

**STUDENT READINESS ASSESSMENT
ITEM RELEASE GUIDE
STUDENT EDITION
ALGEBRA 1**

Algebra 1

Reporting Category:

Number, Quantities, Equations and Expressions

CRITICAL AREA OF FOCUS #1

Relationships Between Quantities and Reasoning with Equations

CRITICAL AREA OF FOCUS #4

Expressions and Equations

Question _____

Michelle holds a small rock in her hand.

Density (D) can be found using the formula $D = \frac{\text{mass}}{\text{volume}}$

Which unit would be the **most** appropriate for calculating the density of the rock in Michelle's hand?

- (A) $\frac{\text{lb}}{\text{mm}^3}$
- (B) $\frac{\text{g}}{\text{cm}^3}$
- (C) $\frac{\text{kg}}{\text{m}^3}$
- (D) $\frac{\text{ton}}{\text{m}^3}$

Question _____

Select the most appropriate unit for each situation.

	$\frac{\text{feet}}{\text{minute}}$	$\frac{\text{square feet}}{\text{minute}}$	$\frac{\text{cubic feet}}{\text{minute}}$
Rate of walking to school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rate of painting a bedroom wall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rate of filling a bucket with water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rate of mopping the kitchen floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Question _____

Trent plants a sunflower that is 6 inches tall. The sunflower is expected to grow at an average rate of 1.5 inches per day during the next month.

- A. Create an equation that Trent can use to find the number of days, x , it will take the sunflower to grow to a height of 45 inches.
- B. How many days will it take the sunflower to grow to a height of 45 inches?

A.

B. days

Question_____

A factory has two assembly lines, M and N, that make the same toy. On Monday, only assembly line M was functioning, and it made 900 toys.

On Tuesday, both assembly lines were functioning for the same amount of time. Line M made 300 toys per hour and line N made 480 toys per hour. Line N made as many toys on Tuesday as line M did over both days.

Write an equation that can be used to find the number of hours, t , that the assembly lines were functioning on Tuesday.

Question_____

Stephanie adds pennies, nickels and quarters to a scale until the mass of the combined coins is 75 grams. Each penny has a mass of 2.5 grams, each nickel has a mass of 5 grams and each quarter has a mass of 5.7 grams.

Create an equation to model this situation, where x is the number of pennies, y is the number of nickels and z is the number of quarters that Stephanie can put on the scale so that the mass of the combined coins is exactly 75 grams.

Question_____

Tim is sorting his book collection into groups. He places each group onto bookshelves that can each hold a maximum of 25 pounds. His collection includes hardcover books that weigh 3 pounds each and softcover books that weigh 2 pounds each.

Select all of the possible numbers of hardcover books that could be on one bookshelf.

- 3
- 4
- 8
- 9
- 12

Question _____

The equation shown is used to find the force of gravity, F , between two objects, where

- G is the gravitational constant,
- m_1 and m_2 are the masses of the two objects, and
- r is the distance between the two objects.

$$F = \frac{Gm_1m_2}{r^2}$$

Which equation correctly shows the distance between the two objects?

- (A) $r = \frac{\sqrt{F}}{Gm_1m_2}$
- (B) $r = \frac{\sqrt{Gm_1m_2}}{F}$
- (C) $r = \sqrt{\frac{F}{Gm_1m_2}}$
- (D) $r = \sqrt{\frac{Gm_1m_2}{F}}$

Question _____

An equation is given.

$$A = 4 \pi r^2$$

Solve the equation for r .

- (A) $r = \sqrt{\frac{4 \pi}{A}}$
- (B) $r = \sqrt{\frac{A}{4 \pi}}$
- (C) $r = \frac{4 \pi A}{2}$
- (D) $r = \frac{A}{2 \pi}$

Question _____

An equation is given.

$$y = 3x + c$$

Create an equivalent equation by solving for x in terms of y and c .

$x =$

Question _____

This item has three parts.

Eleanor incorrectly solves the equation $\frac{1}{2}(x + 18) = 4(2x - 6) - 9x$.

Part A. Select the first equation in which Eleanor makes an error.

Step	Equation
Given	$\frac{1}{2}(x + 18) = 4(2x - 6) - 9x$
1.	$x + 18 = 8(2x - 6) - 9x$
2.	$x + 18 = 16x - 48 - 9x$
3.	$x + 18 = 7x - 48$
4.	$66 = 6x$
5.	$x = 11$

Part B. Create an equation to correct Eleanor's error identified in Part A.

Part C. What is the correct solution to $\frac{1}{2}(x + 18) = 4(2x - 6) - 9x$?

$x =$

Question_____

What is the solution to the equation $12(x + 5) = 4x$?

$x =$

Question_____

An equation is shown.

$$3x + \frac{4}{5} = 7 - 2x$$

What is the solution to the equation?

$x =$

Question_____

An equation is shown.

$$16x^2 + 10x - 27 = -6x + 5$$

What are the solutions to this equation?

$x =$

$x =$

Question _____

A system of equations is given.

$$y = x^2 - 9$$

$$y = -2x - 1$$

What is one solution to the system of equations?

(,)

Question _____

Lena sells custom-printed T-shirts at her shop. She can sell 120 T-shirts in a month if she charges \$14 for each T-shirt. She plans to change the price per T-shirt by a fixed amount n times. The revenue, in dollars, after n changes in price can be modeled by the expression $(120 + 5n)(14 - 3n)$.

Based on the information, complete the sentence about Lena's T-shirt sales.

For each in the price per T-shirt by \$, Lena will sell T-shirts in a month.

Drop down choices:

For each in the price per T-shirt by \$, Lena

increase
decrease

3
5
9
14
17

will sell T-shirts in a month.

3 more
5 more
14 more
3 fewer
5 fewer
9 fewer

Question_____

Samantha sells two types of wristbands, rope or beaded. She charges more for beaded wristbands than for rope wristbands. The amount of money, in dollars, that she collects from selling x wristbands of one type and y wristbands of the other type can be modeled by the expression $5x + 8y$.

What does the variable y represent in this situation?

- Ⓐ the number of rope wristbands sold
- Ⓑ the number of beaded wristbands sold
- Ⓒ the selling price of one rope wristband
- Ⓓ the selling price of one beaded wristband

Question_____

Henry places x marbles into an empty bucket. Each marble has the same weight.

The weight, in ounces, of the bucket and marbles can be calculated using the expression shown.

$$3x + 8$$

What does the term 8 represent in this expression?

- Ⓐ the weight of each marble
- Ⓑ the weight of the empty bucket
- Ⓒ the number of marbles in the bucket
- Ⓓ the total weight of the bucket and marbles

Question_____

An expression is given.

$$(2x + 8)(5x - 7)$$

Which expression is equivalent to the given expression?

- Ⓐ $36x - 56$
- Ⓑ $10x^2 - 56$
- Ⓒ $10x^2 + 26x - 56$
- Ⓓ $10x^2 + 54x + 56$

Question_____

An expression is shown.

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

Which expression is equivalent to the given expression?

- Ⓐ $9x - 1$
- Ⓑ $14x + 5$
- Ⓒ $12x^2 + 2x - 1$
- Ⓓ $12x^2 + 10x - 3$

Algebra 1

Reporting Category:

Functions

CRITICAL AREA OF FOCUS #2

Linear and Exponential Relationships

CRITICAL AREA OF FOCUS #5

Quadratics Functions and Modeling

Question_____

A total of 330 children and adults attended a school play. There were 21 times as many children in attendance as there were adults.

This situation is modeled by the given system of equations, where a represents the number of adults and c represents the number of children.

$$c = 21a$$

$$a + c = 330$$

How many children attended the play?

Question_____

A system of equations is given.

$$\begin{cases} y + 2 = 3(x - 1) \\ y = -2x + 10 \end{cases}$$

What is the solution to the system?

(,)

Question_____

What two numbers have a sum of 217 and a difference of 85?

Question _____

An equation is given.

$$5y - 2x = 5$$

Create an ordered pair that represents one point on the graph of the equation.

(,)

Question _____

The points $(0, 1)$ and $(1, 4)$ are contained in the graph of an equation with only two variables, x and y .

Select all of the true statements.

- There is exactly one equation in the form $y = mx + b$ that contains these points.
- There are two equations in the form $y = mx + b$ that contain these points.
- There are no equations in the form $y = a \cdot b^x$ that contain these points.
- There is exactly one equation in the form $y = a \cdot b^x$ that contains these points.
- There is more than one equation in the form $y = a \cdot b^x$ that contains these points.

Question _____

A linear function is given.

$$a(x) = 26 - 12.4x$$

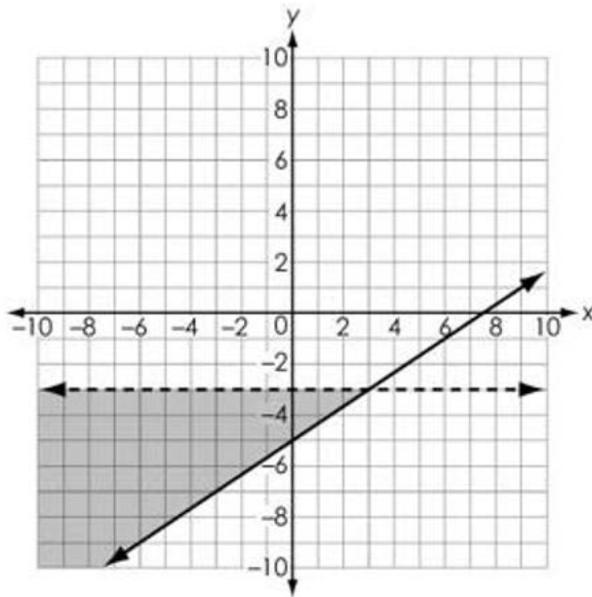
The function b is also linear. The equation $a(x) = b(x)$ has exactly one solution at $x = 5$.

Create a possible equation for function b .

$b(x) =$

Question _____

The graph of a system of inequalities is shown.



Create the system of inequalities that is represented by the graph.

Question _____

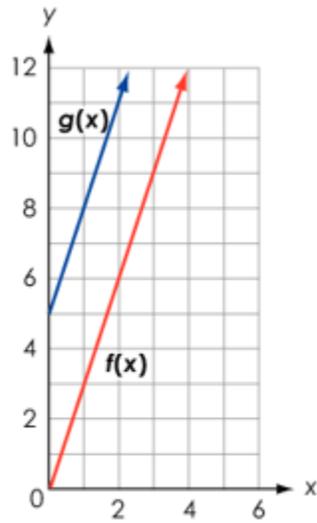
The first four terms of an arithmetic sequence are given.

27, 32, 37, 42, ...

What is the 60th term of the sequence?

Question _____

The graphs of two functions, $f(x)$ and $g(x)$, where $g(x) = f(x) + h$, are shown.



Based on the graph, what is the value of h ?

$h =$

Question _____

Ryan works for a delivery service. The function $f(n)$ is used to calculate his daily pay, in dollars, on a day when he makes n deliveries.

$$f(n) = 7n + 96$$

Use the function to complete the table shown.

Number of Deliveries	Daily Pay (dollars)
0	<input type="text"/>
5	<input type="text"/>
<input type="text"/>	145

Question_____

A function is given.

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

What is the value of $f(-2)$?

$$f(-2) = \text{[input box]}$$

Question_____

The values of several terms in a sequence are shown in the table.

Term	Value
Second	5
Fourth	12
Seventh	22.5

Find the first term, $f(1)$.

$$f(1) = \text{[input box]}$$

Question_____

A sequence is shown.

3, 6, 12, 24, 48, ...

Which function, $f(n)$, represents the n th term of the sequence, where $f(1) = 3$?

(A) $f(n) = 2 \cdot 3^{n-1}$

(B) $f(n) = 3 \cdot 2^{n-1}$

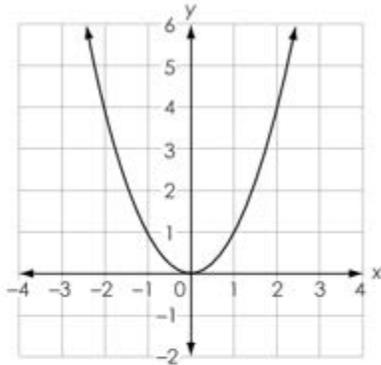
(C) $f(n) = 3 \cdot 2^n$

(D) $f(n) = 6^n$

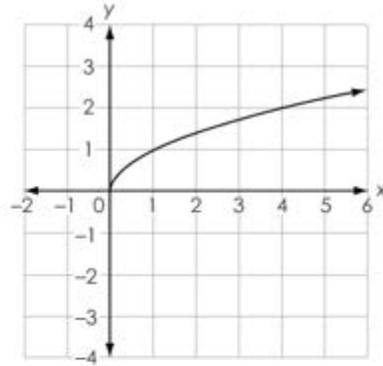
Question _____

Which graph represents a function whose domain is the set of non-negative real numbers?

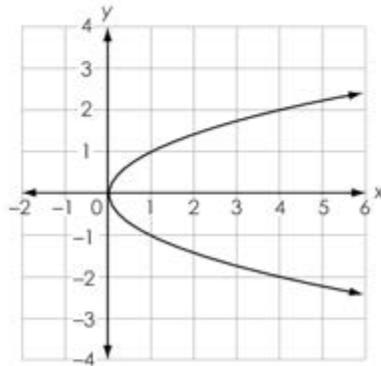
(A)



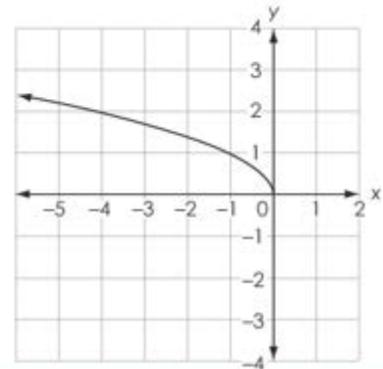
(C)



(B)



(D)



Question _____

The manager of a company uses the function shown to model its daily profit based on the price of a product in dollars, x .

$$f(x) = (x - 22)(53 - x)$$

- A. What is the minimum price, in dollars, to avoid a loss?
- B. What is the maximum price, in dollars, to avoid a loss?
- C. What is the price, in dollars, that results in the greatest profit?

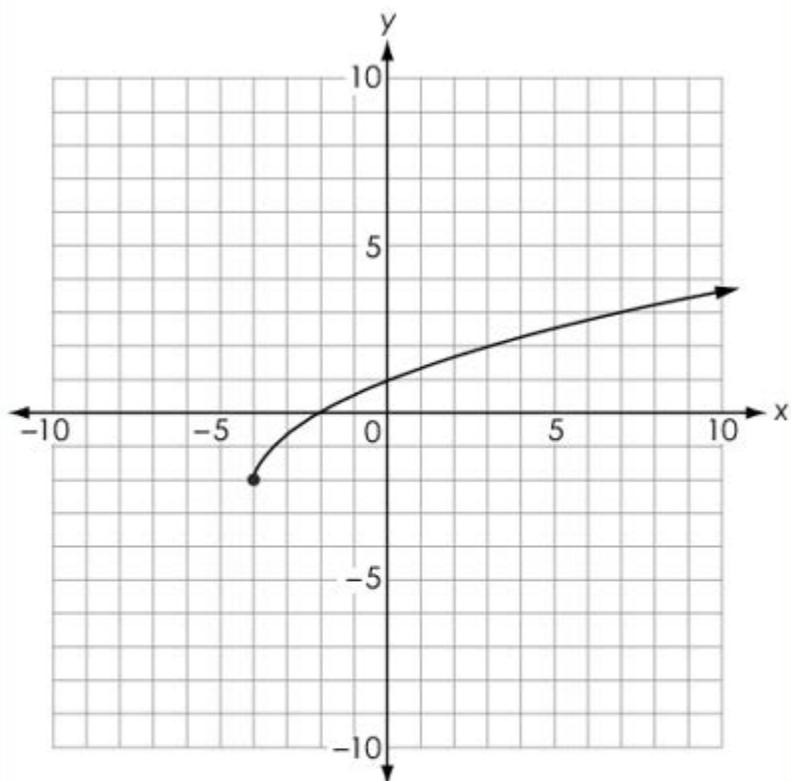
A. \$

B. \$

C. \$

Question_____

The graph of a function is shown.



What is the domain of the function?

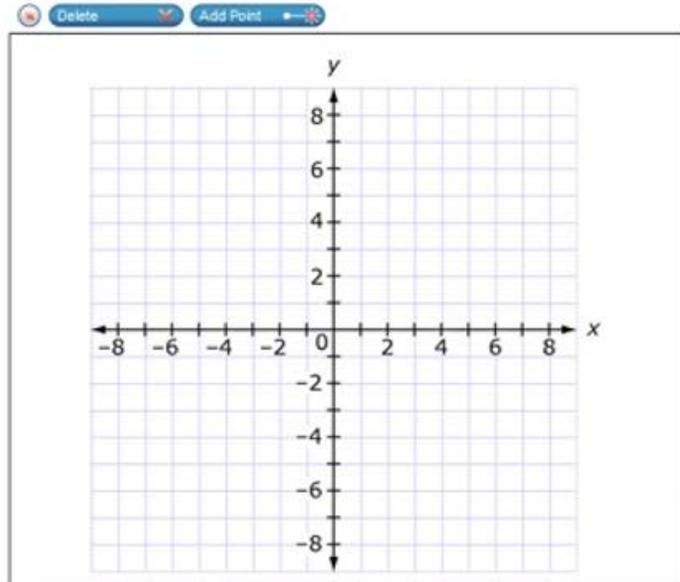
- (A) $x \geq -4$
- (B) $x \geq -2$
- (C) $x \geq 0$
- (D) $x \geq 1$

Question_____

A function is given.

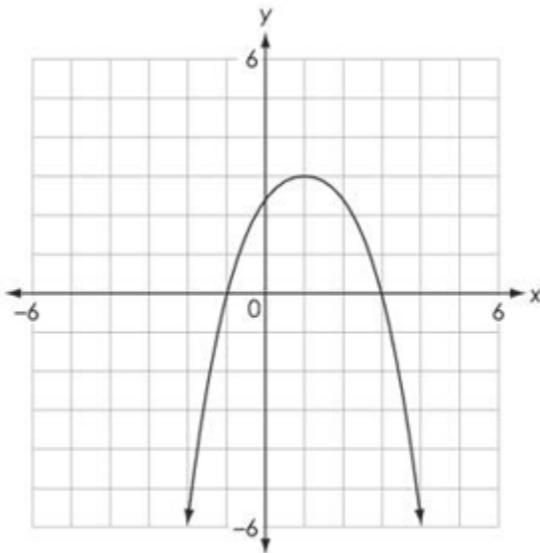
$$f(x) = (2x - 2)(x - 3)$$

Use the Add Point tool to plot the zeros and the maximum or minimum value of the function.



Question_____

The graph of a function is shown.



What is the maximum value of the function?

Question _____

Which situation describes a quantity that increases by a constant percent rate?

- (A) The size of one photo is 15% larger than the size of another photo.
- (B) The number of plants in a pond is 85% of the number from the previous year.
- (C) The population of one city is 85% greater than the population of another city.
- (D) The number of magazine subscribers each year is 15% greater than the previous year.

Question _____

Some values for a function are shown in the table.

x	$f(x)$
0	0
2	25
3	50

Which statement best describes the function?

- (A) It is linear because $f(x)$ increases by a constant amount compared to x .
- (B) It is linear because $f(x)$ increases by a constant percentage compared to x .
- (C) It is not linear because $f(x)$ does not increase by a constant amount compared to x .
- (D) It is not linear because $f(x)$ does not increase by a constant percentage compared to x .

Question _____

Emerson has \$120. Each week, he saves an additional \$15.

Write a function $f(x)$ that models the total amount of money Emerson has after x weeks.

$f(x) =$

Question _____

An incomplete table of values for an exponential function is shown. The exponential function is of the form $y = a \cdot b^x$, where a is a real number such that $a \neq 0$ and b is a positive real number not equal to 1.

Complete the table with possible values for the exponential function.

x	0	1	2	3
y	96	<input type="text"/>	<input type="text"/>	<input type="text"/>

Question _____

The manager of a company uses the function shown to model its daily profit based on the price of a product in dollars, x .

$$f(x) = (x - 22)(53 - x)$$

- A. What is the minimum price, in dollars, to avoid a loss?
- B. What is the maximum price, in dollars, to avoid a loss?
- C. What is the price, in dollars, that results in the greatest profit?

A. \$

B. \$

C. \$

Question_____

Functions $f(x)$ and $g(x)$ are given.

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

$$g(x) = 2x$$

Which statement about $f(x)$ and $g(x)$ is true?

- Ⓐ $f(x) > g(x)$ for all values of x .
- Ⓑ $g(x) > f(x)$ for all values of x .
- Ⓒ $f(x) > g(x)$ for all values of x where $x > 2$.
- Ⓓ $g(x) > f(x)$ for all values of x where $x > 2$.

Question_____

A fitness club charges members an initial fee and a separate monthly membership fee. The equation of the function given models the total fee, $f(x)$, in dollars, that a person pays for x months of membership.

$$f(x) = 30x + 25$$

What does the number 30 represent in this situation?

- Ⓐ the initial membership fee
- Ⓑ the monthly membership fee
- Ⓒ the number of months that a person is a member
- Ⓓ the total amount that a member pays in monthly fees

Algebra 1

Reporting Category:

Statistics

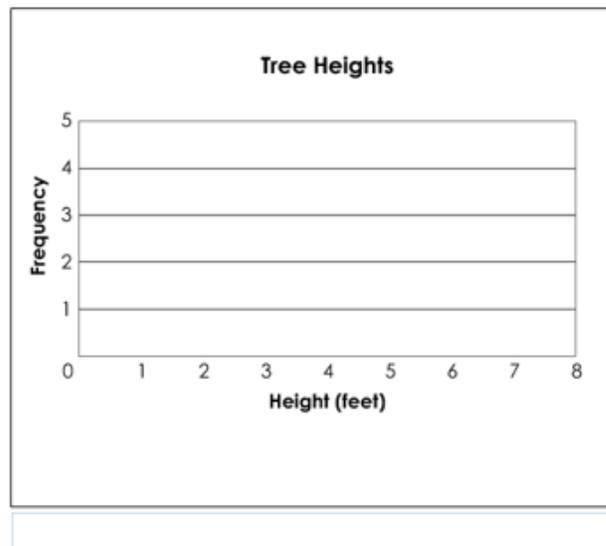
CRITICAL AREA OF FOCUS #3
Descriptive Statistics

Question _____

A landscaper records the heights, in feet, of 15 newly planted trees in a community garden, as shown.

3.2, 4.3, 3.5, 5.4, 3.7,
5.5, 6.2, 3.1, 6.8, 7.1,
4.8, 6.5, 4.9, 5.3, 5.9

Complete the histogram by selecting frequencies for the heights of the newly planted trees in the community garden.



Question _____

Which statistical measure changes when every number in a data set is increased by 10?

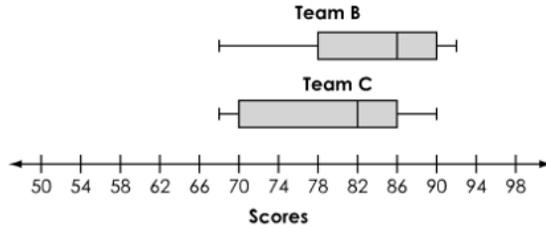
- (A) range
- (B) mean
- (C) standard deviation
- (D) interquartile range

Question _____

A gym teacher compares the points scored by three basketball teams in their last 11 games. The points scored by Team A are shown.

Team A										
62	72	74	74	76	78	82	85	88	88	92

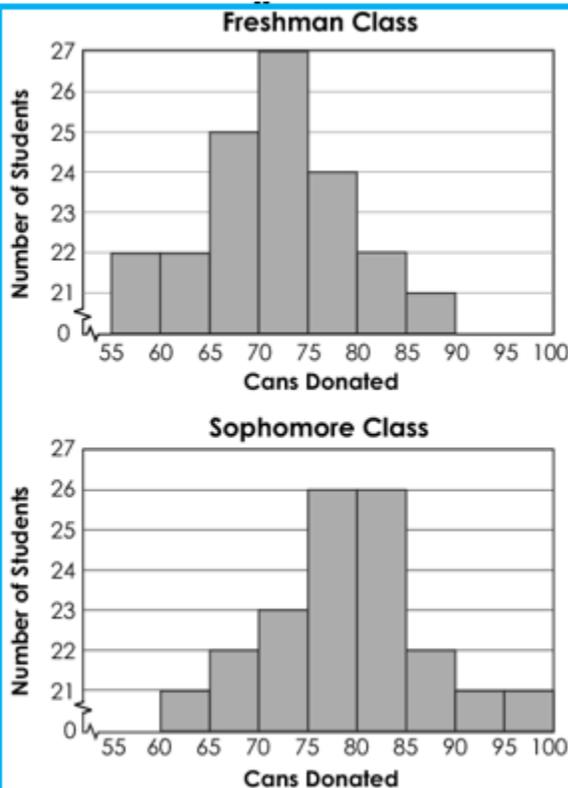
The scores of Team B and Team C are shown by the following box plots:



Select a box in each row of the table to compare the median scores and the interquartile range of scores for the three teams.

	Team A	Team B	Team C
Lowest Median Score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Highest Median Score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smallest Interquartile Range of Scores	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Largest Interquartile Range of Scores	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Question _____



The histograms shown display the number of cans of food donated by students in the freshman class and the sophomore class at a school.

Which statement is true?

- (A) The freshman class has a lesser mean number of cans donated than the sophomore class.
- (B) The freshman class has the same median number of cans donated as the sophomore class.
- (C) The freshman class has a greater mean number of cans donated than the sophomore class.
- (D) The freshman class has a greater median number of cans donated than the sophomore class.

Question _____

Alton studies the growth patterns of sassafras trees and yellow birch trees in the 88 counties in Ohio. He finds that

- approximately 27% of the counties have both species of trees,
- yellow birch only grows in 24 counties, and
- 1 out of 11 counties grows neither species.

Complete the table to show the relationship between the number of counties where sassafras trees and yellow birch trees grow.

	Sassafras Grow	Sassafras Do Not Grow	Total
Yellow Birch Grow	<input type="text"/>	<input type="text"/>	<input type="text"/>
Yellow Birch Do Not Grow	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total	<input type="text"/>	<input type="text"/>	88

Question _____

The population of a town has grown by an average of 2,000 people per year over the last 10 years.

Which equation could represent an appropriate linear model of the population?

- (A) $y = 25,000x + 2,000$
- (B) $y = 2,000x + 25,000$
- (C) $y = -25,000x + 2,000$
- (D) $y = -2,000x + 25,000$

Question _____

Select all of the correlation coefficients that represent a linear model with a weak correlation.

- 0.982
- 0.618
- 0.103
- 0.204
- 0.907
- 1

Question _____

Bryson collects data on the depth of a river at various points and the velocity of the river at those points. His data have a correlation coefficient of -0.9382 .

Which scatterplot could represent Bryson's data?

