# FSA Algebra I End-of-Course Review Packet

## Algebra and Modeling

## Table of Contents

**MAFS.912.A-APR.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| adds two polynomials with integral coefficients, including adding when multiplying a constant to one or both polynomials using the distributive property is required | adds and subtracts polynomials, including adding or subtracting when one or both polynomials is multiplied by a monomial or binomial, with a degree no greater than 1 | completes an informal argument on closure; applies multiple operations (excluding division) when simplifying polynomials | explains closure for polynomials |

1. What is the product of the following expression?

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

A. $6x^2 + 12$
B. $9x^2 + 36$
C. $9x^2 + 18x + 36$
D. $9x^2 + 36x + 36$

2. What is the product of the following expression?

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

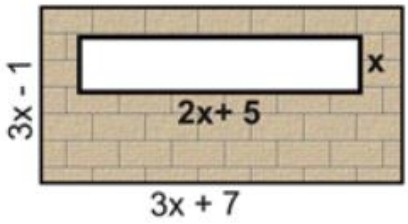
A. $2x^3 + x - 5$
B. $2x^3 + 2x - 10$
C. $2x^3 + 2x^2 - 5x$
D. $2x^3 + 2x^2 - 10x$

3. Which is the simplified form of this expression?

$$(2x + 3)(x - 6) - 2x^2 + 3x + 30$$

E. $4x^2 - 6x + 12$
A. $-2x^2 + 6x + 27$
B. $-6x - 12$
C. $-6x + 12$

4. In the diagram at the right, the dimensions of the large rectangle are $(3x - 1)$ by $(3x + 7)$ units. The dimensions of the cut-out rectangle are $x$ by $2x + 5$ units. Which choice expresses the area of the shaded region, in square units?




A. $x^2 + 23x - 7$
B. $x^2 + 13x - 7$
C. $7x^2 + 23x - 7$
D. $7x^2 + 13x - 7$

5. Given $ax^2 + bx + c = 2(1.2x + 0.3)(x - 0.5) + (0.5x^2 + 2.5x - 1.3)$.

   What are the values of $a$, $b$, and $c$?

   $a =$ ☐

   $b =$ ☐

   $c =$ ☐

6. Under what operations is the system of polynomials NOT closed?

A. Addition
B. Subtraction
C. Multiplication
D. Division

**MAFS.912.A-CED.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| writes or chooses a one-variable linear equation or inequality in a real-world context | writes or chooses a simple exponential (no horizontal or vertical translation) or a simple quadratic equation | writes an exponential equation with a horizontal or vertical translation or a quadratic equation; identifies the meaning of the variables | employs the modeling cycle when writing an equation |

1. There are 60 students going on a field trip to the chocolate factory. The students are from three different classes. Mrs. Hooper's class has 24 students and Mr. Gomez's class has 18 students. Which of the equalities correctly describes the students and could be used to solve for how many students are from Mr. Anderson's class? (Let A = the number of students in Mr. Anderson's class.)

A. $A + 18 = 24$
B. $A + A + A = 60$
C. $60 - 18 = A - 24$
D. $24 + 18 + A = 60$

2. The ages of three friends are consecutively one year apart. Together, their ages total 48 years. Which equation can be used to find the age of each friend (where $a$ represents the age of the youngest friend)?

A. $3a = 48$
B. $a(a + 1)(a + 2) = 48$
C. $a + (a - 1) + (a - 2) = 48$
D. $a + (a + 1) + (a + 2) = 48$

a) What are the ages of the friends?

A. $16, 17, 18$
B. $15, 16, 17$
C. $14, 15, 16$
D. $17, 18, 19$

3. Student council is renting a tent for $350 for an upcoming student fair. Each student attending the fair will pay $0.50. All other attendees will pay $2.25 each. If 200 students attend the fair, which inequality can be used to determine the number of "other" attendees, $a$, needed to cover the cost of the tent?

A. $(0.50)(200) - 2.25a \geq 350.00$
B. $(0.50)(200) + 2.25a \geq 350.00$
C. $0.50a - (2.25)(200) \geq 350.00$
D. $0.50a + (2.25)(200) \geq 350.00$

4. A heart shaped chocolate box is composed of one square and two half circles. The total number of chocolates in the box is calculated by adding the area of a square given by $4x^2$ and the area of a circle approximated by $3x^2$. The company plans to add a small additional box for a promotional campaign containing one row $(2x)$ of chocolates. If the total combined heart shape and small box contain 69 chocolates, which of these equations could be utilized to solve for the number of chocolates in the small box $(2x)$?

A. $4x^2 + 3x^2 + 2x = 69$
B. $4x^2 - 3x^2 + 2x = 69$
C. $4x^2 + 3x^2 - 2x = 69$
D. $4x^2 - 3x^2 - 2x = 69$

5. An internet business sells U.S. flags for $16.95 each, plus $2.50 shipping per flag. Shipping is free, however, on orders where more than $100.00 of flags are purchased. Which correctly shows the number of flags f that must be purchased to get free shipping?

A. $16.95f = 100$
B. $16.95f > 100$
C. $19.45f > 100$
D. $16.95f + 2.50 > 100$

6. A farmer has a rectangular field that measures 100 feet by 150 feet. He plans to increase the area of the field by 20%. He will do this by increasing the length and width by the same amount, x. Which equation represents the area of the new field?

A. $(100 + 2x)(150 + x) = 18{,}000$
B. $2(100 + x) + 2(150 + x) = 15{,}000$
C. $(100 + x)(150 + x) = 18{,}000$
D. $(100 + x)(150 + x) = 15{,}000$

**MAFS.912.A-REI.2.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| solves linear equations (with variable on one side and simple benchmark fractions as the coefficient; may require the use of the distributive property and adding like terms) and inequalities (with a variable on one side and positive coefficient that may include a simple benchmark fraction as the coefficient) in one variable | solves linear equations and inequalities in one variable, where the variable is included on both sides of the equal sign or inequality, that require up to three steps to isolate the variable with rational coefficients | solves linear equations in one variable, including equations where one coefficient is represented by a letter and requires up to three steps to isolate the variable; solves compound inequalities in one variable | solves linear equations and inequalities in one variable, including equations with coefficients represented by letters that require up to four steps to isolate the variable |

1. Solve for $x$: $3(2x - 1) - 10 = 8 + 5x$

A. $-7$
B. $-3$
C. $19$
D. $21$

2. Solve for $x$: $4(x + 5) = 3(x - 2) - 2(x + 2)$

A. $x = -1$
B. $x = -4$
C. $x = -6$
D. $x = -10$

3. Solve: $3(x + 3) > 4(x - 4)$

A. $x > 25$
B. $x < 25$
C. $x > -7$
D. $x < -7$

4. Solve the following inequality for $b$, showing all of your work carefully and completely.

$$4b - 12 - 5b < 9b + 8$$

**5.** What is the value of $x$ in the equation $\frac{3}{4}x + 2 = \frac{5}{4}x - 6$?

A. -16
B. 16
C. -4
D. 4

**MAFS.912.A-CED.1.4 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| solves a literal linear equation in a real-world context for a variable whose coefficient is 1 | solves a literal equation that requires two procedural steps | solves a literal equation that requires three procedural steps | solves a literal equation that requires four procedural steps |

1. The formula for simple interest plus starting principal, where $A$ = amount, $P$ = principal, $r$ = interest rate per period, and $t$ = time, is given below.

$$A = P + Prt$$

Which could be used to find the time, $t$, if the amount, principal, and interest are known?

A. $A - P - Pr = t$

B. $\frac{A-P}{Pr} = t$

C. $\frac{A-Pr}{P} = t$

D. $\frac{A}{P+rt} = t$

2. A line is represented by the equation $3x + 2y = 4$.What is another way to represent the same line?

A. $y = -\frac{3}{2}x + 2$

B. $y = \frac{3}{2}x + 2$

C. $y = \frac{3}{2}x + 4$

D. $y = -\frac{3}{2}x + 4$

3. If $k = am + 3mx$, the value of $m$ in terms of $a$, $k$ and $x$ can be expressed as

A. $m = \frac{k}{a+3x}$

B. $m = \frac{k-3mx}{a}$

C. $m = \frac{k-am}{3x}$

D. $m = \frac{k-a}{3x}$

4. A formula is expressed as $D = a(2 + kt)$. Express $k$ in terms of $D$, $a$ and $t$.

A. $k = \frac{D}{a} - 2t$

B. $k = D - 2at$

C. $k = \frac{D-2a}{at}$

D. $k = \frac{D-2a}{t}$

5. Tim was asked to solve the equation for $x$. His solution is shown below.

   Start: $kx = my - mx$

   Step 1: $kx + mx = my$

   Step 2: $x(k + m) = my$

   Step 3: $x = \frac{my}{k+m}$

   In which step did Tim make his first mistake when solving the equation?

A. Step 1
B. Step 2
C. Step 3
D. Tim did not make a mistake.

**MAFS.912.A-CED.1.2 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| writes or chooses a two-variable linear equation for a real-world context with integral coefficients | writes or chooses a system of linear equations or writes a single equation that has at least three variables with integral coefficients | writes a system of linear equations or writes a single equation that has at least three variables; correctly identifies the meaning of the variables | employs the modeling cycle when writing equations that have two variables |

1. Kesha is planning to rent a van for her trip to Mt. Rainier. Two of her friends each rented the same type of van from the same car rental company last week. This is what they told her:

   John: "The cost of my rental was $240. The company charged me a certain amount per day and a certain amount per mile. I had the rental for five days and I drove it 200 miles."

   Katie: "The cost of my rental was only $100. I drove it for 100 miles and had it for two days."

   Kesha plans to get the same type of van that John and Katie had from the same car rental company. Kesha estimated her trip would be 250 miles, and she would have the vehicle for four days.
   Let $C$ = cost, $M$ = miles, and $D$ = days
   Which equation could Kesha use to figure out how much her rental would cost?

A. $C = 40.00M + 0.20D$
B. $C = 40.00D + 0.20M$
C. $C = 20.00M + 0.40D$
D. $C = 20.00D + 0.40M$

2. Eddie's Towing Company charges $40 to hook a vehicle to the truck and $1.70 for each mile the vehicle is towed. Which equation best represents the relationship between the number of miles towed, m, and the total charges, c?

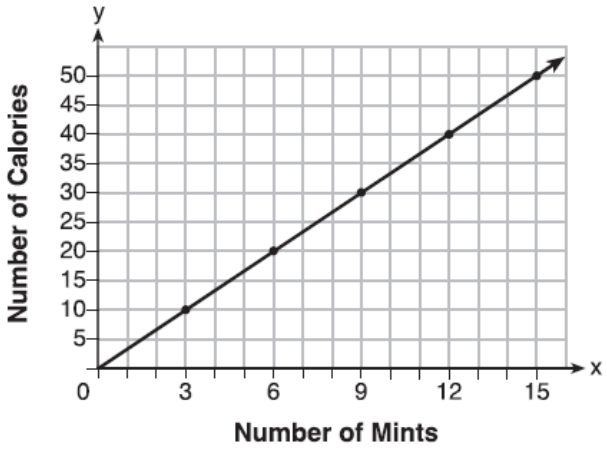
A. $c = 40 + 1.70$
B. $c = 40 + 1.70m$
C. $c = 40m + 1.70$
D. $c = 40m + 1.70$

3. The local deli charges a fee for delivery. On Monday, they delivered two dozen bagels to an office at a total cost of $8. On Tuesday, three dozen bagels were delivered at a total cost of $11. Which system of equations could be used to find the cost of a dozen bagels, $b$, if the delivery fee is $f$?

A. $b + 2f = 8$
   $b + 3f = 11$
B. $2b + f = 8$
   $b + 3f = 11$
C. $b + 2f = 8$
   $3b + f = 11$
D. $2b + f = 8$
   $3b + f = 11$

4. 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.

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




b) Write an equation that represents $C\ (x)$.

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

c) A full box of mints contains 180 Calories. Use the equation to determine the total number of mints in the box.

5. A shipping company charges \$1.20 times the sum, s, of the length, width, and height of a package to be shipped. All dimensions are measured in inches. The company also charges \$3.00 for processing the package to be shipped.
   On the line below, write an equation that the shipping company can use for determining the cost, $C$, for shipping any package.

   Equation: _____

**MAFS.912.A-REI.3.5 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies an equivalent system of two equations in two variables that has a multiple of one of the equations of the original system | identifies an equivalent system that has a sum of the original as one of the equations and a multiple of the other | identifies systems that have the same solutions | justifies why multiple equivalent systems would have the same solution |

1. The Smith Family Reunion and the Jones Family Reunion both include a visit to a family friendly amusement park in Florida. The Smith family pays $ 882.00 for passes for 10 adults and 18 children. The Jones family pays $ 951.00 for passes for 11 adults and 19 children. Which equation below can be used to solve for the price of the adult and child admissions?

   A. $882 + 951 = (10A + 11A) + (18C + 19C)$
   B. $882 - 951 = (10A - 11A) + (18C - 19C)$
   C. $882 = 10A - 18C;\ 951 = 11A - 19C$
   D. $882 = 10A + 18C;\ 951 = 11A + 19C$

2. Which system of equations has the same solution as the system below?

$$2x + 2y = 16$$
$$3x - y = 4$$

   A. $2x + 2y = 16$
      $6x - 2y = 4$

   B. $x + y = 16$
      $3x - y = 4$

   C. $2x + 2y = 16$
      $6x - 2y = 8$

   D. $6x + 6y = 48$
      $6x + 2y = 8$

3. Without solving the systems, explain why the following systems must have the same solution.

System (a): $4x - 5y = 13$
$3x + 6y = 11$

System (b): $8x - 10y = 26$
$x - 11y = 2$

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

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

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

   B. $12x + 6y = 66$
      $6x - 6y = 24$

   C. $4x + 2y = 22$
      $-4x + 4y = -16$

   D. $8x + 4y = 44$
      $-8x + 8y = -8$

**MAFS.912.A-REI.3.6 EOC Practic**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| solves a system of linear equations approximately when given a graph of the system; solves a system of equations using elimination in the form of ax + by = c and dx + ey = f with integral coefficients, where only one equation requires multiplication; solves a simple system of equations that require substitution | explains whether a system of equations has one, infinitely many, or no solutions; solves a system of equations by graphing or substitution (manipulation of equations may be required) or elimination in the form of ax + by = c and dx + ey = f, where multiplication is required for both equations | solves a system of equations with rational coefficients by graphing, substitution, or elimination; interprets solutions in a real-world context | [intentionally left blank] |

1. Sandy has a total of 35 coins in her money jar. If Sandy's jar contains only nickels and dimes and the value of all the coins is $2.50, how many nickels does Sandy have?

A. $5$
B. $15$
C. $20$
D. $30$

2. The enrollment at High School R has been increasing by 20 students per year. Currently High School R has 200 students attending. High School T currently has 400 students, but its enrollment is decreasing in size by an average of 30 students per year. If the two schools continue their current enrollment trends over the next few years, how many years will it take the schools to have the same enrollment?

A. $4\ years$
B. $5\ years$
C. $10\ years$
D. $20\ years$

3. What is the solution for the system of equations?

$$y = 2x - 3$$

$$4x - 3y = 31$$

A. $(-11, -25)$
B. $(-11, -19)$
C. $(11, 19)$
D. $(14, 25)$

4. What is the y-coordinate in the solution for the system of linear equations below?

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

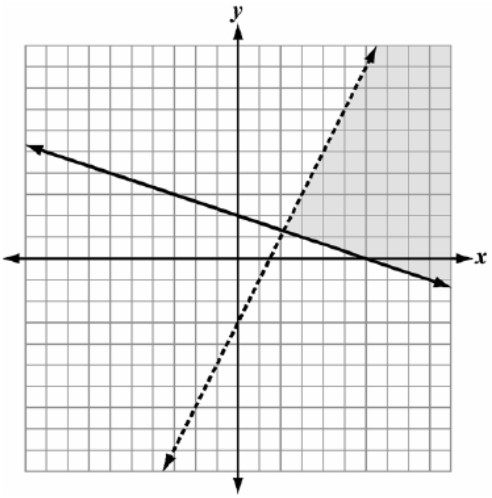
$$4x - y = 2$$

A. $-6$
B. $1$
C. $2$
D. $6$

**MAFS.912.A-REI.4.12 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies a solution region when the graph of a linear inequality is given | graphs solutions of the system of two linear inequalities and identifies the solution set as a region of the coordinate plane that satisfies both inequalities; if the form is written in ax + by < c format, then a, b, and c should be integers | verifies ordered pairs as being a part of the solution set of a system of inequalities | justifies why an ordered pair is a part of a solution set |

1. Which system of inequalities describes the graph?




A. $y < 2x - 3$
$y \geq -\frac{1}{3}x + 2$

B. $y \leq 2x - 3$
$y > -\frac{1}{3}x + 2$

C. $y > 2x - 3$
$y \leq -\frac{1}{3}x + 2$

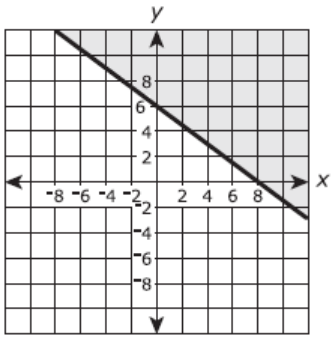
D. $y \geq 2x - 3$
$y < -\frac{1}{3}x + 2$

2. Which quadrant will be completely shaded by the graph of the inequality $y < 3x$ ?

A. Quadrant I
B. Quadrant II
C. Quadrant III
D. Quadrant IV

3. Which is a graph of the solution set of the inequality $3x - 4y \leq 24$

A.



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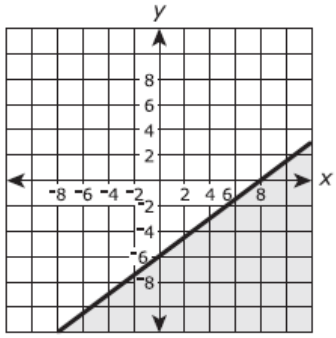

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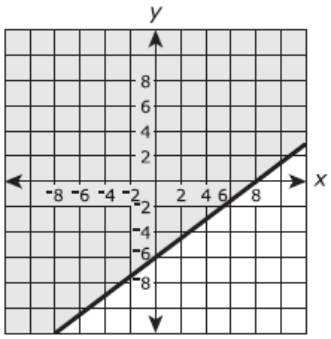
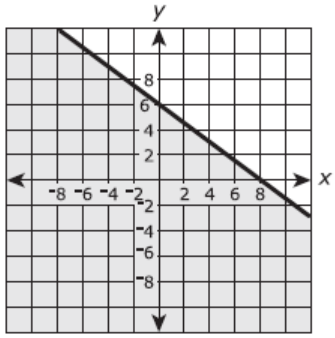
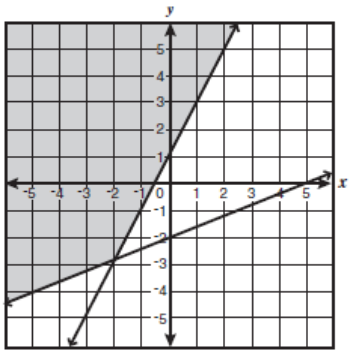


D.

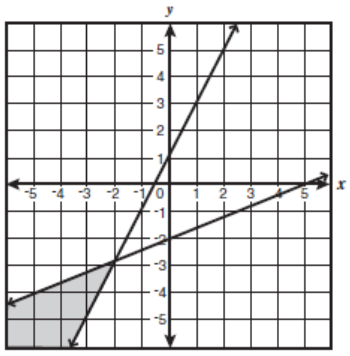


4. Which graph best represents the solution to this system of inequalities? $\begin{cases} 2x \geq y - 1 \\ 2x - 5y \leq 10 \end{cases}$

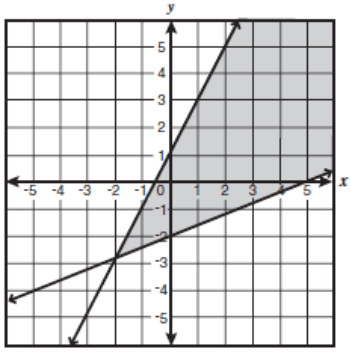
A.



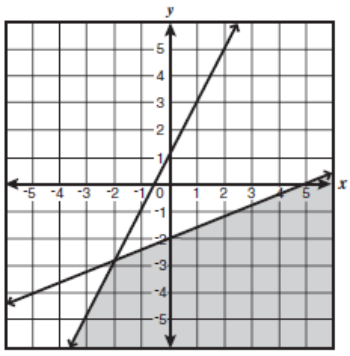
B.



C.



D.



**MAFS.912.A-CED.1.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies constraints that are constant values or simple linear equations/inequalities in a real-world context | identifies variables; writes constraints as a system of linear inequalities or linear equations | models constraints using a combination of linear equations/inequalities; interprets solutions as viable or nonviable based on the context | employs the modeling cycle when writing constraints |

1. On the day of the field trip, each teacher must call the parents of any student who has not returned a permission slip. All of Mr. Gomez's students returned their permission slips, so he did not have to make any calls. Mrs. Hooper and Mr. Anderson had to call a total of eight parents. Mrs. Hooper needed to call two more students than Mr. Anderson. Which set of equations correctly describes the phone calls made? (Let H = Mrs. Hooper's calls and A = Mr. Anderson's calls.)

A. $H + A = 8;\ H = A + 2$
B. $H + A = 8;\ A = H + 2$
C. $H + A = 2;\ H = A + 8$
D. $H + A = 2;\ A = H + 8$

2. In a basketball game, Marlene made 16 fields goals. Each of the field goals were worth either 2 points or 3 points, and Marlene scored a total of 39 points from field goals.

**Part A**

Let x represent the number of two-point field goals and y represent the number of three-point field goals. Which equations can be used as a system to model the situation? Select **ALL** that apply.

☐ $x + y = 16$

☐ $x + y = 39$

☐ $2x + 3y = 16$

☐ $2x + 3y = 39$

☐ $3x + 2y = 16$

☐ $3x + 2y = 39$

**Part B**

How many three-point field goals did Marlene make in the game? Enter your answer in the box.

3. Justin plans to spend \$20 on sports cards. Regular cards cost \$3.50 per pack and foil cards cost \$4.50 per pack. Which inequality shows the relationship between the number of packs of regular cards ($r$) and the number of packs of foil cards ($f$) Justin can afford to buy?

A. $3.5f + 4.5r \leq 20$
B. $3.5r + 4.5f \leq 20$
C. $3.5f + 4.5r \geq 20$
D. $3.5r + 4.5f \geq 20$

4. The amount of profit, $p$, you earn by selling knives, $k$, can be determined by: $p = 200k - 500$

a) Determine the constraints on profit and the constraints on the number of knives sold.

b) What happens to your profit as you sell more knives?

c) Is it possible to make a \$14,000 profit? Explain.

**MAFS.912.A-REI.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| chooses the correct justifications for the steps in a two-step equation, ax + b = c | chooses the correct justifications for the steps in an equation of the form a(bx +c) = d or ax + b = cx + d, where a, b, c, and d are integers | explains and justifies the steps in an equation of the form a(bx +c) = d or ax + b = cx + d, where a, b, c, and d are rational numbers | explains and justifies the steps in an equation of the form a(bx +c) = d(ex +f) , where a, b, c, d, e, and f are rational numbers |

1. State the missing steps and reasons to this solution of $3(x + 4) = 18$.

a) $3(x + 4) = 18$

b) _____ _____

c) $3x + 12 - 12 = 18 - 12$

d) $3x + 0 = 18 - 12$

e) $3x = 18 - 12$

f) _____ _____

g) $\frac{3x}{3} = \frac{6}{3}$

h) $1x = \frac{6}{3}$

i) $x = \frac{6}{3}$

j) $x = 2$

2. John's solution to an equation is shown below.

**Given:** $x^2 + 5x + 6 = 0$

**Step 1:** $(x+2)(x+3) = 0$

**Step 2:** $x + 2 = 0$ **or** $x + 3 = 0$

**Step 3:** $x = -2$ **or** $x = -3$

Which property of real numbers did John use for **Step 2**?

A. multiplication property of equality
B. zero product property of multiplication
C. commutative property of multiplication
D. distributive property of multiplication over addition

Which equations illustrate the zero property of multiplication? Select **ALL** that apply.

- ☐ $\frac{1}{3} \cdot 3 - 3 = 4$
- ☐ $\frac{1}{2} + 2 - 2 = \frac{1}{2}$
- ☐ $0 \cdot \frac{1}{9} \cdot 9 = 0$
- ☐ $x - 5 + 5 = x$
- ☐ $\frac{1}{3}(9 + 3) = 3 + 1$

For questions 4 and 5, use the solution to the equation $3(x - 9) = 12$ below.

Start: $3(x - 9) = 12$

Step 1: $3x - 27 = 12$

Step 2: $3x - 27 + 27 = 12 + 27$

Step 3: $3x = 39$

Step 4: $x = 13$

3. In Step 1, the multiplication property of equality was applied.

- ☐ True
- ☐ False

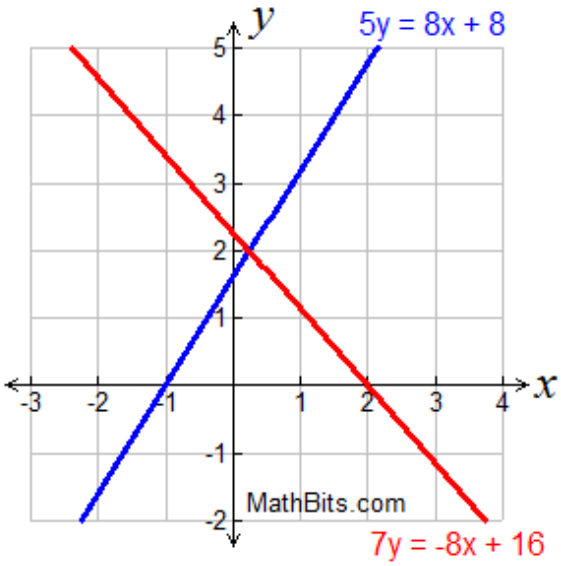
4. In Step 3, the addition property of equality was applied.

- ☐ True
- ☐ False

**MAFS.912.A-REI.4.11 EOC Practice**

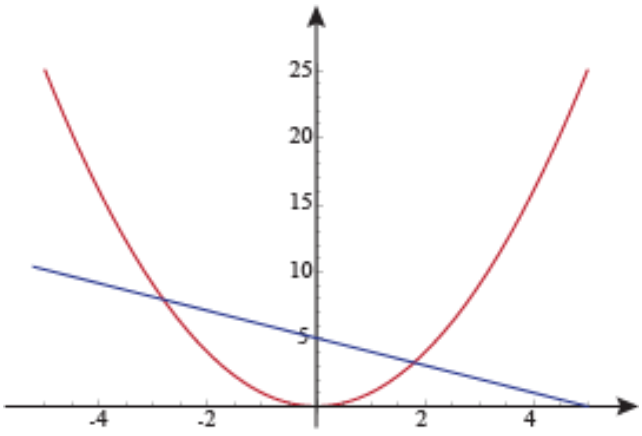
| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| determines an integral solution for f(x) = g(x) given a graph or a table of a linear, quadratic, or exponential function, in a mathematical or real-world context | determines a solution to the nearest tenth for f(x) = g(x) given a graph or a table | completes an explanation on how to find an approximate solution to the nearest tenth for f(x) = g(x) given a graph or a table | explains how to find an approximate solution to the nearest tenth for f(x) = g(x) given a graph or a table and justifies why the intersection of two functions is a solution to f(x) = g(x) |

1. The system $5y = 8x + 8$ and $7y = -8x + 16$ is graphed as shown. Which choice is the point of intersection?



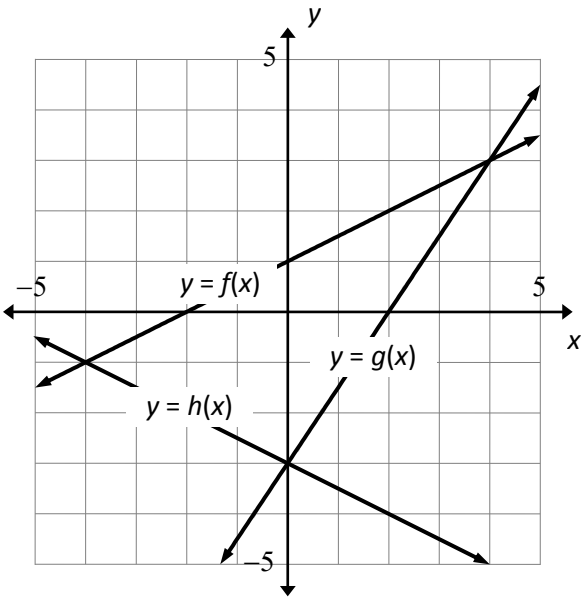

A. $\left(\frac{1}{2}, 2\right)$
B. $\left(\frac{1}{3}, 2\right)$
C. $\left(\frac{1}{4}, 2\right)$
D. $\left(\frac{1}{8}, 2\right)$

2. At which point do the two equations $3x + 5 = y + 4x$ and $y = x^2$ intersect?



A. $(1.8, 3.2)$
B. $(-2.8, 7.8)$
C. $(0, 5)$
D. $Both\ (A)\ and\ (B)$

3. Use the graph




If $f(x_1) = g(x_1)$ and $g(x_2) = h(x_2)$ , what is $f(x_1) + g(x_2)$ ?

A. –3
B. 0
C. 3
D. 4

For questions 4and 5, use the table below.

| $x$ | -4 | -3 | -2 | -1 | 0 | 1 |
|---|---|---|---|---|---|---|
| $f(x)$ | -23 | -10 | -3 | -2 | -7 | -18 |
| $g(x)$ | -13 | -11.5 | -10 | -8.5 | -7 | -5.58 |

4. $f(x) = g(x)$ at $(0, -7)$

☐ True
☐ False

5. $f(x) = g(x)$ somewhere on the interval $-3 < x < -2$.

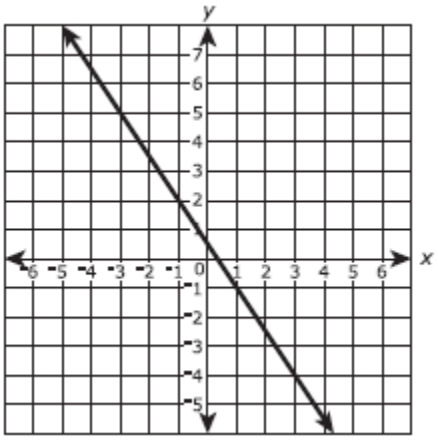
☐ True
☐ False

**MAFS.912.A-REI.4.10 EOC Practice**

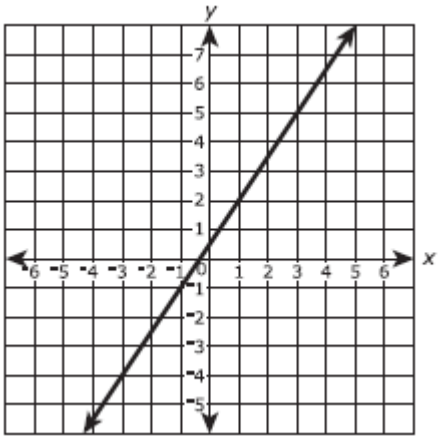
| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| distinguishes between coordinates that are solutions to linear equations in two variables and those that are not | distinguishes between coordinates that are solutions to equations in two variables (quadratic or exponential) and those that are not | recognizes that a graph is the set of all the solutions of a given equation | justifies that a graph is the set of all the solutions of an equation |

1. The ordered pairs $(20, -29.5), (21, -31)$, and $(22, -32.5)$ are points on the graph of a linear equation. Which of the following graphs show all of the ordered pairs in the solution set of this linear equation?

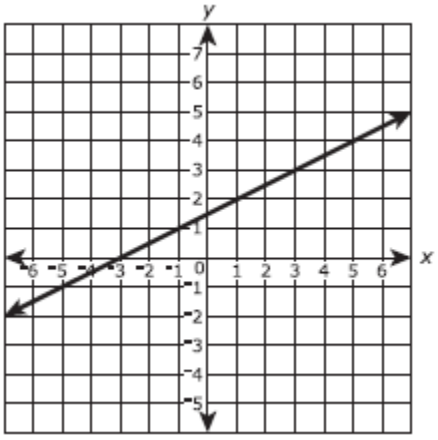
A.



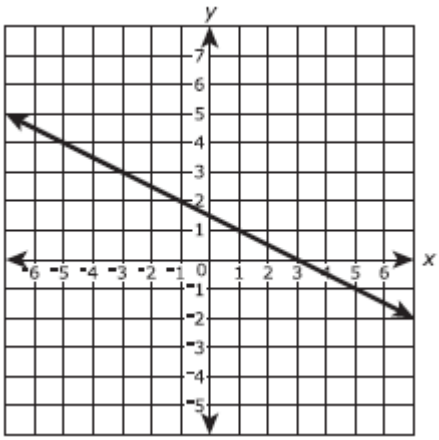
B.



C.



D.



2. Dr. Math thinks he knows more than you about what is true and false world just because he's a doctor. He says that the equation $y = 17x + 1$ also includes the point $(1, 8)$. Is Dr. Math right or wrong?

A. He's right
B. He's wrong
C. We need more information before we can say if he's right or wrong
D. None of the above

3. You talk on the phone y minutes on day x of every month according to the equation y = 2x + 1. The cell phone company claims you talked 12 minutes on the phone on the fourth day of the month. Are they right?

A. Yes, you did talk on the phone for 12 minutes on the fourth of the month
B. No, you talked on the phone for 7 minutes on the fourth of the month
C. No, you talked on the phone for 9 minutes on the fourth of the month
D. No, you talked on the phone for 15 minutes on the fourth of the month

4. The speed of a snowboarder from uphill to downhill can be modeled using the equation $y = x^2 + 1$ where $x$ is in minutes. The snowboarder's speed at time 0 is 1 and is 2 at time 1. The snowboarder claims that this proves his speed increases linearly. Is he right?

A. Yes, because two points are needed to define a line
B. No, because the equation is not linear
C. No, because the two points have positive values only
D. No, because it does not cross the x-axis

5. Which point is NOT on the graph represented by $y = -x^2 - 2x + 8$?

A. (-4, 0)
B. (-1, 9)
C. (2, 0)
D. (4, 0)

**MAFS.912.A-SSE.2.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| uses properties of exponents (one operation) and identifies the new base of an exponential function; explains the properties of the a in y = $ab^x$ in a real- world context | factors the difference of two squares with a degree of 2 and trinomials with a degree of 2 and explains the properties of the zeros; completes the square when the leading coefficient is 1 and explains the properties of the maximum or minimum; uses the properties of exponents and names the new rate | factors the difference of two squares with a common integral factor, trinomials with a common integral factor and a leading coefficient having more than four factors and explains the properties of the zeros; completes the square when the leading coefficient is greater than 1 and explains the properties of the maximum or minimum; transforms exponential functions that have more than one operation and explains the properties of expression | explains the differences between equivalent forms and why an equivalent form would provide the required property |

1. The director of a play must decide how much to charge per ticket. If tickets cost c dollars each, a total of (755c) people will attend the play. Which ticket price will generate the most income?

A. $1.00
B. $7.50
C. $15.00
D. $20.50

2. Which of these shows the following expression factored completely?

$$6x^2 + 15x - 36$$

A. $(2x - 3)(x + 4)$
B. $(6x + 9(x - 4)$
C. $3(2x - 3)(x + 4)$
D. $3(2x + 3)(x - 4)$

3. If $f(x) = 2x^2 - 8x + 9$, which statement regarding the vertex form of $f(x)$ is true?

A. In vertex form, $f(x) = 2(x - 2)^2 + 1$ and therefore has a minimum value of 1.
B. In vertex form, $f(x) = 2(x - 2)^2 + 1$ and therefore has a minimum value of 2.
C. In vertex form, $f(x) = 2(x - 2)^2 + 4.5$ and therefore has a minimum value of 4.5.
D. In vertex form, $f(x) = 2(x - 2)^2 + 4.5$ and therefore has a minimum value of 2.

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

A. $(x^2 - 6)(x^2 - 6)$
B. $(6 - x^2)(6 + x^2)$
C. $(x^2 + 6)(x^2 + 6)$
D. $(x^2 + 6)(x^2 - 6)$

5. What number should be added to both sides of the equation to complete the square in $x^2 + 8x = 17$?

A. 4
B. 16
C. 29
D. 49

6. If $(x - 7)$ is a factor of $2x^2 - 11x + k$, what is the value of $k$?

A. -21
B. -7
C. 7
D. 28

7. In the equation $y = (x - 2)^2$ , the minimum value occurs when $x$ is

A. -2
B. 2
C. -4
D. 4

**MAFS.912.A-SSE.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| interprets coefficients or terms of exponential and quadratic expressions in a real-world context | interprets factors of exponential and quadratic expressions | interprets more than one part of an expression | given an interpretation, chooses the correct part of the expression |

1. Combined estimates for Etosha National Park and the Northwestern Population

| Year | Base Year | Estimated Number of Elephants |
|---|---|---|
| 1998 | 3 | 3,218 |
| 2000 | 5 | 3,628 |
| 2002 | 7 | 3,721 |
| 2004 | 9 | 3,571 |

The elephant population in northwestern Namibia and Etosha National Park can be predicted by the expression $2{,}649(1.045)^b$, where b is the number of years since 1995.

What does the value 2,649 represent?

A. the predicted increase in the number of elephants in the region each year
B. the predicted number of elephants in the region in 1995
C. the year when the elephant population is predicted to stop increasing
D. the percentage the elephant population is predicted to increase each year

2. A store manager begins each shift with the same total amount of money. She keeps $200 in a safe and distributes the rest equally to the 5 cashiers in the store. This situation can be represented by the function $y = \frac{(x-200)}{5}$. What does the variable $x$ represent in this situation?

A. The total amount of money the manager has at the beginning of a shift
B. The total amount of money the manager has at the end of a shift
C. The amount of money each cashier has at the beginning of a shift
D. The amount of money each cashier has at the end of a shift

3. 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?

A. $y$ 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.
B. $y$ 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.
C. $x$ 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.
D. $x$ 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.

A ball was thrown upward into the air. The height, in feet, of the ball above the ground *t* seconds after being thrown can be determined by the expression $-16t^2 + 40t + 3$. What is the meaning of the $3$ in the expression? Select the correct answer.

A. The ball takes 3 seconds to reach its maximum height.
B. The ball takes 3 seconds to reach the ground.
C. The ball was thrown from a height of 3 feet.
D. The ball reaches a maximum height of 3 feet.

4. Is the equation $A = 21000(1 - 0.12)^t$ a model of exponential growth or exponential decay, and what is the rate (percent) of change per time period?

A. exponential growth and 12%
B. exponential growth and 88%
C. exponential decay and 12%
D. exponential decay and 88%

**MAFS.912.A-SSE.1.2 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| works with expressions with only monomial factors and chooses the correct equivalent forms of a trinomial whose leading coefficient is 1 | factors the difference of two squares with a degree of 2, trinomials with a degree of 2 whose leading coefficient has no more than 4 factors | factors the difference of two squares with a common integral factor, trinomials with a common integral factor and a leading coefficient with more than four factors | factors the difference of two squares with a degree of 4 with or without a common integral factor, and a polynomial with a degree of 3 and a leading coefficient of 1 |

1. Students were asked to write a trinomial that could not be factored using integers.

**Pat Wrote:** $x^2+3x-10$

**Sam wrote:** $x^2+x-12$

**Mel wrote:** $x^2+2x-1$

**Lee wrote:** $x^2+2x-3$

Which student followed the given directions?

A. Pat
B. Sam
C. Mel
D. Lee

Identify **ALL** the factors of this polynomial when it is factored completely.

$$27x^2 - 153x - 90$$

- ☐ $3$
- ☐ $9$
- ☐ $x - 5$
- ☐ $x + 5$
- ☐ $3x - 2$
- ☐ $3x + 2$
- ☐ $3x - 15$
- ☐ $9x + 6$

2. Four expressions are shown below.

   I $2(2x^2 - 2x - 60)$

   II $4(x^2 - x - 30)$

   III $2(x + 6)(x - 5)$

   IV $4x(x - 1) - 120$

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

A. I and II, only
B. II and IV, only
C. I, II, and IV
D. II, III, and IV

3. Which of these shows the following expression factored completely?

$$6x^2 - 13x + 5$$

A. $(3x - 1)(2x + 5)$
B. $(3x - 5)(2x - 1)$
C. $(3x - 1)(2x - 5)$
D. $(3x - 5)(2x + 1)$

# FSA Algebra I End-of-Course Review Packet

## Functions and Modeling

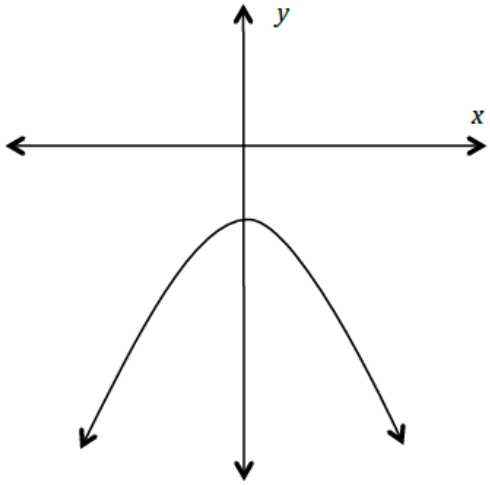
# FSA Algebra 1 EOC Review

**Table of Contents**

**MAFS.912.F-BF.2.3 EOC Practice**

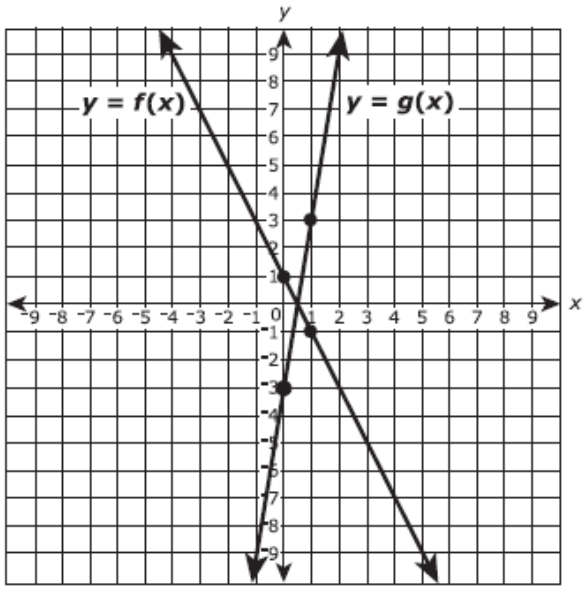
| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies the graph, the equation, or ordered pairs of a linear, quadratic, or exponential function with a vertical or horizontal shift | identifies the graph of a linear or quadratic function with a vertical or horizontal stretch or shrink; determines the value of k given a graph and its transformation; completes a table of values for a function that has a vertical or horizontal shift; graphs a function with a vertical or horizontal shift | identifies the graph of an exponential function with a vertical or horizontal stretch or shrink; completes a table of values for a function with a horizontal or vertical stretch or shrink | determines the value of k when given a set of ordered pairs for two functions or a table of values for two functions; identifies differences and similarities between a function and its transformation |

1. Write an equation that could represent the graph below. Justify why your equation is appropriate for this graph.




*Equation:*

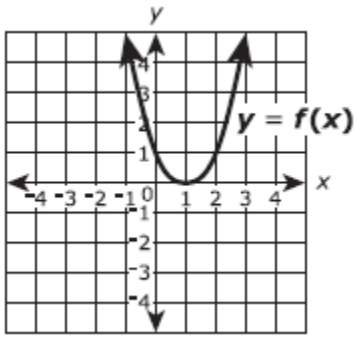
2. The figure shows the graphs of the functions $y = f(x)$ and $y = g(x)$. The four indicated points all have integer coordinates.




If $g(x) = k \cdot f(x)$, what is the value of $k$?

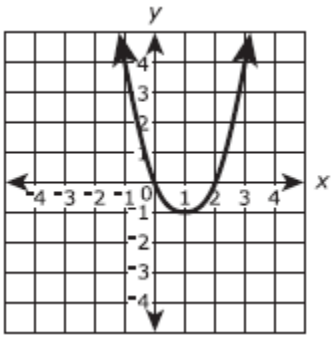
Enter your answer in the box.

3. Consider the function $f(x)$, shown in the $xy$ −coordinate plane, as the parent function.




**Part A**

The graph of a transformation of the function $f(x)$ is shown.

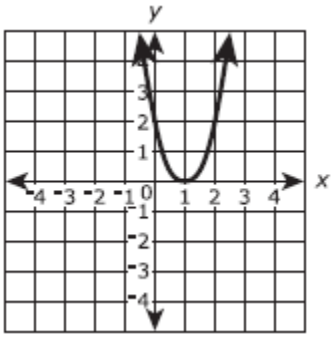



Which expression defines the transformation shown?

A. $f(x + 0) - 1$
B. $f(x + 0) + 1$
C. $f(x - 1) + 0$
D. $f(x + 1) + 0$

**Part B**

The graph of a transformation of the function $f(x)$ is shown.

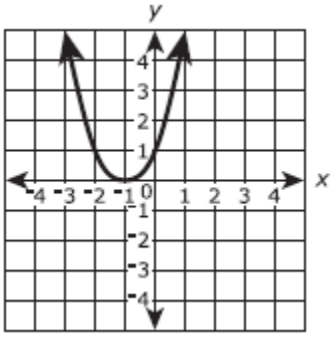



Which expression defines the transformation shown?

A. $\frac{1}{2}f(x + 0) + 0$
B. $2f(x + 0) + 0$
C. $\frac{1}{2}f(x - 1) - 1$
D. $2f(x + 1) - 0$

**Part C**

The graph of a transformation of the function $f(x)$ is shown.




Which expression defines the transformation shown?

A. $f(x) - 2$
B. $f(x - 2) + 0$
C. $f(x) + 2$
D. $f(x + 2) + 0$

**MAFS.912.F-IF.1.2 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| evaluates simple functions in their domains; evaluates functions for a simple quadratic, simple square root, and simple exponential | evaluates quadratic, polynomial of degree 3, absolute value, square root, and exponential functions for inputs in their domain; interprets statements that use function notation in terms of a real-world context for simple quadratic, simple square root, and simple exponential | uses function notation to evaluate functions for inputs in their domain and interprets statements that use function notation in terms of context | writes and evaluates functions when the function is described in a real-world context |

1. What is the value of $f(16) - f(0)$ when $f(x) = 4x - 8$?

A. 16
B. 48
C. 56
D. 64

2. The height, $h$, in feet, of an object thrown upward from a height of 144 feet is a function of time, $t$, in seconds. The height can be determined by the function $h(t) = -16t^2 + 128t + 144$ . What is the height of the object at 3 seconds?

A. 144 feet
B. 384 feet
C. 432 feet
D. 672 feet

3. In 1997 there were 31 laptop computers at Grove High School. Starting in 1998 the school bought 20 more laptop computers at the end of each year. The equation $T = 20x + 3$ can be used to determine $T$, the total number of laptop computers at the school $x$ years after 1997. What was the total number of laptop computers at Grove High School at the end of 2005?

A. 160
B. 171
C. 191
D. 268

4. The number of miles a car can be driven depends on the number of gallons of gas in its tank. The function m = 25g models a situation in which a car gets 25 miles per gallon. If the gas tank holds 20 gallons of gas, which inequality represents its range?

A. $0 \leq g \leq 20$
B. $0 \leq m \leq 500$
C. $m \leq 500$
D. $g \leq 20$

5. Which equation could best be used to determine the value of $f(3)$ for the function $f(x) = 2x + 4$?

A. $f(3) = 23 + 4$
B. $f(3) = 2(3) + 4$
C. $f(3) = 3(2x) + 4$
D. $f(3) = 3(3x + 4)$

6. Vincent goes to the gym for 30 minutes every day. He starts a new exercise routine on a Monday and uses a function to model the amount of calories he has used, $f(d)$, as a function of the number of days, d, he has exercised with the new routine.
   Which statement represents a correct interpretation of $f(d)$?

A. $f(5) = 150$ means Vincent has exercised for a total of 150 minutes after the fifth day of exercising with his new routine
B. $f(10) = 3{,}500$ means Vincent will use 3,500 calories on day 10 of exercising with his new routine.
C. $f(15) = 5{,}250$ means after 15 days of exercising with his new routine, Vincent has used 5,250 calories.
D. $f(30) = 10{,}500$ means the number of calories Vincent has used times 30 is equal to 10,500.

**MAFS.912.F-IF.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| uses the definition of a function to identify whether a relation represented by a graph, a table, mapping, diagrams, or sets of ordered pairs is a function | demonstrates understanding that a function's domain is assigned to exactly one element of the range in function notation | applies and extends knowledge of domain and range to real world situations and contexts; justifies that a relation is a function using the definition of a function | [intentionally left blank] |

1. Collin noticed that various combinations of nickels and dimes could add up to $0.65.

- Let x equal the number of nickels.
- Let y equal the number of dimes.

What is the domain where y is a function of x and the total value is $0.65?

A. {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13}
B. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13}
C. {0, 1, 3, 5, 7, 9, 11, 13}
D. {1, 3, 5, 7, 9, 11, 13}

2. Let $f$ be a function such that $f(x) = 2x - 4$ is defined on the domain $2 \leq x \leq 6$. The range of this function is

A. $-\infty \leq y \leq \infty$
B. $0 \leq y \leq 8$
C. $0 \leq y \leq \infty$
D. $2 \leq y \leq 6$

3. Given that y is a function of x, which of the following tables best represents a function?

A.

| $x$ | $y$ |
|---|---|
| –7 | 12 |
| –3 | 8.5 |
| 0 | –1 |
| –3 | –8.5 |
| 7 | –12 |

B.

| $x$ | $y$ |
|---|---|
| –5 | –17 |
| –2 | –11 |
| 1 | –5 |
| 2 | –3 |
| 5 | 3 |

C.

| $x$ | $y$ |
|---|---|
| –2 | –14 |
| –2 | –8 |
| –2 | –5 |
| –2 | –1 |
| –2 | 7 |

D.

| $x$ | $y$ |
|---|---|
| –8 | –7 |
| –5 | –2 |
| 0 | 1 |
| –5 | 4 |
| –8 | 12 |

4. Which of the following could be a function?

A. The height of a student in your school related to the shoe size of that student.
B. The hair length of a student in your school related to the height of that student.
C. The color of hair of a student in your school related to the age of that student.
D. The student ID number of a student in your school related to the full name of that student.

5. Which statement below is correct for the following set of ordered pairs?

$$\{ (0, 1.2), (3, 2), (-1.2, 3), (4, -2), (1, -1.2), (1,2, 4) \}$$

A. The set is a function since each element in the domain has a different element in the range.
B. The set is a function since each element in the range has a different element in the domain.
C. The set is a not a function since each element in the domain has a different element in the range.
D. The set is a not function since each element in the range has a different element in the domain.

6. The domain of the function $f(x) = -3x$ is restricted to the negative integers. Which values are elements of the range?

- ☐ -12
- ☐ -3
- ☐ 0
- ☐ 7
- ☐ 9
- ☐ 12
- ☐ 21

7. A function, $f$, has domain $-10 \leq x \leq 20$ and range $-40 \leq f(x) \leq -10$. Select each statement that **must be false** about $f(x)$.

$$f(1) = -13$$

$$f(-10) = -40$$

- ☐ $f(1) = 13$
- ☐ $f(-9) = 88$
- ☐ $f(5) = -40$
- ☐ $f(0) = 0$
- ☐ $f(-15) = -20$

**MAFS.912.F-IF.2.5 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| interprets and identifies domains of linear functions when presented with a graph in a real-world context | interprets and identifies domains of quadratic or exponential functions (with no translation) when presented with a graph; interprets and identifies the domain of a linear function from a context | relates the domains of linear, quadratic, or exponential functions to a graph when the function is described within the context | interprets and identifies domains of linear, quadratic, or exponential functions when presented a function described within the context |

1. A local theater sells admission tickets for $9.00 on Thursday nights. At capacity, the theater holds 100 customers. The function $M(n) = 9n$ represents the amount of money the theater takes in on Thursday nights, where $n$ is the number of customers. What is the domain of $M(n)$ in this context? Select the correct answer.

A. all whole numbers
B. all non-negative rational numbers
C. all non-negative integers that are multiples of 9
D. all non-negative integers less than or equal to 100

2. If the function $f(x)$ represents the number of hours that it takes a person to catch $x$ fish in a lake. What domain makes sense for the function?

A. $-\infty \leq x \leq \infty$
B. $0 < x < \infty$
C. $x \leq 0$
D. $x \geq +\infty$

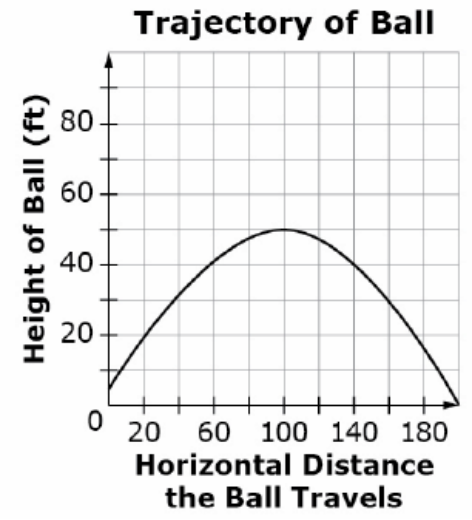
3. Officials in a town use a function, $C$, to analyze traffic patterns. $C(n)$ represents the rate of traffic through an intersection where $n$ is the number of observed vehicles in a specified time interval. What would be the most appropriate domain for the function?

A. $\{\ldots -2, -1, 0, 1, 2, 3, \ldots\}$
B. $\{-2, -1, 0, 1, 2, 3\}$
C. $\left\{0, \frac{1}{2}, \ 1, 1\ \frac{1}{2}, 2, 2\frac{1}{2}\right\}$
D. $\{0, 1, 2, 3, \ldots\}$

4. 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

A. $-3 \leq t \leq 3$
B. $0 \leq h(t) \leq 144$
C. $0 \leq t \leq 3$
D. $all\ real\ numbners$

5. Sue hits a ball from a height of 4 feet. The height of the ball above the ground is a function of the horizontal distance the ball travels until it comes to rest on the ground. Consider this complete graph of the function.



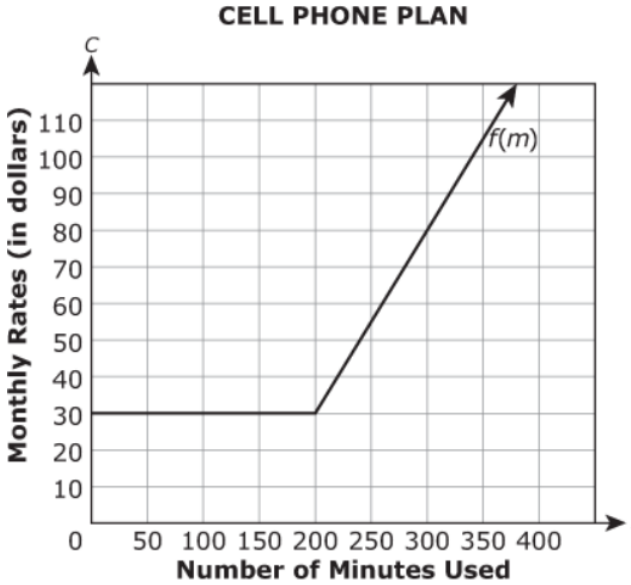

Select all values that are in the domain of the function as shown in the graph.

- ☐ –5 feet
- ☐ 0 feet
- ☐ 60 feet
- ☐ 200 feet
- ☐ 220 feet

**MAFS.912.F-IF.2.4 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies the key features (as listed in the standard, excluding periodicity) when given a linear, quadratic, or exponential graph in a real- world context | interprets the key features (as listed in the standard, excluding periodicity) when given a table of a linear, quadratic, or exponential; interprets key features of a linear function given as a verbal description | interprets key features of a quadratic function given as a verbal description | interprets key features of an exponential function given as a verbal description |

1. Corinne has a cell phone plan that includes 200 minutes for phone calls and unlimited texting. An additional fee is charged for using more than 200 minutes for phone calls. The figure below is the graph of $C = f(m)$, where $C$ is the monthly cost after m minutes used.



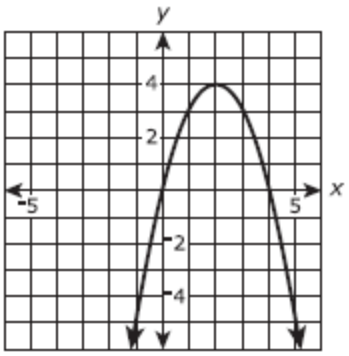

**Part A**
What is the minimum monthly cost for Corinne's cell phone plan? Show or explain your work.

**Part B**
What is the value of $f(150)$. Explain its meaning in terms of the cell phone plan.

**Part C**
For what $m$ is $f(m) = 55$? Explain its meaning in terms of the cell phone plan.

**Part D**
What is the cost per minute after Corinne uses her monthly allowance of 200 minutes? Show or explain your work.

2. The function $f(x) = 4x - x^2$ is graphed in the $xy$-coordinate plane as shown.




**Part A**

Based on the graph of the function, which statements are true? Select **ALL** that apply.

- ☐ ***f*** is increasing on the interval $x < 0$.
- ☐ ***f*** is decreasing on the interval $x < 0$.
- ☐ ***f*** is increasing on the interval $0 < x < 2$.
- ☐ ***f*** is decreasing on the interval $0 < x < 2$.
- ☐ ***f*** is increasing on the interval $2 < x < 4$.
- ☐ ***f*** is decreasing on the interval $2 < x < 4$.
- ☐ *f* is increasing on the interval $x > 4$.
- ☐ ***f*** is decreasing on the interval $x > 4$.

**Part B**

Based on the graph of the function, which statements are true? Select all that apply.

- ☐ *f(x)* < 0 on the interval $x < 0$.
- ☐ *f(x)* > 0 on the interval $x < 0$.
- ☐ *f(x)* < 0 on the interval $0 < x < 2$ .
- ☐ *f(x)* > 0 on the interval $0 < x < 2$ .
- ☐ *f(x)* < 0 on the interval $2 < x < 4$ .
- ☐ *f(x)* > 0 on the interval $2 < x < 4$ .
- ☐ *f(x)* < 0 on the interval $x > 4$ .
- ☐ *f(x)* > 0 on the interval $x > 4$.

3. A computer technician charges a one-time fee of $50 plus an additional $20 per hour of labor. If an equation is created to determine the technician's total charge, what does the $50 represent?

A. slope
B. coefficient
C. x-intercept
D. y-intercept

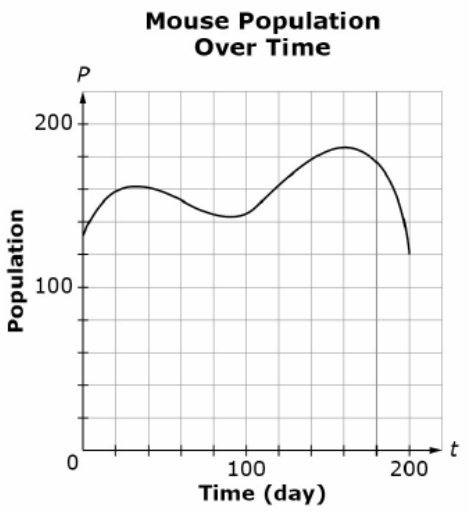
4. Given two equations of lines:

$$y = -\frac{1}{4}x + 2 \quad \text{and} \quad -2y = \frac{1}{2}x - 4$$

How do the lines compare?

A. They are different lines with the same slope.
B. They are different lines with the same y-intercept.
C. They are the same line, both with a slope of 1/2 and a y- intercept of -4
D. They are the same line, both with a slope of - 1/4 and a y- intercept of 2.

5. This graph shows the population of mice in a study, modeled as a function of time. The study begins on day 0 and ends on day 200.



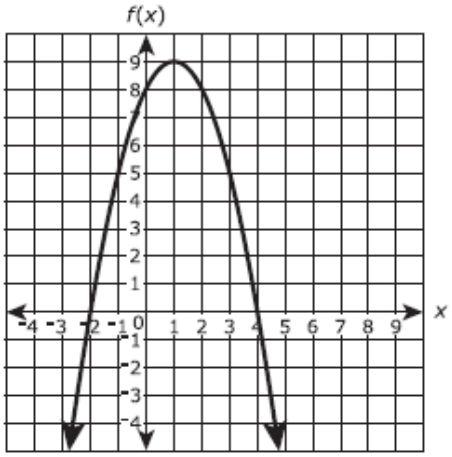

Determine whether each statement is true according to the graph. Select True or False for each statement.

| Statement | TRUE | FALSE |
|---|---|---|
| The mouse population was decreasing between day 40 and day 80. | | |
| The least number of mice during the study was 130. | | |
| The mouse population was at its greatest around day 160. | | |
| There are two intervals of time where the mouse population is decreasing. | | |

**MAFS.912.F-IF.3.9 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| compares properties of two linear functions, each represented a different way in a real-world or mathematical context | compares the properties of two functions of the same type with different representations (such as a quadratic to a quadratic but using a table and an equation); differentiates between linear and quadratic functions that are represented using different representations (table, graph, or algebraic) | compares properties of two functions (linear, quadratic, or exponential), each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions); differentiates between exponential and quadratic functions that are represented using different representations (table, graph, or algebraic) | compares properties of two functions (linear, quadratic, or exponential) when at least one function is described verbally; differentiates between two functions (linear, quadratic, or exponential) when at least one is described verbally |

1. The figure shows a graph of the function of $f(x)$ in the $xy$-coordinate plane, with the vertex at $(1, 9)$ and the zeros at $-2$ and $4$.




The function g is defined by $g(x) = -3x + 2$. Which statements are true? Select **ALL** that apply.

☐ $f\{-2)\ is\ greater\ than\ g(-2).$

☐ $f\{-1)\ is\ less\ than\ g(-1).$

☐ $f\{0)\ is\ greater\ than\ g(0).$

☐ $f(1)\ is\ less\ than\ g(1).$

☐ $f(2)\ \ is\ greater\ than\ g(2).$

2. Which table shows the same rate of change of $y$ with respect to $x$ as $y = 4 - \frac{5}{8}x$?

A.

| x | y |
|---|---|
| −3 | −12 |
| −1 | −4 |
| 2 | 8 |
| 5 | 20 |

B.

| x | y |
|---|---|
| −4 | 6.5 |
| 2 | 2.75 |
| 4 | 1.5 |
| 8 | −1 |

C.

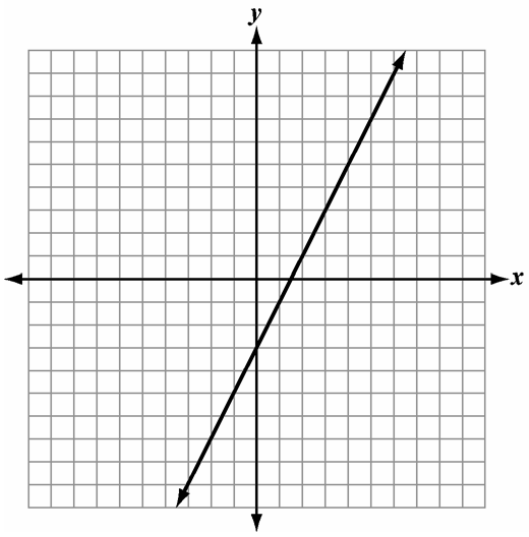
| x | y |
|---|---|
| −4 | 10.4 |
| 2 | 0.8 |
| 4 | −2.4 |
| 8 | −8.8 |

D.

| x | y |
|---|---|
| −3 | 12 |
| −1 | 4 |
| 2 | −8 |
| 5 | −20 |

3. Two linear functions are represented by the set of ordered pairs and the graph below.

$\{(-4, -6), (-2, -2), (2, 6), (4, 10)\}$



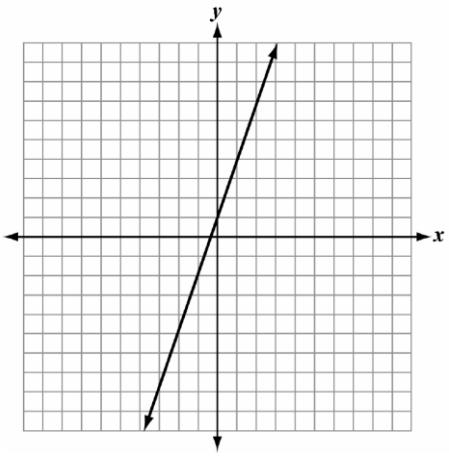

Which statement is true about the functions?

A. The two functions are the same.
B. The two functions have the same y-intercept
C. The two functions have the same x-intercept
D. The two functions have the same rate of change

4. Which function is different from the others?

A. $f(x) = 3x + 1$

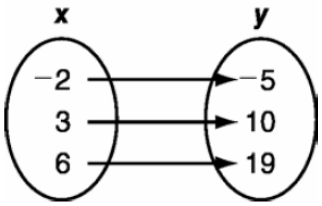
B.



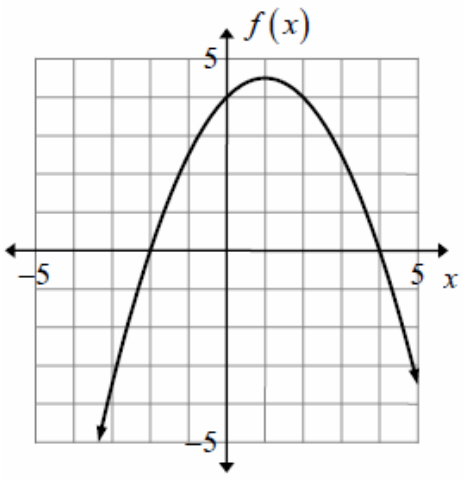

C.

| x | y |
|---|---|
| −5 | −14 |
| 4 | 12 |
| 12 | 36 |

D.




5. Look at the graph of the quadratic $f(x)$ below.



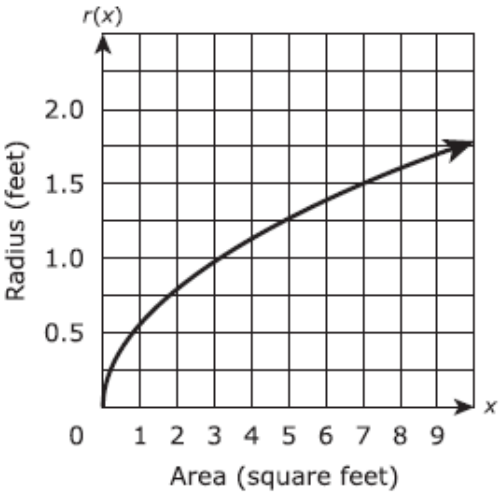

The graph of $g(x) = 3x^2 + bx - 24$ has the same $x$ −intercepts. What is the value of $b$?

A. -6
B. -2
C. 1
D. 14

**MAFS.912.F-IF.2.6 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| calculates the average rate of change of a function represented by a graph, table of values, or set of data in a real-world context (which may or may not be linear) | interprets the average rate of change of a function represented by a graph, table of values, or set of data or a linear regression equation; calculates the average rate of change when given a quadratic or exponential function presented algebraically; interprets the y-intercept of a linear regression equation | determines the units of a rate of change for a function presented algebraically; uses an interpretation to identify the graph | explains the interpretation, using units, of the rate of change and/or the y-intercept within the context |

1. The function $r(x)$ represents the radius of a circle for a given area $x$. A graph of the function is shown in the figure.




According to the graph what is the approximate average rate of change in the radius of the circle as the area increases from 3 square feet to 7 square feet?

A. 0.125 foot per square foot
B. 0.25 foot per square foot
C. 0.5 foot per square foot
D. 8 feet per square foot

2. Which of the following best describes the relationship between the math class grade and number of days absent represented by the table?

| Days Absent | 0 | 3 | 6 | 9 | 12 | 15 |
|---|---|---|---|---|---|---|
| Math Grade | 95% | 88% | 81% | 74% | 67% | 60% |

A. The math class grade is not affected by the number of days absent.
B. The math class grade decreases steadily as the number of days absent decreases.
C. The math class grade increases steadily as the number of days absent increases.
D. The math class grade decreases steadily as the number of days absent increases.

3. Use the table to answer the question.

**Gulf Water Temperature, Gulfport**
**(data collected on the fifteenth of the month)**

| Month | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. |
|---|---|---|---|---|---|---|---|---|---|
| Water Temperature (°F) | 63.9 | 64.4 | 66.8 | 73.1 | 78.1 | 82.4 | 85.2 | 86.7 | 84.5 |

A scientist measures the water temperature in the Gulf at Gulfport on the fifteenth of each month. Her data is shown in the table.

What is the average rate of change between March 15 and June 15?

A. 2.6°F per month
B. 3.9°F per month
C. 5.2°F per month
D. 7.8°F per month

4. During the first years of growth the height of a tree can be modeled with the function

$$h = -t^2 + 12t + 10$$

where $t$ is the time in years since being planted and h is the height in inches.

Enter the average rate of change, in inches per year, from year 1 to year 5. ☐

5. The table below is of a quadratic function, $g\,(x)$, where $x$ is measured in seconds and $g\,(x)$ is measured in meters.

| $x$ | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| $g(x)$ | 2.3 | -1.0 | 1.7 | 10.4 | 25.1 |

What is the approximate rate of change over the interval $0 \leq x \leq 4$?

A. 22.8 m/s
B. 8.7 m/s
C. 6.3m/s
D. 5.7 m/s

**MAFS.912.S-ID.3.7 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| calculates the average rate of change of a function represented by a graph, table of values, or set of data in a real-world context (which may or may not be linear) | interprets the average rate of change of a function represented by a graph, table of values, or set of data or a linear regression equation; calculates the average rate of change when given a quadratic or exponential function presented algebraically; interprets the y-intercept of a linear regression equation | determines the units of a rate of change for a function presented algebraically; uses an interpretation to identify the graph | explains the interpretation, using units, of the rate of change and/or the y-intercept within the context |

1. The distance in miles, $y$, a bicyclist is from home after riding $x$ hours is represented by the equation $y = 8x + 7$. What does the slope represent in this situation?

A. the number of hours it takes the bicyclist to ride 15 miles
B. the distance the bicyclist is from home when $x = 0$
C. the steepness of the hill the bicyclist is climbing
D. the speed of the bicyclist

2. One type of redwood tree has an average height of 65 feet when it is 20 years old. If the tree is more than 20 years old, the average height, $h$, can be modeled by the function $h = 1.95(a - 20) + 65$, where $a$ is the age of the tree in years. Which statement about this situation is true?

A. Every additional 1.95 ft of length over 20 ft adds 45 years to the age of this type of redwood tree.
B. For this type of redwood tree, the average height increases by 1.95 ft per year throughout its lifetime.
C. Each additional year of age over 20 years adds 1.95 ft to the average height of this type of redwood tree.
D. For this type of redwood tree, the average height increases by 65 ft for every 20 years of growth.

3. The table shows the playing time in minutes of high-definition videos and the file size of these videos in megabytes (MB).

Videos

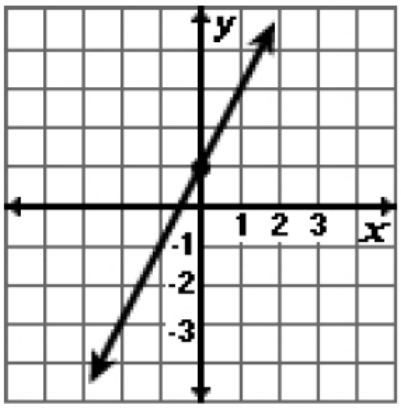
| Playing Time, $x$ (min) | File Size, $y$ (MB) |
|---|---|
| 0.5 | 60 |
| 1.5 | 180 |
| 2 | 240 |
| 4.5 | 540 |
| 5 | 600 |

What does the slope of the graph of this situation represent?

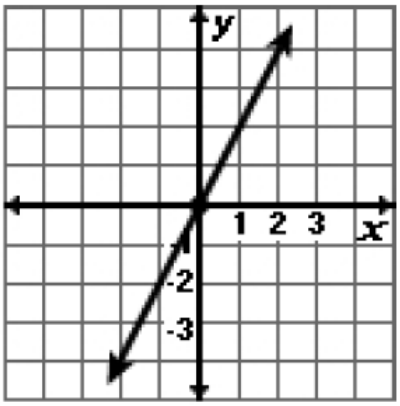
A. The increase in the file size of the video per minute of playing time
B. The file size of each video
C. The playing time of each video
D. The increase in the playing time per MB of video

4. Which is the graph of a linear function with a slope of 2 and a y-intercept at (0, 1)?

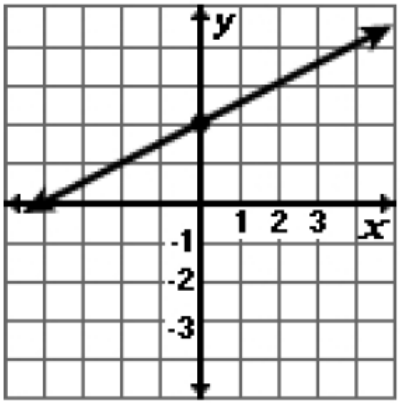
A.



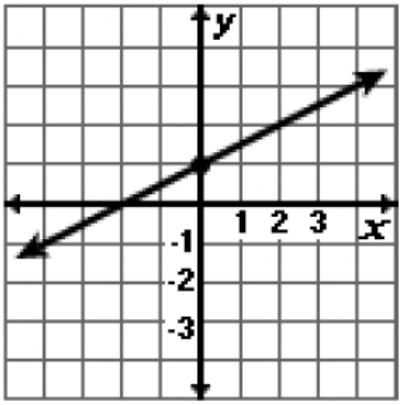

B.




C.




D.




5. A scatterplot is made of a city's population over time. The equation of the line of best fit is $p = 629t + 150{,}000$ where $p$ is the city's predicted population size and $t$ is the number of years since 2000. What is the meaning of the slope of this line?

A. In 2000, the city's population was about 629 people.
B. In 2000, the city's population was about 150,000 people.
C. The city's population increases by about 629 people each year.
D. The city's population increases by about 150,000 people each year.

**MAFS.912.F-IF.3.8 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| finds zeros of quadratics of the form $ax_2 + b = c$, where a, b, and c are integers; interprets the zero contextually; real-world or mathematical contexts | factors the difference of two squares with a degree of 2, and trinomials with a degree of 2 whose leading coefficient has up to 4 factors and interprets the zeros; completes the square when the leading coefficient is 1; interprets the extreme values | factors quadratics with a common integral factor and a leading coefficient with more than four factors and interprets the zeros; completes the square when the leading coefficient is greater than 1 and b/(2a) is an integer; interprets the extreme values | interprets the axis of symmetry |
| uses properties of exponents (one operation) and identifies the new base of an exponential function; interprets the a in $y = ab^x$ | uses the properties of exponents and interprets the new base, in terms of a rate | transforms exponential functions that have more than one operation and explains the properties of the expressions within a real-world context | compares and contrasts different forms of exponential functions using a real-world context |

1. Write the function $y - 3 = \frac{2}{3}(x - 4)$ in the equivalent form most appropriate for identifying the slope and $y$-intercept of the function.

2. The area, A, in square feet, of a rectangular storage bin in a warehouse is given by the function $A(x) = -2x^2 + 36x$, where $x$ is the width, in feet, of the storage bin.

**Part A**

If the function is graphed in a coordinate plane, which statement would be true?

A. The x-intercepts of the function are 0 and 8, which are a lower bound and an upper bound for the possible values of the length of the storage bin.
B. The x-intercepts of the function are 0 and 8, which are a lower bound and an upper bound for the possible values of the width of the storage bin.
C. The x-intercepts of the function are 0 and 18, which are a lower bound and an upper bound for the possible values of the length of the storage bin.
D. The x-intercepts of the function are 0 and 18, which are a lower bound and an upper bound for the possible values of the width of the storage bin.

**Part B**

The process of completing the square can be used to calculate the width, in feet, of the storage bin that gives a maximum area. What is the missing value?

$$A = -2x^2 + 36x$$

$$A = -2(x - 9)^2 + ?$$

Enter your answer in the box.

3. A cliff diver's height above the water, in meters, is modeled by the function $h(d) = -d^2 + 2d + 24$, where $d$ represents how far the diver is from the cliff.
   How far from the cliff will the diver be when she reaches the water?

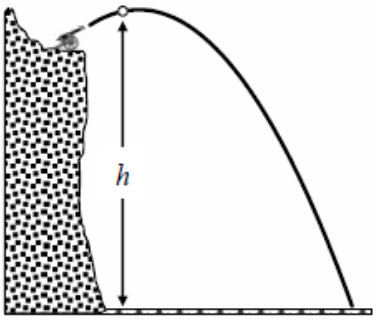
A. 0 meters
B. 4 meters
C. 6 meters
D. 24 meters

4. Given the function $f(x) = -x^2 + 8x + 9$,

**Part A**
State whether the vertex represents a maximum or minimum point for the function. Explain your answer.

**Part B**
Rewrite $f(x)$ in vertex form by completing the square.

5. A cannonball is shot from the top of an ocean cliff as shown. The height (in meters) of the cannonball above the water is given by $h(t) = -5t^2 + 15t + 8$ , where $t$ is the number of seconds after the shot.




Determine whether each statement is true according to the graph. Select True or False for each statement.

| Statement | TRUE | FALSE |
|---|---|---|
| The cannon is 8 meters above the water. | | |
| The cannonball reaches its maximum height at 1.5 seconds after it is shot. | | |
| The cannonball hits the water 8 seconds after it is shot. | | |

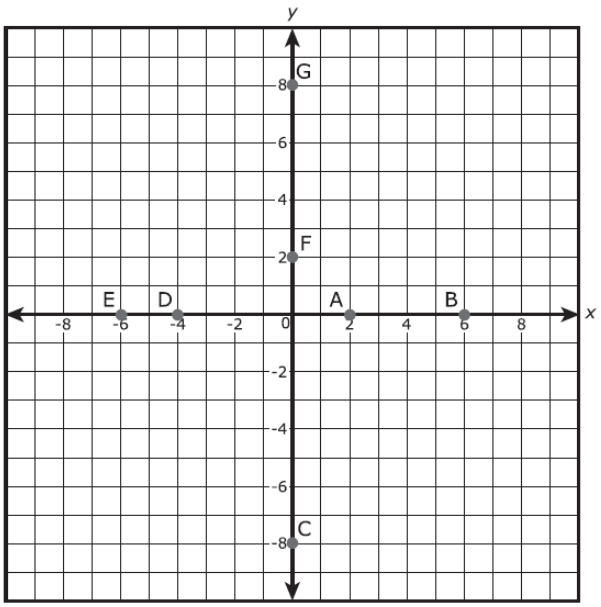
**MAFS.912.A-APR.2.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies the zeros of a function from a graph | identifies the graph of a function given in factored form for a polynomial whose leading coefficient is a positive integer | creates a rough graph given a polynomial function in factored form whose leading coefficient is an integer in a real-world or mathematical context | uses the x-intercepts of a polynomial function and end behavior to graph the function in a real-world or mathematical context |

1. Several points are plotted on the graph.
   Select the plotted points on the graph that represent the zeros of the function:

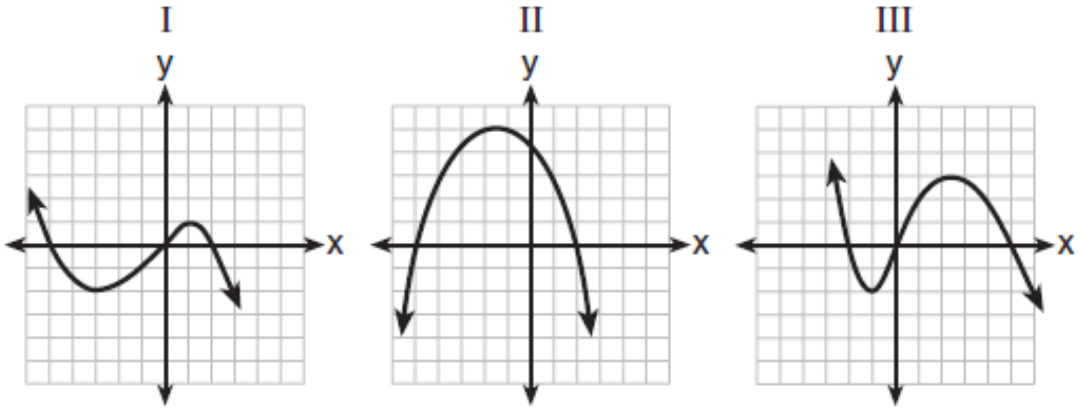
   $f(x) = (x^2 + 2x - 8)(x - 6)$?

   Select **ALL** that apply.




- ☐ $(2, 0)$
- ☐ $(6, 0)$
- ☐ $(0, -8)$
- ☐ $(-4, 0)$
- ☐ $(-6, 0)$
- ☐ $(0, 2)$
- ☐ $(0, 8)$

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

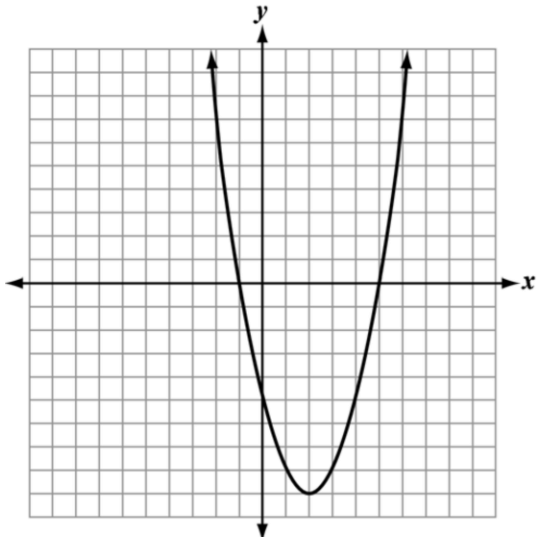



A. I only
B. II only
C. I and III
D. I, II, and III

**MAFS.912.F-IF.3.7 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies the graph of a linear, simple quadratic, or simple exponential function given its equation | constructs the graph of a linear function, quadratic, or exponential given its equation; constructs a linear function using x- and y-intercepts | constructs the graph of a quadratic function given the x- and y-intercepts or vertex and end behavior; key features can be presented in both a mathematical and a real-world context | constructs the graph of an exponential function given the x- and y-intercepts and end behavior |

1. What are the $x$ −intercepts of the parabola?




A. $(0, -1)$ and $(0, 5)$
B. $(2, 0)$ and $(-9, 0)$
C. $(-1, 0)$ and $(5, 0)$
D. $(0, -5)$ and $(-5, 0)$

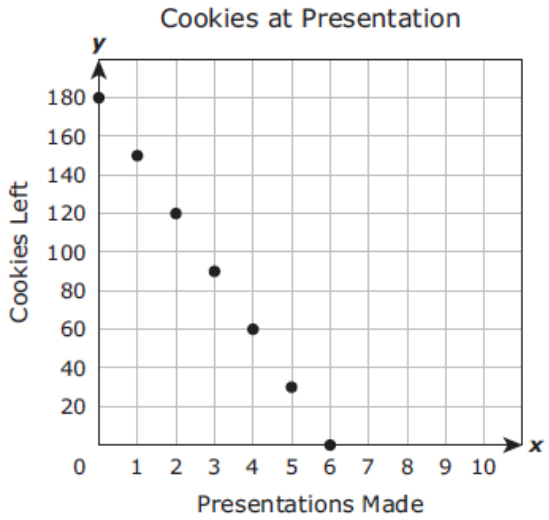
2. In the $xy$-coordinate plane, the graph of the equation $y = 3x^2 - 12x - 36$ has zeros at $x =$ a and $x = b$, where $a < b$. The graph has a minimum at $(c, -48)$. What are the values of $a, b$, and $c$?

A. $a = 2, b = 4, c = 2$
B. $a = -2, b = 6, c = 2$
C. $a = -31\ b = 31\ C = 0$
D. $a = 3, b = 6, c = 2$

3. What are the intercepts of the line with equation $2x - 3y = 30$?

A. (–10, 0) and (0, 15)
B. (6, 0) and (0, –6)
C. (15, 0) and (0, –10)
D. (30, 0) and (0, –30)

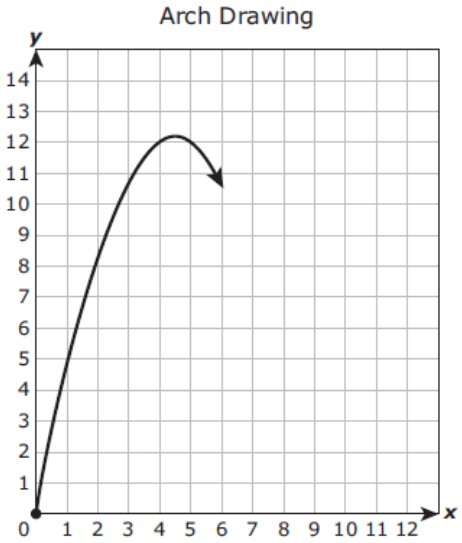
4. The graph shows the relationship between the number of cookies a presenter at a convention had left to give away and the number of presentations she had made.




What does the $x$ −intercept of the graph represent?

A. The number of cookies the presenter had before making any presentations
B. The maximum number of cookies the presenter gave away during every presentation
C. The number of presentations the presenter made per hour
D. The maximum number of presentations the presenter made before running out of cookies

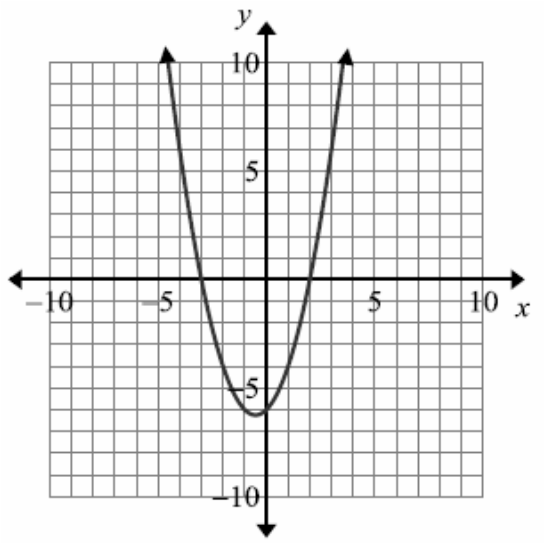
5. An architecture student is drawing a graph of an arch. As shown below, the arch has the shape of a parabola that begins at the origin and has a vertex at (4.6, 12.2).




Other than the origin, at which point will the graph intersect the x-axis?

A. $(12.2, 0)$
B. $(9.2, 0)$
C. $(4.6, 0)$
D. $(10.6, 0)$

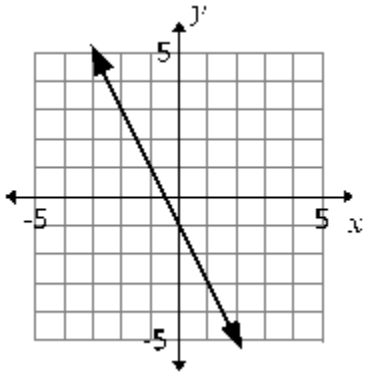
6. Which equation is represented in the graph below?



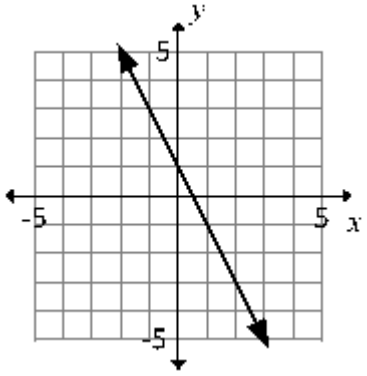

A. $y = x^2 - x - 6$
B. $y = x^2 - x + 6$
C. $y = x^2 - x - 6$
D. $y = x^2 + x + 6$

7. Which is the graph of the line with x-intercept $\frac{1}{2}$ and y-intercept 1?

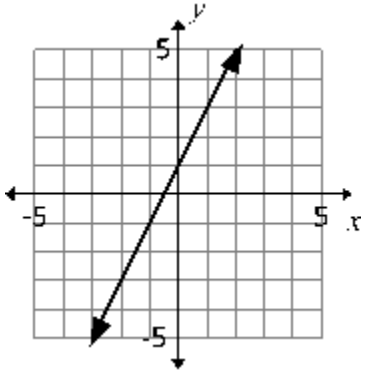
A.



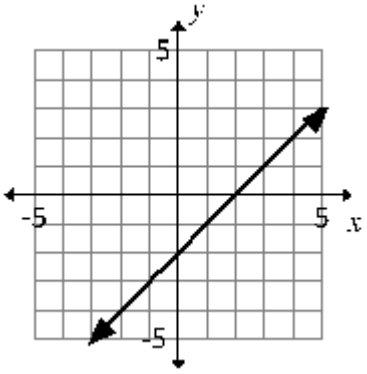

B.




C.




D.



**MAFS.912.F-LE.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies relationships in tables and graphs that can be modeled with linear functions (constant rate of change) and with exponential functions (exponential rate of change) | proves that linear functions grow by equal differences over equal intervals; proves that exponential functions grow by equal factors over equal intervals; identifies the constant rate or rate of growth or decay; chooses an explanation as to why a context may be modeled by a linear or exponential function | identifies situations given as a written description in a real-world context in which one quantity changes at a constant rate per unit interval relative to another or grows by equal factors over equal intervals | [intentionally left blank] |

1. Christy and Derron set goals for improving their recorded times for the mile. Which statement best describes these goals?

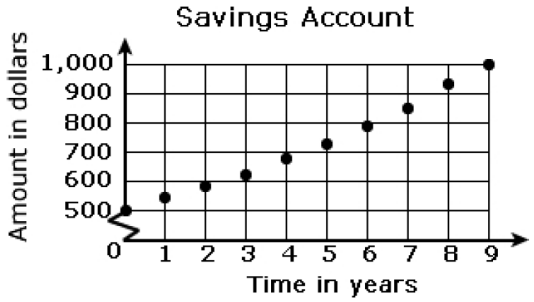
   - Christy: Complete each new run in 5 fewer seconds than the previously recorded run.
   - Derron: Complete each new run in 5% less time than the previously recorded run.

A. Christy's goal can be modeled with an exponential function, while Derron's goal can be modeled with a linear function.
B. Christy's goal can be modeled with a linear function, while Derron's goal can be modeled with an exponential function.
C. Both goals can be modeled with exponential functions.
D. Both goals can be modeled with linear functions.

2. Given that $y = ax + b$, $x_0 = -2$, and $x_1 = 3$, what is the difference between the value of $y$ corresponding to $x_1$ and the value of $y$ corresponding to $x_0$?

A. -5a
B. -a
C. a
D. 5a

3. Which situation best describes the graph?




A. 8% per year increase in value of a $1,000 deposit over 9 years.
B. 8% per year increase in value of a $500 deposit over 9 years.
C. 8% per year decrease in value of a $1,000 deposit over 9 years.
D. 8% per year decrease in value of a $500 deposit over 9 years.

4. Which equation represents a linear function?

A. $y = x + 1$
B. $xy = 1$
C. $y = x^2$
D. $x = \frac{1}{y}$

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

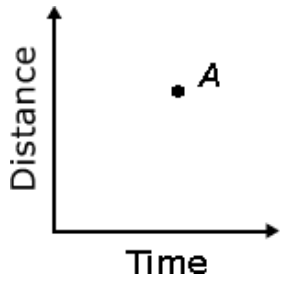
| **Number of Hours,** *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** B(*x*) | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

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.

**MAFS.912.F-LE.2.5 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies which values are constant from a given context | interprets the slope and x- and y-intercepts in a linear function; interprets the base value and vertical shifts in an exponential function of the form $f(x) = b^x + k$, where b is an integer and k can equal zero; in a real-world context | interprets the base value and initial value in an exponential function of the form $f(x) = ab^x$, where b is an integer and can be any positive integer | [intentionally left blank] |

1. Point A on the graph represents the distance and time that Cat traveled on her trip. Which of the following represents her average speed?




A. x-coordinate of point A
B. y-coordinate of point A
C. slope of line through A and (0, 0)
D. distance from the origin to point A

2. The development budget $(C)$ for a computer game company is described by the equation $C = \$50{,}000t + \$10{,}000$, where t is the number of years since the company's creation. Which statement is true?

A. Each year development expenses increase by $50,000.
B. Each year development expenses increase by $60,000.
C. Each year development expenses are $50,000.
D. Each year development expenses are $60,000.

3. Roy opened a savings account and made a deposit. Assuming he makes no deductions or additional deposits, his balance can be calculated using the function $f(t) = 850(1.065)^t$ where t represents the number of years since the initial deposit.
What does the number 850 represent?

A. the amount of Roy's initial deposit
B. the amount of interest Roy will earn each year
C. the number of years it will take for Roy's money to double
D. the maximum amount of interest Roy can earn with the account

4. Population growth of a country is modeled by the function below, where $t$ is time in years. Based on the model, which is true about the country?

$$P = 10^7(1.04)^t$$

A. Since reaching 10 million people, the population was growing by 0.04% each year.
B. Since reaching 10 million people, the population was growing by 4% each year.
C. Since reaching 100 million people, the population was growing by 0.04% each year.
D. Since reaching 100 million people, the population was growing by 4% each year.

5. Laniqua trains for the long jump each week. She writes this function to model the relationship between the number of weeks, w, she trains and the distance, $f(w)$, in inches, she can jump.

$$f(w) = 2w + 180$$

What does the slope of this function represent?

A. the number of inches Laniqua can jump when she begins training
B. the number of weeks it takes Laniqua to improve her jumping
C. the number of weeks it takes Laniqua to increase her jump distance by 1 inch
D. the number of inches Laniqua's jump distance increases per week of training

**MAFS.912.F-LE.1.2 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| constructs linear functions of arithmetic sequences when given a graph in a real-world context | constructs linear functions, including arithmetic sequences, given a graph or input-output pairs; constructs exponential functions, including geometric sequences given a graph | constructs linear functions and exponential functions, including arithmetic sequences and geometric sequences, given input- output pairs, including those in a table | constructs linear and exponential functions, including arithmetic and geometric sequences, given the description of a relationship |

1. What is the equation of the function represented by this table of values?

| $x$ | $-2$ | $-1$ | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $y$ | $\frac{3}{25}$ | $\frac{3}{5}$ | 3 | 15 | 75 |

A. $y = 5x + 3$
B. $y = 12x + 3$
C. $y = 3 \cdot 5^x$
D. $y = 5 \cdot 3^x$

2. Which expression represents the output of the nth term?

| **Input** | 1 | 2 | 3 | 4 | 5 | *n* |
|---|---|---|---|---|---|---|
| **Output** | 1 | 3 | 5 | 7 | 9 | |

A. $n + 2$
B. $n + 11$
C. $2n + 1$
D. $2n - 1$

3. If $x$ and $y$ are defined as indicated by the accompanying table, which equation correctly represents the relationship between $x$ and $y$?

| *x* | *y* |
|---|---|
| 2 | 1 |
| 3 | 3 |
| 5 | 7 |
| 7 | 11 |

A. $y = x + 2$
B. $y = 2x + 2$
C. $y = 2x + 3$
D. $y = 2x - 3$

4. A certain type of lily plant is growing in a pond in such a way that the number of plants is growing exponentially. The number of plants N in the pond at time tis modeled by the function $N(t) = ab^t$, where $a$ and $b$ are constants and $t$ is measured in months. The table shows two values of the function.

| $t$ | $N(t)$ |
|---|---|
| 0 | 150 |
| 1 | 450 |

Which equation can be used to find the number of plants in the pond at time $t$?

A. $N(t) = 150(1)^t$
B. $N(t) = 450(1)^t$
C. $N(t) = 150(3)^t$
D. $N(t) = 450(3)^t$

5. In a basketball game, Marlene made 16 field goals. Each of the field goals were worth either 2 points or 3 points, and Marlene scored a total of 39 points from field goals.

**Part A**
Let x represent the number of two-point field goals and y represent the number of three-point field goals. Which equations can be used as a system to model the situation?

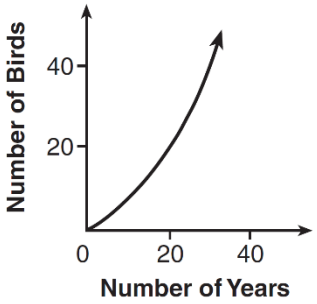
Select **ALL** that apply.

☐ $x + y = 16$
☐ $x + y = 39$
☐ $2x + 3y = 16$
☐ $2x + 3y = 39$
☐ $3x + 2y = 16$
☐ $3x + 2y = 39$

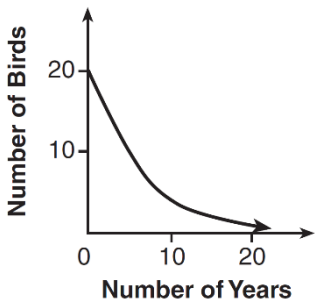
**Part B**
How many three-point field goals did Marlene make in the game? Enter your answer in the box.

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

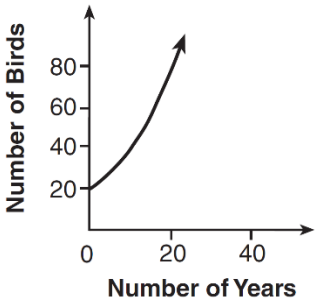
A.



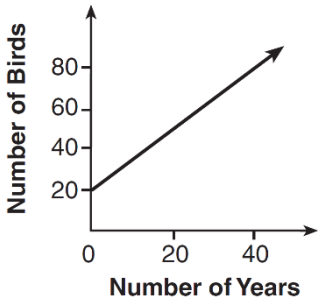

B.




C.




D.



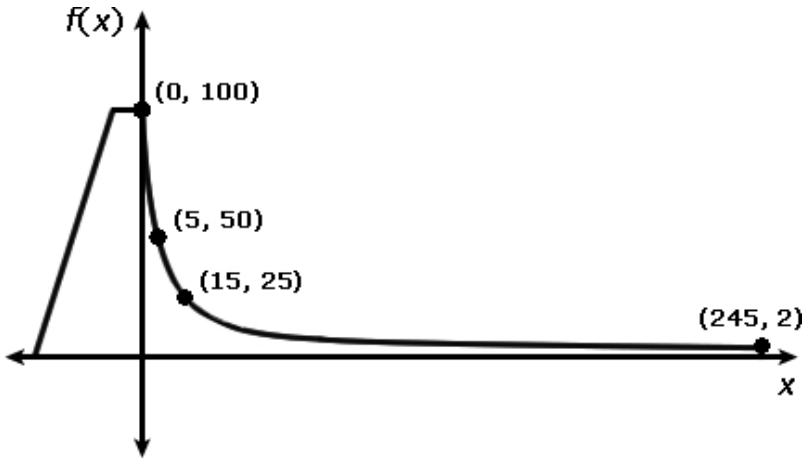
**MAFS.912.F-BF.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| recognizes an explicit expression that is linear for arithmetic sequences whose common difference is an integer in a real-world context | writes an explicit function for arithmetic sequences and geometric sequences; writes a recursive formula for an arithmetic sequence; completes a table of calculations | writes a recursive formula for a geometric sequence | writes a recursive formula for a sequence that is not arithmetic or geometric |
| combines standard function types using addition and subtraction when the functions are given within a real-world context | combines standard function types using addition, subtraction, and multiplication when the functions are given within the context; writes a composition of functions that involve two linear functions in a real-world context | writes a composition of functions that involve linear and quadratic functions | writes a new function that uses both a composition of functions and operations |

1. Every day commuting to and from work, Jay drives his car a total of 45 miles. His car already has 2,700 miles on it.
   Which function shows the total number of miles Jay's car will have been driven after n more days?

A. $d(n) = 60$
B. $d(n) = 60n$
C. $d(n) = 45 + 2{,}700n$
D. $d(n) = 2{,}700 + 45n$

2. At the top of the water slide, Jessica sits 100 feet above the ground. She begins her descent and quickly drops to a height of 50 feet while moving only 5 feet forward. She drops to a height of 25 feet upon travelling 15 feet forward, eventually coming to rest 2 feet above the ground at the end of the 245-foot-long slide.
   Which function models Jessica's entire descent down the water slide?




A. $f(x) = 100 - 10x$
B. $f(x) = \frac{500}{x+5}$
C. $f(x) = \frac{2}{5}x^2 - 12x + 100$
D. $f(x) = \frac{265-x}{10}$

3. If the first $Now = 5$, what formula can be used to find the terms of this pattern?

$$\mathbf{5}, -\mathbf{10}, \mathbf{20}, -\mathbf{40}, \mathbf{80} \ldots$$

A. $Next = Now - 15$
B. $Next = (-2) \cdot Now$
C. $Next = 2 \cdot Now$
D. $Next = (-4) \cdot Now + 10$

4. The first five terms in a pattern are shown below.

$$-\mathbf{0.5}, -\mathbf{0.25}, \mathbf{0}, \mathbf{0.25}, \mathbf{0.5} \ldots$$

If the pattern continues, which expression can be used to find the nth term?

A. $0.75n - 1.25$
B. $-0.25n - 0.25$
C. $0.25n - 0.75$
D. $-0.50n + 0.25$

5. Jalea has a camera that automatically takes pictures of hummingbirds visiting her hummingbird feeder. The camera takes 4 pictures on the first day and 10 pictures every day after that. Which function models the total number of hummingbird pictures, $f(d)$, the camera has taken after d days?

A. $f(d) = 4d + 10$
B. $f(d) = 4(d + 1) + 10$
C. $f(d) = 10d + 4$
D. $f(d) = 10(d - 1) + 4$

**MAFS.912.F-IF.1.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies an arithmetic sequence as a linear function when the sequence is presented as a sequence | identifies an arithmetic sequence as a linear function when the sequence is presented as a graph or table; identifies that a geometric sequence is a function when the sequence is presented as a sequence, graph, or table; recognizes the domain of a sequence as a set of integers or a subset of integers | identifies non-arithmetic and non-geometric sequences as a function when given as a sequence | identifies non-arithmetic and non-geometric sequences as a function when given as a graph or table; explains why the domain of sequences are a set or a subset of integers |

1. For the function below, which set produces the sequence -11, 0, 5?

$$k(n) = 8n - 3n^2$$

A. $k(-1), k(0), k(1)$
B. $k(1), k(2), k(3)$
C. $k(-3), k(-2), k(-1)$
D. $k(-11), k(0), k(5)$

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

A. -11
B. 1
C. 5
D. 17

3. 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?

A. $a_n = 8n + 10$
B. $a_n = 8n - 14$
C. $a_n = 16n + 10$
D. $a_n = 16n - 38$

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

A. -5
B. 11
C. 21
D. 43

5. A sequence is created from the function $k(n) = 3n + 1$, where n represents the position of the term in the sequence. The sequence does not begin at 0. Which list represents the first five terms of the sequence?

A. $5, 6, 7, 8, 9$
B. $4, 7, 10, 13, 16$
C. $4, 7, 11, 18, 29$
D. $6,9,12,15,18$

6. Use the number sequences to answer the question.

| | Term 1 | Term 2 | Term 3 | Term 4 | Term 5 | Term 6 |
|---|---|---|---|---|---|---|
| **Sequence I** | 2 | 4 | 8 | 16 | 32 | 64 |
| **Sequence II** | 10 | 20 | 30 | 40 | 50 | 60 |
| **Sequence III** | 1 | 5 | 1 | 5 | 1 | 5 |

The table shows the first 6 terms for three different number sequences.

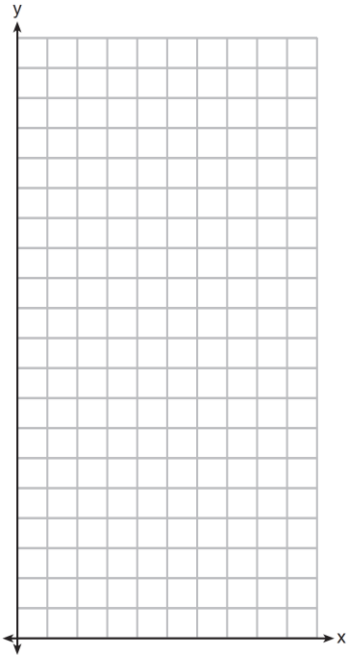
Which statement describes all number sequences?

A. Sequences are functions, with the previous term as the domain and the following terms as the range.
B. Sequences are not functions because the same number can appear more than once in a sequence.
C. Sequences are functions, with the term number as the domain and the terms of the sequence as the range.
D. Sequences are not functions because functions relate two sets of numbers, the inputs and the outputs, and sequences have only one set of numbers

**MAFS.912.F-LE.1.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| given graphs or a linear and exponential function on the same coordinate plane, describes how the graphs compare; identifies which function is a linear function, an exponential function, or a quadratic function given in a real-world context by interpreting the functions' graphs or tables | identifies that an exponential growth function will eventually increase faster than a linear function or a quadratic function given in a real-world context by interpreting the functions' tables | identifies that a quantity increasing exponentially eventually exceeds a quantity increasing linearly using graphs and tables; explains that an exponential growth function will eventually increase faster than a linear function or a quadratic function given in a real-world context by interpreting the functions' graphs or tables | describes and compares the changes of behavior between a linear and an exponential function including the approximate point(s) of intersection; justifies that an exponential function will eventually increase faster than a linear function or a quadratic function given in a real-world context by interpreting the functions' graphs or tables using rates |

1. 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.

2. During the 1st day of a canned-goods drive, Jasmine's homeroom teacher collected 2 cans. During the 3rd day, the teacher collected 8 cans. Let D represent each collection day, and let N represent the number of canned goods collected on that day.

**Part A**

Based on the situation, Jasmine claims that the number of canned goods collected can be modeled by an exponential function. What is the number of canned goods collected on the 6th day based on an exponential model? Enter your answer in the box.

**Part B**

Ramon disagrees with Jasmine and claims that the number of canned goods collected can be modeled by a linear function.
Which statement is true about the number of cans predicted to be collected on the 6th day based on the two models?

A. The number of cans predicted to be collected on the 6th day using a linear model is greater than that predicted using an exponential model.
B. The number of cans predicted to be collected on the 6th day using a linear model is less than that predicted using an exponential model.
C. The number of cans predicted to be collected on the 6th day using a linear model is equal to that predicted using an exponential model.
D. There is not enough information to determine the relationship between the number of cans predicted to be collected on the 6th day using a linear model and that predicted using an exponential model.

3. Alicia has invented a new app for smart phones that two companies computations. 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?

A. 6
B. 7
C. 8
D. 9

# FSA Algebra I End-of-Course Review Packet

## Statistics Probability and Number System

**FSA Algebra 1 EOC Review**

**Table of Contents**

**MAFS.912.N-RN.1.2 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| converts radical notation to rational exponent notation and vice versa | identifies equivalent forms of expressions involving rational exponents and radical expressions where there is one operation | identifies equivalent forms of expressions involving rational exponents and radical expressions where there are two operations | [intentionally left blank] |

1. Determine whether each equation is True or False. In case you find a "False " equation, explain why is False.

| | TRUE | FALSE |
|---|---|---|
| $\sqrt{32} = 2^{\frac{5}{2}}$ | ☐ | ☐ |
| $16^{\frac{3}{8}} = 8^2$ | ☐ | ☐ |
| $4^{\frac{1}{2}} = \sqrt[4]{64}$ | ☐ | ☐ |
| $2^8 = \left(\sqrt[3]{16}\right)^6$ | ☐ | ☐ |
| $\left(\sqrt{64}\right)^{\frac{1}{3}} = 8^{\frac{1}{6}}$ | ☐ | ☐ |

2. Which expression is equivalent to $\left(-\sqrt{\frac{2}{3}}\right)^{-\frac{2}{3}}$?

A. $\left(-\frac{2}{3}\right)^{\frac{1}{3}}$

B. $\left(-\frac{2}{3}\right)^{\frac{4}{3}}$

C. $\frac{1}{\left(\frac{2}{3}\right)^{\frac{1}{3}}}$

D. $\frac{1}{\left(-\frac{2}{3}\right)^{\frac{1}{3}}}$

3. If x represents a positive real number, which expression is equivalent to $\sqrt[3]{x^2} \cdot \sqrt{x^5}$?

A. $\sqrt[3]{x^7}$

B. $\sqrt[3]{x^{10}}$

C. $\sqrt[6]{x^{10}}$

D. $\sqrt[6]{x^{19}}$

4. Use the expression given below to answer the questions in part A and part B.

$$\frac{\left(\sqrt{5}^3\right)^{\frac{k}{9}}}{\left(\sqrt{5}^6\right)^{\frac{-k}{3}}}$$

**Part A.**

Using the properties of exponents, rewrite the expression in the form of $\left(\sqrt{5}\right)^{\frac{p}{q}}$.

**Part B.**

If the above expression is equivalent to the expression $5^{\frac{3}{2}} \times 5^{\frac{3}{2}}$, what is the value of $k$?

**MAFS.912.N-RN.2.3 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| [intentionally left blank] | completes an informal proof to show that a sum or product of two rational numbers is rational, that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational | generalizes rules for sum and product properties of rational and irrational numbers | [intentionally left blank] |

1. Alicia added two rational numbers and arrived at the sum shown.

$$\frac{a}{b}+\frac{c}{d}=\frac{ad+bc}{bd}, b\neq 0; d\neq 0$$

Alicia concluded that the sum of two rational numbers is also rational. Which of the mathematical statements did Alicia use to arrive at that conclusion?

I. The set of integers is closed under addition.
II. The set of integers is closed under multiplication.
III. A rational number can be written as the ratio of two integers.

A. I only
B. II only
C. I and II only
D. I, II, and III

2. The rectangle shown below has a length of 6 feet.

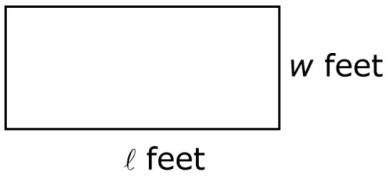

**Part A**

The value of the area of the rectangle, in square feet, is an irrational number. Therefore, the number that represents the width of the rectangle must be_____

A. a whole number.
B. a rational number.
C. an irrational number.
D. a non-real complex number.

**Part B**

The length, $\ell$, and width, $w$, of the rectangle shown below have values that are rational numbers.




Construct an informal proof that shows that the value of the area, in square feet, of the rectangle must be a rational number.

3. Let $a$ represent a non-zero rational number and let $b$ represent an irrational number.

**Part A**

Which expression could represent a rational number?

A. $-b$
B. $a + b$
C. $ab$
D. $b^2$

**Part B**

Consider a quadratic equation with integer coefficients and two distinct zeros. If one zero is irrational, which statement is true about the other zero?

A. The other zero must be rational.
B. The other zero must be irrational.
C. The other zero can be either rational or irrational.
D. The other zero must be non-real.

4. Which statement is NOT always true?

A. The product of two irrational numbers is irrational.
B. The product of two rational numbers is rational.
C. The sum of two rational numbers is rational.
D. The sum of a rational number and an irrational number is irrational.

**MAFS.912.N-RN.1.1 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| applies and explains properties of integer exponents | defines rational exponents by extending the properties of integer exponents | explains and uses the meaning of rational exponents in terms of properties of integer exponents, and uses notation for radicals in terms of rational exponents | proves the properties of rational exponents (which are an extension of the properties of integer exponents) |

1. Which statement shows why $g^{\frac{1}{3}}$ represents the cubic root of $g$?

   A. $\left(g^{\frac{1}{3}}\right)^{\frac{1}{3}} = g$

   B. $\left(g^{\frac{1}{3}}\right)^{3} = g$

   C. $\left(g^{\frac{1}{3}}\right)^{\frac{1}{3}} = g^{\frac{2}{3}}$

   D. $\left(g^{\frac{1}{3}}\right)^{3} = g^{\frac{1}{3}}$

2. Four students have rewritten the expression with rational exponent $m^{\frac{5}{3}}$ in radical form as shown.

| | |
|---|---|
| Dexter | $\sqrt[5]{m^3}$ |
| Martha | $\sqrt[5]{3m}$ |
| Alicia | $\sqrt[3]{m^5}$ |
| Trevon | $\sqrt[3]{5m}$ |

   A. Dexter
   B. Martha
   C. Alicia
   D. Trevon

3. Which value of $x$ would make the expression below equal to 8?

$$\left(\sqrt[5]{8^3}\right)^{x}$$

   A. $\frac{3}{5}$

   B. $\frac{5}{3}$

   C. $5$

   D. $15$

4. Four students were asked to solve the equation below:

$$5^{\frac{1}{3}} \times \_\_\_ = 5$$

Their answers were, as follows:

| | |
|---|---|
| Alberto | $\sqrt[3]{25}$ |
| Rocio | $\sqrt[3]{125}$ |
| Sharon | $5^{\frac{2}{3}}$ |
| Alice | $5^3$ |

Which student or students answered the problem correctly?

- ☐ Only Alberto
- ☐ Only Rocio
- ☐ Only Sharon
- ☐ Only Alice
- ☐ Alberto and Rocio
- ☐ Alberto and Sharon
- ☐ Alberto and Alice

**MAFS.912.S-ID.1.1 EOC Practice**

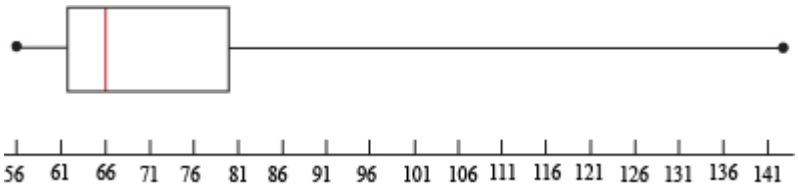
| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| identifies dot plots, histograms, and box plots for a given set of data in a real-world context | uses real-world data (represented in a table or in another display) to create dot plots, histograms, or box plots applying correct labels for components and/or axes, applying appropriate scale in a graph | completes a dot plot, histogram, or box plot for data that requires some interpretation or inference | determines and justifies which type of data plot would be most appropriate for a set of data; identifies advantages and disadvantages of different types of data plots |

1. The following lists the salaries in millions, for the top ten highest paid CEOs in the United States.

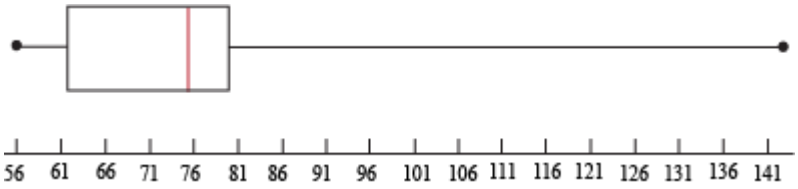
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **145** | **90** | **76** | **69** | **68** | **66** | **66** | **64** | **57** | **56** |

Which of the following is the box plot for this data set?

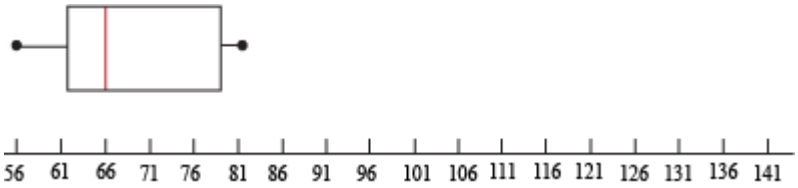
A.



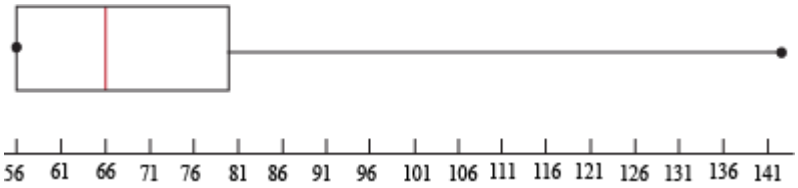

B.



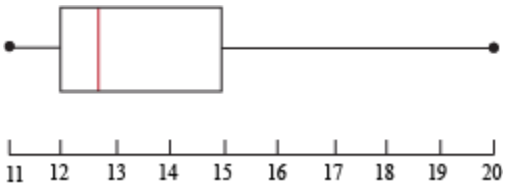

C.




D.



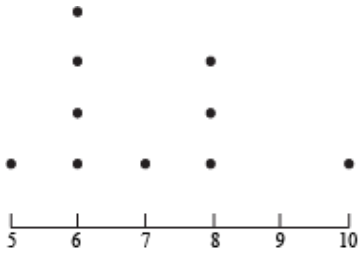
2. Given the following box plot, what are the median, lower, and upper quartiles?



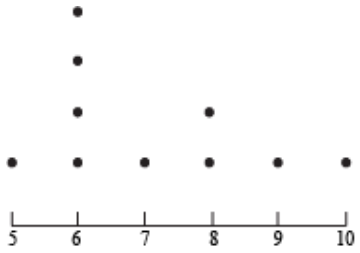

A. 11.5, 14, and 16
B. 12, 16, and 18
C. 12, 12.7, and 15
D. 11, 14, and 20

3. Which of the following is the dot plot for the data: 8, 7, 6, 10, 5, 6, 6, 6, 8, 8.

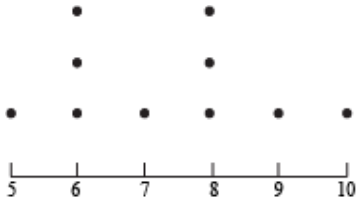
A.



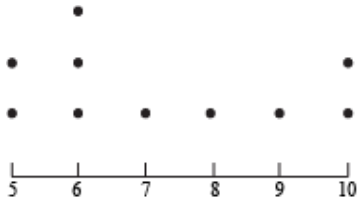

B.




C.



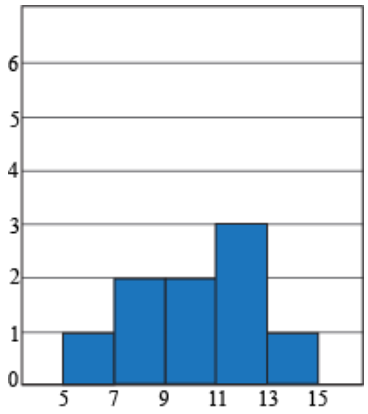

D.



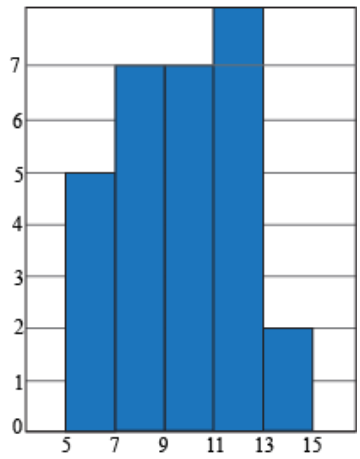
4. Twenty of your classmates were asked to keep track of the number of hours of TV they watched for a week. After the week was up, the following data was collected. Which histogram best represents the data?

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10** | **7** | **8** | **11** | **7** | **12** | **7** | **14** | **18** | **13** | **7** | **8** | **6** | **11** | **12** | **10** | **9** | **11** | **11** | **12** |

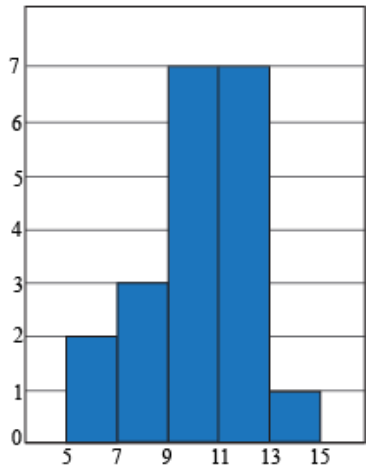
A.



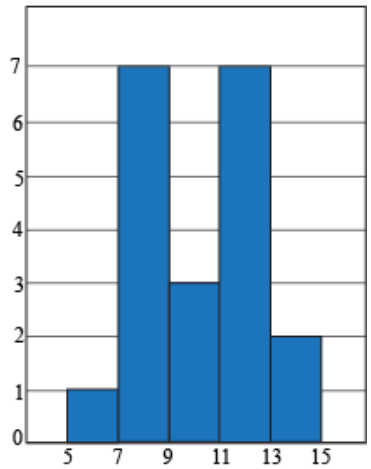

B.



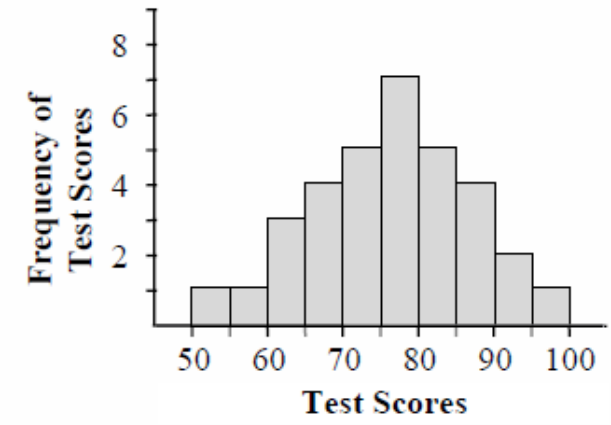

C.




D.

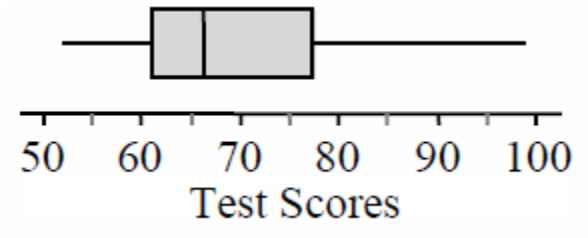



5. Mrs. Johnson created this histogram of her 3rd period students' test scores.

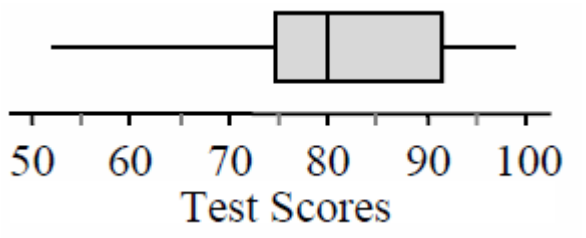


Which boxplot represents the same information as the histogram?

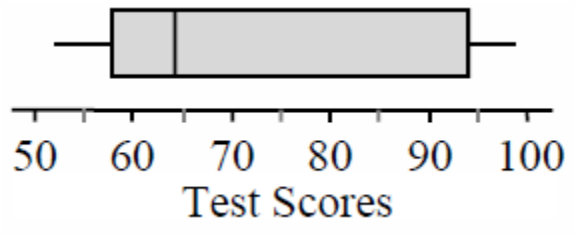
A.



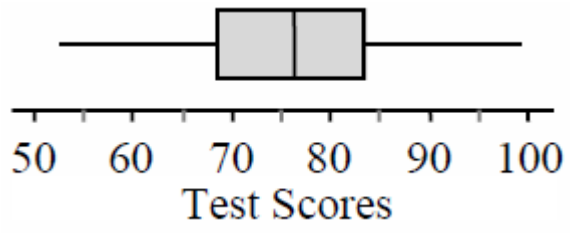

B.



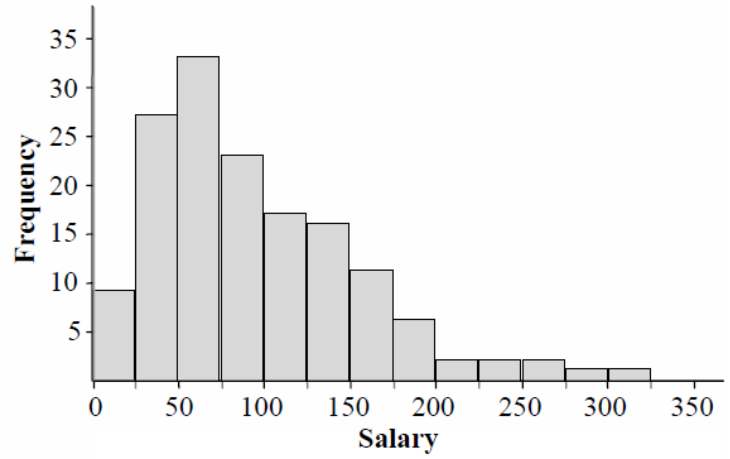

C.




D.




6. This graph shows annual salaries (in thousands of dollars) for all workers in a certain city.




The median salary is $80,500. Which value is the best approximation for the mean?

A. $40,250
B. $66,500
C. $80,500
D. $94,500

**MAFS.912.S-ID.1.2 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| determines the mean/median and interquartile range of a single set of data from a visual representation (e.g., table) | interprets the difference in mean, median, and interquartile range in the context of a data set and compares the similarities or differences in mean, median, and interquartile range between two sets of data; predicts the effect of an outlier on the shape and center of a data set; uses the empirical rule with data values that are one or more standard deviation about the mean | explains similarities and differences using specific measures of center and spread, given two sets of data; predicts the effect of an outlier on the spread of a data set; uses the empirical rule with two data values that have integers as standard deviations, up to 3, above or below the mean | plots data based on situations with multiple data sets, and then compares and discusses using measures of center and spread, normal distribution; justifies which measure(s) are most appropriate for comparison; identifies advantages and disadvantages of using each measure of center and spread |

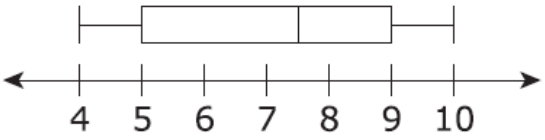
1. Members of two cross-country teams ran an obstacle course. The table shows the times, in minutes and seconds, for the members of team R to complete the course.

**Team R Obstacle Course Times**

| | | | | |
|---|---|---|---|---|
| 5:32 | 6:48 | 4:25 | 8:05 | 7:23 |
| 5:37 | 5:12 | 6:26 | 5:31 | 4:43 |
| 6:08 | 7:16 | 5:52 | 5:21 | 6:53 |
| 4:49 | 5:02 | 6:33 | 5:54 | 6:20 |

The obstacle course times, in minutes and seconds, for team S are summarized in the box plot below.

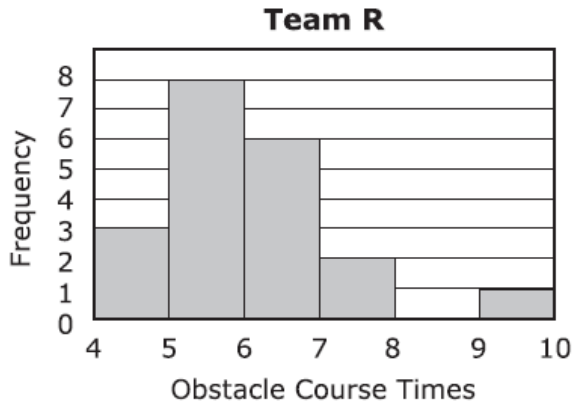
**Team S Obstacle Course Times**



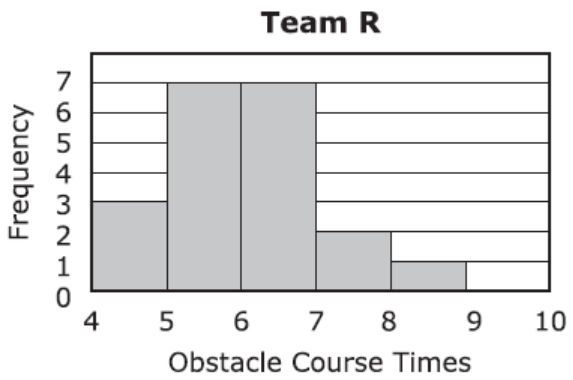
**Part A**

Which Histogram represents the times from Team R on the obstacle course?

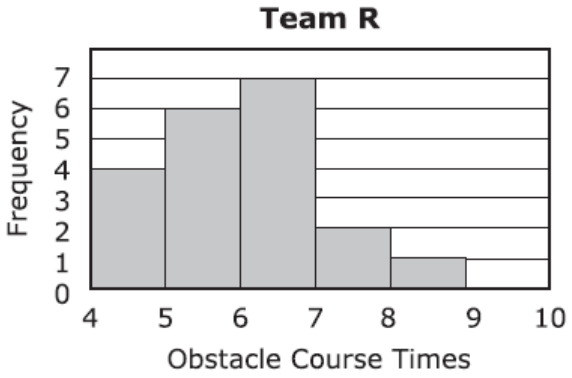
A.



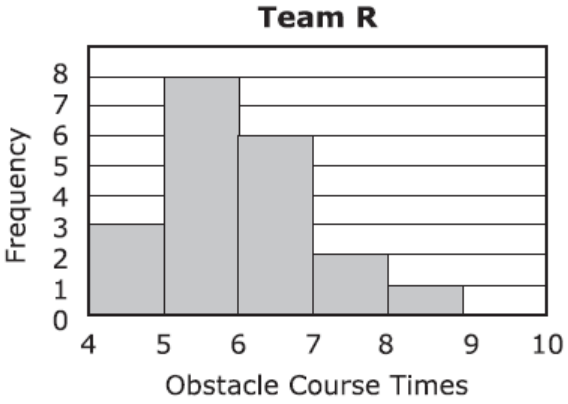

B.




C.




D.




**Part B**

Which statements are true about the data for team Rand team 5? Select **ALL** that apply.

- ☐ The median time of team R is less than the median time of team 5.
- ☐ The median time of team R is greater than the median time of team S.
- ☐ The interquartile range of team R is less than the interquartile range of team S.
- ☐ The interquartile range of team R is equal to the interquartile range of team 5.
- ☐ The data for team R is skewed to the left.
- ☐ The data for team S includes an outlier.

2. The data set shown below has an outlier. Determine the outlier and then answer the questions as to what happens to the median, mean, mode, range and standard deviation when the outlier is removed.

   Data: 29, 19, 35, 27, 21, 40, 23, 12, 24, 26, 20, 28, 30, 22, 19, 32, 22

| If the outlier is excluded, what happens to: | Increase | Decrease | No effect |
|---|---|---|---|
| the median? | ○ | ○ | ○ |
| the mean? | ○ | ○ | ○ |
| the mode? | ○ | ○ | ○ |
| the range? | ○ | ○ | ○ |
| the standard deviation? | ○ | ○ | ○ |

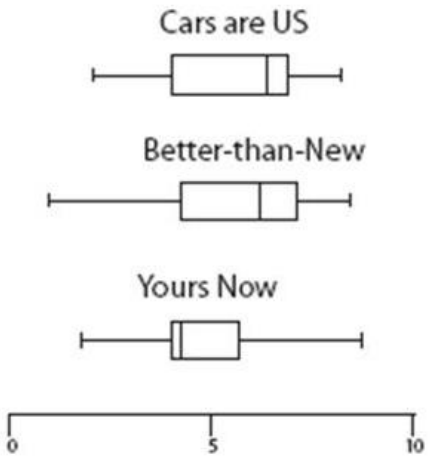
3. Each box-and-whisker plot to the right shows the prices of used cars (in thousands of dollars) advertised for sale at three different car dealers. Suppose Joe wants to go to the dealer whose prices seem least expensive. Which of the following is the best statistical reasoning?

A. Joe should go with Cars are Us because they have the lowest maximum price.

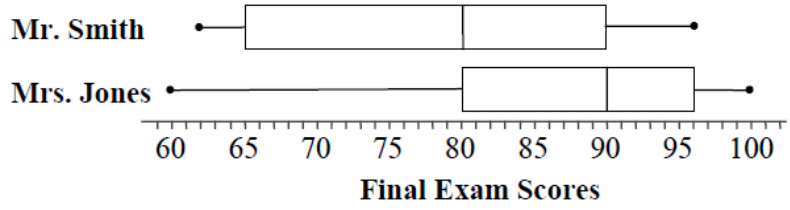
B. Joe should go with Better-than-New because they have the lowest low price of all three.

C. Joe should not go with Yours Now because they have the maximum high price.

D. Joe should go with Yours Now because 75% of their prices fall in the range of the lowest 50% of both the other companies' prices




4. The distributions of two classes' final exam scores are shown below.




Which statement about the box-and-whisker plots is true?

A. 50% of the scores for Mr. Smith's class are between 65 and 80.
B. 50% of the scores for Mrs. Jones' class are between 80 and 100.
C. The median scores for the two classes are the same.
D. The interquartile range of scores for Mr. Smith's class is greater than the interquartile range of the scores for Mrs. Jones' class.

For questions 5-6, use the following scenario.

A survey was made of high-school-aged students owning cell phones with text messaging. The survey asked how many text messages each student sends and receives per day. Some results are shown in the table below.

| | | Number of text messages sent/received per day among teens who text | |
|---|---|---|---|
| Group | Number Surveyed | Mean | Median |
| Girls, 14–17 years old | 270 | 187 | 100 |
| Boys, 14–17 years old | 282 | 176 | 50 |
| Total | 552 | | |

5. A histogram of the girls' responses (not shown) has a strong right skew. Which statement would support that observation?

A. The number of girls' surveyed is greater than the mean number of texts sent by girls.
B. The mean number of texts sent by girls is greater than the median number of texts sent by girls.
C. The mean number of texts sent by girls is greater than the mean number of texts sent by boys.
D. The median number of texts sent by girls is greater than the median number of texts sent by boys.

6. Which group's data has the larger interquartile range?

A. Boys
B. Girls
C. Neither, they are equal.
D. It cannot be computed from the information given.

**MAFS.912.S-ID.2.5 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| completes a two-way frequency table that requires completion of frequencies | creates or completes a two-way frequency table when up to two joint, marginal, or conditional relative frequencies are described within the context; finds the values for joint, marginal, or conditional relative frequency | chooses an interpretation of joint, marginal, and conditional relative frequencies; recognizes possible associations and trends in the data | interprets joint, marginal, and conditional relative frequencies; identifies and concludes associations and trends using a two-way frequency table |

1. A random sample of 200 teenagers participated in a taste test. Each teenager sampled four choices of fruit drink (labeled "A", "B", "C", and "D"), and then were asked to pick a favorite. The table shows the results of this taste test.

| | A | B | C | D | Total |
|---|---|---|---|---|---|
| Boys | 45 | 25 | 30 | 20 | 120 |
| Girls | 25 | 10 | 30 | 15 | 80 |
| Total | 70 | 35 | 60 | 35 | 200 |

Based on the information given, which of the given statements are true? Select **ALL** that apply.

☐ 40% of the participants were girls

☐ 70% of the participants preferred "A"

☐ $\frac{20}{120}$ of the boys preferred "D"

☐ $\frac{10}{35}$ of the participants who preferred "B" were girls

☐ The proportion of boys who preferred "C" is equal to the proportion of girls who preferred "C"

2. You are testing a theory that says that students who speak a foreign language are also strong mathematics students. You survey the freshman class and the results are shown below, in an incomplete two-way frequency table. Answer the questions, regarding this table. (Percentage answers rounded to nearest percent.)

| | Speak a Foreign Language | Do Not Speak a Foreign Language | Totals |
|---|---|---|---|
| Math Average $\geq 90$ | 70 | 15 | |
| Math Average NOT $\geq 90$ | 10 | 50 | |
| Totals | | | |

a) How many students were surveyed?

A. 65 B. 85 C. 145 D. 80

b) What percentage of the students speak a foreign language and have a math average greater than or equal to 90?

A. 41% B. 48% C. 82% D. 88%

c) What percentage of the students with a math average greater than or equal to 90 do not speak a foreign language?

A. 10% B. 18% C. 23% D. 25%

For questions 3-5, use the following scenario.

A survey asked 100 students whether or not they like two sports: soccer and tennis. The results of the survey are shown in the table.

| | | Likes Soccer | |
|---|---|---|---|
| | | Yes | No |
| Likes Tennis | Yes | 12 | 18 |
| | No | 48 | 22 |

3. What is the relative frequency of students who like tennis, soccer, or both?

A. 0.12
B. 0.66
C. 0.78
D. 0.90

4. What is the relative frequency of students who like tennis?

A. 0.12
B. 0.18
C. 0.25
D. 0.30

5. What is the relative frequency of students who like both tennis and soccer?

A. 0.12
B. 0.30
C. 0.60
D. 0.78

6. A high school principal randomly surveyed students about a change in the dress code. The results are shown in the table.

| | | Class | | |
|---|---|---|---|---|
| | | Freshmen | Sophomores | Juniors |
| Favors the change | Yes | 56 | 38 | 32 |
| | No | 24 | 37 | 58 |

**Part A**

What percentage of all respondents favors the policy change?

**Part B**

Which class has the highest favorable percentage? Which class has the lowest favorable percentage?

**Part C**

Is there a relationship between class and favoring the dress code change? Explain.

**MAFS.912.S-ID.2.6 EOC Practice**

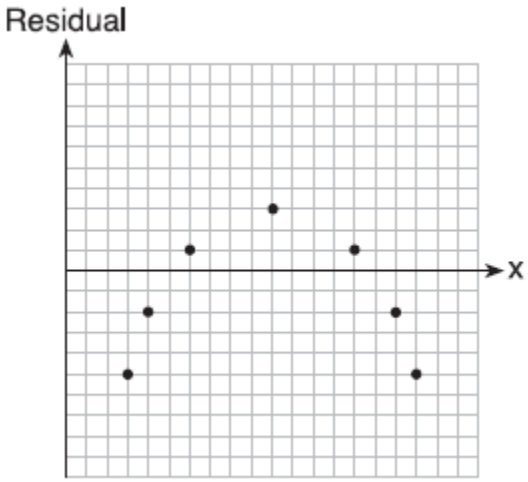
| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| creates a scatter plot of bivariate data | identifies a linear, quadratic, or exponential regression model that fits the data; uses a regression equation to solve problems within the context; interprets correlation coefficient; calculates residuals | creates a residual plot and determines whether the function is an appropriate fit for the data; explains why a situation with correlation does not imply causation | distinguishes variables that are correlated because one is a cause of another; explains why the correlation coefficient may not show a strong correlation; identifies flaws in data where causation is claimed |

1. Which statistic would indicate that a linear function would *not* be a good fit to model a data set?

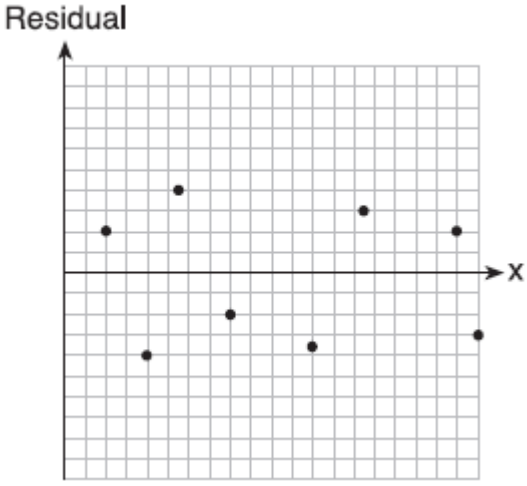
A. $r = -0.93$

B. $r = 1$

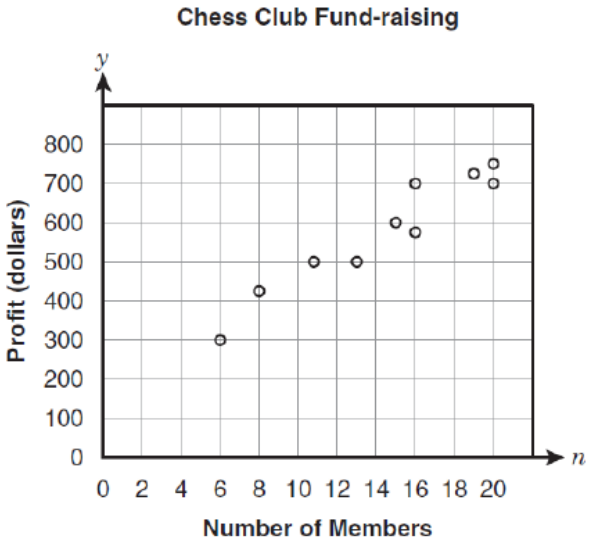
C.




D.



2. Vance graphed the relation between fund-raising profits for the chess club and the number of members.




Which equation represents a line that fits the data?

A. $y = 29n + 180$
B. $y = 60n + 180$
C. $y = \frac{2}{3}n + 180$
D. $y = \frac{200}{3}n + 180$

Professor Plum conducted an experiment on the number of bacteria growing in his lab. The data below shows his results.

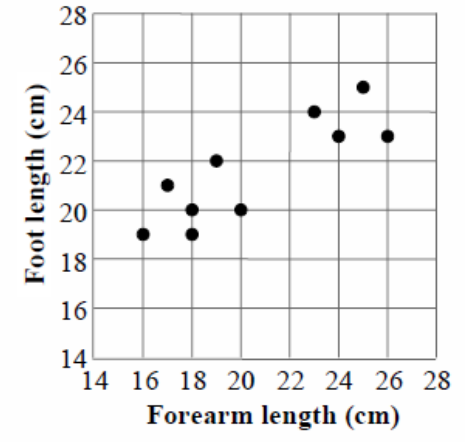
| *Day* | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| *Approximate # of bacteria* | 50 | 100 | 200 | 400 | 800 | 1600 |

Write a function to model this situation. ____

3. Matt drank a super tall glass of soda pop which had 200mg of caffeine. His body can process about 15% of the caffeine every hour. Which of the following best models the number of milligrams of caffeine, $C$, remaining in his body $h$ hours after he drank that soda pop?

A. $C(w) = 200 \cdot (.85)^h$
B. $C(w) = 200 \cdot (.15)^h$
C. $C(w) = 200 - 85h$
D. $C(w) = 200 - 15h$

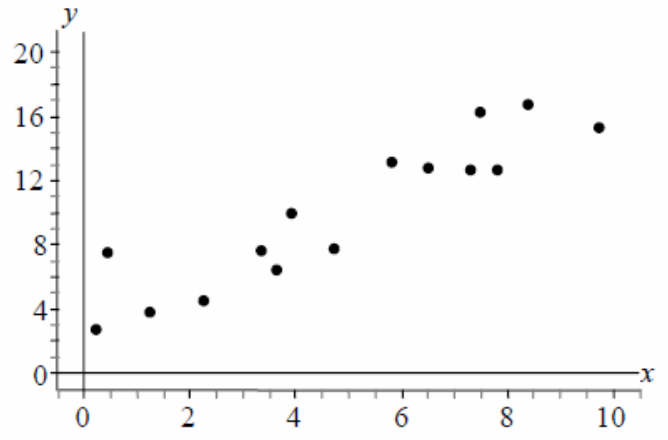
4. The scatterplot below represents the forearm lengths and foot lengths of 10 people.




Based on a linear model of the data, which is the best prediction for the length of a person's foot if his/her forearm length is 21 centimeters?

A. 19 cm
B. 20 cm
C. 22 cm
D. 24 cm

5. The line of best fit for the scatterplot below is $y = 1.4x + 2.9$




What is the residual for the point (4, 10)?

A. -1.5
B. 1.5
C. 8.5
D. 10

**MAFS.912.S-ID.3.8 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| creates a scatter plot of bivariate data | identifies a linear, quadratic, or exponential regression model that fits the data; uses a regression equation to solve problems within the context; interprets correlation coefficient; calculates residuals | creates a residual plot and determines whether the function is an appropriate fit for the data; explains why a situation with correlation does not imply causation | distinguishes variables that are correlated because one is a cause of another; explains why the correlation coefficient may not show a strong correlation; identifies flaws in data where causation is claimed |

1. What does the correlation coefficient tell us?

A. Measure of the exponential association between two variables
B. Measure of the causation of one variable on the other
C. Measure of the linear association between two variables
D. Measure of the distance between a datum and the value predicted by a model

2. The correlation coefficient between two variables is 0.9. How would you describe this value?

A. Strong and positive
B. Strong and negative
C. Weak and positive
D. Weak and negative

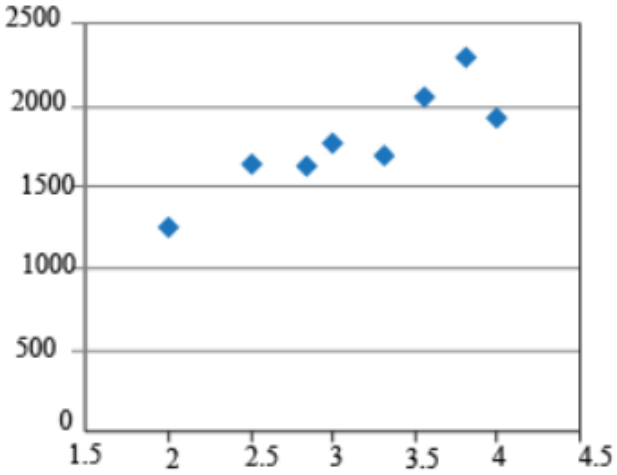
3. We assume that SAT score is linearly associated with GPA and determine the correlation coefficient to be 0.8. What does this value suggest?

A. SAT score decreases as GPA increases
B. There is no relation between SAT score and GPA
C. GPA increases as SAT decreases
D. SAT score increases as GPA increases

4. Evaluate the truth of each statement about the correlation coefficient $r$.

| Statement | TRUE | FALSE |
|---|---|---|
| A value of $r$ near zero indicates there is a weak linear relationship between $x$ and $y$ | | |
| A value of $r = -0.5$ indicates a weaker linear relationship between $x$ and $y$ than a value of $r = 0.5$. | | |
| A value of $r = 1$ indicates that there is a cause-and-effect relationship between $x$ and $y$. | | |

5. The following figure displays a graph showing GPA and SAT score. Based on the scatter plot, which of the following is the best assumption about the correlation between the variables?




A. Positive linear correlation
B. No correlation
C. Negative linear correlation
D. Exponential correlation

**MAFS.912.S-ID.3.9 EOC Practice**

| Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|
| creates a scatter plot of bivariate data | identifies a linear, quadratic, or exponential regression model that fits the data; uses a regression equation to solve problems within the context; interprets correlation coefficient; calculates residuals | creates a residual plot and determines whether the function is an appropriate fit for the data; explains why a situation with correlation does not imply causation | distinguishes variables that are correlated because one is a cause of another; explains why the correlation coefficient may not show a strong correlation; identifies flaws in data where causation is claimed |

1. Fill in the blank: Correlation does not _____ causation.

A. cause
B. imply
C. beat
D. run

2. What is the definition of correlation?

A. Measure of the strength of a linear relationship between two variables
B. Proof that one variable causes another
C. A measure of the strength of causation of one variable on another
D. An implication of causation

3. Which of the following values for r suggests that one variable causes another?

A. -0.7
B. 0
C. 0.9
D. None of the above

4. What does an r value of -0.89 suggest about two variables?

A. That an increase in the independent variable causes the dependent variable to decrease
B. That an increase in the independent variable causes the dependent variable to increase
C. As the independent variable increases, the dependent variable increases
D. As the independent variable increases, the dependent variable decreases