)$.

REF: 081811ai NAT: F.IF.C.9 TOP: Comparing Functions

762 ANS: 4
$f(4) = q(4) = p(4) = 3$

REF: 011921ai NAT: F.IF.C.9 TOP: Comparing Functions

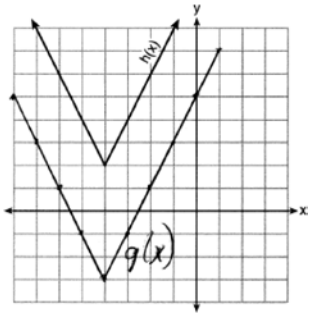
763 ANS: 3
1) -1; 2) 2; 3) 3; 4) 1

REF: 012411ai NAT: F.IF.C.9 TOP: Comparing Functions

764 ANS: 2
1) 1; 2) -3; 3) -2; 4) -1

REF: 082214ai NAT: F.IF.C.9 TOP: Comparing Functions

765 ANS: 2



REF: 081718ai NAT: F.IF.C.9 TOP: Comparing Functions
766 ANS: 3 REF: 011622ai NAT: F.IF.C.9 TOP: Comparing Functions
767 ANS: 4
1) $b = 0$; 2) $b = 4$; 3) $b = -6$; 4) $b = 5$

REF: 081611ai NAT: F.IF.C.9 TOP: Comparing Functions
768 ANS: 2 REF: 011723ai NAT: F.IF.C.9 TOP: Comparing Functions
769 ANS: 3 REF: 061820ai NAT: F.IF.C.9 TOP: Comparing Functions
770 ANS: 3
1) *B*'s zeros are –2 and –6 and *C*'s zeros are –4 and –2; 2) *A*'s *y*-intercept is 4 and *B*'s *y*-intercept is 12; 3) *B* in standard form, $a > 0$ and *C* in standard form, $a < 0$; d) *A* has no minimum

REF: 061914ai NAT: F.IF.C.9 TOP: Comparing Functions
771 ANS: 4
$f(0) = 3, g(0) = 4, h(0) = 2, k(0) = 1$

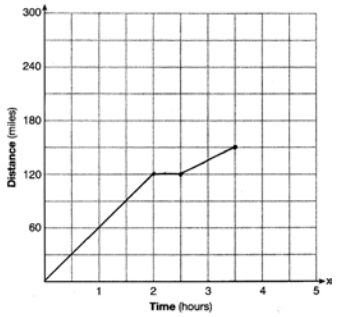
REF: 082314ai NAT: F.IF.C.9 TOP: Comparing Functions
772 ANS: 1
1) -6; 2) 1; 3) -2; 4) -2

REF: 062115ai NAT: F.IF.C.9 TOP: Comparing Functions
773 ANS: 3 REF: 061701ai NAT: F.IF.B.4 TOP: Relating Graphs to Events
774 ANS: 1 REF: 081918ai NAT: F.IF.B.4 TOP: Relating Graphs to Events
775 ANS: 4 REF: 061502ai NAT: F.IF.B.4 TOP: Relating Graphs to Events
776 ANS: 1 REF: 012401ai NAT: F.IF.B.4 TOP: Relating Graphs to Events
777 ANS:
20-30; 10000; $\frac{4000 - 10000}{40 - 30} = -600$. The population decreases by 600 each year.

REF: 012333ai NAT: F.IF.B.4 TOP: Relating Graphs to Events
778 ANS: 3 REF: 082301ai NAT: F.IF.B.4 TOP: Relating Graphs to Events
779 ANS:
The zeros represent when the height of the kite is 0. The height of the kite is increasing over 0-0.5 and 1-2 minutes. The maximum height of the kite is 60 feet.

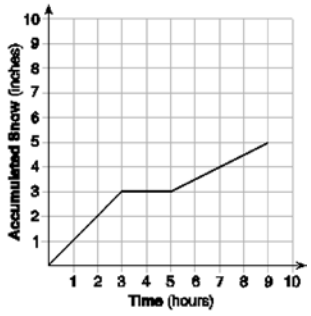
REF: 062233ai NAT: F.IF.B.4 TOP: Relating Graphs to Events

780 ANS:



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

781 ANS:



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

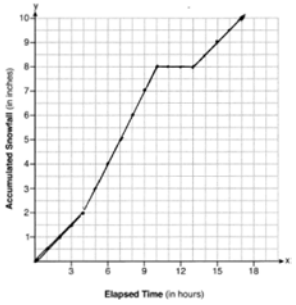
REF: spr1307ai NAT: F.IF.B.4 TOP: Relating Graphs to Events

782 ANS:

D-E, because his speed was slower. Craig may have stayed at a rest stop during *B-C.* $\frac{230-0}{7-0} \approx 32.9$

REF: 061734ai NAT: F.IF.B.4 TOP: Relating Graphs to Events

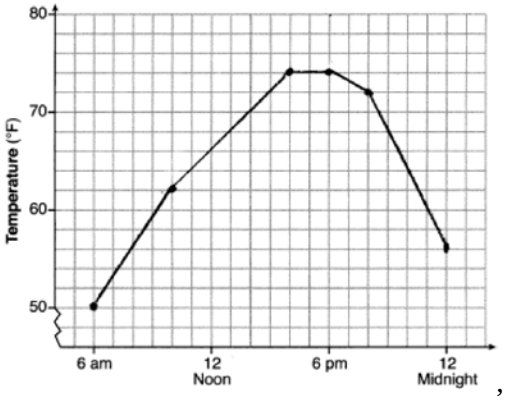
783 ANS:



$\frac{10.0-0}{17.0-0} \approx 0.59$

REF: 081936ai NAT: F.IF.B.4 TOP: Relating Graphs to Events

784 ANS:



, 6am-4pm, $\frac{74-56}{6-12}=-3$

REF: 011936ai NAT: F.IF.B.4 TOP: Relating Graphs to Events

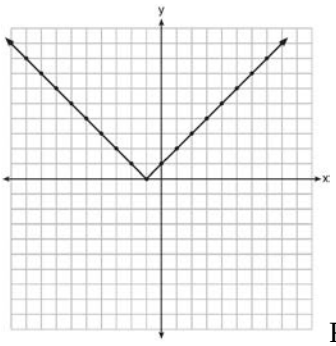
785 ANS:

The bus stopped in the interval between *D* and *E*. The bus traveled the fastest in the interval between *C* and *D* at 60 mph. The average rate of speed was $\frac{140}{4}=35$ mph.

REF: 082233ai NAT: F.IF.B.4 TOP: Relating Graphs to Events

786 ANS: 1 REF: 011712ai NAT: F.IF.C.7 TOP: Graphing Absolute Value Functions

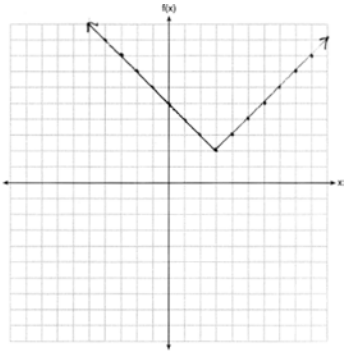
787 ANS:



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

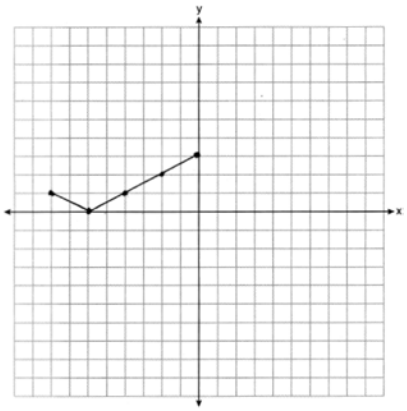
REF: fall1310ai NAT: F.IF.C.7 TOP: Graphing Absolute Value Functions

788 ANS:



REF: 011825ai NAT: F.IF.C.7 TOP: Graphing Absolute Value Functions

789 ANS:



REF: 062126ai NAT: F.IF.C.7 TOP: Graphing Absolute Value Functions

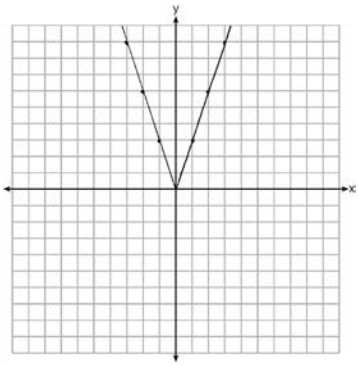
790 ANS: 3 REF: 062316ai NAT: F.BF.B.3 TOP: Graphing Absolute Value Functions

791 ANS:

$g(x)$ is $f(x)$ shifted right by a, $h(x)$ is $f(x)$ shifted down by a.

REF: 061732ai NAT: F.BF.B.3 TOP: Graphing Absolute Value Functions

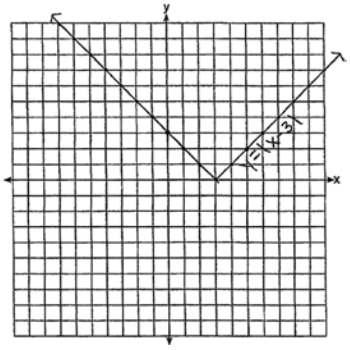
792 ANS:



2 down. 4 right.

REF: 081433ai NAT: F.BF.B.3 TOP: Graphing Absolute Value Functions

793 ANS:



The graph has shifted three units to the right.

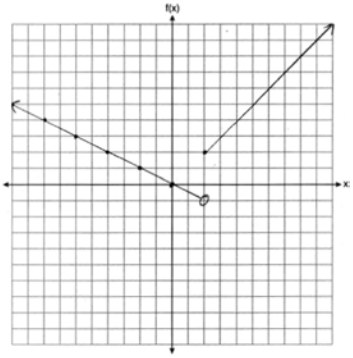
REF: 061525ai NAT: F.BF.B.3 TOP: Graphing Absolute Value Functions

794 ANS: 2 REF: 081516ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions
KEY: bimodalgraph

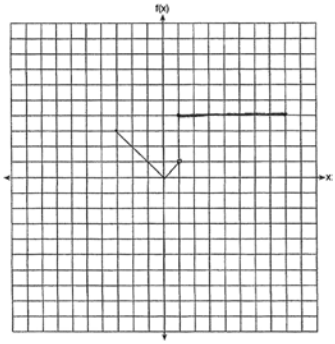
795 ANS: 2 REF: 081422ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions
796 ANS: 4 REF: 081815ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions
797 ANS:

$f(3) = -(3)^2 + 15 = 6$

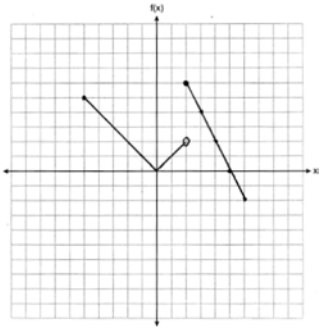
REF: 012430ai NAT: F.IF.A.2 TOP: Functional Notation
798 ANS:



REF: 061832ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions
799 ANS:

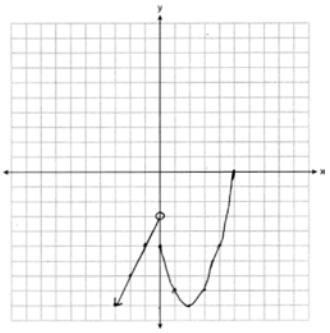


REF: 011530ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions
800 ANS:



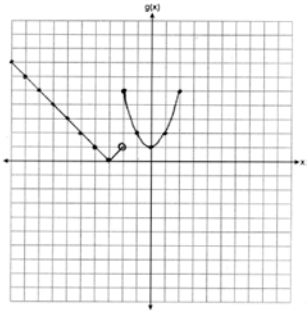
REF: 061927ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions

801 ANS:



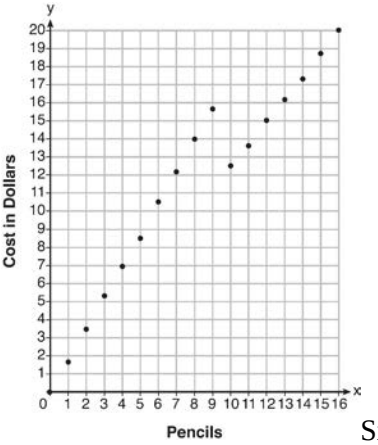
REF: 081932ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions

802 ANS:



REF: 012332ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions

803 ANS:

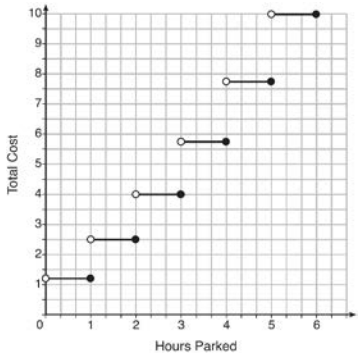


Since according to the graph, 8 pencils cost $14 and 10 pencils cost $12.50, the cashier is correct.

REF: fall1312ai NAT: F.IF.C.7 TOP: Graphing Piecewise-Defined Functions

804 ANS: 1 REF: 061507ai NAT: F.IF.C.7 TOP: Graphing Step Functions
KEY: bimodalgraph

805 ANS:



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

REF: fall1311ai NAT: F.IF.C.7 TOP: Graphing Step Functions

806 ANS: 3

$$\frac{17-5}{5-1}=\frac{12}{4}=3$$

REF: 062215ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

807 ANS: 2 REF: 061919ai NAT: F.IF.A.3 TOP: Sequences
KEY: difference or ratio

808 ANS:

$$\frac{15-3}{4-1}=\frac{12}{3}=4$$

REF: 012328ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

809 ANS: 1

$$5r=a_2 \quad a_2r=245 \quad 5r=\frac{245}{r}$$

$$a_2=\frac{245}{r} \quad 5r^2=245$$

$$r^2=49$$

$$r=\pm 7$$

REF: 081924ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

810 ANS: 1

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

REF: 082202ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

811 ANS:
Yes, because the sequence has a common ratio, 3.

REF: 081726ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

812 ANS: 4

$$31=4+(10-1)3$$

REF: 062118ai NAT: F.BF.A.1 TOP: Sequences

813 ANS: 3
$a_n = 3n + 1$

$a_5 = 3(5) + 1 = 16$

REF: 061613ai NAT: F.IF.A.3 TOP: Sequences KEY: explicit

814 ANS: 1
$d = \frac{37 - 31}{6 - 3} = 2 \;\; a_n = 2n + 25$

$a_{20} = 2(20) + 25 = 65$

REF: 061807ai NAT: F.IF.A.3 TOP: Sequences KEY: explicit

815 ANS: 2
$a_n = 4n + 8$

$a_{35} = 4(35) + 8 = 148$

REF: 012008ai NAT: F.IF.A.3 TOP: Sequences KEY: explicit

816 ANS: 2
$a_{24} = -5 + (24 - 1)(-6) = -143$

REF: 062305ai NAT: F.IF.A.3 TOP: Sequences KEY: explicit

817 ANS:
$d = \frac{17 - 5}{5 - 1} = 3; \;\; a_{21} = 5 + (21 - 1)(3) = 65$

REF: 082330ai NAT: F.IF.A.3 TOP: Sequences KEY: explicit

818 ANS: 4 REF: 081820ai NAT: F.BF.A.1 TOP: Sequences

819 ANS: 2 REF: 081416ai NAT: F.BF.A.1 TOP: Sequences

820 ANS: 2 REF: 061424ai NAT: F.BF.A.1 TOP: Sequences

821 ANS: 1
$a_5 = 4(-3)^{5-1} = 324$

REF: 012317ai NAT: F.IF.A.3 TOP: Sequences KEY: explicit

822 ANS: 3
$a_{11} = 3(-2)^{11-1} = 3072$

REF: 012404ai NAT: F.BF.A.1 TOP: Sequences KEY: explicit

823 ANS: 1 REF: 061922ai NAT: S.ID.A.2 TOP: Dispersion
KEY: basic

824 ANS: 3

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

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

825 ANS: 1

$A: \bar{x} = 6;\ \sigma_x = 3.16$ $B: \bar{x} = 6.875;\ \sigma_x = 3.06$

REF: 081519ai NAT: S.ID.A.2 TOP: Central Tendency and Dispersion

826 ANS: 3

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

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

827 ANS: 3

	Donna	Andrew
mean	91.6	89.6
median	92	93
IQR	6	12.5
3rd Q	94.5	95

REF: 062214ai NAT: S.ID.A.2 TOP: Central Tendency and Dispersion

828 ANS: 4 REF: 011514ai NAT: S.ID.A.2 TOP: Central Tendency and Dispersion

829 ANS: 4 REF: 011720ai NAT: S.ID.A.2 TOP: Central Tendency and Dispersion

830 ANS:

$61.5 - 51 = 10.5$

REF: 082228ai NAT: S.ID.A.2 TOP: Dispersion KEY: basic

831 ANS:

4th because IQR and σ_x are greater for 4th Period.

REF: 081831ai NAT: S.ID.A.2 TOP: Central Tendency and Dispersion

832 ANS:

Los Angeles because range, IQR and σ_x are less.

	σ_x	**Min**	**Q1**	**Q3**	**Max**	**Range**	**IQR**
Miami	7.2	60	75	83	87	27	8
Los Angeles	3.6	61	63	67	74	13	4

REF: 011931ai NAT: S.ID.A.2 TOP: Central Tendency and Dispersion

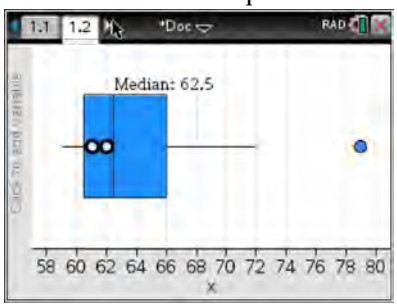
833 ANS: 3
Median remains at 1.4.

REF: 061520ai NAT: S.ID.A.3 TOP: Central Tendency and Dispersion

834 ANS: 1
1) The mode is a bit high.
2) $Q_1 = 41$, $Q_3 = 68$, 1.5 times the IQR of 27 is 40.5, $Q_1 - 1.5IQR = 41 - 40.5 = 0.5$,
$Q_3 + 1.5IQR = 68 + 40.5 = 108.5$, so the data have two outliers.

REF: 011816ai NAT: S.ID.A.3 TOP: Central Tendency and Dispersion

835 ANS: 4
(1) The box plot indicates the data is not evenly spread. (2) The median is 62.5. (3) The data is skewed because the mean does not equal the median. (4) an outlier is greater than $Q3 + 1.5 \cdot IRQ = 66 + 1.5(66 - 60.5) = 74.25$.



REF: 061715ai NAT: S.ID.A.3 TOP: Central Tendency and Dispersion

836 ANS: 2
$$\frac{60-45}{60} = \frac{15}{60} = \frac{1}{4}$$

REF: 081814ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

837 ANS: 4
$$\frac{30}{30+12+8} = 0.6$$

REF: 061615ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

838 ANS: 2
$$\frac{14}{16+20+14} = 28\%$$

REF: 011705ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

839 ANS: 1
$$\frac{58+41}{42+58+20+84+41+5} = \frac{99}{250} = 0.396$$

REF: 061809ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

840 ANS: 2

$$\frac{26}{42+26} = 0.382$$

REF: 061912ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

841 ANS: 3

$$\frac{138}{192} \approx 72\%$$

REF: 012010ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

842 ANS: 2

$$\frac{56}{56+74+103} \approx 0.24$$

REF: 081906ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

843 ANS: 4

$$\frac{67}{42+67} \approx 0.615$$

REF: 012409ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

844 ANS: 2

$$\frac{44+30}{32+44+24+36+30+34} = 37\%$$

REF: 082212ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

845 ANS: 2

$$\frac{38}{84} \approx 45.2\%$$

REF: 062317ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

846 ANS:

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

REF: 011526ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

847 ANS:

$$\frac{46}{39+46+37} \approx 38\%$$

REF: 012326ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

848 ANS:

$$\frac{m}{351} = \frac{70}{70+35}$$

$$105m = 24570$$

$$m = 234$$

REF: 011630ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

849 ANS:

	Watch Sports	Don't Watch Sports	Total
Like Pop	**26**	**28**	**54**
Don't Like Pop	**34**	**12**	**46**
Total	**60**	**40**	**100**

REF: 061729ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

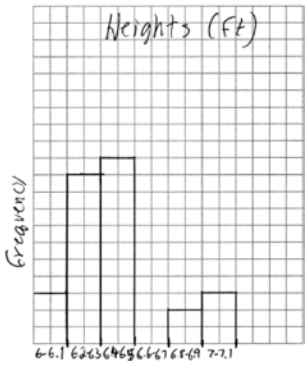
850 ANS:

	Horse	Dolphin	Penguin	Total
Male	28	18	23	69
Female	14	42	25	81
Total	42	60	48	150

REF: 082326ai NAT: S.ID.B.5 TOP: Frequency Tables
KEY: two-way

851 ANS:

Interval	Frequency
6.0 – 6.1	3
6.2 – 6.3	10
6.4 – 6.5	11
6.6 – 6.7	0
6.8 – 6.9	2
7.0 – 7.1	3



6.4-6.5

REF: 081734ai NAT: S.ID.A.1 TOP: Frequency Histograms
KEY: frequency histograms

852 ANS: 4 REF: 081603ai NAT: S.ID.A.1 TOP: Box Plots
KEY: interpret

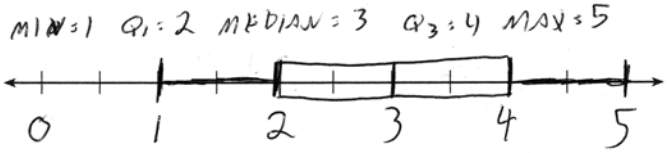
853 ANS: 2 REF: 061805ai NAT: S.ID.A.1 TOP: Box Plots
KEY: interpret

854 ANS: 3
The value of the third quartile is the last vertical line of the box.

REF: 012306ai NAT: S.ID.A.1 TOP: Box Plots KEY: interpret
855 ANS: 3
The value of the third quartile is the last vertical line of the box.

REF: 082307ai NAT: S.ID.A.1 TOP: Box Plots KEY: interpret
856 ANS: 1
$8 - 1 = 7$

REF: 081915ai NAT: S.ID.A.1 TOP: Box Plots KEY: interpret
857 ANS: 3 REF: 062119ai NAT: S.ID.A.1 TOP: Box Plots
KEY: interpret
858 ANS:

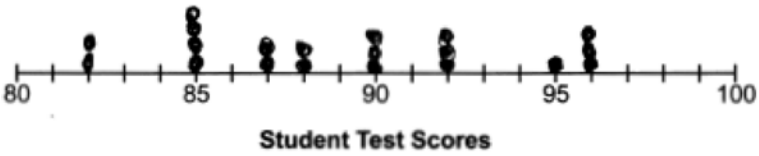


REF: 061432ai NAT: S.ID.A.1 TOP: Box Plots KEY: represent
859 ANS:

REF: 062328ai NAT: S.ID.A.1 TOP: Box Plots KEY: represent
860 ANS: 3
median = 3, IQR = $4 - 2 = 2$, $\bar{x} = 2.75$. An outlier is outside the interval $[Q_1 - 1.5(\text{IQR}), Q_3 + 1.5(\text{IQR})]$.
$[2 - 1.5(2), 4 + 1.5(2)]$

[-1,7]

REF: 061620ai NAT: S.ID.A.1 TOP: Dot Plots
861 ANS: 1 REF: 082210ai NAT: S.ID.A.1 TOP: Dot Plots
862 ANS: 4 REF: 012022ai NAT: S.ID.A.1 TOP: Dot Plots
863 ANS:



89

REF: 012425ai NAT: S.ID.A.1 TOP: Dot Plots
864 ANS: 2 REF: 011901ai NAT: S.ID.B.6 TOP: Scatter Plots
KEY: line of best fit
865 ANS: 2 REF: 011713ai NAT: S.ID.C.9 TOP: Analysis of Data
866 ANS: 2 REF: 062201ai NAT: S.ID.C.9 TOP: Analysis of Data
867 ANS: 2 REF: 081708ai NAT: S.ID.C.9 TOP: Analysis of Data

868 ANS: 2 REF: 061516ai NAT: S.ID.C.9 TOP: Analysis of Data
869 ANS: 3 REF: 081821ai NAT: S.ID.C.9 TOP: Analysis of Data
870 ANS: 4 REF: 081421ai NAT: S.ID.B.6 TOP: Regression
KEY: linear
871 ANS:
$y = 0.05x - 0.92$

REF: fall1307ai NAT: S.ID.B.6 TOP: Regression KEY: linear
872 ANS:
$y = -8.5x + 99.2$ The y-intercept represents the length of the rope without knots. The slope represents the decrease in the length of the rope for each knot.

REF: 011834ai NAT: S.ID.B.6 TOP: Regression KEY: linear
873 ANS:
$y = 17.159x - 2.476$. $y = 17.159(.65) - 2.476 \approx 8.7$

REF: 081633ai NAT: S.ID.B.6 TOP: Regression KEY: linear
874 ANS:
$y = 0.16x + 8.27$ $r = 0.97$, which suggests a strong association.

REF: 081536ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient
875 ANS:
$f(t) = -58t + 6182$ $r = -.94$ This indicates a strong linear relationship because r is close to -1.

REF: 011635ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient
876 ANS:
$y = 0.96x + 23.95$, 0.92, high, positive correlation between scores 85 or better on the math and English exams.

REF: 061836ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient
877 ANS:
$y = 40.48x + 363.81$, 0.84, strong

REF: 012434ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient
878 ANS:
$y = 1.9x + 29.8$ $r = 0.3$ This indicates a weak relationship between a dog's height and mass.

REF: 011934ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient
879 ANS:
$y = 7.79x + 34.27$ $r = 0.98$ high, positive correlation between hours spent studying and test scores

REF: 061935ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient
880 ANS:
$y = -7.76x + 246.34$, -0.88 As the distance from Times Square increases, the cost of a room decreases.

REF: 081935ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

881 ANS:
$f(p) = -.79p + 249.86$ $r = -.95$ There is a strong negative correlation as the higher the sales price, the fewer number of new homes available.

REF: 012035ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

882 ANS:
$y = 1.72x + 69.4$, 0.97, high, positive correlation between the number of jumping jacks and heart rate

REF: 062133ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

883 ANS:
$y = -0.96x + 64.74$, $r = -0.98$. There is a strong correlation between the driver's age and the percentage of accidents caused by speeding.

REF: 062235ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

884 ANS:
$y = -2.81x + 97.55$, -0.97, strong

REF: 012334ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

885 ANS:
$y = 184.89x - 1706.07$, 0.99, As the height of the horse increases, the weight of the horse increases.

REF: 062336ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

886 ANS:
$y = 0.41x - 2.31$, 0.99, strong

REF: 082335ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

887 ANS: 3 REF: 061411ai NAT: S.ID.C.8 TOP: Correlation Coefficient

888 ANS: 1 REF: 061714ai NAT: S.ID.C.8 TOP: Correlation Coefficient

889 ANS: 2
$r = 0.92$

REF: 081606ai NAT: S.ID.C.8 TOP: Correlation Coefficient

890 ANS: 1
$r = -0.98$

REF: 082223ai NAT: S.ID.C.8 TOP: Correlation Coefficient

891 ANS: 4 REF: 011703ai NAT: S.ID.C.8 TOP: Correlation Coefficient

892 ANS: 1 REF: 081722ai NAT: S.ID.C.8 TOP: Correlation Coefficient

893 ANS: 2 REF: 061604ai NAT: S.ID.C.8 TOP: Correlation Coefficient

894 ANS:
$r \approx 0.92$. The correlation coefficient suggests a strong positive correlation between a student's mathematics and physics scores.

REF: 011831ai NAT: S.ID.C.8 TOP: Correlation Coefficient

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

REF: 011535ai NAT: S.ID.C.8 TOP: Correlation Coefficient