Algebra I EOC Study Guide

*Directions: Select the best answer.*

1) Which of the following sets *CORRECTLY* show *ALL* possibilities for the product of two irrational numbers*?*

A)

$$\frac{1}{8} * \sqrt{20} = \frac{\sqrt{5}}{2}$$

$$\pi * \pi = \pi^2$$

The product of two irrational numbers will always be irrational.

B)

$$0 * \sqrt{40} = 0$$

$$\sqrt{7} * \sqrt{7} = 7$$

The product of two irrational numbers will always be rational.

C)

$$\sqrt{8} * \sqrt{32} = 16$$

$$\pi * \sqrt{27} = 3\pi\sqrt{3}$$

The product of two irrational numbers can be rational or irrational.

D)

$$\frac{3}{9} * 2.\bar{1} = \frac{22}{9}$$

$$\sqrt[3]{343} * 6\frac{1}{4} = 43.74\bar{9}$$

The product of two irrational numbers is always irrational.

2) Carleigh has a punch bowl that can hold 4.75 quarts of liquid.  The ladle she uses to pour the punch into glasses holds 1.5 cups of liquid.  Carleigh decides that this ladle is the perfect amount to put in each glass.  What is the maximum amount of glasses Carleigh will be able to fill using this ladle if she has filled her punch bowl to capacity?

A) 8 glasses        B) 12 glasses        C) 13 glasses        D) 25 glasses

3) Ryan is going to visit a college that is 600 kilometers away.  The cost of gas is 86 cents per liter, and Ryan's car can get 8982 meters per liter.  How much will Ryan spend in gas to travel to the college *AND* back home?

A) $114.90        B) $121.40        C) $124.85        D) $143.79

4) The formula for gravity is $F = \frac{Gm_1 m_2}{r^2}$ where *F* represents the force of gravity, *G* represents a constant equal to 6.67x10$^{-11}$ N-m²/kg², $m_1$ and $m_2$ represents the masses of the two different bodies, and *r* represents the radius or distance between the two bodies.   A scientist wants to observe the different effects of using different radii with the same force and object masses.  To simplify his observations, he rearranges the gravity formula by solving for the radius.  Which formula is he now using?

A) $r = F\sqrt{Gm_1 m_2}$      B) $r = \sqrt{\frac{F}{Gm_1 m_2}}$      C) $r = \sqrt{\frac{Gm_1 m_2}{F}}$      D) $r = \sqrt{FGm_1 m_2}$

5) Which of the following equations is true?

A) $(x^2 + 5x - 3) + (4x^2 - 2x + 8) = 4x^2 + 3x + 5$

C) $(2x^3 - 4x) - (12x^2 - 3x) = 10x - 7$

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

D) $(5x^5 + 3x^2) + (12x^5 - 6x^2) = 17x^{10} - 3x^4$

6) A triangle has a base that measures $(4x - 8)$ units and an altitude that measures $(6x + 10)$ units.  Which algebraic expression represents the area of this triangle?
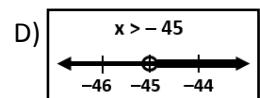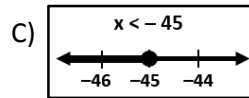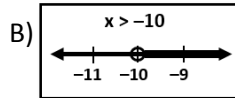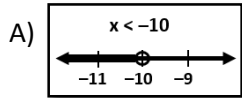
A) $12x^2 - 4x - 40$

C) $6x^2 - 2x - 20$

B) $12x^2 - 40$

D) $6x^2 - 20$

7) Which algebraic expression represents the area of the shaded region in the figure below?



$x^2 - 3$

$2x - 1$

$3x - 2$

$x$

$10x + 9$

$2x^2 + x + 12$
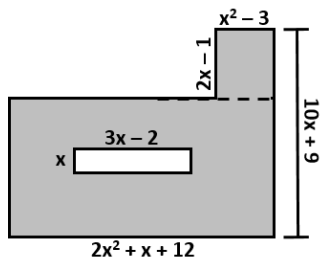
A) $18x^3 + 24x^2 + 102x + 123$

B) $3x^2 + 17x + 15$

C) $4x^3 + 16x^2 - 9x + 111$

D) None of these answers

8) Which set shows the correct solution and graph of the inequality $-\frac{3}{2}x - 4 < 11$?

A)
$x < -10$



$-11 \quad -10 \quad -9$

B)
$x > -10$



$-11 \quad -10 \quad -9$

C)
$x < -45$



$-46 \quad -45 \quad -44$

D)
$x > -45$



$-46 \quad -45 \quad -44$

9) Judy can buy 4 hot dogs and 3 hamburgers for $11.35. From the same restaurant, John can get 5 hot dogs and 2 hamburgers for $10.25. What is the price of a hot dog?

A) $1.50          B) $1.25          C) $1.15          D) None of these answers

10) David sells remote control helicopters. Each helicopter costs $14.26 to make. David wants to make a profit of $10.50 per helicopter. David just signed a 12-month contract with a local mall to rent space for his store at a rate of $500 per month. As part of the contract, David has to pay a one-time fee of $700. Which of the following statements is *NOT* true?

A) If E(h) represents the total amount of expenses for David's business, then E(h) = 14.26h + 6700 where *h* is the number of helicopters manufactored.

B) To meet his profit goal for each helicopter sold, David needs to sell each helicopter for $24.76 (before taxes).

C) David uses P(h) – E(h) = R(h) to find the revenue he can potentially earn for his business. In this formula, the function *P(h)* represents profit, *E(h)* represents expenditures, *R(h)* represents total revenue, and *h* represents the number of helicopters sold. An appropriate domain for this formula would be whole numbers.

D) David uses P(h) – E(h) = R(h) to find the revenue he can potentially earn for his business. In this formula, the function *P(h)* represents profit, *E(h)* represents expenditures, *R(h)* represents total revenue, and *h* represents the number of helicopters sold. An appropriate range for this formula would be R(h) ≥ 0.

11) Which of the following figures does NOT represent a function?

A)


B)
INPUT          OUTPUT

3
4
5
2
7

C)
(6, 1), (2, 5),
(3, 4), (2, 6),
& (– 4, 0)

D)
$y = 2x$
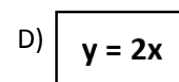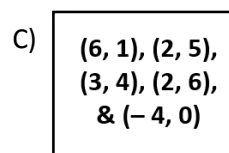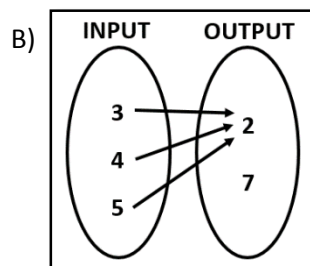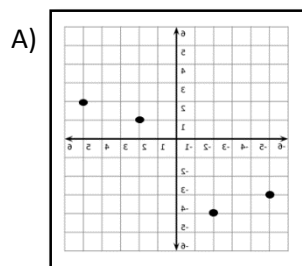
12) Which algebraic proof is incorrect?

A)

| Statements | Reasons |
| --- | --- |
| 4(x − 3) = 16 | Given |
| 4x − 12 = 16 | Distributive Property |
| 4x = 28 | Addition Property of Equality |
| x = 7 | Division Property of Equality |

C)

| Statements | Reasons |
| --- | --- |
| 8x + 2x − 6 = 4 | Given |
| 10x − 6 = 4 | Combine Like Terms |
| 10x = 10 | Addition Property of Equality |
| x = 1 | Division Property of Equality |

B)

| Statements | Reasons |
| --- | --- |
| 8x − 12 = 6x + 19 | Given |
| −12 = −2x + 19 | Subtraction Property of Equality |
| −31 = −2x | Subtraction Property of Equality |
| 15.5 = x | Division Property of Equality |
| x = 15.5 | Symmetric Property |

D)

| Statements | Reasons |
| --- | --- |
| − 4(x + 6) = 2 | Given |
| − 4x + 6 = 2 | Distributive Property |
| − 4x = − 4 | Subtraction Property of Equality |
| x = 1 | Division Property of Equality |

13) Which of the following is *NOT* true regarding the sequence −6, −1, 4, 9, … ?

A) The explicit form of this sequence is $a_n = 5n − 11$.

C) The recursive form of this sequence is $t_n = t_{n−1} + 5$ where $t_1 = −6$.

B) The domain of this sequence is all natural numbers, and the range is −6, −1, 4, 9, …

D) The graph below represents this sequence.
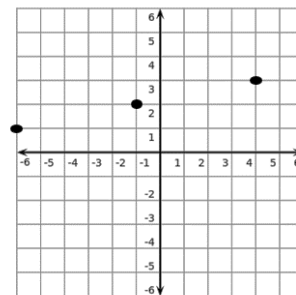


14) Which of the following statements is NOT true about the linear function $f(x) = −\frac{2}{3} x + 1$?

A) The y-intercept is (0, 1).

B) The function is increasing on the interval $(−\infty,\infty)$.

C) As x → ∞, f(x) → −∞.

D) The domain is $\mathbb{R}$.

15) Which polynomials does NOT have a factor of x + 6?

A) $2x^2 + 7x − 30$

C) $x^2 + 2x − 24$

B) $4x^3 − 24x^2 − x + 6$

D) $2x^4 + 12x^3$

16) The Smith family hired a contractor to enclose a designated area for a garden. The area of this garden was $(x^2 + 10x + 24)$ units. After one year, the Smith family decided to expand their garden by increasing its length. The area of the new expansion is $(2x^2 + 15x + 28)$ units. What are the dimensions of the new addition?



x + 6

NEW EXPANSION

ORIGINAL GARDEN
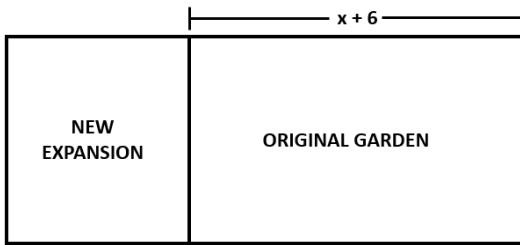
Note: The figure is not drawn to scale.

A) length: 2x + 7
   width: x + 4

B) length: x + 16
   width: x + 12

C) length: 2x + 6
   width: x + 14

D) length: 2x – 1
   width: x + 7

17) A football is thrown into the air. The function $h(t) = -16t^2 + v_0t + h_0$ represents the path of the football where $v_0$ is the initial velocity, $h_0$ is the initial height at which the football was thrown, and $t$ represents time in seconds. When the football leaves the quarterback's hand, it is 8 feet above the ground. The initial velocity was determined to be 92 feet per second. Approximately what is the maximum height the football reaches?

A) 8 feet          B) 125 feet          C) 140 feet          D) 220 feet

18) Which pair of graphs accurately shows the transformation of the parent function, g(x), and its transformation, g(x + 2)?

A)

g(x)
g(x+2)

B)

g(x)
g(x+2)

C)

g(x+2)
g(x)

D)

g(x+2)
g(x)
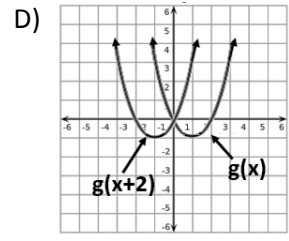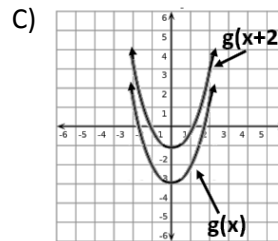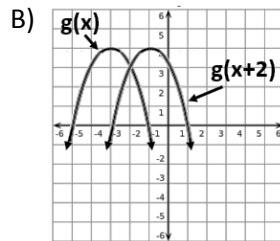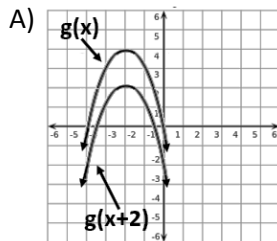
19) Which of the following is true regarding the function $m(x) = 2x^2 + x - 6$?

A) The zeros are 1.5 and 2.

B) The function has a maximum value at (–0.25, –6.125).

C) The end behavior of the left arm is represented by "as $x \to -\infty$, $m(x) \to -\infty$".

D) The function increases on the interval [–0.25, ∞).

20) Which set of quadratic functions are NOT coincidental?

A) $f(x) = (x - 12)(x + 8)$
   $g(x) = (x - 2)^2 - 100$

B) $f(x) = 6x^2 + x - 1$
   $g(x) = (2x + 1)(3x - 1)$

C) $f(x) = 4x^2 - 49$
   $g(x) = (2x - 7)^2$

D) $f(x) = x^2 - 11x + 24$
   $g(x) = (x - 5.5)^2 - 6.25$

21) Cameron has been given a check in the amount of $2000 from his grandparents as a gift for graduating from high school. Cameron opens a bank account, and the bank has offered to pay 0.5% interest that compounds twice a year. If he leaves the money in the bank, what will his bank balance be in 4 years after he graduates from college?

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = total amount after $t$ years
P = principal amount
r = annual rate
n = number of times the interest is compounded each year
t = number of years

    A) $2040.35          B) $2020.08          C) $2040.30          D) $2548.86

22) What is the value of x in the equation $27^x * 3^{5x-4} = \frac{1}{9^x}$ ?

    A) x = 3          B) $x = \frac{2}{5}$          C) $x = \frac{4}{3}$          D) None of these values

23) Given the functions j(x) and w(x), which transformation does *NOT* occur for the parent function, w(x)?

$w(x) = 2^x$

$j(x) = -3*2^{x-4} + 5$

    A) reflection          C) horizontal translation left

    B) vertical stretch          D) vertical translation up

24) Which of the following is *NOT* true about the sequence 0.25, 0.75, 2.25, 6.75, ...

    A) The recursive form is represented by $t_n = 3*t_{n-1}$ where $t_1 = 0.25$.

    B) $a_{10} = 4920.75$

    C) The common ratio is 3.

    D) A linear function would be an appropriate line of regression for this sequence.

25) For which function is the average rate of change the greatest for the interval $0 \le x \le 2$?

$f(x) = \frac{7}{2}x + 2$

g(x)

h(x)

| x | j(x) |
|---|------|
| 1 | 0.5 |
| 2 | 1 |
| 3 | 2 |
| 4 | 4 |
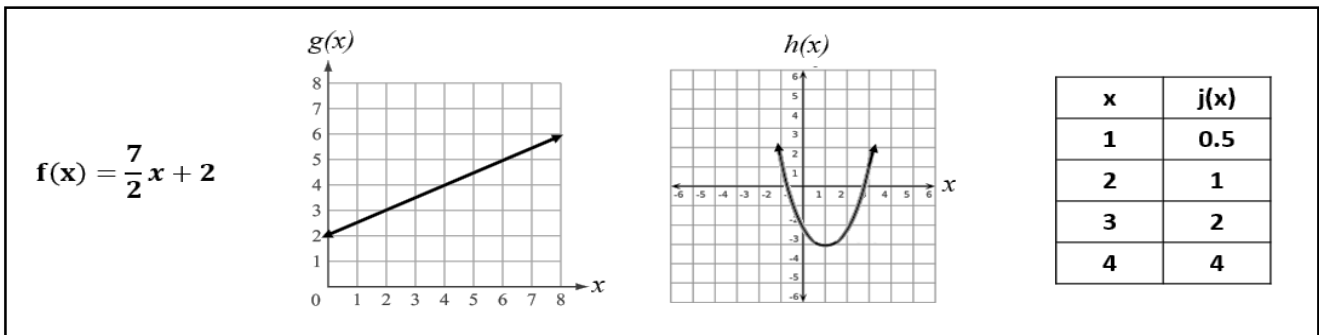
    A) f(x)          B) g(x)          C) h(x)          D) j(x)

26) Given the two functions, f(x) and g(x), which statement is accurate?

f(x)

g(x)
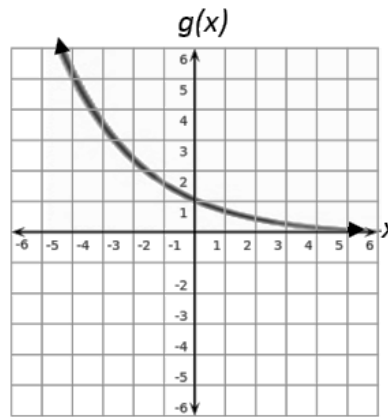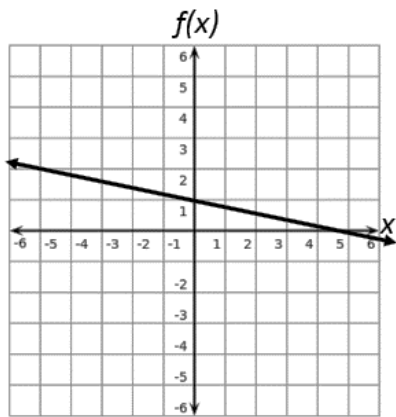
A) Both functions have a y-intercept of 5.

B) Both functions have a range of $(-\infty, \infty)$.

C) Both functions are positive for all values of x.

D) Both functions have the same end behavior for the left arm.

27) Figure A, Figure B, and Figure C each represent a different set of data collected using surveys. Each set of data represents customer reports on product satisfaction; however, the rating scales and scoring items in each survey were not the same. Which of the following statements is *MOST* accurate about the data displayed in the figures?

FIGURE A
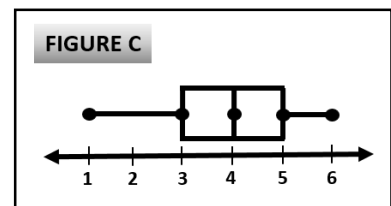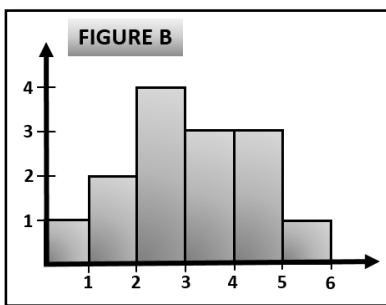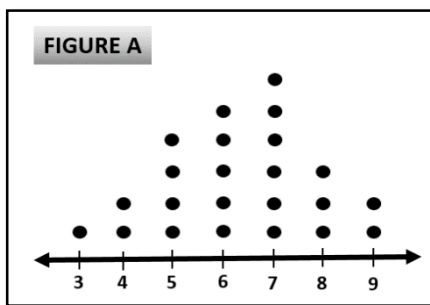
FIGURE B

FIGURE C

A) The variation, in terms of range, was the same for all three surveys.

B) The measure of central tendency that would best represent all three figures would be the mean.

C) The number of customers who took the survey represented in Figure B was equivalent to the number of customers who took the survey in Figure C.

D) The interquartile ranges of the data for Figures A and C are different.

28) Given the two sets of data, which statement is true?

| DATA SET J: |
|---|
| 3, 5, 10, 12, 1, 4, 6, 4, 27, 4, 8, 9, 10, 5 |

| DATA SET K: |
|---|
| 6, 2, 8, 5, 4, 16, 11, 3, 7 |

A) As compared to the mean absolute deviation, the interquartile range would better represent Data Set K.

B) As compared to the median, the mean would be a more appropriate measure of central tendency to represent Data Set J.

C) The median of Data Set K is greater than the median of Data Set J.

D) The mean absolute deviation of Data Set K is equivalent to the mean absolute deviation of Data Set J.


29) A survey included the responses from 40 individuals including kids and parents. Of the 25 kids surveyed, 18 of them preferred creamy peanut butter. 12 adults said they preferred chunky peanut butter. Which statement is *NOT* true regarding the survey responses?

A) Of the respondents who prefer chunky peanut butter, approximately 37% are kids.

B) 21 respondents stated a preference for chunky peanut butter.

C) 7.5% represents the joint percentage of the respondents in the group of adults who preferred creamy peanut butter.

D) 0.625 represents the marginal frequency of kid respondents.


30) Given the graph, which set of statements are both true?
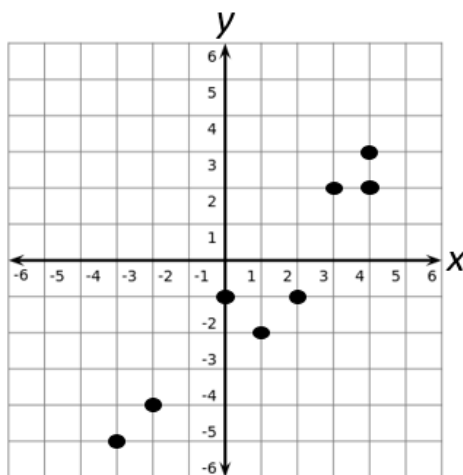


A)
| Set A |
|---|
| • A quadratic equation would be an appropriate fit for the data. <br> • This set of data represents a function. |

B)
| Set B |
|---|
| • The equation y = x is an appropriate line of best fit for the data. <br> • When given the choice of a correlation coefficient of 0, 0.5, or 1, r = 0 best represents the correlation coefficient of the data. |

C)
| Set C |
|---|
| • A linear equation that has a y-intercept of −2 and a slope of 1 is an appropriate line of regression for the data. <br> • In general, as the independent variable increases, the dependent variable also increases. |

D)
| Set D |
|---|
| • A line of best fit would have a negative correlation coefficient. <br> • The graph passes the vertical line test. |