

JMAP  
REGENTS BY STATE  
STANDARD: TOPIC

NY Algebra I Regents Exam Questions from Fall 2023 to  
August 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: MODELING EXPRESSIONS**

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

- 3 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

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

- 4 The solution to  $\frac{4(x-5)}{3} + 2 = 14$  is
- 1) 15
  - 2) 14
  - 3) 6
  - 4) 4
- 5 Solve algebraically for  $x$ :  $0.05(x-3) = 0.35x - 7.5$

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

- 6 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

- 7 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)  $\frac{3-a}{12}$
- 8 When the equation  $6 - ax = ax - 2$  is solved for  $x$  in terms of  $a$ , and  $a \neq 0$ , the result is
- 1)  $4a$
  - 2)  $\frac{4}{a}$
  - 3)  $2a$
  - 4)  $\frac{2}{a}$

RATE

N.Q.A.1: CONVERSIONS

- 9 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)  $\frac{400 \text{ m}}{43.03 \text{ sec}} \cdot \frac{1000 \text{ m}}{0.62 \text{ mi}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}}$
  - 2)  $\frac{400 \text{ m}}{43.03 \text{ sec}} \cdot \frac{0.62 \text{ mi}}{1000 \text{ m}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}}$
  - 3)  $\frac{400 \text{ m}}{43.03 \text{ sec}} \cdot \frac{0.62 \text{ mi}}{1000 \text{ m}} \cdot \frac{3600 \text{ sec}}{1 \text{ hr}}$
  - 4)  $\frac{400 \text{ m}}{43.03 \text{ sec}} \cdot \frac{1000 \text{ m}}{0.62 \text{ mi}} \cdot \frac{3600 \text{ sec}}{1 \text{ hr}}$
- 10 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)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \cdot \frac{1 \text{ ft}^3}{7.5 \text{ gal}} \cdot \frac{6000 \text{ gal}}{1 \text{ truck load}}$
  - 2)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \cdot \frac{1 \text{ ft}^3}{7.5 \text{ gal}} \cdot \frac{1 \text{ truck load}}{6000 \text{ gal}}$
  - 3)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \cdot \frac{7.5 \text{ gal}}{1 \text{ ft}^3} \cdot \frac{6000 \text{ gal}}{1 \text{ truck load}}$
  - 4)  $\frac{3240 \text{ ft}^3}{1 \text{ pool}} \cdot \frac{7.5 \text{ gal}}{1 \text{ ft}^3} \cdot \frac{1 \text{ truck load}}{6000 \text{ gal}}$

F.IF.B.6: RATE OF CHANGE

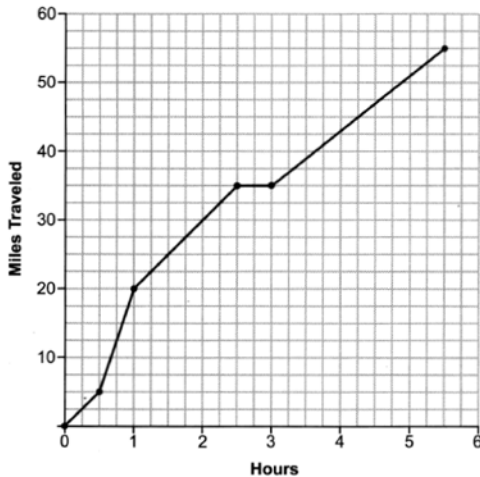
11 A bookstore owner recorded the number of books sold and the profit made selling the books.

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
- 2) 0.67
- 3) 1.50
- 4) 2.00

12 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

13 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

14 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

F.IF.B.4: GRAPHING LINEAR FUNCTIONS

- 15 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

- 16 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)  $y + 3 = 2(x + 7)$
- 17 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

- 18 What is the solution to the inequality  $2m - 4 \leq 3(2m + 4)$ ?
- 1)  $m \leq -2$
  - 2)  $m \geq -2$
  - 3)  $m \leq -4$
  - 4)  $m \geq -4$

- 19 Solve  $5(x - 2) \leq 3x + 20$  algebraically.

QUADRATICS

A.REI.B.4: SOLVING QUADRATICS

- 20 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)  $(x + 6)^2 = 27$
- 21 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.
- 22 Use the method of completing the square to determine the exact values of  $x$  for the equation  $x^2 + 10x - 30 = 0$ .

- 23 Use the quadratic formula to determine the exact roots of the equation  $x^2 + 3x - 6 = 0$ .
- 24 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**

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

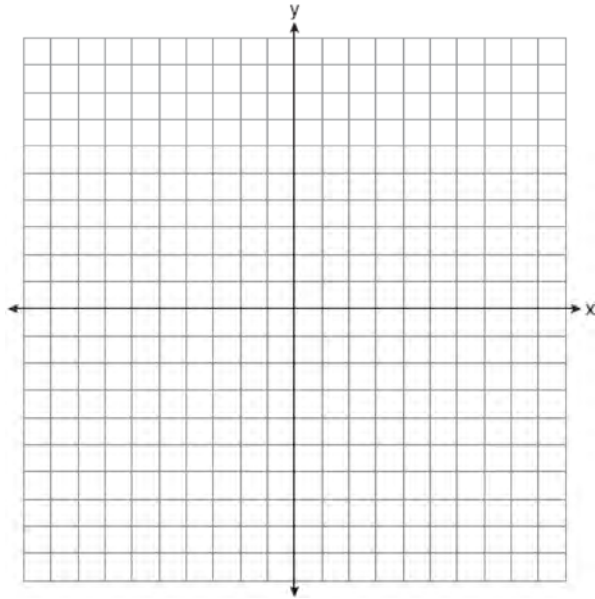
<b>Time (sec)</b>	0	1	2	3	4
<b>Height (ft)</b>	11	59	75	59	11

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

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

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



State the coordinates of the minimum.



F.IF.C.9: COMPARING QUADRATIC FUNCTIONS

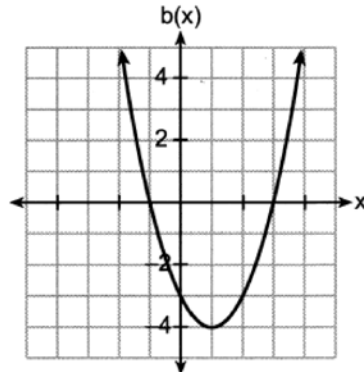
28 Four quadratic functions are represented below.

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

I

$$c(x) = x^2 + 6x + 3$$

III



II

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

IV

Which function has the *smallest* minimum value?

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

POWERS

A.APR.A.1: MULTIPLICATION OF POWERS

29 Which equation is always true?

- 1)  $x^2 \cdot x^3 = x^5$
- 2)  $3^x \cdot 3^2 = 9^{2x}$
- 3)  $-z^2 = z^2$
- 4)  $7^a \cdot 7^b = 7^{ab}$

30 The expression  $5^{a+2b}$  is equivalent to

- 1)  $5^a \cdot 5^2 \cdot 5^b$
- 2)  $5^a \cdot 25^b$
- 3)  $25^{2ab}$
- 4)  $25^{a+2b}$

POLYNOMIALS

A.APR.1: OPERATIONS WITH POLYNOMIALS

31 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)  $x^2 + 7x - 7$

32 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)  $-x^2 - 9x + 10$

33 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)  $2x^2 - 4x - 40$

34 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

35 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

36 Factor  $5x^3 - 80x$  completely.

37 Factor  $20x^3 - 45x$  completely.

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

38 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

39 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)  $k(x) = (x - 1)(x + 3)(x + 4)$

#### RADICALS

#### N.RN.B.3: OPERATIONS WITH RADICALS

40 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)  $5x^2\sqrt{14}$

41 The sum of  $2\sqrt{54}$  and  $2\sqrt{6}$  is

- 1)  $4\sqrt{60}$
- 2)  $8\sqrt{15}$
- 3)  $7\sqrt{6}$
- 4)  $8\sqrt{6}$

42 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)  $\sqrt{49} + 3\sqrt{121}$

43 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)  $\frac{1}{3} + \sqrt{3}$

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

## SYSTEMS

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

- 45 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  $x$  represents 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.
- 46 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.CED.A.3: MODELING SYSTEMS OF LINEAR INEQUALITIES

47 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?

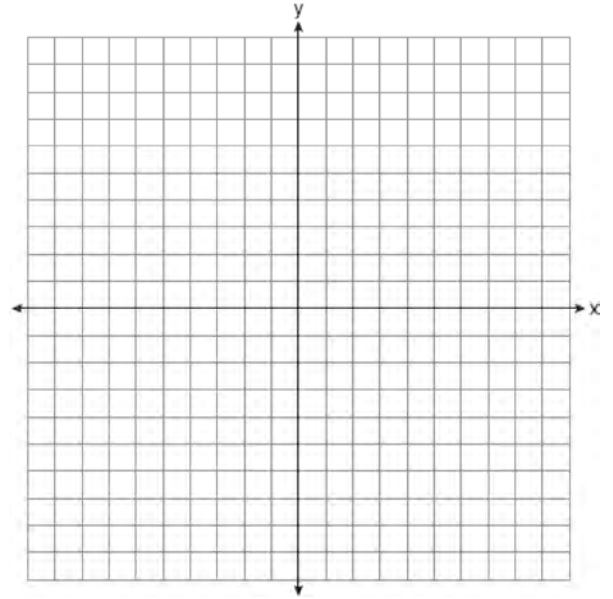
- 1)  $a + c < 48$   
 $18a + 12c > 650$
- 2)  $a + c \leq 48$   
 $18a + 12c \geq 650$
- 3)  $a + c < 48$   
 $18a + 12c < 650$
- 4)  $a + c \leq 48$   
 $18a + 12c \leq 650$

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

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

$$3y + 2x \leq 15$$

$$y - x > 1$$



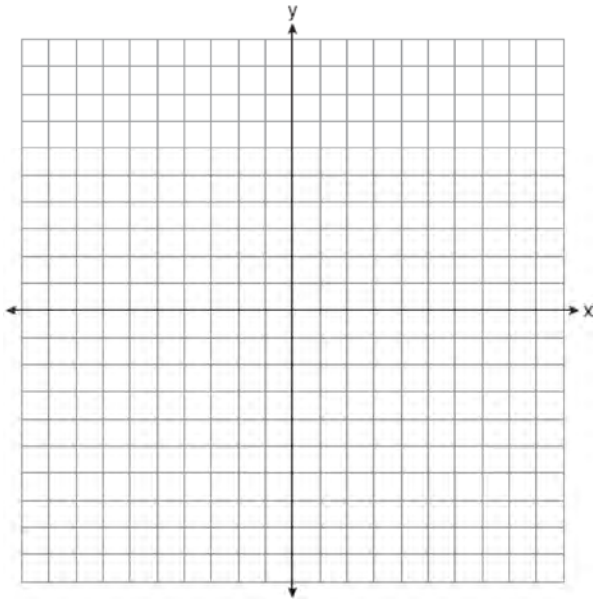
State the coordinates of a point in the solution to this system. Justify your answer.

- 49 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$

$$x + 2y \leq 6$$

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

- 50 Solve the systems of equations algebraically for all values of  $x$  and  $y$ :

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

$$y = 2x + 7$$

- 51 Solve the following systems of equations algebraically for all values of  $x$  and  $y$ :

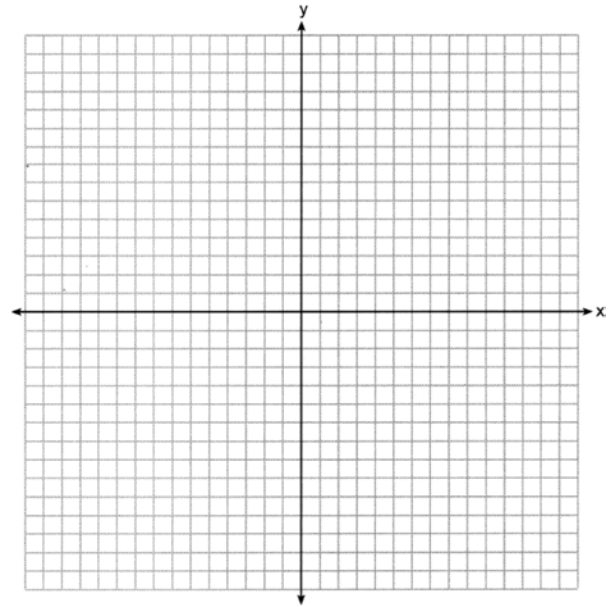
$$y = x^2 + 5x - 17$$

$$x - y = 5$$

- 52 Graph the following system of equations on the set of axes below.

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

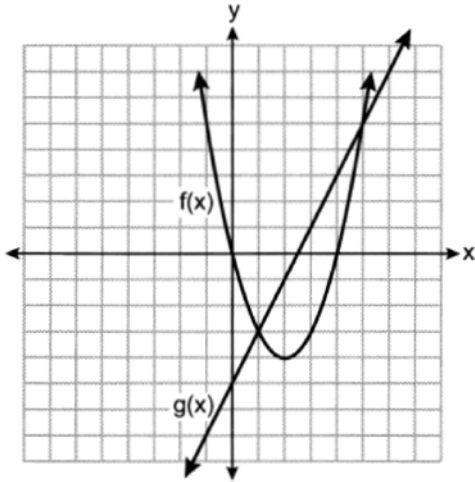
$$y = x - 1$$



State the coordinates of all solutions.

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

- 53 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

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

<b>x</b>	-1	0	1	2
<b>y</b>	2	4	4	5

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

<b>x</b>	-1	0	1	2	
<b>y</b>	2	4	4	5	

F.IF.A.2: FUNCTIONAL NOTATION

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

- 54 The functions  $f(x) = x^2 - 5x - 14$  and  $g(x) = x + 2$  are 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

- 55 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.

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

F.IF.A.2: DOMAIN AND RANGE

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

F.LE.A.1: FAMILIES OF FUNCTIONS

- 60 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

- 61 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

- 62 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.BF.B.3: TRANSFORMATIONS WITH FUNCTIONS

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

- 64 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.
- 66 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

## SEQUENCES AND SERIES

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

- 65 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)  $-6$

- 67 A geometric sequence with a common ratio of  $-3$  is
- 1)  $-10, -7, -4, -1, \dots$
  - 2)  $14, 11, 8, 5, \dots$
  - 3)  $-2, -6, -18, -54, \dots$
  - 4)  $4, -12, 36, -108, \dots$

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

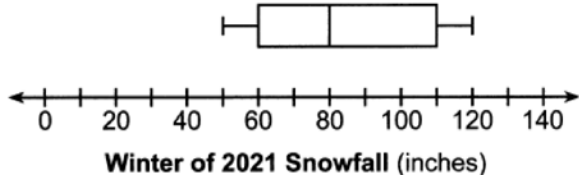
- 68 The equation that represents the sequence  $-2, -5, -8, -11, -14, \dots$  is
- 1)  $a_n = -3 + (-2)(n - 1)$
  - 2)  $a_n = -2 + (-3)(n - 1)$
  - 3)  $a_n = 3 + (-2)(n - 1)$
  - 4)  $a_n = -2 + (3)(n - 1)$





S.ID.A.1: BOX PLOTS

- 71 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.



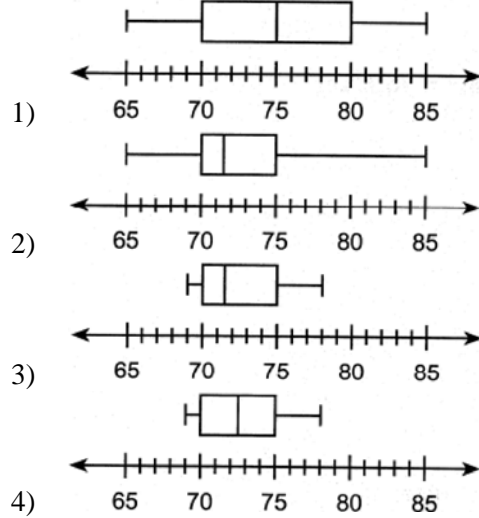
What is the interquartile range?

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

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

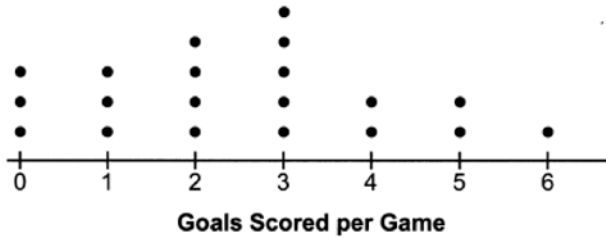
76, 70, 72, 70, 69, 71, 78, 74

Which box plot represents these data?



S.ID.A.1: DOT PLOTS

- 73 The dot plot below shows the number of goals Jessica scored in each lacrosse game last season.



Which statement about the dot plot is correct?

- |                  |                  |
|------------------|------------------|
| 1) mean > mode   | 3) mode = median |
| 2) mean = median | 4) median > mean |

S.ID.B.6: REGRESSION

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

<b>Week (x)</b>	1	2	3	4	5	6
<b>Dollars Earned, in Millions (y)</b>	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.

- 75 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. (x)</b>	72	75	81	78	77	76	80
<b>Daily Ice Cream Cone Sales (y)</b>	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.

## 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: 082405ai NAT: A.SSE.A.1 TOP: Modeling Expressions

3 ANS: 4 REF: 082406ai NAT: A.REI.A.1 TOP: Identifying Properties

4 ANS: 2

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

$$4x - 20 = 36$$

$$4x = 56$$

$$x = 14$$

REF: 062406ai NAT: A.REI.B.3 TOP: Solving Linear Equations

5 ANS:

$$0.05(x-3) = 0.35x - 7.5$$

$$x - 3 = 7x - 150$$

$$147 = 6x$$

$$24.5 = x$$

REF: 082428ai NAT: A.REI.B.3 TOP: Solving Linear Equations

6 ANS: 2 REF: 082404ai NAT: A.CED.A.1 TOP: Modeling Linear Equations

7 ANS: 2

$$3x - ax = 12$$

$$x(3 - a) = 12$$

$$x = \frac{12}{3 - a}$$

REF: 062422ai NAT: A.CED.A.4 TOP: Transforming Formulas

8 ANS: 2

$$6 - ax = ax - 2$$

$$8 = 2ax$$

$$\frac{8}{2a} = x$$

$$\frac{4}{a} = x$$

REF: 082420ai NAT: A.CED.A.4 TOP: Transforming Formulas

9 ANS: 3 REF: 062423ai NAT: N.Q.A.1 TOP: Conversions

10 ANS: 4 REF: 082424ai NAT: N.Q.A.1 TOP: Conversions

11 ANS: 3  

$$\frac{425 - 50}{350 - 100} = 1.5$$

REF: 082410ai NAT: F.IF.B.6 TOP: Rate of Change

12 ANS: 1  

$$\frac{55 - 0}{5.5 - 0} = 10$$

REF: 062418ai NAT: F.IF.B.6 TOP: Rate of Change

13 ANS: 1 REF: 062421ai NAT: F.LE.B.5 TOP: Modeling Linear Functions

14 ANS: 1 REF: 082412ai NAT: F.LE.B.5 TOP: Modeling Linear Functions

15 ANS: 3  

$$\frac{5 - -1}{-1 - 2} = \frac{6}{-3} = -2 \quad 5 = -2(-1) + b$$

$$3 = b$$

REF: 062410ai NAT: F.IF.B.4 TOP: Graphing Linear Functions

16 ANS: 1 REF: 082418ai NAT: A.REI.D.10 TOP: Writing Linear Equations

KEY: other forms

17 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

18 ANS: 4  

$$2m - 4 \leq 3(2m + 4)$$

$$2m - 4 \leq 6m + 12$$

$$-16 \leq 4m$$

$$-4 \leq m$$

REF: 082413ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

19 ANS:  

$$5x - 10 \leq 3x + 20$$

$$2x \leq 30$$

$$x \leq 15$$

REF: 062425ai NAT: A.REI.B.3 TOP: Solving Linear Inequalities

20 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

21 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

22 ANS:

$$x^2 + 10x = 30$$

$$x^2 + 10x + 25 = 30 + 25$$

$$(x + 5)^2 = 55$$

$$x + 5 = \pm\sqrt{55}$$

$$x = -5 \pm \sqrt{55}$$

REF: 062429ai NAT: A.REI.B.4 TOP: Solving Quadratics

KEY: completing the square

23 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

24 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

25 ANS: 4 REF: 062401ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions

KEY: key features

26 ANS:

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

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

$$0 = t^2 - 4t - 5$$

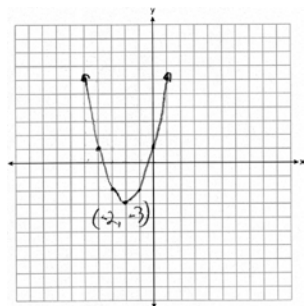
$$0 = (t - 5)(t + 1)$$

$$t = 5$$

REF: 082433ai NAT: F.IF.B.4 TOP: Graphing Quadratic Functions

KEY: key features

27 ANS:



REF: 082425ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions

28 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

29 ANS: 1 REF: 062403ai NAT: A.APR.A.1 TOP: Multiplication of Powers

30 ANS: 2

$$5^{a+2b} = 5^a \cdot 5^{2b} = 5^a \cdot 25^b$$

REF: 082422ai NAT: A.APR.A.1 TOP: Multiplication of Powers

31 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

32 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

33 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

34 ANS: 4

$$(4a^2 - a + 3)(a - 5) = 4a^3 - 20a^2 - a^2 + 5a + 3a - 15 = 4a^3 - 21a^2 + 8a - 15$$

REF: 082417ai NAT: A.APR.A.1 TOP: Operations with Polynomials

KEY: multiplication

35 ANS: 4

REF: 082401ai NAT: A.SSE.A.2 TOP: Factoring Polynomials

36 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

37 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

38 ANS: 2

REF: 062409ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

39 ANS: 3

REF: 082421ai NAT: A.APR.B.3 TOP: Zeros of Polynomials

40 ANS: 1

REF: fall2301ai NAT: N.RN.B.3 TOP: Operations with Radicals

KEY: addition

41 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

42 ANS: 1

REF: 062405ai NAT: N.RN.B.3 TOP: Operations with Radicals

KEY: classify

43 ANS: 4

REF: 082407ai NAT: N.RN.B.3 TOP: Operations with Radicals

KEY: classify

44 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



45 ANS:

$$4x + 2y = 15.5 \quad 5(4x + 2y = 15.5) \quad \text{Courtney is incorrect because of the following calculations: } 20x + 10y = 77.5$$

$$3x + 5y = 18.1 \quad 2(3x + 5y = 18.1)$$

$$6x + 10y = 36.2$$

$$14x = 41.3$$

$$x = 2.95$$

$$4(2.95) + 2y = 15.5$$

$$11.8 + 2y = 15.5$$

$$2y = 3.7$$

$$y = 1.85$$

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

46 ANS:

$$2m + 3r = 38.5 \quad \text{Jen is not correct because the prices are } 6m + 9r = 115.5 \quad 2m + 3(8.5) = 38.5$$

$$6m + r = 47.5$$

$$6m + r = 47.5 \quad 2m + 25.5 = 38.5$$

$$8r = 68$$

$$2m = 13$$

$$r = 8.50$$

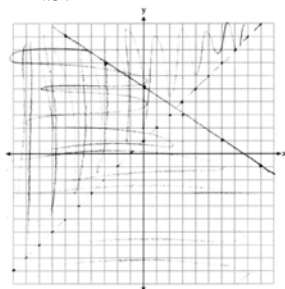
$$m = 6.50$$

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

47 ANS: 2

REF: 062402ai NAT: A.CED.A.3 TOP: Modeling Systems of Linear Inequalities

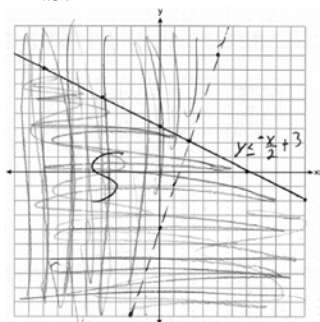
48 ANS:



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

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

49 ANS:



; No, because  $2 > 3(2) - 4$  is false.

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

50 ANS:

$$x^2 + 4x - 1 = 2x + 7 \quad y = 2(-4) + 7 = -1 \quad (-4, -1), (2, 11)$$

$$x^2 + 2x - 8 = 0 \quad y = 2(2) + 7 = 11$$

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

$$x = -4, 2$$

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

51 ANS:

$$x^2 + 5x - 17 = x - 5 \quad -6 - y = 5 \quad 2 - y = 5 \quad (-6, -11), (2, -3)$$

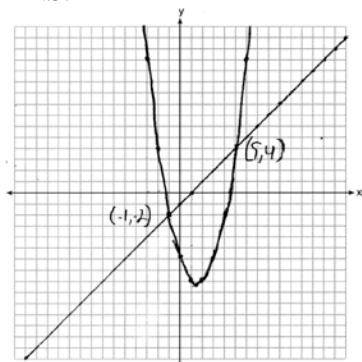
$$x^2 + 4x - 12 = 0 \quad y = -11 \quad y = -3$$

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

$$x = -6, 2$$

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

52 ANS:



REF: 062431ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems

53 ANS: 1

REF: 062420ai NAT: A.REI.D.11 TOP: Quadratic-Linear Systems

54 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

55 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

56 ANS:

x	-1	0	1	2	2
y	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

57 ANS:

$$g(-3) = (-3)^3 + 2(-3)^2 - (-3) = -27 + 18 + 3 = -6$$

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

58 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

59 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

60 ANS: 3 REF: 062407ai NAT: F.LE.A.1 TOP: Families of Functions

61 ANS: 1 REF: 082402ai NAT: F.LE.A.1 TOP: Families of Functions

62 ANS: 1

$$a(8) = 2^8 + 25 = 281 \quad b(8) = 10(8) + 75 = 155 \quad c(8) = \sqrt{400(8)} + 80 \approx 137 \quad d(8) = 2(8+1)^2 - 10(8) + 50 = 132$$

REF: 062411ai NAT: F.LE.A.3 TOP: Families of Functions

63 ANS: 3 REF: 082411ai NAT: F.BF.B.3 TOP: Transformations with Functions

64 ANS: 4 REF: 062417ai NAT: F.BF.B.3 TOP: Transformations with Functions

65 ANS: 3

$$\frac{-2-4}{3-1} = \frac{-6}{2} = -3$$

REF: 082423ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

66 ANS: 2

$$25r^2 = 625$$

$$r^2 = 25$$

$$r = \pm 5$$

REF: 062412ai NAT: F.IF.A.3 TOP: Sequences KEY: difference or ratio

67 ANS: 4 REF: 082419ai NAT: F.IF.A.3 TOP: Sequences

KEY: difference or ratio

68 ANS: 2 REF: 062415ai NAT: F.BF.A.1 TOP: Sequences  
KEY: explicit

69 ANS: 3  
 $\frac{68}{68+79} \approx 0.46$

REF: 082414ai NAT: S.ID.B.5 TOP: Frequency Tables  
KEY: two-way

70 ANS:

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	40	125
No Social Media	15	10	25
Total	100	50	150

REF: 062428ai NAT: S.ID.B.5 TOP: Frequency Tables  
KEY: two-way

71 ANS: 2  
 $110 - 60 = 50$

REF: 062413ai NAT: S.ID.A.1 TOP: Box Plots KEY: interpret

72 ANS: 3  
69,70,70,71,72,74,76,78 ordered. median:  $\frac{71+72}{2} = 71.5$

REF: 082409ai NAT: S.ID.A.1 TOP: Box Plots KEY: represent

73 ANS: 2  
mean:  $\frac{3(0) + 3(1) + 4(2) + 5(3) + 2(4) + 2(5) + 1(6)}{3+3+4+5+2+2+1} = \frac{50}{20} = 2.5$ , mode: 3, median:  $\frac{2+3}{2} = 2.5$

REF: 062416ai NAT: S.ID.A.1 TOP: Dot Plots

74 ANS:  
 $y = -37.57x + 215.67$ ,  $-0.98$ , strong

REF: 062432ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient

75 ANS:  
 $y = 15.13x - 959.63$ ,  $0.99$ , strong

REF: 082431ai NAT: S.ID.B.6 TOP: Regression KEY: linear with correlation coefficient