



WCSD

Test Booklet:
Algebra 1 EOC Review Revised

Name: _____

Date: _____



1. On a quiz, students were awarded a certain number of points for a correct answer and penalized a certain number of points for an incorrect answer. If a student answered all the questions on the quiz and had c correct answers, her score on the quiz was $25c - 10(15 - c)$. How many questions were on the quiz?
- A. 10
B. 15
C. 25
D. 35
2. The height above the ground in feet of a ball kicked into the air from the balcony of an apartment is $-16t^2 + 24t + 40$, where t is the time in seconds since the ball was kicked. How high above the ground is the balcony?
- A. 16 ft
B. 24 ft
C. 32 ft
D. 40 ft
3. $x^2 + 36x + 324 = (x + m)^2$, which of the following is the value of m ?
- A. 36
B. 18
C. 12
D. 6
4. A square has a side length of $(2x + 4)$ inches.

Which expressions represent the area, in square inches, of this square? Select *three* that apply.

- A. $8x + 16$
B. $4x^2 + 16$
C. $(2x + 4)^2$
D. $2(x + 2)^2$
E. $4(x + 2)^2$
F. $4x^2 + 16x + 16$
5. Which of these functions has zeros of $x = -\frac{5}{4}$ and $x = 8$?
- A. $g(x) = 4x^2 - 37x + 40$
B. $g(x) = 4x^2 - 27x - 40$
C. $g(x) = 4x^2 + 27x - 40$
D. $g(x) = 4x^2 + 37x + 40$
6. Jeff factored the quadratic function $f(x) = 2x^2 + x - 15$ and determined that it has zeros at $x = -\frac{3}{2}$ and $x = 5$.

Did Jeff correctly find the zeros of the function?

- A. Yes, Jeff correctly found the zeros of the function.
B. No, the zeros of the function are at $x = \frac{3}{2}$ and $x = -5$.

C. No, the zeros of the function are at $x = -\frac{5}{2}$ and $x = 3$.

D. No, the zeros of the function are at $x = \frac{5}{2}$ and $x = -3$.

7. A firework is shot into the air, but it malfunctions and does not explode. The firework's height h , below or above sea level, in meters as a function of the time t in seconds since it was shot is $h(t) = -4.9t^2 + 29.4t - 40.1$. What is the maximum height of the firework? (A negative height is one below sea level, and a positive height is one above sea level.)

A. 4 m below sea level

B. 3 m below sea level

C. 3 m above sea level

D. 4 m above sea level

8. Jessica was asked to find the minimum value of the quadratic expression $2x^2 - 12x + 17$ by completing the square. She used the following steps:

Step 1: $2(x^2 - 6x \quad) + 17$

Step 2: $2(x^2 - 6x + 9 - 9) + 17$

Step 3: $2(x^2 - 6x + 9) - 9 + 17$

Step 4: $2(x - 3)^2 + 8$

Jessica's teacher told her that one of her steps was wrong. Which step is incorrect and why?

A. Step 1 is incorrect because 2 must first be factored out of all three terms in the expression in order to correctly complete the square.

B. Step 2 is incorrect because the value that needs to be added to complete the square should be -3 instead of 9.

C. Step 3 is incorrect because -9 needs to be multiplied by 2 when it is taken out of the parentheses.

D. Step 4 is incorrect because $x^2 - 6x + 9$ factors as $(x + 3)$ instead of $(x - 3)$.

9. Use the falling object model, $h = -16t^2 + s$. If an object is dropped from 190ft, how long will it take for the object to reach the ground?

A. 4 seconds

B. 3.45 seconds

C. 11.87 seconds

D. 13.19 seconds

10. A worm crawls around a rectangular plot of land at a speed of 1 foot per minute. The length of the plot is 2 feet less than twice its width. The plot area is 4 square feet. How long does it take the worm to crawl completely around the plot? (area = length \times width)

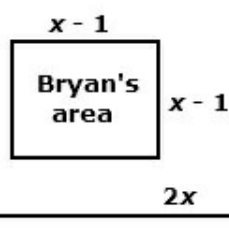
A. 2 minutes

B. 4 minutes

C. 8 minutes

D. 12 minutes

11.





From the drawing above, Bryan discovered that his area was 2 less than Jon's area. What is the reasonable value of x ?

- A. 1
- B. 3
- C. 4.236
- D. not defined
12. The height of a triangle is 6 inches less than 3 times its base. If the triangle's area is 72 in^2 , how long is its base?
- A. $\sqrt{26}$ inches
- B. $5\sqrt{2}$ inches
- C. 6 inches
- D. 8 inches
13. A parking meter charges \$2 per hour. As a driver parks her car, she notices that the parking meter has 15 minutes remaining on it from the previous driver who used the parking spot. If the driver inserts d dollars into the parking meter and the parking meter has 3 hours remaining on it as a result, which of these equations can be used to solve for d ?
- A. $3 = 0.5d + 0.15$
- B. $3 = 0.5d + 0.25$
- C. $3 = 2d + 0.15$
- D. $3 = 2d + 0.25$
14. The graph below shows the relationship between the distance in inches on a map and the actual distance in miles. If m is the distance on the map and d is the actual distance, which of these equations does the graph represent?



- A. $d = \frac{3}{5}m$
- B. $d = m + \frac{3}{5}$
- C. $d = m + \frac{5}{3}$

D. $d = \frac{5}{3}m$

15. On Monday, Josh went to the Farmer's Market. He bought 5 peaches and 2 watermelons for \$7.75. On Thursday, Josh went back to the Farmer's Market and bought 3 peaches and 4 watermelons for \$10.95. Which of the following systems of equations can be used to determine the cost for one peach (p) and one watermelon (w)?

A. $5p \times 2w = \$7.75$
 $3p \times 4w = \$10.95$

B. $5w \times 2p = \$7.75$
 $3w \times 4p = \$10.95$

C. $5p + 2w = \$7.75$
 $3p + 4w = \$10.95$

D. $5w + 2p = \$7.75$
 $3w + 4p = \$10.95$

16. Only one of the following steps was justified with the correct property. Pick the justification that was used correctly in the problem.

$6(3x - 4) - 26 = 40$	
$18x - 24 - 26 = 40$	↔ Associative Property of Multiplication
$18x - 50 = 40$	↔ Addition Property of Equality
$18x = 90$	↔ Distributive Property of Multiplication with Respect to Addition
$x = 5$	↔ Multiplication Property of Equality

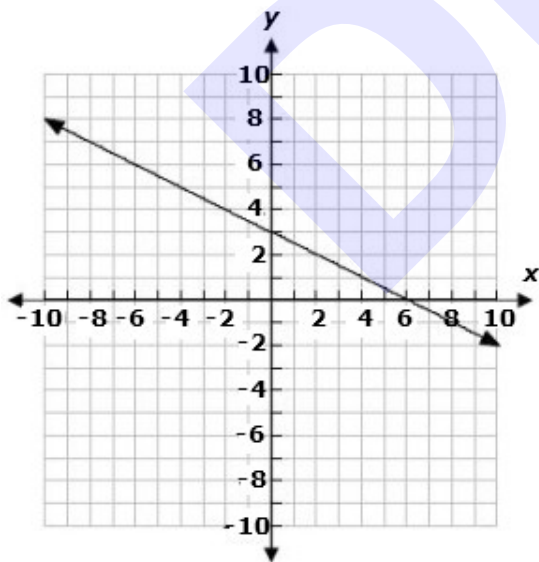
A. Associative Property of Multiplication

B. Addition Property of Equality

C. Distributive Property of Multiplication with Respect to Addition

D. Multiplication Property of Equality

17. Randall graphed the equation $y = -2x + 3$ as follows:



Did Randall correctly graph the equation?

A. Yes, Randall correctly graphed the equation.

B. No, Randall graphed the line with a slope of 2 instead of -2 .

C. No, Randall graphed the line with a slope of $-\frac{1}{2}$ instead of -2 .

D. No, Randall graphed an x -intercept of $(3, 0)$ instead of a y -intercept of $(0, 3)$.

18. A shoe store employee needs to decide how many shoes to put on display. The store manager wants the number of sneakers on display to be at least two more than the number of soccer cleats on display. The store employee represents this restriction as $y \geq 2 + x$, where x is the number of soccer cleats, and y is the number of sneakers on display.

Which of the following ordered pairs represent viable solutions in terms of the context? Select *all* that apply.

- A. $(-1, 3)$
 B. $(4, 10)$
 C. $(10, 12)$
 D. $(14, 12)$
 E. $(15, 18.5)$
19. The length of a rectangle is 2 more than 3 times its width. Find the dimensions of the rectangle if the perimeter is 44 in.
- A. 5.25 in. by 17.75 in.
 B. 5 in. by 17 in.
 C. 6.33 in. by 21 in.
 D. 10.5 in. by 33.5 in.
20. The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$, where h is the height and b_1 and b_2 are the lengths of the two parallel sides.

Based on this formula, which of the following formulas are also true? Select *three* that apply.

- A. $b_1 = \frac{A}{2h} - b_2$
 B. $b_1 = b_2 - \frac{2A}{h}$
 C. $b_2 = \frac{2A}{h} - b_1$
 D. $h = \frac{2A}{b_1 + b_2}$
 E. $h = \frac{A}{\frac{1}{2}b_1 + \frac{1}{2}b_2}$
21. Newton's law of universal gravitation is $F = G \frac{m_1 m_2}{r^2}$, where F is the force between two masses, G is the gravitational constant, m_1 and m_2 are the two masses, and r is the distance between the centers of the masses. Which of these is the equation solved for r ?

A. $r = G \sqrt{\frac{m_1 m_2}{F}}$

B. $r = \sqrt{\frac{G m_1 m_2}{F}}$

C. $r = G \sqrt{\frac{F}{m_1 m_2}}$

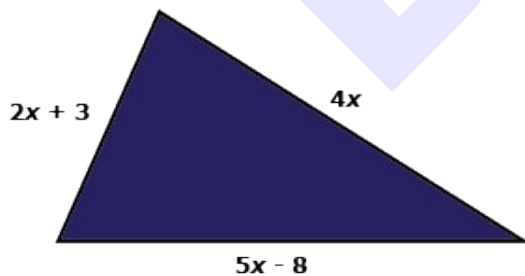
D. $r = \sqrt{\frac{F}{G m_1 m_2}}$

22. The lengths of the sides of a triangle are three consecutive even integers. The perimeter of the triangle is 36 in. What is the length of the LONGEST side of the triangle?
- A. 8 in.
B. 10 in.
C. 14 in.
D. 16 in.
23. Jennifer claims that the solution to $3(3x + 9) - 2x = 4x$ is $x = -9$. She shows the work below to justify her claim.

Given:	$3(3x + 9) - 2x = 4x$
Step 1:	$9x + 27 - 2x = 4x$
Step 2:	$9x - 2x + 27 = 4x$
Step 3:	$7x + 27 = 4x$
Step 4:	$7x - 7x + 27 = 4x - 7x$
Step 5:	$0 + 27 = -3x$
Step 6:	$27 = -3x$
Step 7:	$-9 = x$

Select *all* the justifications that are correct.

- A. Step 1 is justified by the distributive property.
B. Step 2 is justified by the associative property.
C. Step 4 is justified by the symmetric property.
D. Step 5 is justified by the property of additive inverses.
E. Step 6 is justified by the property of the additive identity.
24. If x equals 9, find the perimeter, P , of the triangle below:



- A. $P = 94$
B. $P = 110$
C. $P = 388.5$
D. $P = 756$
25. Which value should be added to both sides of the equation to complete the square for $ax^2 + bx = -c$?
- A. $\frac{b^2}{2}$

B. $b^2 - 4ac$

C. $\left(\frac{b}{2a}\right)^2$

D. $\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$

26. Alexis is going to derive the quadratic formula by using completing the square to solve $ax^2 + bx + c = 0$ for x . Where does she have to add the \pm symbol to her work?

- A. When she divides all the terms by a .
 B. When she adds a value to both sides to complete the square.
 C. When she rewrites the perfect square trinomial into its factored form.
 D. When she takes the square root of both sides.

27. Which of the following is a step in using "completing the square" to derive the quadratic formula from the equation $ax^2 + bx + c = 0$?

- A. $x^2 + bx + b^2 = -\frac{c}{a} + b^2$
 B. $x^2 + bx + \left(\frac{b}{2}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2}\right)^2$
 C. $x^2 + \frac{b}{a}x + \left(\frac{b}{a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{a}\right)^2$
 D. $x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 = -\frac{c}{a} + \left(\frac{b}{2a}\right)^2$

28. Rueben is "completing the square" to derive the quadratic formula from the equation $ax^2 + bx + c = 0$.

One of the steps in Rueben's work is the equation

$$x^2 + \frac{b}{a}x - \frac{b^2}{4a^2} = -\frac{c}{a} - \frac{b^2}{4a^2}$$

What error, if any, has Rueben made?

- A. He should not have variables in any of the denominators, only 4.
 B. He should have subtracted $\frac{b}{2a}$ from each side instead of $\frac{b^2}{4a^2}$.
 C. He should have added $\frac{b^2}{4a^2}$ instead of subtracting it.
 D. There is no error in Rueben's work.

29. Which of the following is an equivalent equation obtained by completing the square of the expression below?

$$x^2 + 6x - 8 = 0$$

- A. $(x + 3)^2 = 8$
 B. $(x + 3)^2 = 17$
 C. $(x + 3)^2 = 1$
 D. $x^2 + 6x + 6 = 14$

30. Using the quadratic formula, find the roots of the equation $3x = 2x^2 + 1$.

- A. $x = -0.5$ and $x = -1$
- B. $x = 1.5$ and $x = 0$
- C. $x = 2$ and $x = 1$
- D. $x = 1$ and $x = 0.5$

31. Select *each* equation that has no real solution.

- A. $x^2 - 4 = 0$
- B. $2x^2 + 2x = 2$
- C. $x^2 + 3x + 6 = 0$
- D. $2x^2 - 4x + 5 = -3$
- E. $x^2 - 12x + 60 = 12$

32. A group of friends were hanging out discussing the movies. They discovered that altogether, they went to the movies 30 times last year. Clio went 5 times as often as Alex. Bernice went 2 more times than Alex. How many times did Clio go to the movies last year?

- A. 5
- B. 10
- C. 20
- D. 4

33. Paige claims that the solution to the system of linear equations $y = 2x - 1$ and $-12x + 3y = 9$ is $(-2, -5)$.

Select *all* methods that could be used to prove Paige's claim.

- A. Solve $3 + 4x = 2x - 1$ for x and substitute into $y = 2x - 1$ to find the value of y .
- B. Graph each linear equation and show that the intersection of the lines is $(-2, -5)$.
- C. Solve $-12x + 3(2x - 1) = 9$ for x and substitute into $y = 2x - 1$ to find the value of y .
- D. Substitute -5 for x and -2 for y into both equations and show that the equations are true.

34. Anna buys trees from a nursery that cost \$5.95 each. She has a maximum of \$40 to spend on her tree purchases.

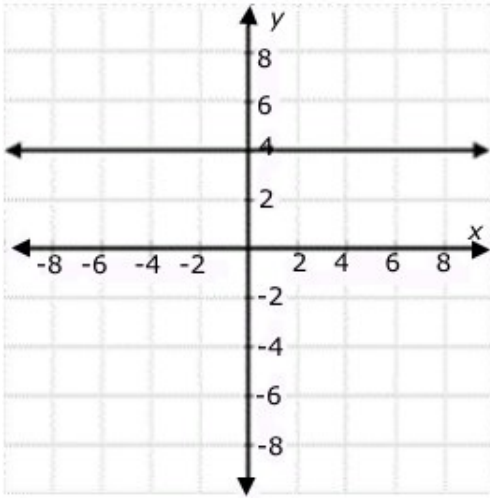
The total cost, with respect to the number of trees purchased, can be modeled by a function. Select the statement that correctly describes the domain of the function.

- A. The domain is the set of all integers greater than or equal to 0 and less than or equal to 6.
- B. The domain is the set of all integers greater than or equal to 0 and less than or equal to 7.
- C. The domain is the set of all real numbers greater than or equal to 0 and less than or equal to 35.7.
- D. The domain is the set of all real numbers greater than or equal to 0 and less than or equal to 40.

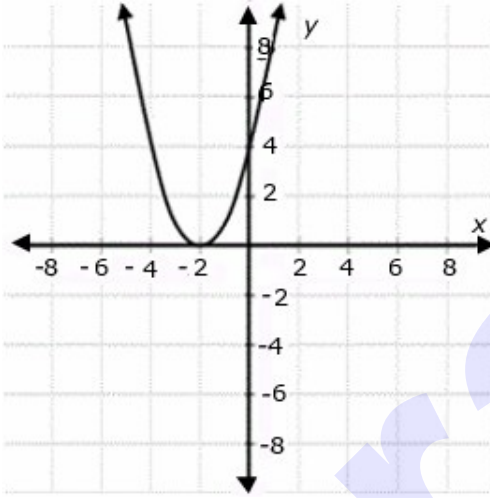
35. Delilah thought that the domain of every function is all real numbers.

Select the graph that *refutes* Delilah's claim.

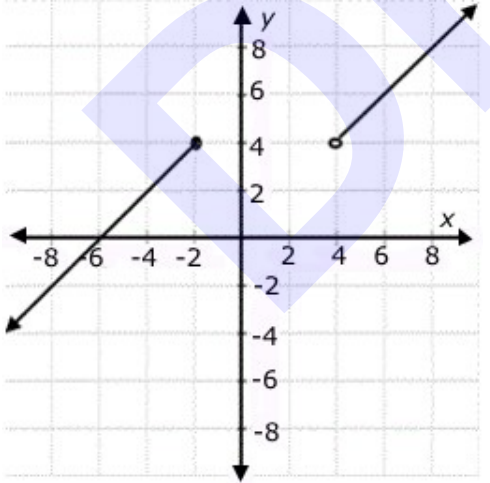
A.



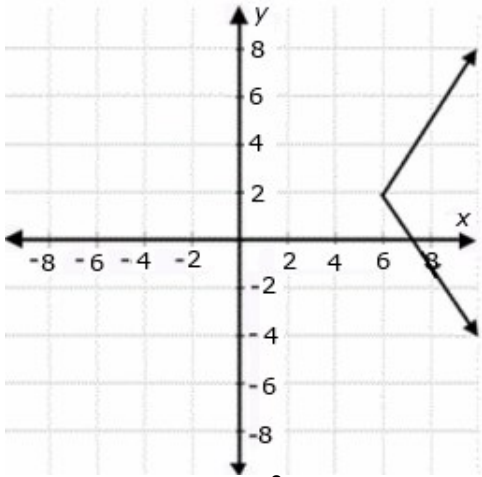
B.



C.



D.



36. Coefficients a , b , and c in $ax^2 + bx + c = 0$ are $a = 1$, $b = 12$, and $c = 7$. Which equation shows the correctly completed square in factored form?

A. $(x + 3)^2 = 2$

B. $(x + 6)^2 = 29$

C. $(x + 12)^2 = 7$

D. $(x + 36)^2 = 43$

37. For which of the following functions is the average rate of change from $x = -1$ to $x = 2$ equal to 5? Select *all* that apply.

A. $f(x) = 1 - 5x$

B. $f(x) = 2x + 5$

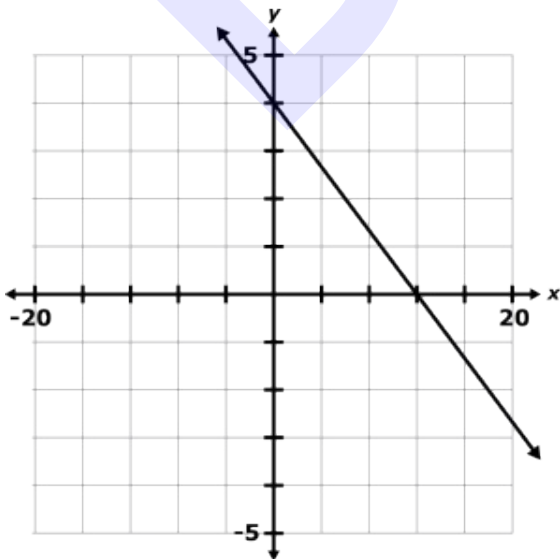
C. $f(x) = 5x + 1$

D. $f(x) = x^2 + 2x$

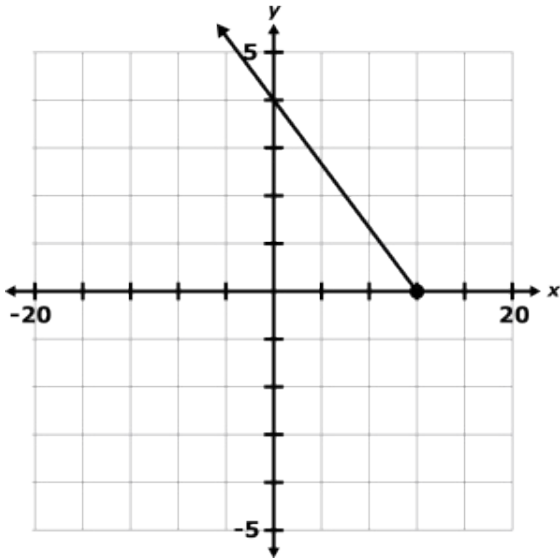
E. $f(x) = x^2 + 4x$

38. Wilbur's fish tank is leaking water. The volume of water, y , in gallons, left in the tank is a linear function of the number of minutes, x , that have passed since the tank started leaking. Which graph could correctly represent this linear function?

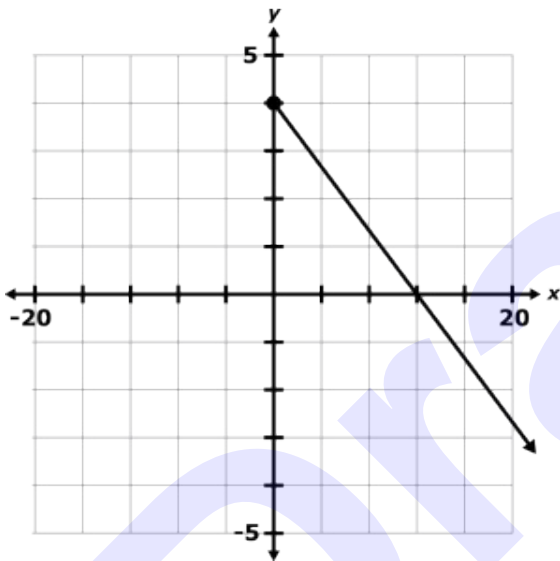
A.



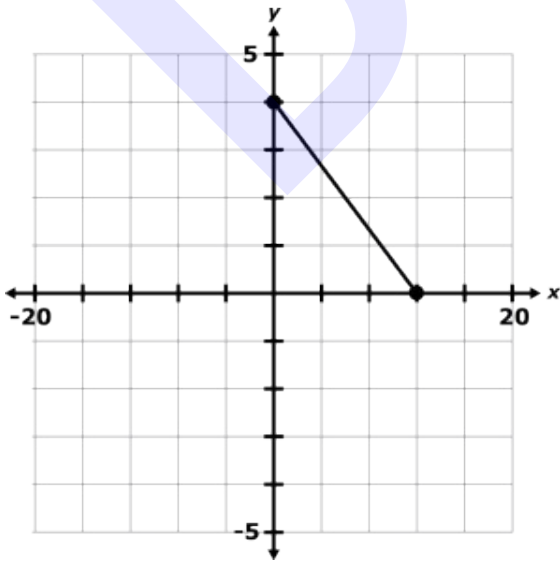
B.



C.



D.



39. If a quadratic function has roots of -2 and 3 , which equation below represents the axis of symmetry of the function's graph?

- A. $x = 0$

B. $x = \frac{1}{2}$

C. $x = 1$

D. $x = \frac{5}{2}$

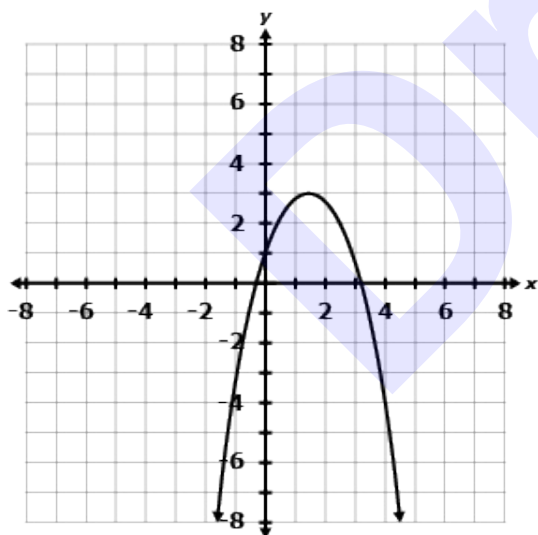
40. A tennis ball is tossed into the air. The height, $h(t)$, in feet, of the tennis ball is a function of time, t , in seconds, as shown in the table below.

t	$h(t)$
0	0
0.5	20
1	32
1.5	36
2	32
2.5	20
3	0

Which statement provides a correct interpretation of the average rate of change of this function from $t = 1.5$ to $t = 3$?

- A. The average rate of change is 24, which means that the tennis ball was rising at an average speed of 24 ft/sec.
 B. The average rate of change is 24, which means that the tennis ball was falling at an average speed of 24 ft/sec.
 C. The average rate of change is -24 , which means that the tennis ball was rising at an average speed of 24 ft/sec.
 D. The average rate of change is -24 , which means that the tennis ball was falling at an average speed of 24 ft/sec.

41.



What is the equation of the function shown above?

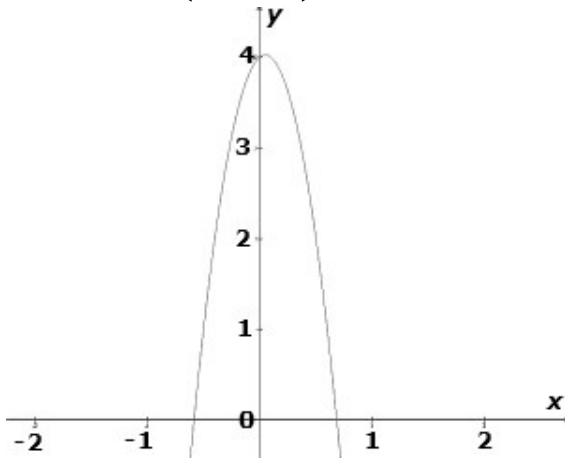
A. $y = \left(x - 1\frac{1}{2}\right)^2 - 3$

B. $y = \left(x - 1\frac{1}{2}\right)^2 + 3$

C. $y = -\left(x - 1\frac{1}{2}\right)^2 + 3$

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

42.



$$y = -10x^2 + x + 4$$

Which of the following responses precisely identifies the zeros and the maximum or the minimum for the above function and its graph?

A. The zeros are $\left(\frac{\pm 1}{2}, 0\right)$.

The minimum is $\left(\frac{1}{20}, 4\right)$.

B. The zeros are $\left(\frac{\pm 1}{2}, 0\right)$.

The maximum is $(0, 4)$.

C. The zeros are $\left(\frac{-1 \pm 4\sqrt{10}}{-20}, 0\right)$

The minimum is $\left(\frac{1}{20}, 4\right)$.

D. The zeros are $\left(\frac{-1 \pm 4\sqrt{10}}{-20}, 0\right)$

The maximum is $\left(\frac{1}{20}, 4\right)$.

43. Jermaine is studying a quadratic function: he finds the function has only one root, -4 .

Which statements below *must* be true about the graph of Jermaine's function?

I	His parabola must open down.
II	The vertex of his parabola must be $(-4, 0)$.
III	The x -intercept of his parabola must be $(-4, 0)$.
IV	The axis of symmetry of his parabola must be $x = -4$.

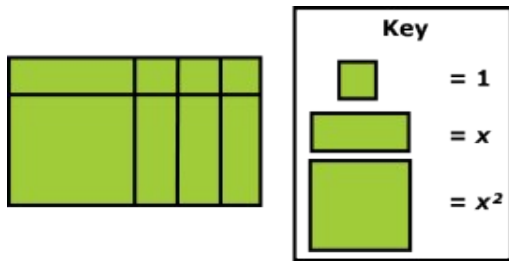
A. I and II only

B. III and IV only

C. II, III and IV only

D. I, II, III and IV

44. A rectangle with an area of
- $x^2 + 4x + 3$
- is modeled using algebra tiles.

What are the dimensions of the rectangle in terms of x ?A. $(x + 4)$ by $(x - 1)$ B. $(2x + 1)$ by $(x + 3)$ C. $(x + 3)$ by $(x + 1)$ D. $(x + 3)$ by $(2x - 1)$

45. Which value of
- c
- will cause the graph of the quadratic equation
- $y = x^2 + 6x + c$
- to have only one
- x
- intercept?

A. $\frac{1}{4}$

B. 3

C. $\frac{35}{4}$

D. 9

46. Which of the following exponential functions represent exponential decay? Select
- three*
- that apply.

A. $y = (0.85)^x$ B. $y = (1.01)^x$ C. $y = (0.95)^{2x}$ D. $y = 1.8(0.6)^x$ E. $y = 0.25(1.5)^{3x}$

47. Last month, Maria purchased a new cell phone for \$500. The store manager told her that her new cell phone would depreciate by 70% every 6 months. Maria thinks she will want to replace her phone after a while. What will be the value (
- V
-) of her phone if she tries to trade it in after 2 years? Select
- all*
- that apply.

A. $V = 500(0.70)^4$ B. $V = 500(0.30)^4$ C. $V = 500(0.30)^2$ D. $V = 500(1 - 0.70)^4$ E. $V = 0.70(500)^4$ F. $V = 0.30(500)^2$

48. Cindy invested \$200 in an account that earns compound interest annually.

Select *all* of the equations that could model the amount of money that Cindy would have in the account after x

years.

A. $y = 200 \cdot (1 - 0.02)^x$

B. $y = 200 \cdot (1 + 0.05)^x$

C. $y = 0.04 \cdot 200^x$

D. $y = 200 \cdot 1.03^x$

E. $y = (1 + 0.01) \cdot 200^x$

49. An employee's salary, $S(n)$, in dollars, at a company is a function of the number of years, n , that the employee has worked at the company.

The relationship between n and $S(n)$ is shown in the table below.

n	$S(n)$
1	40,000
2	42,000
3	44,100
4	46,305

Which of the following equations represents an explicit formula for $S(n)$?

A. $S(n) = 40,000(1.05)^n$

B. $S(n) = 40,000 + 1.05n$

C. $S(n) = 40,000(1.05)^{n-1}$

D. $S(n) = 40,000 + 1.05(n - 1)$

50. The table below shows the amount of water that is in a bathtub that is being filled.

Minutes	1	2	3	4
Gallons of Water	12	17	22	27

Which of the following functions could model the amount of gallons of water, $f(x)$, that the bathtub will contain after x minutes of being filled?

A. $f(x) = 5x + 7$

B. $f(x) = 5x + 12$

C. $f(x) = 7x + 5$

D. $f(x) = 12x + 5$

51. An artist is planning on placing tiles on a wall to create a design. The tiles are to be placed in rows. The number of tiles in each row is shown in the table below.

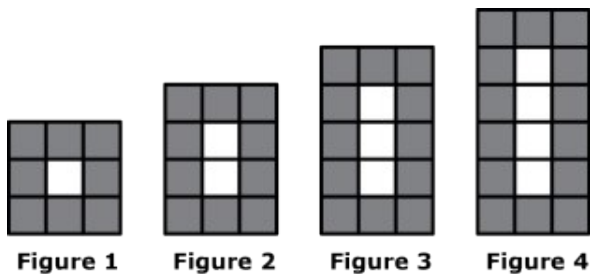
Row Number	Number of Tiles
1	1
2	3
3	5
4	7

Let $f(r)$ represent the number of tiles in row r , where $f(1) = 1$. Which of the following equations correctly represents $f(r)$ in terms of $f(r - 1)$ for all $r > 1$?

A. $f(r) = 2 \cdot f(r - 1)$

- B. $f(r) = 3 \cdot f(r - 1)$
 C. $f(r) = f(r - 1) + 2$
 D. $f(r) = 2 \cdot f(r - 1) + 1$

52. Mackenzie creates the figures below using shaded and unshaded tiles.



Which of the following functions gives the number of shaded squares, $S(n)$, for figure n ?

- A. $S(n) = n + 2$
 B. $S(n) = 8(2)^n - 1$
 C. $S(n) = 8 + 2(n - 1)$
 D. $S(n) = (n + 2)^2 - n^2$

53. A recursive formula for a function is shown below.

$$f(1) = -2$$

$$f(n) = f(n - 1) + 2; n \geq 2$$

Which of the following equations represents the explicit formula for this function for all $n \geq 1$?

- A. $f(n) = -2n + 4$
 B. $f(n) = -2n$
 C. $f(n) = 2n - 2$
 D. $f(n) = 2n - 4$

54. In the arithmetic sequence shown, a_1 is the first term, a_2 is the second term, a_3 is the third term, and so on.

5, 11, 17, 23, 29, 35, ...

If n is an integer, which of these formulas represents the sequence? Select three that apply.

- A. $a_{n+1} = 6n + 5$ for $n \geq 0$
 B. $a_n = 6n + 1$ for $n \geq 1$
 C. $a_1 = 5$;
 $a_{n+1} = a_n + 6$ for $n \geq 1$
 D. $a_1 = 5$;
 $a_n = a_{n-1} + 6$ for $n \geq 2$

55. For which of these pairs of formulas do the explicit formula and the recursive formula represent the same arithmetic sequence, assuming that $f(n)$ represents the n^{th} term in the sequence? Select two that apply.

- A. Explicit formula:
 $f(n) = 2n + 8$ for $n \geq 1$

Recursive formula:
 $f(1) = 10$;
 $f(n) = f(n - 1) + 2$ for $n \geq 2$
- B. Explicit formula:
 $f(n) = 7 + 3(n - 1)$ for $n \geq 1$

Recursive formula:
 $f(1) = 7$;
 $f(n) = f(n - 1) + 3$ for $n \geq 2$
- C. Explicit formula:
 $f(n) = 5n + 4$ for $n \geq 1$

Recursive formula:
 $f(1) = 4$;
 $f(n) = f(n - 1) + 5$ for $n \geq 2$
- D. Explicit formula:
 $f(n) = 9 + 6(n - 1)$ for $n \geq 1$

Recursive formula:
 $f(1) = 15$;
 $f(n) = f(n - 1) + 6$ for $n \geq 2$

56. Select the statement that is true for the graphs of *all* functions $g(x)$.

- A. The graph of $g(x + 1)$ is the graph of $g(x)$ shifted up 1 unit.
- B. The graph of $g(x + 1)$ is the graph of $g(x)$ shifted right 1 unit.
- C. The graph of $g(-x)$ is the graph of $g(x)$ reflected over the x -axis.
- D. The graph of $g(-x)$ is the graph of $g(x)$ reflected over the y -axis.

57. The graph of a function, $f(x)$, is plotted on the coordinate plane. Select *two* of the following functions that would move the graph of the function to the right on the coordinate plane.

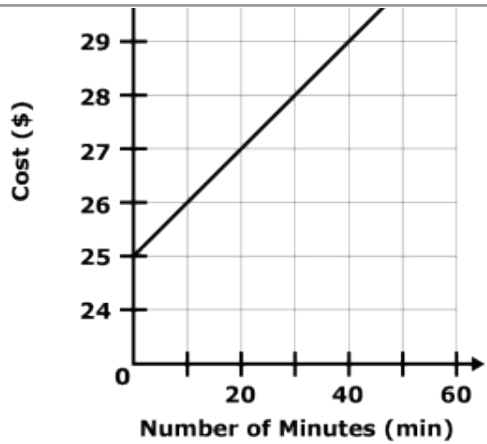
- A. $f(x + 6)$
- B. $f(x) + 4$
- C. $f(x - 3) + 1$
- D. $f(x) - 3$
- E. $f(x - 5)$
- F. $f(x + 2) - 7$

58. A school district currently has 12,000 students. Based on declining enrollment figures, the number of students in the school district is expected to decline by 5% each year. Which of the following functions represents the number of students, S , in the school district after n years?

- A. $S(n) = 12,000(-5)^n$
- B. $S(n) = 12,000(0.95)^n$
- C. $S(n) = 12,000(1.05)^n$
- D. $S(n) = 12,000(-0.05)^n$

59.





Sarah pays a flat rate plus a rate per minute for her phone plan as shown in the graph above.

The cost of Sarah's phone plan, $C(t)$, can be represented by which of the following functions?

- A. $C(t) = -0.10t + 25$
- B. $C(t) = 0.10t + 25$
- C. $C(t) = 25(0.10)^t$
- D. $C(t) = 25(1 + 0.10)^t$

60. The table below shows a company's annual income over a 6-year period. The equation $y = 60000(1.2)^x$ describes the curve of best fit for the company's annual income (y). Let x represent the number of years since 2001.

Annual Income	
Year	Income
2001	\$58,900
2002	\$72,400
2003	\$86,500
2004	\$103,400
2005	\$124,400
2006	\$150,000

Using this equation, what would be the company's approximate annual income be in the year 2009?

- A. \$179,200
 - B. \$258,000
 - C. \$309,600
 - D. \$642,000
61. Mr. Stein receives a water bill from city hall. He notices that the city charges \$50 for fire and sewer service and \$3 for every 1000 gallons of water used. Mr. Stein wants to construct a model describing the relationship between the cost of his water bill and the amount of water he uses.

Which statement *best* describes the model that Mr. Stein should create?

- A. Mr. Stein should use a linear model, since the water bill changes at a constant rate relative to the amount of water he uses.

- B. Mr. Stein should use an exponential model, since the water bill changes at a constant rate relative to the amount of water he uses.
- C. Mr. Stein should use a linear model, since the water bill changes at a constant percent rate relative to the amount of water he uses.
- D. Mr. Stein should use an exponential model, since the water bill changes at a constant percent rate relative to the amount of water he uses.
62. Which of the following situations can be modeled by a linear function, where one quantity changes at a constant rate relative to another? Select *three* that apply.
- A. The number of bacteria in a Petri dish starts at 100 bacteria and doubles every hour.
- B. The amount of water in a tub starts at 60 gallons and drains at rate of 10 gallons per minute.
- C. The amount of flour in a jar starts at 10 cups and decreases by $\frac{3}{4}$ of a cup per batch of cookies made.
- D. The number of people waiting in line at a theater starts at 15 and increases by 10 people every 5 minutes.

63. Consider the function: $f(x) = m(1.1)^x$

If $m > 0$, which of the following is true?

- A. $f(3) = f(5)$
- B. $f(3) > f(5)$
- C. $f(3) < f(5)$
- D. There is not enough information to answer this question.
64. A scientist is studying bacteria and records the number of bacteria over time. The scientist determines that the function $M(t) = 300(1.30)^t$ models the number of bacteria, N , after t hours.

Which statement correctly interprets this model?

- A. The number of bacteria is originally 30 and increases by 300 every hour.
- B. The number of bacteria is originally 300 and increases by 30 every hour.
- C. The number of bacteria is originally 30 and increases by 300% every hour.
- D. The number of bacteria is originally 300 and increases by 30% every hour.
65. Mrs. Scott is driving her car. She writes the function $d(t) = 65 - 55t$ to represent the distance, d , in miles, that she is from her house after t hours of driving.

Which of the following correctly interprets this linear function?

- A. Mrs. Scott is 55 miles from home when she starts driving. She is driving towards her house at a speed of 65 miles per hour.
- B. Mrs. Scott is 65 miles from home when she starts driving. She is driving towards her house at a speed of 55 miles per hour.
- C. Mrs. Scott is 55 miles from home when she starts driving. She is driving away from her house at a speed of 65 miles per hour.
- D. Mrs. Scott is 65 miles from home when she starts driving. She is driving away from her house at a speed of 55 miles per hour.
66. The mayor of a city records the population each year since 1980. He models the data as $P(t) = 16.8(0.94)^t$, where P represents the city's population, in thousands of people, and t represents the number of years since 1980.

Select each *true* statement based on this population model.

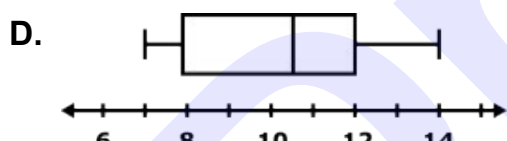
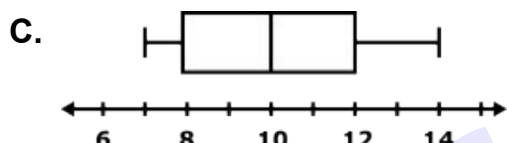
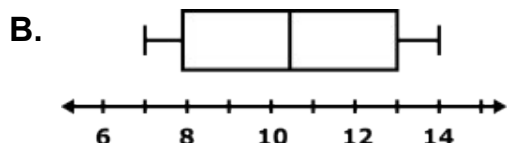
- A. The population was 9400 people in 1980.
- B. The population was 16,800 people in 1980.

- C. The population has been increasing since 1980.
- D. The population has been decreasing since 1980.
- E. The population has changed by 6% each year since 1980.
- F. The population has changed by 94% each year since 1980.

67. The age of each student in a scout troop is shown below.

7, 7, 8, 8, 8, 9, 9, 10, 10, 11, 11, 11, 12, 12, 13, 13, 14, 14

Which box plot best represents the age of the students in the scout troop?



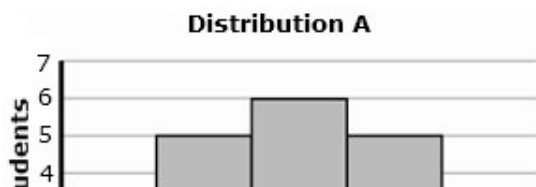
68. Consider the groups of numbers in the box below.

Group A: 4, 5, 6, 7, 8
Group B: 2, 4, 6, 8, 10

Which statement about Group B is true?

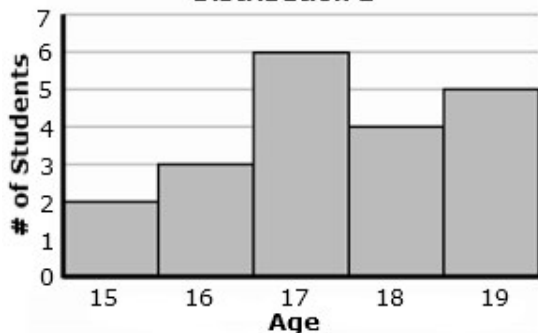
- A. Group B has a larger mean and a larger standard deviation.
- B. Group B has a larger mean and a smaller standard deviation.
- C. Group B has the same mean as Group A and a larger standard deviation.
- D. Group B has the same mean as Group A and a smaller standard deviation.

69. Two groups of students, Group A and Group B, have the age distributions shown below. Which statement about the distributions is true?

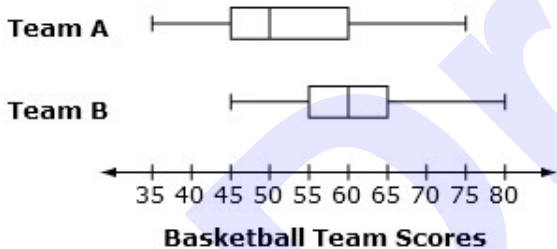




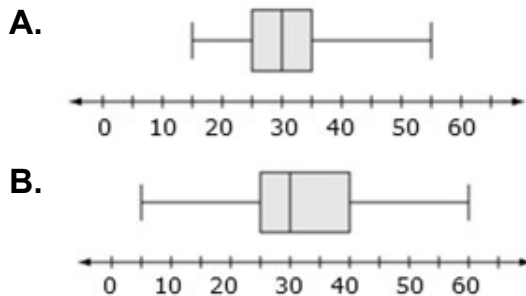
Distribution B

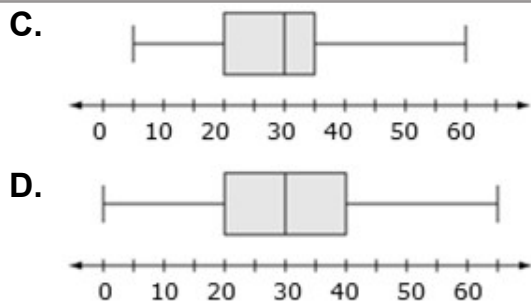


- A. Distribution B has a larger mean, but the medians of both distributions are the same.
 - B. Distribution B has both a larger mean and a larger median than distribution A.
 - C. Distribution B has a smaller mean, but the medians of both distributions are the same.
 - D. Distribution B has both a smaller mean and a smaller median than distribution A.
70. The box-and-whisker plots shown represent the distribution of basketball team scores for two different teams. Based on the data in the plots, which of the following measures is larger for Team A than for Team B? Select two that apply.



- A. Median
 - B. Range
 - C. Maximum
 - D. Interquartile range
71. The "1.5 × IQR" rule states that a data value is potentially an outlier if its distance below the first quartile or above the third quartile is greater than 1.5 times the interquartile range. Which of the following box plots represent a data set with a potential outlier, as identified by the "1.5 × IQR" rule? Select two that apply.





72. The ages of the students in a statistics class are listed below. If the 18-year-old student has a birthday and turns 19, how will it affect the mean and median ages of the class?

Ages: 14, 15, 15, 16, 16, 16, 16, 17, 17, 17, 17, 17, 18

- A. Both the mean age and the median age will increase.
- B. The mean age will increase, and the median age will remain the same.
- C. The mean age will remain the same, and the median age will increase.
- D. The mean age will remain the same, and the median age will decrease.

73. According to the data in the table, which statement is true?

Most Frequent Summer Olympic Sport Watched	Gymnastics	Swimming	Volleyball	Total
Men	0.05	0.22	0.23	0.50
Women	0.30	0.18	0.02	0.50
Total	0.35	0.40	0.25	1.00

- A. Fewer men chose volleyball than swimming.
- B. More men than women chose gymnastics.
- C. More women chose swimming than gymnastics.
- D. More men than women chose swimming.

74. In an election for student government president, students in grades 9 through 12 were eligible to vote for either Spencer or Jules. The two-way table below shows the results of the election.

	Spencer	Jules	Total
12th grade	106	26	132
11th grade	82	59	141
10th grade	74	56	130
9th grade	53	69	122
Total	315	210	525

Based on the two-way table, which statements are true regarding the election? Select two that apply.

- A. Spencer won the election with exactly 60% of the votes.
- B. Approximately 33.7% of the 12th grade students voted for Spencer.
- C. Exactly 50% of the students who voted in the election were in 11th or 12th grade.
- D. Approximately 59.5% of the students who voted for Jules were in 9th or 10th grade.

- 75.** A recent social survey asked whether respondents believed that Antarctic penguins were threatened. The responses are summarized in the table below.

Answer	Male	Female	Total
A great deal	123	200	323
Some	150	164	314
Not at all	28	16	44
Total	301	380	681

A respondent is randomly selected among those who believe that penguins are threatened "a great deal." Approximately what is the probability that this respondent will be female?

- A. 29%
- B. 38%
- C. 53%
- D. 62%

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