# JMAP REGENTS BY STATE STANDARD: TOPIC

NY Algebra I Regents Exam Questions from Fall 2023 to January 2025 Sorted by State Standard: Topic

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## EXPRESSIONS AND EQUATIONS A.SSE.A.1: MODELING EXPRESSIONS

- 1 What is the degree of the polynomial  $2x x^2 + 4x^3$ ?
  - 1) 1
  - 2) 2
  - 3) 3
  - 4) 4
- 2 What is the constant term of the polynomial  $2x^3 x + 5 + 4x^2$ ?
  - 2x x + 5 + 1 1) 5
  - 1) 5 2) 2
  - 2) 2 3) 3
  - 4) 4
- 3 A student creates a fourth-degree trinomial with a leading coefficient of 2 and a constant value of 5. The trinomial could be
  - 1)  $2x^4 + 3x^2 + 5$
  - 2)  $2x^4 + 5x + 3$
  - 3)  $4x^2 3x + 5$
  - 4)  $4x^3 5x^2 + 3$

#### A.REI.A.1: IDENTIFYING PROPERTIES

- 4 When solving the equation  $4x^2 16 = 0$ , Laura wrote  $4x^2 = 16$  as her first step. Which property justifies Laura's first step?
  - 1) distributive property of multiplication over addition
  - 2) multiplication property of equality
  - 3) commutative property of addition
  - 4) addition property of equality

5 Stephanie is solving the equation  $x^2 - 12 = 7x - 8$ . Her first step is shown below.

Given: 
$$x^2 - 12 = 7x - 8$$

Step 1: 
$$x^2 - 4 = 7x$$

Which property justifies her first step?

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

#### A.REI.B.3: SOLVING LINEAR EQUATIONS

6 The solution to 
$$\frac{4(x-5)}{3} + 2 = 14$$
 is

- 1) 15
- 2) 14
- 3) 6
- 4) 4

7 When solving  $-2(3x-5) = \frac{9}{2}x - 2$  for *x*, the

solution is

- 1)  $\frac{8}{7}$ 2)  $\frac{10}{11}$ 3)  $-\frac{16}{21}$ 4)  $-\frac{16}{3}$
- 8 When solved for x in terms of a, the solution to the equation 3x 7 = ax + 5 is
  - 1)  $\frac{12}{3a}$ 2)  $\frac{12}{3-a}$ 3)  $\frac{3a}{12}$ 4)  $\frac{3-a}{12}$

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- 9 When the equation 6 ax = ax 2 is solved for x in terms of a, and  $a \neq 0$ , the result is
  - 1) 4a
  - $\frac{4}{a}$ 2)
  - 3) 2*a*
  - $\frac{2}{a}$
  - 4)
- 10 Solve algebraically for *x*: 0.05(x-3) = 0.35x 7.5

#### A.CED.A.1: MODELING LINEAR EQUATIONS

- 11 At Adelynn's first birthday party, each guest brought \$1 in coins for her piggy bank. Guests brought nickels, dimes, and quarters for a total of \$28. There were twice as many dimes as nickels and 12 more quarters than nickels. Which equation could be used to determine the number of nickels, x, that her guests brought to her party?
  - 1) .05x + .10x + .25x = 28
  - 2) .05x + .10(2x) + .25(x + 12) = 28
  - 3) .05(2x) + .10x + .25(x + 12) = 28
  - 4) .05(x+12) + .10(2x) + .25x = 28

#### A.CED.A.4: TRANSFORMING FORMULAS

- 12 When the formula p = 2l + 2w is solved for w, the result is
  - $1) \quad w = \frac{2l+p}{2}$
  - $2) \quad w = \frac{p-2l}{2}$
  - 3)  $w = \frac{p}{2} + l$

$$4) \quad w = l - \frac{p}{2}$$

### RATE N.Q.A.1: CONVERSIONS

13 Wayde van Niekerk, a runner from South Africa, ran 400 meters in 43.03 seconds to set a world record. Which calculation would determine his average speed, in miles per hour?

1)	_400 m_	<u>1000 m</u>	<u>1 hr</u>
1)	43.03 sec	0.62 mi	3600 sec
2)	_400 m	0.62 mi	1 hr
2)	43.03 sec	1000 m	3600 sec
2)	400 m	0.62 mi	3600 sec
3)	43.03 sec	1000 m	1 hr
4)	400 m	1000 m	3600 sec
4)	43.03 sec	0.62 mi	 1 hr

14 Elena's fastest time for the 50-meter dash is 7 seconds. She wants to know how fast this is in inches per minute. Which expression can Elena use for a correct conversion?

1)	7 sec	<u>60 sec</u>	1 meter
1)	50 meters	1 min	39.37 in
2)	_7 sec	1 min	<u>39.37 in</u>
2)	50 meters	60 sec	1 meter
3)	50 meters	<u>60 sec</u>	1 meter
3)	7 sec	1 min	39.37 in
4)	50 meters	<u>60 sec</u>	<u>39.37 in</u>
4)	7 sec	1 min	1 meter

15 Joe is ordering water for his swimming pool. He determines the volume of his pool to be about 3240 cubic feet. There are approximately 7.5 gallons of water in 1 cubic foot. A truck load holds 6000 gallons of water. Which expression would allow Joe to correctly calculate the number of truck loads of water he needs to fill his pool?

1) 
$$\frac{3240 \text{ ft}^3}{1 \text{ pool}} \bullet \frac{1 \text{ ft}^3}{7.5 \text{ gal}} \bullet \frac{6000 \text{ gal}}{1 \text{ truck load}}$$
  
2)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \bullet \frac{1 \text{ ft}^3}{7.5 \text{ gal}} \bullet \frac{1 \text{ truck load}}{6000 \text{ gal}}$   
3)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \bullet \frac{7.5 \text{ gal}}{1 \text{ ft}^3} \bullet \frac{6000 \text{ gal}}{1 \text{ truck load}}$   
4)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \bullet \frac{7.5 \text{ gal}}{1 \text{ ft}^3} \bullet \frac{1 \text{ truck load}}{6000 \text{ gal}}$ 

#### F.IF.B.6: RATE OF CHANGE

16 A bookstore owner recorded the number of books sold and the profit made selling the books.

Books Sold	Profit
100	\$50.00
250	\$275.00
300	\$350.00
350	\$425.00

What is the average rate of change, in dollars per book, between 100 and 350 books sold?

- 1) 0.50 3) 1.50
- 2) 0.67 4) 2.00
- 17 One Saturday, Dave took a long bike ride. The graph below models his trip.



What was Dave's average rate of change, in miles per hour, on this trip?

- 1) 10
- 2) 11
- 3) 11.6
- 4) 14.5

## LINEAR EQUATIONS F.LE.B.5: MODELING LINEAR FUNCTIONS

- 18 When babysitting, Nicole charges an hourly rate and an additional charge for gas. She uses the function C(h) = 6h + 5 to determine how much to charge for babysitting. The constant term of this function represents
  - 1) the additional charge for gas
  - 2) the hourly rate Nicole charges
  - 3) the number of hours Nicole babysits
  - 4) the total Nicole earns from babysitting
- 19 The amount of money a plumber charges is represented by the function p(h) = 45 + 90h. The best interpretation of the *y*-intercept of this function is that the plumber charges
  - 1) \$45 to come to the house
  - 2) \$45 per hour that he works
  - 3) \$90 to come to the house
  - 4) \$90 per hour that he works

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- 20 A landscaping company charges a set fee for a spring cleanup, plus an hourly labor rate. The total cost is modeled by the function C(x) = 55x + 80. In this function, what does the 55 represent?
  - 1) the set fee for the cleanup
  - 2) the hourly labor rate for a cleanup
  - 3) the profit earned by the company for one cleanup
  - 4) the number of hours of labor required for one cleanup

#### F.IF.B.4: GRAPHING LINEAR FUNCTIONS

- 21 What is the *y*-intercept of the line that passes through the points (-1, 5) and (2, -1)?
  - 1) -1
  - 2) -2
  - 3) 3
  - 4) 5

#### A.REI.D.10: WRITING LINEAR EQUATIONS

- 22 What is an equation of the line that passes through (3,7) and has a slope of 2?
  - 1) y 7 = 2(x 3)
  - 2) y 3 = 2(x 7)
  - 3) y + 7 = 2(x + 3)
  - 4) y + 3 = 2(x + 7)
- 23 Which equation represents the line that passes through the points (-1, 8) and (4, -2)?
  - 1) y = -2x + 6
  - 2) y = -2x + 10
  - 3) y = -0.5x + 7.5
  - 4) y = -0.5x + 8.5

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

## **INEQUALITIES** A.REI.B.3: SOLVING LINEAR INEQUALITIES

- 25 What is the solution to the inequality 2 1 + 2 + 2 + 3 = 1
  - $2m-4 \le 3(2m+4)?$
  - 1)  $m \leq -2$
  - 2)  $m \ge -2$
  - 3)  $m \leq -4$
  - 4)  $m \ge -4$
- 26 Which graph is the solution to the inequality  $6.4 4x \ge -2.8$ ?

	+ + +	0-	
1)	2.1 2.2	2.3 2.4	2.5
	+++	-	-
2)	2.1 2.2	2.3 2.4	2.5
		0-+	+>
3)	2.1 2.2	2.3 2.4	2.5

- 4) 2.1 2.2 2.3 2.4 2.5
- 27 Solve  $5(x-2) \le 3x + 20$  algebraically.

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#### A.CED.A.1: MODELING LINEAR INEQUALITIES

- 28 The number of fish in a pond is eight more than the number of frogs. The total number of fish and frogs in the pond is at least 20. If *x* represents the number of frogs, which inequality can be used to represent this situation?
  - 1)  $x + 8x \ge 20$
  - 2)  $2x + 8 \ge 20$
  - 3)  $x + 8x \le 20$
  - $4) \quad 2x + 8 \le 20$

## QUADRATICS A.REI.B.4: SOLVING QUADRATICS

- 29 Which equation has the same solutions as
  - $x^2 + 6x 18 = 0?$
  - 1)  $(x+3)^2 = 24$
  - 2)  $(x+3)^2 = 27$
  - 3)  $(x+6)^2 = 24$
  - 4)  $(x+6)^2 = 27$

2)

- 30 Solve  $x^2 + 8x = 33$  for x by completing the square.
- 31 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.
- 32 Use the method of completing the square to determine the exact values of x for the equation  $x^2 + 10x 30 = 0$ .
- 33 Use the quadratic formula to determine the exact roots of the equation  $x^2 + 3x 6 = 0$ .
- 34 Using the quadratic formula, solve  $x^2 + 4x 3 = 0$ . Express your solution in simplest radical form.
- 35 Use the quadratic formula to solve the equation  $3x^2 - 10x + 5 = 0$ . Express the answer in simplest radical form.

#### F.IF.B.4: GRAPHING QUADRATIC FUNCTIONS

36 A ball was launched into the air, and its height above the ground was recorded each second, as shown in the table below.

Time (sec)	0	1	2	3	4
Height (ft)	11	59	75	59	11

Based on these data, which statement is a valid conclusion?

- The ball lands on the ground at 4
   The ball was launched from a height of 0 feet.
  - The ball reaches a maximum height of 11 4) The ball reaches its maximum height at 2 feet. seconds.

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37 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function s(t) models the height of the object tseconds after launch. If  $s(t) = -16t^2 + 64t + 80$ , state the vertex of s(t), and explain in detail what each coordinate means in the context of the problem. After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

#### F.IF.C.7: GRAPHING QUADRATIC FUNCTIONS

38 On the set of axes below, graph  $f(x) = x^2 + 4x + 1$ .



State the coordinates of the minimum.

39 Graph the function  $f(x) = x^2 + 4x + 3$ .



State the equation of the axis of symmetry of f(x).

#### F.IF.C.9: COMPARING QUADRATIC FUNCTIONS

40 Four quadratic functions are represented below.

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



x	d(x)			
-4	-1			
-3	-4			
-2	-5			
-1	-4			
0	-1			
IV				

Wh	ich 1	function has the <i>smallest</i> minimum value?	
1)	Ι	3)	III
2)	Π	4)	IV

## POWERS A.APR.A.1: MULTIPLICATION OF POWERS

- 41 The expression  $5^{a+2b}$  is equivalent to
  - 1)  $5^a \bullet 5^2 \bullet 5^b$
  - 2)  $5^a \bullet 25^b$
  - 3) 25<sup>2ab</sup>
  - 4)  $25^{a+2b}$
- 42 The expression  $x^{2a+b}$  is equivalent to
  - 1)  $x^{2a} + x^{b}$
  - $2) \quad x^a + x^{a+b}$
  - 3)  $x^a \bullet x^{a+b}$
  - 4)  $x^{a+b} \bullet x^{a+b}$

- 43 Which equation is always true?
  - 1)  $x^2 \bullet x^3 = x^5$ 2)  $3^x \bullet 3^2 = 9^{2x}$
  - 2)  $5 \cdot 5 = 9$ 3)  $-z^2 = z^2$
  - 4)  $7^a \bullet 7^b = 7^{ab}$

## POLYNOMIALS A.REI.D.10: IDENTIFYING SOLUTIONS

44 Which ordered pair is a solution to the equation

$$y - 1 = 2\left(x + \frac{1}{4}\right)?$$
1) (0.75,0)  
2) (1.25,4)  
3) (2.5,-6.5)  
4) (4,-9.5)

#### A.APR.1: OPERATIONS WITH POLYNOMIALS

- 45 The expression  $-2(x^2 2x + 1) + (3x^2 + 3x 5)$  is equivalent to
  - 1)  $x^2 + x 4$
  - 2)  $x^2 x 7$
  - 3)  $x^2 + 7x 4$
  - 4)  $x^2 + 7x 7$
- 46 Which expression is equivalent to

 $(5x^2 - 2x + 4) - (3x^2 + 3x - 1)?$ 

- 1)  $2x^2 + x + 3$
- 2)  $2x^2 5x + 5$
- 3)  $2x^4 + x^2 + 3$
- 4)  $2x^4 5x^2 + 5$
- 47 Which expression is equivalent to  $3(x^2 2x + 3) (4x^2 + 3x 1)?$ 
  - 1)  $-x^2 + x + 2$
  - 2)  $-x^2 8x + 7$
  - 3)  $-x^2 3x + 8$
  - 4)  $-x^2 9x + 10$
- 48 Which expression is equivalent to (x-5)(2x+7) (x+5)?
  - 1)  $2x^2 2x 30$
  - 2)  $2x^2 2x 40$
  - 3)  $2x^2 4x 30$
  - 4)  $2x^2 4x 40$
- 49 If  $x = 4a^2 a + 3$  and y = a 5, then which polynomial is equivalent to the product of x and y?
  - 1)  $-17a^2 2a 15$
  - 2)  $-17a^2 + 8a 15$
  - 3)  $4a^3 21a^2 2a 15$
  - 4)  $4a^3 21a^2 + 8a 15$

#### A.SSE.A.2: FACTORING POLYNOMIALS

- 50 What is the correct factorization of  $x^2 + 4x 12$ ?
  - 1) (x+3)(x-4)
  - 2) (x-3)(x+4)
  - 3) (x+2)(x-6)
  - 4) (x-2)(x+6)

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

- 51 When factored, the expression  $x^3 36x$  is equivalent to
  - 1) (x+6)(x-6)
  - 2) (x+18)(x-18)
  - 3) x(x+6)(x-6)
  - 4) x(x+18)(x-18)
- 52 Factor  $5x^3 80x$  completely.
- 53 Factor  $20x^3 45x$  completely.

#### A.APR.B.3: ZEROS OF POLYNOMIALS

- 54 The zeros of the function f(x) = x(x-5)(3x+6) are
  - 1) 0,–5, and 2
  - 2) 0, 5, and −2
  - 3) -5 and 2, only
  - 4) 5 and -2, only
- 55 Which function has the zeros -1, 3, and -4?
  - 1) f(x) = (x+1)(x-3)(x-4)
  - 2) g(x) = (x-1)(x+3)(x-4)
  - 3) h(x) = (x+1)(x-3)(x+4)
  - 4) k(x) = (x-1)(x+3)(x+4)

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### <u>RADICALS</u> N.RN.B.3: OPERATIONS WITH RADICALS

- 56 What is the sum of  $8\sqrt{3}$  and  $\sqrt{3}$ ?
  - 1)  $8\sqrt{6}$
  - 2)  $9\sqrt{6}$
  - 3)  $7\sqrt{3}$
  - 4)  $9\sqrt{3}$
- 57 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)  $5x^2\sqrt{14}$
- 58 The sum of  $2\sqrt{54}$  and  $2\sqrt{6}$  is
  - 1)  $4\sqrt{60}$
  - 2)  $8\sqrt{15}$
  - 3)  $7\sqrt{6}$
  - 4)  $8\sqrt{6}$
- 59 Which sum is irrational?

1) 
$$-2\sqrt{12} + \sqrt{100}$$
  
2)  $-\sqrt{4} + \frac{1}{3}\sqrt{900}$   
3)  $\frac{1}{2}\sqrt{25} + \sqrt{64}$   
4)  $\sqrt{49} + 3\sqrt{121}$ 

- 60 Which expression results in an irrational number?
  - 1)  $\sqrt{3} \cdot \sqrt{3}$ 2)  $-\frac{2}{3} + \frac{1}{4}$ 3)  $5 \cdot \sqrt{81}$ 4)  $\frac{1}{3} + \sqrt{3}$

61 Rationalize the denominator of the fraction below. Express the solution in simplest form.

$$\frac{4}{\sqrt{2}}$$

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

### <u>SYSTEMS</u> A.CED.A.3: MODELING LINEAR SYSTEMS

- 63 Alex had \$1.70 in nickels and dimes on his desk. There were 25 coins in all. Write a system of equations that could be used to determine both the number of nickels, *n*, and the number of dimes, *d*, that Alex had. Use your system of equations to algebraically determine both the number of nickels and the number of dimes that he had.
- 64 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of \$15.50 on four lattes and two donuts. The next day she spent a total of \$18.10 on three lattes and five donuts. All prices included tax. If xrepresents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation. Courtney thinks that one latte costs \$2.75 and one donut costs \$2.25. Is Courtney correct? Justify your answer. Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

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65 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent \$38.50. In June, she went to 6 matinees and one regular-priced show and spent \$47.50. Write a system of equations to represent the cost, *m*, of a matinee ticket and the cost, *r*, of a regular-priced ticket. Jen said she spent \$5.75 on each matinee and \$9 on each regular show. Is Jen correct? Justify your answer. Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

#### A.REI.C.6: GRAPHING LINEAR SYSTEMS

66 Anna plans to spend \$30 on balloons and party hats for her daughter's birthday party. Including tax, balloons cost \$2 each and party hats cost \$1.50 each. The number of party hats Anna needs is twice as many as the number of balloons. If xrepresents the number of balloons and y represents the number of party hats, write a system of equations that can be used to represent this situation. Graph your system of equations on the set of axes below.



State the coordinates of the point of intersection of your lines. Explain what each coordinate means in the context of the problem.

#### A.CED.A.3: MODELING SYSTEMS OF LINEAR INEQUALITIES

67 A tour bus can seat, at most, 48 passengers. An adult ticket costs \$18 and a child ticket costs \$12. The bus company must collect at least \$650 to make a profit. If *a* represents the number of adult tickets sold and *c* represents the number of child tickets sold, which system of inequalities models this situation if they make a profit?

1) 
$$a + c < 48$$

18a + 12c > 650

$$2) \quad a+c \le 48$$

 $18a + 12c \ge 650$ 

3) a + c < 48

18a + 12c < 650

4)  $a+c \le 48$ 

 $18a + 12c \le 650$ 

#### A.REI.D.12: GRAPHING SYSTEMS OF LINEAR INEQUALITIES

68 A system of inequalities is graphed on the set of axes below.



Which point is a solution to this system?

- 1) (1,1)
- 2) (2,-2)
- 3) (1,8)
- 4) (4,2)

69 Graph the system of inequalities on the set of axes below.



State the coordinates of a point in the solution to this system. Justify your answer.

70 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$

 $x + 2y \le 6$ 

Label the solution set *S*.



Is the point (2,2) a solution to the system? Justify your answer.

#### A.REI.C.7: QUADRATIC-LINEAR SYSTEMS

71 Solve the systems of equations algebraically for all values of *x* and *y*:

$$y = x^2 + 4x - 1$$
$$y = 2x + 7$$

72 Solve the following system of equations algebraically for all values of *x* and *y*:

$$y = x^2 - 7x + 12$$
$$y = 2x - 6$$

73 Solve the following systems of equations algebraically for all values of *x* and *y*:

$$y = x^2 + 5x - 17$$
$$x - y = 5$$

74 Graph the following system of equations on the set of axes below.



State the coordinates of all solutions.

#### A.REI.D.11: QUADRATIC-LINEAR SYSTEMS

75 The functions f(x) and g(x) are graphed on the set of axes below.



What is the solution to the equation f(x) = g(x)?

- 1) 1 and 5
- 2) -5 and 0
- 3) -3 and 5
- 4) 0 and 4
- 78 The function f(x) is shown in the table below.

X	0	3	2	6	1	5	4	m
f(x)	6	2	7	5	8	4	3	9

State an appropriate value for *m* in the table, so that f(x) remains a function. Explain your reasoning.

79 Explain why the relation shown in the table below is a function.

X	-1	0	1	2
у	2	4	4	5

Complete the table below with values for both x and y so that this new relation is *not* a function.

X	-1	0	1	2	
у	2	4	4	5	

- 76 The functions  $f(x) = x^2 5x 14$  and g(x) = x + 2are graphed on the same set of axes. What are the solutions to the equation f(x) = g(x)? 1) -14 and 0
  - 2) 0 and 2
  - 3) -2 and 8
  - 4) -2 and 7

## FUNCTIONS F.IF.A.1: DEFINING FUNCTIONS

77 Given the relation

 $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$ . State a value for *x* that will make this relation a function. Explain why your answer makes this a function.

#### F.IF.A.2: FUNCTIONAL NOTATION

80 Given  $g(x) = x^3 + 2x^2 - x$ , evaluate g(-3).

81 If 
$$f(x) = \frac{30x^2}{x+2}$$
, determine the value of  $f\left(\frac{1}{2}\right)$ .

82 If  $f(x) = \frac{-3x-5}{2}$ , algebraically determine the value of *x* when f(x) = -22.

#### F.IF.A.2: DOMAIN AND RANGE

- 83 Which function has a domain of all real numbers and a range greater than or equal to three?
  - $1) \quad f(x) = -x + 3$
  - 2)  $g(x) = x^2 + 3$
  - 3)  $h(x) = 3^x$
  - 4) m(x) = |x+3|

#### F.LE.A.1: FAMILIES OF FUNCTIONS

85 The inputs and outputs of a function are shown in the table below.

x	f(x)
0	0.0625
1	0.125
2	0.25
3	0.5
4	1
5	2

This function can best be described as

- 1) linear
- 2) quadratic

- 3) exponential
- 4) absolute value

#### F.IF.B.5: DOMAIN AND RANGE

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



#### The domain of this function is

- 1)  $\{x | x > -2\}$
- 2)  $\{x | x \ge -2\}$
- 3)  $\{x | x > -4\}$
- 4)  $\{x | x \ge -4\}$

- 86 On an island, a rare breed of rabbit doubled its population each month for two years. Which type of function best models the increase in population at the end of two years?
  - 1) linear growth
  - 2) linear decay
  - 3) exponential growth
  - 4) exponential decay
- 87 Which situation can be modeled by a linear function?
  - 1) A printer can print one page every three seconds.
  - 2) A bank account earns 0.5% interest each year, compounded annually.
  - 3) The number of cells in an organism doubles every four days.
  - 4) The attendance at a professional sports team's games decreases by 1.5% each year.

#### F.LE.A.3: FAMILIES OF FUNCTIONS

88 Nancy has just been hired for her first job. Her company gives her four choices for how she can collect her annual salary over the first eight years of employment. Each function below represents the four choices she has for her annual salary in thousands of dollars, where *t* represents the number of years after she is hired.

$$a(t) = 2^{t} + 25$$
  

$$b(t) = 10t + 75$$
  

$$c(t) = \sqrt{400t} + 80$$
  

$$d(t) = 2(t+1)^{2} - 10t + 50$$

Which pay plan should Nancy choose in order to have the highest salary in her eighth year?

- 1) a(t)
- 2) b(t)
- 3) c(t)
- 4) d(t)

#### F.IF.B.4: RELATING GRAPHS TO EVENTS

89 The graph below models Sally's drive to the store.



State an interval when Sally is traveling at a constant speed. Explain your reasoning.

#### F.BF.B.3: TRANSFORMATIONS WITH FUNCTIONS

90 The function  $f(x) = x^2$  is multiplied by *k*, where k < -1. Which graph could represent g(x) = kf(x)?



- 91 If  $f(x) = x^2$ , then which function represents a shift of the graph of f(x) 4 units to the right and 3 units down?
  - 1)  $g(x) = (x+4)^2 + 3$
  - 2)  $j(x) = (x+4)^2 3$
  - 3)  $h(x) = (x-4)^2 3$
  - 4)  $k(x) = (x-4)^2 + 3$
- 92 The students in Mrs. Smith's algebra class were asked to describe the graph of  $g(x) = 2(x 3)^2$  compared to the graph of  $f(x) = x^2$ . Which student response is correct?
  - 1) Ashley said that the graph of g(x) is wider and shifted left 3 units.
  - 2) Beth said that the graph of g(x) is narrower and shifted left 3 units.
  - 3) Carl said that the graph of g(x) is wider and shifted right 3 units.
  - 4) Don said that the graph of g(x) is narrower and shifted right 3 units.

#### F.IF.C.7: GRAPHING PIECEWISE-DEFINED FUNCTIONS

93 Which graph below represents a function that is always *decreasing* over the entire interval -3 < x < 3?



## SEQUENCES AND SERIES F.IF.A.3: SEQUENCES

- 94 In an arithmetic sequence, the first term is 4 and the third term is −2. What is the common difference?
  - 1) -1
  - 2) –2
  - 3) -3
  - 4) -6
- 95 A geometric sequence is shown below.

$$\frac{1}{2}$$
,2,8,32,...

What is the common ratio?

- 1)  $\frac{1}{4}$ 2) 2
- 3)  $\frac{1}{2}$
- 4) 4
- 96 The third term in a sequence is 25 and the fifth term is 625. Which number could be the common ratio of the sequence?
  - 1)  $\frac{1}{5}$
  - 2) 5
  - 3)  $\frac{1}{25}$
  - 4) 25
- 97 A geometric sequence with a common ratio of -3 is
  - 1) -10,-7,-4,-1,...
  - 2) 14,11,8,5,...
  - 3) -2, -6, -18, -54, ...
  - 4) 4,-12,36,-108,...

#### F.BF.A.1: SEQUENCES

- 98 The equation that represents the sequence
  - $-2, -5, -8, -11, -14, \dots$  is
  - 1)  $a_n = -3 + (-2)(n-1)$
  - 2)  $a_n = -2 + (-3)(n-1)$
  - 3)  $a_n = 3 + (-2)(n-1)$
  - 4)  $a_n = -2 + (3)(n-1)$

- 99 In an arithmetic sequence, the first term is 25 and the third term is 15. What is the tenth term in this sequence?
  - 1) -20
  - 2) -25
  - 3) 70
  - 4) 75

## **GRAPHS AND STATISTICS** S.ID.A.2: CENTRAL TENDENCY AND DISPERSION

100 The table below shows the highest temperatures recorded in August for several years in one town.

Year	<b>Temperature</b> (°F)
1990	86
1991	78
1992	84
1993	95
1994	81
1995	77
1996	88
1997	93

The interquartile range of these data is

1)	7	3)	11
2)	10	4)	18

#### S.ID.B.5: FREQUENCY TABLES

101 A survey of students at West High School was taken to determine a theme for the prom. The results of the survey are summarized in the table below.

46

68

	<b>Beach Party</b>	Hollywood	Broadway
Girls	86	112	68
Boys	123	77	79

Approximately what percentage of the students who chose the Broadway theme were girls?

1) 26 2) 27

3)
4)

Algebra I Regents Exam Questions by State Standard: Topic <u>www.jmap.org</u>

102 Market Street Pizza kept a record of pizza sales for the month of February. The results are shown in the table below.

Туре	Plain	Veggie	Meat Only	The Works
Thin Crust	300	80	120	100
Deep-dish	200	25	105	70

40%

Of all the pizzas sold in February, what percent were plain, deep-dish pizzas?

- 1) 20% 3)
- 2) 30% 4) 50%
- 103 A survey of 150 students was taken. It was determined that  $\frac{2}{3}$  of the students play video games. Of the students that play video games, 85 also use social media. Of the students that do not play video games, 20% do not use social media. Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media			
No Social Media			
Total			

#### S.ID.A.1: BOX PLOTS

104 The box plot below summarizes the data for the amount of snowfall, in inches, during the winter of 2021 for 12 locations in western New York.



What is the interquartile range?

- 1) 30
- 2) 50
- 3) 80
- 4) 110

105 The heights, in inches, of eight football players are given below.

76, 70, 72, 70, 69, 71, 78, 74 Which box plot represents these data? 70 75 80 65 85 1) 65 70 75 80 2) 85 65 70 75 80 85 3) +++ 4) 65 70 75 80 85

#### S.ID.A.1: DOT PLOTS





107 The dot plots below represent test scores for 20 students on a math test.



The mode for this math test is 80 and the median is 85. Which dot plot correctly represents this data?1) I3) III2) II4) IV

#### S.ID.B.6: REGRESSION

108 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
<b>Dollars Earned, in Millions</b> (y)	185	150	90	50	25	5

Write the linear regression equation for this data set, rounding all values to the *nearest hundredth*. State the correlation coefficient to the *nearest hundredth*. State what this correlation coefficient indicates about the linear fit of the data.

109 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

<b>Average Daily Temp.</b> (x)	72	75	81	78	77	76	80
<b>Daily Ice Cream Cone Sales</b> (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*. State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data. State what this correlation coefficient indicates about the linear fit of the data.

110 The table below shows the average heart rate, x, and Calories burned, y, for seven men on an Olympic rowing team during a one-hour workout class.

Average Heart Rate (x)	135	147	150	144	146	153	143
Calories Burned (y)	725	812	866	761	825	863	737

Write the linear regression equation that models these data, rounding all values to the *nearest tenth*. State the correlation coefficient, rounded to the *nearest tenth*. State what the correlation coefficient suggests about the linear fit of these data.

# Algebra I Regents Exam Questions by State Standard: Topic Answer Section

1	ANS: 3	REF:	062408ai	NAT:	A.SSE.A.1	TOP:	Modeling Expressions
2	ANS: 1	REF:	012504ai	NAT:	A.SSE.A.1	TOP:	Modeling Expressions
3	ANS: 1	REF:	082405ai	NAT:	A.SSE.A.1	TOP:	Modeling Expressions
4	ANS: 4	REF:	082406ai	NAT:	A.REI.A.1	TOP:	<b>Identifying Properties</b>
5	ANS: 4	REF:	012514ai	NAT:	A.REI.A.1	TOP:	<b>Identifying Properties</b>
6	ANS: 2						
	$\frac{4(x-5)}{3} = 12$						
	4x - 20 = 36						
	4x = 56						
	x = 14						
	REF: 062406ai	NAT:	A.REI.B.3	TOP:	Solving Linea	r Equat	tions
7	ANS: 1						
	$-2(3x-5) = \frac{9}{2}x - 2$						
	-4(3x-5) = 9x - 4						
	-12x + 20 = 9x - 4						
	24 = 21x						
	24 9						
	$x = \frac{24}{21} = \frac{8}{7}$						
	REF: 012511ai	ΝΑΤ·	A REL B 3	тор∙	Solving Linea	r Equa	tions
8	ANS: 2		1111111111111	1011	2011.119 2		
	3x - ax = 12						
	x(3-a) = 12						
	12						
	$x = \overline{3-a}$						
	REF: 062422ai	NAT:	A.REI.B.3	TOP:	Solving Linea	r Equat	tions
					-	-	

KEY: coefficients represented by letters

9 ANS: 2 6 - ax = ax - 28 = 2ax $\frac{8}{2a} = x$  $\frac{4}{a} = x$ REF: 082420ai NAT: A.REI.B.3 **TOP:** Solving Linear Equations KEY: coefficients represented by letters 10 ANS: 0.05(x-3) = 0.35x - 7.5x - 3 = 7x - 150147 = 6x24.5 = xREF: 082428ai NAT: A.REI.B.3 **TOP:** Solving Linear Equations 11 ANS: 2 REF: 082404ai NAT: A.CED.A.1 **TOP:** Modeling Linear Equations 12 ANS: 2 p = 2l + 2wp-2l=2w $\frac{p-2l}{2} = w$ REF: 012509ai NAT: A.CED.A.4 **TOP:** Transforming Formulas 13 ANS: 3 REF: 062423ai NAT: N.Q.A.1 **TOP:** Conversions 14 ANS: 4 **TOP:** Conversions REF: 012519ai NAT: N.Q.A.1 15 ANS: 4 REF: 082424ai NAT: N.Q.A.1 **TOP:** Conversions 16 ANS: 3  $\frac{425 - 50}{350 - 100} = 1.5$ REF: 082410ai NAT: F.IF.B.6 TOP: Rate of Change 17 ANS: 1  $\frac{55-0}{5.5-0} = 10$ REF: 062418ai NAT: F.IF.B.6 TOP: Rate of Change 18 ANS: 1 REF: 062421ai NAT: F.LE.B.5 **TOP:** Modeling Linear Functions 19 ANS: 1 REF: 082412ai NAT: F.LE.B.5 TOP: Modeling Linear Functions 20 ANS: 2 REF: 012505ai NAT: F.LE.B.5 **TOP:** Modeling Linear Functions

21 ANS: 3  $\frac{5--1}{-1-2} = \frac{6}{-3} = -2 \ 5 = -2(-1) + b$ 3 = bREF: 062410ai NAT: F.IF.B.4 **TOP:** Graphing Linear Functions 22 ANS: 1 REF: 082418ai NAT: A.REI.D.10 TOP: Writing Linear Equations KEY: other forms 23 ANS: 1  $m = \frac{8 - -2}{-1 - 4} = \frac{10}{-5} = -2 \quad y = mx + b$ 8 = -2(-1) + b6 = bREF: 012502ai NAT: A.REI.D.10 TOP: Writing Linear Equations KEY: slope-intercept form 24 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 25 ANS: 4  $2m-4 \le 3(2m+4)$  $2m - 4 \le 6m + 12$  $-16 \leq 4m$  $-4 \le m$ REF: 082413ai NAT: A.REI.B.3 **TOP:** Solving Linear Inequalities 26 ANS: 4  $6.4 - 4x \ge -2.8$  $9.2 \ge 4x$  $2.3 \ge x$ REF: 012522ai NAT: A.REI.B.3 **TOP:** Solving Linear Inequalities 27 ANS:  $5x - 10 \le 3x + 20$  $2x \le 30$  $x \le 15$ REF: 062425ai NAT: A.REI.B.3 **TOP:** Solving Linear Inequalities

28 ANS: 2  $x + x + 8 \ge 20$ REF: 012523ai NAT: A.CED.A.1 TOP: Modeling Linear Inequalities 29 ANS: 2  $x^{2} + 6x = 18$  $x^{2} + 6x + 9 = 18 + 9$  $(x+3)^2 = 27$ REF: 082408ai NAT: A.REI.B.4 **TOP:** Solving Quadratics KEY: completing the square 30 ANS:  $x^{2} + 8x + 16 = 33 + 16$  $(x+4)^2 = 49$  $x + 4 = \pm 7$ x = -11.3REF: 012528ai NAT: A.REI.B.4 **TOP:** Solving Quadratics KEY: completing the square 31 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 32 ANS:  $x^{2} + 10x = 30$  $x^{2} + 10x + 25 = 30 + 25$  $(x+5)^2 = 55$  $x+5=\pm\sqrt{55}$  $x = -5 \pm \sqrt{55}$ NAT: A.REI.B.4 REF: 062429ai

KEY: completing the square

33 ANS:

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(-6)}}{2(1)} = \frac{-3 \pm \sqrt{33}}{2}$$

REF: 082429ai NAT: A.REI.B.4 TOP: Solving Quadratics KEY: quadratic formula

34 ANS:

$$x = \frac{-4 \pm \sqrt{4^2 - 4(1)(-3)}}{2(1)} = \frac{-4 \pm \sqrt{28}}{2} = \frac{-4 \pm 2\sqrt{7}}{2} = -2 \pm \sqrt{7}$$

REF: 012533ai NAT: A.REI.B.4 TOP: Solving Quadratics KEY: quadratic formula

35 ANS:

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(5)}}{2(3)} = \frac{10 \pm \sqrt{40}}{6} = \frac{10 \pm 2\sqrt{10}}{6} = \frac{5 \pm \sqrt{10}}{3}$$

REF: 062433ai NAT: A.REI.B.4 TOP: Solving Quadratics

KEY: quadratic formula

36 ANS: 4 REF: 062401ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions KEY: key features

37 ANS:

$$t = \frac{-64}{2(-16)} = 2 \quad h(2) = -16(2)^2 + 64(2) + 80 = -64 + 128 + 80 = 144 \quad (2, 144).$$
 At 2 seconds, the object is 144 feet above the ground  $0 = -16t^2 + 64t + 80$ 

above the ground.  $0 = -16t^2 + 64t + 80$ 

$$0 = t2 - 4t - 5$$
$$0 = (t - 5)(t + 1)$$
$$t = 5$$

REF: 082433ai NAT: F.IF.B.4 KEY: key features **TOP:** Graphing Quadratic Functions

38 ANS:





NAT: F.IF.C.7

**TOP:** Graphing Quadratic Functions





REF: 012526ai NAT: F.IF.C.7 **TOP:** Graphing Quadratic Functions 40 ANS: 1 1) -7; 2) -4; 3)  $x = \frac{-6}{2(1)} = -3$ ,  $c(-3) = (-3)^2 + 6(-3) + 3 = -6$ ; 4) -5 REF: 062414ai NAT: F.IF.C.9 **TOP:** Comparing Quadratic Functions 41 ANS: 2  $5^{a+2b} = 5^a \bullet 5^{2b} = 5^a \bullet 25^b$ REF: 082422ai NAT: A.APR.A.1 TOP: Multiplication of Powers 42 ANS: 3 REF: 012512ai NAT: A.APR.A.1 TOP: Multiplication of Powers 43 ANS: 1 REF: 062403ai NAT: A.APR.A.1 TOP: Multiplication of Powers 44 ANS: 2  $4-1=2\left(\frac{5}{4}+\frac{1}{4}\right)$ 3 = 3REF: 012518ai NAT: A.REI.D.10 **TOP:** Identifying Solutions 45 ANS: 4  $-2x^{2} + 4x - 2 + 3x^{2} + 3x - 5 = x^{2} + 7x - 7$ REF: 062404ai NAT: A.APR.A.1 TOP: Operations with Polynomials KEY: addition 46 ANS: 2 REF: 012506ai TOP: Operations with Polynomials NAT: A.APR.A.1 KEY: subtraction 47 ANS: 4  $3(x^2 - 2x + 3) - (4x^2 + 3x - 1)$  $3x^2 - 6x + 9 - 4x^2 - 3x + 1$  $-x^{2} - 9x + 10$ REF: 082403ai NAT: A.APR.A.1 TOP: Operations with Polynomials **KEY:** subtraction

48 ANS: 4  $2x^{2} + 7x - 10x - 35 - x - 5 = 2x^{2} - 4x - 40$ REF: 062419ai NAT: A.APR.A.1 TOP: Operations with Polynomials **KEY:** multiplication 49 ANS: 4  $(4a^{2} - a + 3)(a - 5) = 4a^{3} - 20a^{2} - a^{2} + 5a + 3a - 15 = 4a^{3} - 21a^{2} + 8a - 15$ TOP: Operations with Polynomials REF: 082417ai NAT: A.APR.A.1 **KEY:** multiplication 50 ANS: 4 REF: 082401ai NAT: A.SSE.A.2 **TOP:** Factoring Polynomials 51 ANS: 3  $x^{3} - 36x = x(x^{2} - 36) = x(x + 6)(x - 6)$ REF: 012501ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares 52 ANS:  $5x^{3} - 80x = 5x(x^{2} - 16) = 5x(x + 4)(x - 4)$ REF: 082430ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares 53 ANS:  $20x^{3} - 45x = 5x(4x^{2} - 9) = 5x(2x + 3)(2x - 3)$ REF: 062430ai NAT: A.SSE.A.2 TOP: Factoring the Difference of Perfect Squares 54 ANS: 2 REF: 062409ai NAT: A.APR.B.3 TOP: Zeros of Polynomials 55 ANS: 3 REF: 082421ai NAT: A.APR.B.3 TOP: Zeros of Polynomials 56 ANS: 4 REF: 012515ai NAT: N.RN.B.3 TOP: Operations with Radicals KEY: addition 57 ANS: 1 REF: fall2301ai NAT: N.RN.B.3 TOP: Operations with Radicals KEY: addition 58 ANS: 4  $2\sqrt{54} + 2\sqrt{6} = 2\sqrt{9}\sqrt{6} + 2\sqrt{6} = 6\sqrt{6} + 2\sqrt{6} = 8\sqrt{6}$ REF: 082415ai NAT: N.RN.B.3 TOP: Operations with Radicals KEY: addition 59 ANS: 1 REF: 062405ai NAT: N.RN.B.3 TOP: Operations with Radicals KEY: classify 60 ANS: 4 REF: 082407ai NAT: N.RN.B.3 TOP: Operations with Radicals KEY: classify 61 ANS:  $\frac{4}{\sqrt{2}}\frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$ 

REF: 012530ai NAT: N.RN.B.3 TOP: Operations with Radicals KEY: division

62 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 63 ANS: n + d = 25 n + 9 = 25 5n + 10d = 170 n = 16 5(25 - d) + 10d = 170 125 - 5d + 10d = 170 5d = 45d = 9

REF: 012531ai NAT: A.CED.A.3 TOP: Modeling Linear Systems 64 ANS:

4x + 2y = 15.5 5(4x + 2y = 15.5) Courtney is incorrect because of the following calculations: 20x + 10y = 77.53x + 5y = 18.1 2(3x + 5y = 18.1) 6x + 10y = 36.214x = 41.3

$$x = 2.95$$

4(2.95) + 2y = 15.511.8 + 2y = 15.52y = 3.7y = 1.85

REF: 062435ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

65 ANS:

 $2m + 3r = 38.5 \text{ Jen is not correct because the prices are } 6m + 9r = 115.5 \ 2m + 3(8.5) = 38.5$   $6m + r = 47.5 \qquad 6m + r = 47.5 \qquad 2m + 25.5 = 38.5$   $8r = 68 \qquad 2m = 13$  $r = 8.50 \qquad m = 6.50$ 

REF: 082435ai NAT: A.CED.A.3 TOP: Modeling Linear Systems

66 ANS:



(6,12) is the intersection, meaning Anna bought 6 baloons and 12

	REF:	012535ai	NAT:	A.REI.C.6	TOP:	Graphing Line	ear Syst	tems
67	ANS:	2	REF:	062402ai	NAT:	A.CED.A.3	TOP:	Modeling Systems of Linear Inequalities
68	ANS:	4	REF:	012507ai	NAT:	A.REI.D.12	TOP:	Graphing Systems of Linear Inequalities
69	ANS:							



(-1, 1) is a solution as it is in the overlap area.

REF: 062434ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities 70 ANS:



REF: 082432ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

#### 71 ANS:

$$x^{2} + 4x - 1 = 2x + 7 \quad y = 2(-4) + 7 = -1 \quad (-4, -1), (2, 11)$$
$$x^{2} + 2x - 8 = 0 \qquad y = 2(2) + 7 = 11$$
$$(x + 4)(x - 2) = 0$$
$$x = -4, 2$$

REF: 082434ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems 72 ANS:

$$x^{2} - 7x + 12 = 2x - 6 \quad y = 2(6) - 6 = 6 \quad (6,6), (3,0)$$
$$x^{2} - 9x + 18 = 0 \qquad y = 2(3) - 6 = 0$$
$$(x - 6)(x - 3) = 0$$
$$x = 6,3$$

REF: 012534ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems 73 ANS:

 $x^{2} + 5x - 17 = x - 5 - 6 - y = 5 \qquad 2 - y = 5 \qquad (-6, -11), (2, -3)$  $x^{2} + 4x - 12 = 0 \qquad y = -11 \qquad y = -3$ (x + 6)(x - 2) = 0x = -6, 2

REF: fall2305ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems 74 ANS:



REF:062431aiNAT:A.REI.C.7TOP:Quadratic-Linear Systems75ANS:1REF:062420aiNAT:A.REI.D.11TOP:Quadratic-Linear Systems

76 ANS: 3  

$$x^{2}-5x-14 = x+2$$
  
 $x^{2}-6x-16 = 0$   
 $(x-8)(x+2) = 0$   
 $x = 8,-2$ 

REF: 082416ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems 77 ANS:

x may be any value other than -2, -1, 0, so that for any value of x, there is a unique y.

REF: 062427ai NAT: F.IF.A.1 TOP: Defining Functions

78 ANS:

7, as for each value of *x*, there is a unique value of *y*.

REF: 012527ai NAT: F.IF.A.1 TOP: Defining Functions 79 ANS:

x	-1	0	1	2	a
у	2	4	4	5	4

For every value of *x*, there is a unique value of *y*.

REF: 082427ai NAT: F.IF.A.1 TOP: Defining Functions 80 ANS:  $g(-3) = (-3)^3 + 2(-3)^2 - (-3) = -27 + 18 + 3 = -6$ 

REF: 062426ai NAT: F.IF.A.2 TOP: Functional Notation

81 ANS:

$$f\left(\frac{1}{2}\right) = \frac{30\left(\frac{1}{2}\right)^2}{\frac{1}{2}+2} = \frac{\frac{30}{4}}{\frac{5}{2}} = \frac{15}{2} \times \frac{2}{5} = 3$$

REF: 082426ai NAT: F.IF.A.2

**TOP:** Functional Notation

82 ANS:

 $-22 = \frac{-3x-5}{2}$ -44 = -3x-5-39 = -3x13 = x

REF: 012529ai NAT: F.IF.A.2 TOP: Functional Notation

#### 83 ANS: 2

All four functions have a real domain. f has a real range. h has a positive real range. m has a nonnegative real range.

REF: 062424ai NAT: F.IF.A.2 TOP: Domain and Range 84 ANS: 1 REF: 012517ai NAT: F.IF.B.5 TOP: Domain and Range KEY: graph 85 ANS: 3 REF: 012513ai NAT: F.LE.A.1 **TOP:** Families of Functions **TOP:** Families of Functions 86 ANS: 3 REF: 062407ai NAT: F.LE.A.1 87 ANS: 1 REF: 082402ai NAT: F.LE.A.1 **TOP:** Families of Functions 88 ANS: 1  $a(8) = 2^8 + 25 = 281$  b(8) = 10(8) + 75 = 155  $c(8) = \sqrt{400(8) + 80} \approx 137$   $d(8) = 2(8+1)^2 - 10(8) + 50 = 132$ NAT: F.LE.A.3 REF: 062411ai **TOP:** Families of Functions 89 ANS: 5-6 minutes, as the speed remains at 35 mph during this interval. REF: 012525ai NAT: F.IF.B.4 **TOP:** Relating Graphs to Events 90 ANS: 4 **TOP:** Transformations with Functions REF: 012521ai NAT: F.BF.B.3 KEY: bimodalgraph NAT: F.BF.B.3 91 ANS: 3 REF: 082411ai **TOP:** Transformations with Functions 92 ANS: 4 REF: 062417ai **TOP:** Transformations with Functions NAT: F.BF.B.3 93 ANS: 4 REF: 012524ai NAT: F.IF.C.7 **TOP:** Graphing Piecewise-Defined Functions 94 ANS: 3  $\frac{-2-4}{3-1} = \frac{-6}{2} = -3$ REF: 082423ai NAT: F.IF.A.3 KEY: difference or ratio **TOP:** Sequences 95 ANS: 4  $\frac{8}{2} = 4$ REF: 012503ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio 96 ANS: 2  $25r^2 = 625$  $r^2 = 25$  $r = \pm 5$ REF: 062412ai NAT: F.IF.A.3 **TOP:** Sequences KEY: difference or ratio 97 ANS: 4 NAT: F.IF.A.3 REF: 082419ai TOP: Sequences KEY: difference or ratio 98 ANS: 2 REF: 062415ai NAT: F.BF.A.1 **TOP:** Sequences KEY: explicit

- 99 ANS: 1  $\frac{15-25}{3-1} = \frac{-10}{2} = -5 \ a_{10} = 25 + (10-1)(-5) = 25 - 45 = -20$ REF: 012508ai NAT: F.BF.A.1 TOP: Sequences KEY: explicit 100 ANS: 3 77 78 81 84 86 88 93 95 79.5 90.5 90.5-79.5=11 101 ANS: 3  $\frac{-68}{68+79} \approx 0.46$ REF: 082414ai NAT: S.ID.B.5 TOP: Frequency Tables KEY: two-way 102 ANS: 1  $\frac{-200}{300+200+80+25+120+105+100+70} = \frac{200}{1000} = 20\%$ 
  - REF:012510aiNAT:S.ID.B.5TOP:Frequency TablesKEY:two-way
- 103 ANS:

		Play Video Games	Do Not Play Video Games	<b>Total</b> 125 25
	Social Media	85	40	
	No Social Media	15	10	
	Total	100	50	150
104	REF: $062428ai$ KEY: two-way ANS: 2 110-60 = 50	NAT: S.ID.B.5	TOP: Frequency Tables	
105	REF: 062413ai ANS: 3 69,70,70,71,72,74,7	NAT: S.ID.A.1 76,78 ordered. median	TOP: Box Plots KEY: : $\frac{71+72}{2} = 71.5$	interpret
106	REF: 082409ai ANS: 2	NAT: S.ID.A.1	TOP: Box Plots KEY:	represent
	mean: $\frac{3(0) + 3(1) + 3}{3}$	-4(2) + 5(3) + 2(4) + 2(4) + 2(4) + 3 + 4 + 5 + 2 + 2 + 1	$\frac{50+1(6)}{20} = \frac{50}{20} = 2.5$ , mode: 3,	median: $\frac{2+3}{2}$
107	REF: 062416ai ANS: 1	NAT: S.ID.A.1 REF: 012516ai	TOP: Dot Plots NAT: S.ID.A.1 TOP:	Dot Plots

108 ANS:

y = -37.57x + 215.67, -0.98, strong

109	REF: ANS: y = 15	062432ai .13 <i>x</i> – 959.63,	NAT: S.ID.B.6 0.99, strong	TOP:	Regression	KEY:	linear with correlation coefficient
110	REF: ANS: <i>y</i> = 9.1	082431ai 1x – 527.6, 0.9,	NAT: S.ID.B.6 strong relationship	TOP:	Regression	KEY:	linear with correlation coefficient
	REF:	012532ai	NAT: S.ID.B.6	TOP:	Regression	KEY:	linear with correlation coefficient