

UNIT 1—Solving Equations and Inequalities

3. For what values of x is the inequality $\frac{2}{3} + \frac{x}{3} > 1$ true?

- A. $x < 1$
 B. $x > 1$
 C. $x < 5$
 D. $x > 5$

Correct Answer: B

$$3 \cdot \frac{2+x}{3} > 1 \cdot 3$$

$$\frac{2+x}{1} > \frac{3}{1}$$

$$2+x > 3$$

$$x > 1$$

4. Look at the steps used when solving $3(x-2) = 3$ for x .

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

Write the original equation.

$$3x - 6 = 3$$

Use the Distributive Property.

$$3x - 6 + 6 = 3 + 6$$

Step 1

$$3x = 9$$

Step 2

$$\frac{3x}{3} = \frac{9}{3}$$

Step 3

$$x = 3$$

Step 4

Which step is the result of combining like terms?

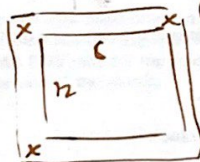
- A. Step 1
 B. Step 2
 C. Step 3
 D. Step 4

Correct Answer: B

1. A garden measuring 8 feet by 12 feet will have a walkway around it. The walkway has a uniform width, and the area covered by the garden and the walkway is 192 square feet. What is the width of the walkway?

- A. 2 feet
 B. 3.5 feet
 C. 4 feet
 D. 6 feet

Correct Answer: A



$$(2x+8)(2x+12) = 192$$

$$4x^2 + 16x + 24x + 96 = 192$$

$$4x^2 + 40x + 96 = 192$$

$$4x^2 + 40x - 96 = 0$$

$$x^2 + 10x - 24 = 0$$

$$(x+12)(x-2) = 0$$

2. The formula for the area of a circle is $A = \pi r^2$. Which equation shows the formula in terms of r ?

A. $r = \frac{2A}{\pi}$

B. $r = \frac{\sqrt{A}}{\pi}$

C. $r = \sqrt{\frac{A}{\pi}}$

D. $r = \frac{A}{2\pi}$

$$A = \pi r^2$$

$$\frac{A}{\pi} = r^2$$

Correct Answer: C

1. This equation can be used to find h , the number of hours it will take Flo and Bryan to mow their lawn.

$$\frac{h}{3} + \frac{h}{6} = 1$$

How many hours will it take them to mow their lawn?

- A. 6 hours
 B. 3 hours
 C. 2 hours
 D. 1 hour

Correct Answer: C

$$\frac{2h+2h}{6} = 1$$

$$\frac{4h}{6} = \frac{6}{6}$$

$$h = 2$$

2. A ferry boat carries passengers back and forth between two communities on the Peachville River.

- It takes 30 minutes longer for the ferry to make the trip upstream than downstream.
- The ferry's average speed in still water is 15 miles per hour.
- The river's current is usually 5 miles per hour.

This equation can be used to determine how many miles apart the two communities are.

$$\frac{m}{15-5} = \frac{m}{15+5} + 0.5$$

What is m , the distance between the two communities?

- A. 0.5 mile
 B. 5 miles
 C. 10 miles
 D. 15 miles

Correct Answer: C

$$\frac{m}{10} = \frac{m}{20} + \frac{10}{20}$$

$$\frac{m}{10} = \frac{m+10}{20}$$

$$20m = 10m + 100$$

$$10m = 100 \quad m = 10$$

$$4x^2 + 40x - 96 = 0$$

$$x^2 + 10x - 24 = 0$$

$$\frac{-24}{10} \quad \frac{-2}{10}$$

$$(x+12)(x-2)$$

$$x = 2$$

- 1 B
 2 B
 3 A
 4 C

- 5 C
 6 C

UNIT 2—Sequences, Writing Equations, and Graphing

KHDUD cm

1. A rectangle has a length of 120 meters and a width of 400 centimeters. What is the perimeter, in cm, of the rectangle?

- A. 824 cm
B. 1,600 cm
C. 2,000 cm
D. 3,200 cm

Correct Answer: D

$$\begin{array}{r} 1200 \\ 400 \times 2 = 800 \\ 800 + 1200 = 2000 \\ 2000 \times 2 = 4000 \end{array}$$

2. Jill swam 200 meters in 2 minutes 42 seconds. If each lap is 50 meters long, which is MOST LIKELY to be her time, in seconds, per lap?

- A. 32 seconds
B. 40 seconds
C. 48 seconds
D. 60 seconds

Correct Answer: B

$$\frac{162 \text{ sec}}{4} = 40.5$$

4. Which ordered pair is a solution of $3y + 2 = 2x - 5$?

- A. (-5, 2)
B. (0, -5)
C. (5, 1)
D. (-7, 5)

Explanation of correct answer: The correct answer is choice (C) (5, 1). Also, if the values of x and y are substituted into the equation, the statement becomes $5 = 5$, which is a true statement. This shows that the ordered pair is a solution of the equation.

Correct Answer: C

$$3(1) + 2 = 2(5) - 5 \\ 5 = 5 \checkmark$$

1. Which function represents the sequence?

n	0	1	2	3	4	5	...
a_n	-4	3	10	17	24	31	...

- A. $f(n) = n + 3$
B. $f(n) = 7n - 4$
C. $f(n) = 3n + 7$
D. $f(n) = n + 7$

Correct Answer: B

$$-4 + 7 = 3$$

2. Each week, Tim wants to increase the number of sit-ups he does daily by 2 sit-ups. The first week, he does 15 sit-ups each day.

Write an explicit function in the form $f(n) = mn + b$ to represent the number of sit-ups, $f(n)$, Tim does daily in week n .

Solution:

The difference between the number of daily sit-ups each week is always 2, so this is a linear model with $m = 2$. Since there is no zero term, we take the first term, ($n = 1$), and work backwards by subtracting 2 from 15. This gives us $b = 13$. Therefore, the explicit function is $f(n) = 2n + 13$.

A recursive function in the form $f(n + 1) = f(n) + d$, where $f(1) = a$, can be written for the sit-up problem. What recursive function represents the number of sit-ups, $f(n)$, Tim does daily in week n ?

Solution:

Since Tim starts out doing 15 sit-ups each day, $f(1) = 15$. The variable d stands for the difference between the number of daily sit-ups Tim does each week, which is 2. The recursive function will be $f(n + 1) = f(n) + 2$, where $f(1) = 15$.

1. Look at the sequence in this table.

n	1	2	3	4	5	...
a_n	-1	1	3	5	7	...

Which function represents the sequence?

- A. $a_n = a_{n-1} + 1$
B. $a_n = a_{n-1} + 2$
C. $a_n = 2a_{n-1} - 1$
D. $a_n = 2a_{n-1} - 3$

Correct Answer: B

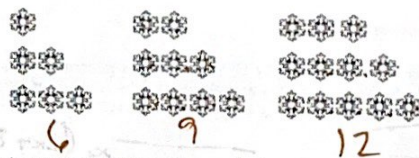
1. A wild horse runs at a rate of 8 miles an hour for 6 hours. Let y be the distance, in miles, the horse travels for a given amount of time, x , in hours. This situation can be modeled by a function.

Which of these describes the domain of the function?

- A. $0 \leq x \leq 6$
B. $0 \leq y \leq 6$
C. $0 \leq x \leq 48$
D. $0 \leq y \leq 48$

Correct Answer: A

2. Consider this pattern.



Which function represents the sequence that represents the pattern?

- A. $a_n = a_{n-1} - 3$
B. $a_n = a_{n-1} + 3$
C. $a_n = 3a_{n-1} - 3$
D. $a_n = 3a_{n-1} + 3$

Correct Answer: B

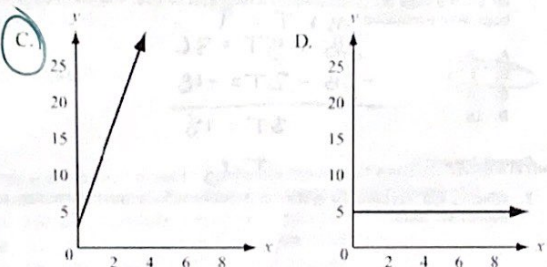
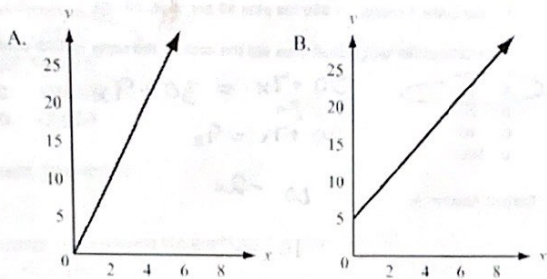
3. Which function is modeled in this table?

x	$f(x)$
1	8
2	11
3	14
4	17

- A. $f(x) = x + 7$
B. $f(x) = x + 9$
C. $f(x) = 2x + 5$
D. $f(x) = 3x + 5$

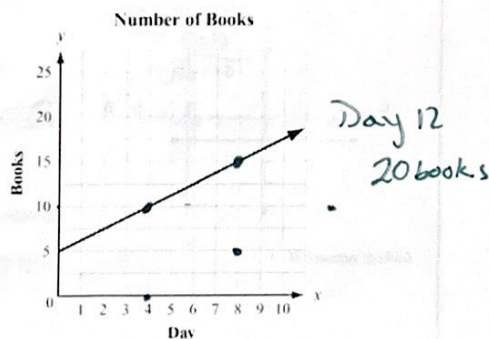
Correct Answer: D

1. To rent a canoe, the cost is \$3 for the oars and life preserver, plus \$5 an hour for the canoe. Which graph models the cost of renting a canoe?



Correct Answer: C

2. Juan and Patti decided to see who could read more books in a month. They began to keep track after Patti had already read 5 books that month. This graph shows the number of books Patti read for the next 10 days and the rate at which she will read for the rest of the month.



If Juan does not read any books before day 4 and he starts reading at the same rate as Patti for the rest of the month, how many books will he have read by day 12?

- A. 5
B. 10
C. 15
D. 20

Correct Answer: B

4. Which explicit formula describes the pattern in this table?

d	C
2	6.28
3	9.42
5	15.70
10	31.40

- A. $d = 3.14 \times C$
B. $3.14 \times C = d$
C. $31.4 \times 10 = C$
D. $C = 3.14 \times d$

Correct Answer: D

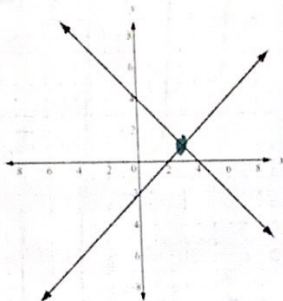
5. If $f(12) = 4(12) - 20$, which function gives $f(x)$?

- A. $f(x) = 4x$
B. $f(x) = 12x$
C. $f(x) = 4x - 20$
D. $f(x) = 12x - 20$

Correct Answer: C

UNIT 3—Systems of Equations

1. Two lines are graphed on this coordinate plane.



Which point appears to be a solution of the equations of both lines?

- A. (0, -2)
- B. (0, 4)
- C. (2, 0)
- D. (3, 1)

Correct Answer: D

2. Based on the tables, at what point do the lines $y = -x + 5$ and $y = 2x - 1$ intersect?

$y = -x + 5$		$y = 2x - 1$	
x	y	x	y
-1	6	-1	-3
0	5	0	-1
1	4	1	1
2	3	2	3
3	2	3	5

- A. (1, 1)
- B. (3, 5)
- C. (2, 3)
- D. (3, 2)

Correct Answer: C

3. Look at the tables of values for two linear functions, $f(x)$ and $g(x)$.

x	f(x)	x	g(x)
-1	16	-1	-18
0	7	0	-14
1	4	1	-10
3	-2	3	-2
5	-8	5	6
7	-14	7	14

What is the solution to $f(x) = g(x)$?

Solution:

The solution to $f(x) = g(x)$ is $x = 3$. This is the value of x where $f(x)$ and $g(x)$ both equal -2.

5. A manager is comparing the cost of buying baseball caps from two different companies.

- Company X charges a \$50 fee plus \$7 per baseball cap.
- Company Y charges a \$30 fee plus \$9 per baseball cap.

For what number of baseball caps will the cost be the same at both companies?

- A. 10
- B. 20
- C. 40
- D. 100

$$50 + 7x = 30 + 9x$$

$$20 + 7x = 9x$$

$$20 = 2x$$

$$10 = x$$

Correct Answer: A

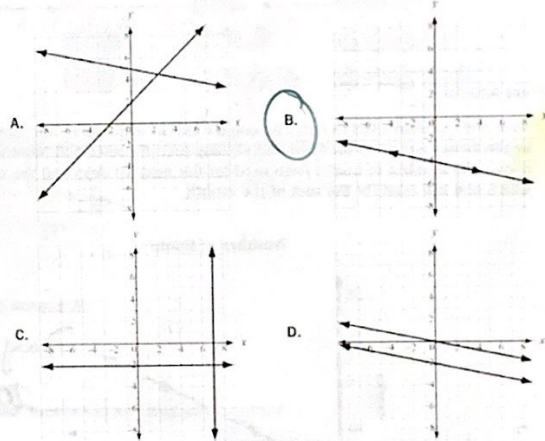
6. A shop sells one-pound bags of peanuts for \$2 and three-pound bags of peanuts for \$5. If 9 bags are purchased for a total cost of \$36, how many three-pound bags were purchased?

- A. 3
- B. 6
- C. 9
- D. 18

$$\begin{aligned} B + T &= 9 \\ 2B + 5T &= 36 \\ -2B - 2T &= -18 \\ \hline 3T &= 18 \\ T &= 6 \end{aligned}$$

Correct Answer: B

7. Which graph represents a system of linear equations that has multiple common coordinate pairs?



Correct Answer: B

UNIT 4—Radical and Polynomial Operations

1. Look at the radical.

$$-8\sqrt{726}$$

What is a rewritten form of the radical?

- A. $-88\sqrt{6}$
B. -90.75
C. $-986\sqrt{6}$
D. $-2,904$

$$-8\sqrt{21} \cdot 6$$

$$-88\sqrt{6}$$

Correct Answer: A

1. In which expression is the coefficient of term "n" - 1?

- A. $3n^2 + 4n - 1$
B. $-n^2 + 5n + 4$
C. $-2n^2 - n + 5$
D. $4n^2 + n - 5$

Correct Answer: C

2. The expression s^2 is used to calculate the area of a square, where s is the side length of the square. What does the expression $(8x)^2$ represent?

- A. the area of a square with a side length of 8
B. the area of a square with a side length of 16
C. the area of a square with a side length of 4x
D. the area of a square with a side length of 8x

Correct Answer: D

2. Look at the expression.

$$2\sqrt{8} \cdot \sqrt{20}$$

Which of these is equivalent to this expression?

- A. $2\sqrt{28}$
B. 5
C. $8\sqrt{10}$
D. $32\sqrt{10}$

$$2\sqrt{160}$$

$$\sqrt{16 \cdot 10}$$

$$8\sqrt{10}$$

Correct Answer: C

3. Which sum is rational?

- A. $\pi + 18$
B. $\sqrt{25} + 1.75$
C. $\sqrt{3} + 5.5$
D. $\pi + \sqrt{2}$

Correct Answer: B

4. Which product is irrational?

- A. $\sqrt{2} \cdot \sqrt{50}$
B. $\sqrt{64} \cdot \sqrt{4}$
C. $\sqrt{9} \cdot \sqrt{49}$
D. $\sqrt{10} \cdot \sqrt{8}$

$$\sqrt{100}$$

$$8 \cdot 2$$

$$3 \cdot 7$$

$$\sqrt{80}$$

Correct Answer: D

1. Which expression is equivalent to $121x^2 - 64y^2$?

- A. $(11x - 16y)(11x + 16y)$
B. $(11x - 16y)(11x - 16y)$
C. $(11x + 8y)(11x + 8y)$
D. $(11x + 8y)(11x - 8y)$

Correct Answer: D

2. What is a common factor for the expression $24x^2 + 16x + 144$?

- A. 16
B. 8x
C. $3x^2 + 2x + 18$
D. $8(x - 2)(3x + 9)$

$$3x^2 + 2x + 18$$

Correct Answer: C

3. Which of these shows the complete factorization of $6x^2y^2 - 9xy - 42$?

- A. $3(2xy^2 - 7)(xy^2 + 2)$
B. $(3xy + 6)(2xy - 7)$
C. $3(2xy - 7)(xy + 2)$
D. $(3xy^2 + 6)(2xy^2 - 7)$

$$\begin{array}{r} 2x \quad 7 \\ \times 2x^2 - 7x \\ \hline 4x^3 - 14x \end{array}$$

$$2x^2y^2 - 3xy - 14$$

$$2x^2 - 3x - 14$$

Correct Answer: C

1. What is the product of $7x - 4$ and $8x + 5$?

- A. $15x + 1$
B. $30x + 2$
C. $56x^2 + 3x - 20$
D. $56x^2 - 3x + 20$

$$\begin{array}{r} 7x \quad 5 \\ \times 8x - 4 \\ \hline 56x^2 + 35x - 28x - 20 \\ \hline 56x^2 + 7x - 20 \end{array}$$

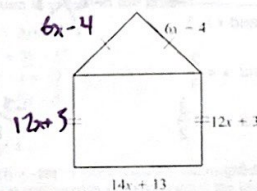
$$-28$$

$$-7 \times 14$$

$$-3$$

Correct Answer: C

2. A model of a house is shown.



add outside

What is the perimeter, in units, of the model?

- A. $32x + 12$ units
B. $46x + 25$ units
C. $50x + 11$ units
D. $64x + 24$ units

Correct Answer: C

3. Which expression has the same value as the expression $(8x^2 + 2x - 6) - (5x^2 - 3x + 2)$?

- A. $3x^2 - x - 4$
B. $3x^2 + 5x - 8$
C. $13x^2 - x - 8$
D. $13x^2 - 5x - 4$

$$8x^2 + 2x - 6 - 5x^2 + 3x - 2$$

$$3x^2 + 5x - 8$$

Correct Answer: B

UNIT 5—Solving Quadratics

3. What are the solutions to the equation $x^2 - 5x = 14$?

- A. $x = -7, x = -2$
- B. $x = -14, x = -1$
- C. $x = -2, x = 7$
- D. $x = -1, x = 14$

Correct Answer: C

$$x^2 - 5x - 14 = 0$$

$$\begin{array}{r} -14 \\ \times -5 \\ \hline 70 \\ 70 \\ \hline 140 \end{array}$$

$$x-7 \quad x+2$$

$$x=7 \quad x=-2$$

3. Which of these is the result of completing the square for the expression $x^2 + 8x - 30$?

- A. $(x+4)^2 - 30$
- B. $(x+4)^2 - 46$
- C. $(x+8)^2 - 30$
- D. $(x+8)^2 - 94$

Correct Answer: B

$$x^2 + 8x - 30 = 30 - 16$$

$$(x+4)^2 = 46$$

4. The expression $-x^2 + 70x - 600$ represents a company's profit for selling x items. For which number(s) of items sold is the company's profit equal to \$0?

- A. 0 items
- B. 35 items
- C. 10 items and 60 items
- D. 20 items and 30 items

Correct Answer: C

table or

$$x^2 - 70x + 600 = 0$$

$$(x-10)(x-60)$$

$$x=10 \quad x=60$$

1. What are the zeros of the function represented by the quadratic expression $2x^2 + x - 3$?

- A. $x = -\frac{3}{2}$ and $x = 1$
- B. $x = -\frac{2}{3}$ and $x = 1$
- C. $x = -1$ and $x = \frac{2}{3}$
- D. $x = -1$ and $x = -\frac{3}{2}$

Correct Answer: A

$$\begin{array}{r} -3 \\ \times -2 \\ \hline 6 \\ 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} x \\ \times -1 \\ \hline -x^2 \\ -3x \\ \hline 3x-3 \end{array}$$

$$-\frac{3}{2}$$

2. What is the vertex of the graph of $f(x) = x^2 + 10x - 9$?

- A. (5, 66)
- B. (5, -9)
- C. (-5, -9)
- D. (-5, -34)

Correct Answer: D

$$\frac{-10}{2(1)} = \frac{-10}{2} = -5$$

1. What are the solutions to the equation $2x^2 - 2x - 12 = 0$?

- A. $x = -4, x = 3$
- B. $x = -3, x = 4$
- C. $x = -2, x = 3$
- D. $x = -5, x = 2$

Correct Answer: C

$$x^2 - x - 6$$

$$\begin{array}{r} -6 \\ \times -3 \\ \hline 18 \\ 18 \\ \hline 36 \end{array}$$

$$x-3 \quad x+2$$

$$x=3 \quad x=-2$$

2. What are the solutions to the equation $6x^2 - x - 40 = 0$?

- A. $x = -\frac{8}{3}, x = -\frac{5}{2}$
- B. $x = -\frac{8}{3}, x = \frac{5}{2}$
- C. $x = \frac{5}{2}, x = \frac{8}{3}$
- D. $x = -\frac{5}{2}, x = \frac{8}{3}$

Correct Answer: D

$$\begin{array}{r} 240 \\ \times -15 \\ \hline 360 \\ 360 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 3x-8 \\ \times 5x-16 \\ \hline 15x^2-48x \\ 15x^2-48x \\ \hline 480 \end{array}$$

$$(3x-8)(5x-16)$$

$$x = \frac{8}{3} \quad x = \frac{16}{5}$$

UNIT 6—Graphing Quadratics and Characteristics

4. An object is thrown in the air with an initial velocity of 5 m/s from a height of 9 m. The equation $h(t) = -4.9t^2 + 5t + 9$ models the height of the object in meters after t seconds.

About how many seconds does it take for the object to hit the ground? Round your answer to the nearest tenth of a second.

- A. 0.940 second
 B. 1.50 seconds
 C. 2.00 seconds
 D. 9.00 seconds

Correct Answer: C

3. Which statement BEST describes how the graph of $g(x) = -3x^2$ compares to the graph of $f(x) = x^2$?

- A. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3.
 B. The graph of $g(x)$ is a reflection of $f(x)$ across the x -axis.
 C. The graph of $g(x)$ is a vertical shrink of $f(x)$ by a factor of $\frac{1}{3}$ and a reflection across the x -axis.
 D. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3 and a reflection across the x -axis.

Correct Answer: D

1. A flying disk is thrown into the air from a height of 25 feet at time $t = 0$. The function that models this situation is $h(t) = -16t^2 + 75t + 25$, where t is measured in seconds and h is the height in feet. What values of t best describe the times when the disk is flying in the air?

- A. $0 < t < 5$
 B. $0 < t < 25$
 C. all real numbers
 D. all positive integers

Correct Answer: A

2. Use this table to answer the question.

x	$f(x)$
-2	15
-1	9
0	5
1	3
2	3

What is the average rate of change of $f(x)$ over the interval $-2 \leq x \leq 0$?

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

Correct Answer: B

3. What is the end behavior of the graph of $f(x) = -0.25x^2 - 2x + 1$?

- A. As x increases, $f(x)$ increases.
 As x decreases, $f(x)$ decreases.
 B. As x increases, $f(x)$ decreases.
 As x decreases, $f(x)$ decreases.
 C. As x increases, $f(x)$ increases.
 As x decreases, $f(x)$ increases.
 D. As x increases, $f(x)$ decreases.
 As x decreases, $f(x)$ increases.

Correct Answer: B

2. The function $s(t) = vt + h - 0.5at^2$ represents the height of an object, s , from the ground after the time, t , when the object is thrown with an initial velocity of v at an initial height of h and where a is the acceleration due to gravity (32 feet per second squared).

A baseball player hits a baseball 4 feet above the ground with an initial velocity of 80 feet per second. About how long will it take the baseball to hit the ground?

- A. 2 seconds
 B. 3 seconds
 C. 4 seconds
 D. 5 seconds

Correct Answer: D

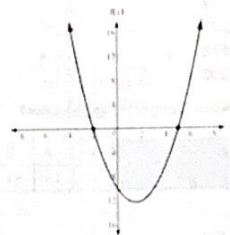
3. A café's annual income depends on x , the number of customers. The function $f(x) = 4x^2 - 20x$ describes the café's total annual income. The function $C(x) = 2x^2 + 5$ describes the total amount the café spends in a year. The café's annual profit, $P(x)$, is the difference between the annual income and the amount spent in a year.

Which function describes $P(x)$?

- A. $P(x) = 2x^2 - 20x - 5$
 B. $P(x) = 4x^2 - 20x^2$
 C. $P(x) = 6x^2 - 20x + 5$
 D. $P(x) = 8x^4 - 40x^2 - 20x^2 - 100x$

Correct Answer: A

1. Use this graph to answer the question.



Which function is shown in the graph?

- A. $f(x) = x^2 - 3x - 10$
 B. $f(x) = x^2 + 3x - 10$
 C. $f(x) = x^2 + x - 12$
 D. $f(x) = x^2 - 5x - 8$

Correct Answer: A

2. The function $f(t) = -16t^2 + 64t + 5$ models the height of a ball that was hit into the air, where t is measured in seconds and h is the height in feet.

This table represents the height, $g(t)$, of a second ball that was thrown into the air

Time, t (in seconds)	Height, $g(t)$ (in feet)
0	4
1	36
2	36
3	4

Which statement BEST compares the length of time each ball is in the air?

- A. The ball represented by $f(t)$ is in the air for about 5 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.
 B. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 5 seconds.
 C. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 4 seconds.
 D. The ball represented by $f(t)$ is in the air for about 4 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

Correct Answer: D

UNIT 7—Exponential Functions and Graphs

1. What explicit expression can be used to find the next term in this sequence?

2, 8, 18, 32, 50, ...

- A. $2n$
- B. $2n + 6$
- C. $2n^2$
- D. $2n^2 + 1$

Correct Answer: C

1. Which statement BEST describes the graph of $f(x + 6)$?

- A. The graph of $f(x)$ is shifted up 6 units.
- B. The graph of $f(x)$ is shifted left 6 units.
- C. The graph of $f(x)$ is shifted right 6 units.
- D. The graph of $f(x)$ is shifted down 6 units.

Correct Answer: B

1. A certain population of bacteria has an average growth rate of 2%. The formula for the growth of the bacteria's population is $A = P_0 \cdot 1.02^t$, where P_0 is the original population and t is the time in hours.

If you begin with 200 bacteria, about how many bacteria will there be after 100 hours?

- A. 7
- B. 272
- C. 1,478
- D. 20,000

1. Which function represents this sequence?

n	1	2	3	4	5	...
a_n	6	18	54	162	486	...

- A. $f(n) = 3^{n-1}$
- B. $f(n) = 6^{n-1}$
- C. $f(n) = 3(6^{n-1})$
- D. $f(n) = 6(3^{n-1})$

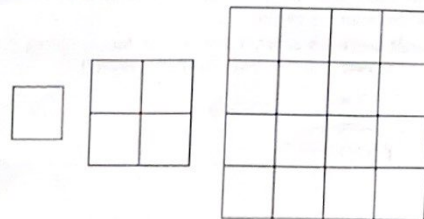
Correct Answer: D

2. The points (0, 1), (1, 5), (2, 25), and (3, 125) are on the graph of a function. Which equation represents that function?

- A. $f(x) = 2^x$
- B. $f(x) = 3^x$
- C. $f(x) = 4^x$
- D. $f(x) = 5^x$

Correct Answer: D

1. Consider this pattern.



Which function represents the sequence that represents the pattern?

- A. $a_n = (4)^{n-1}$
- B. $a_n = (4)^{n-3}$
- C. $a_n = (a_n)(4)^{n-1}$
- D. $a_n = (a_n)^4$

Correct Answer: A

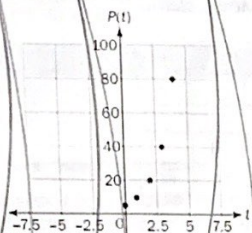
2. Which function is modeled in this table?

x	$f(x)$
1	1000
2	800
3	640
4	512

- A. $1,000(0.80)$
- B. $1,000(0.20)$
- C. $1,000(0.80)^x$
- D. $1,000(0.20)^x$

Correct Answer: C

A population of squirrels doubles every year. Initially, there were 5 squirrels. A biologist studying the squirrels created a function to model their population growth: $P(t) = 5(2)^t$, where t is the time in years. The graph of the function is shown.



What is the range of the function?

- A. any real number
- B. any whole number greater than 0
- C. any whole number greater than 5
- D. any whole number greater than or equal to 5

Correct Answer: D

1. Which function shows the function $f(x) = 3^x$ being translated 5 units to the left?

- A. $f(x) = 3^x - 5$
- B. $f(x) = 3^{(x+5)}$
- C. $f(x) = 3^x$
- D. $f(x) = 3^x + 5$

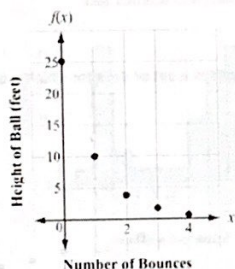
Correct Answer: B

2. Which function shows the function $f(x) = 3^x$ being translated 5 units down?

- A. $f(x) = 3^x - 5$
- B. $f(x) = 3^{(x-5)}$
- C. $f(x) = 3^{(x+5)}$
- D. $f(x) = 3^x + 5$

Correct Answer: A

2. The function graphed on this coordinate grid shows $f(x)$, the height of a dropped ball in feet after its x th bounce.

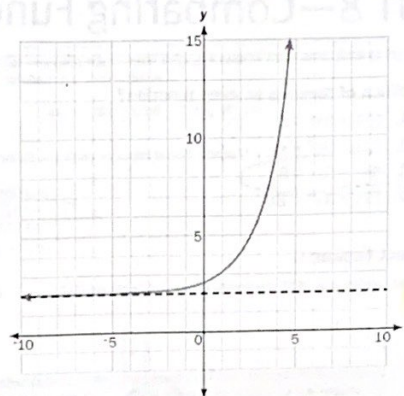


On which bounce was the height of the ball 10 feet?

- A. bounce 1
- B. bounce 2
- C. bounce 3
- D. bounce 4

Correct Answer: A

1. Look at the graph.



Which equation represents this graph?

- A. $y = 2^{(x+1)} - 2$
- B. $y = 2^{(x-1)} + 2$
- C. $y = 2^{(x+2)} - 1$
- D. $y = 2^{(x-2)} + 1$

Correct Answer: B

3. Which explicit formula describes the pattern in this table?

d	C
0	1
1	6
2	36
3	216

- A. $C = 6d$
- B. $C = d + 6$
- C. $C = 6^d$
- D. $C = d^6$

Correct Answer: C

4. If $f(12) = 100(0.50)^{12}$, which expression gives $f(x)$?

- A. $f(x) = 12^x$
- B. $f(x) = 100^x$
- C. $f(x) = 100(x)^{12}$
- D. $f(x) = 100(12)^x$

Correct Answer: D

UNIT 8—Comparing Functions

2. Which of these is an even function?

A. $f(x) = 5x^2 - x$

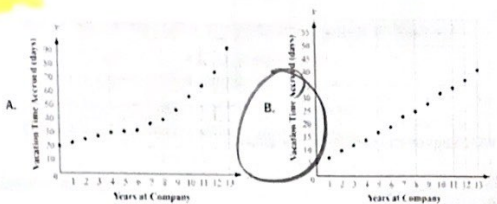
B. $f(x) = 3x^3 + x$

C. $f(x) = 6x^2 - 8$

D. $f(x) = 4x^3 + 2x^2$

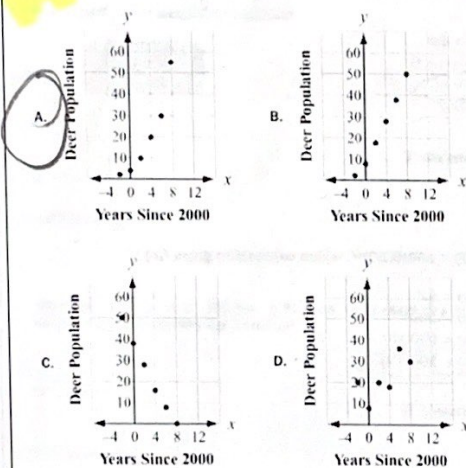
Correct Answer: C

1. Which scatter plot BEST represents a model of linear growth?



Correct Answer: B

2. Which scatter plot BEST represents a model of exponential growth?



Correct Answer: A

3. Which table represents an exponential function?

A.

x	0	1	2	3	4
y	5	6	7	8	9

B.

x	0	1	2	3	4
y	0	22	44	66	88

C.

x	0	1	2	3	4
y	5	13	21	29	37

D.

x	0	1	2	3	4
y	0	3	9	27	81

Correct Answer: D

4. A table of values is shown for $f(x)$ and $g(x)$.

x	f(x)
0	0
1	1
2	4
3	9
4	16
5	25

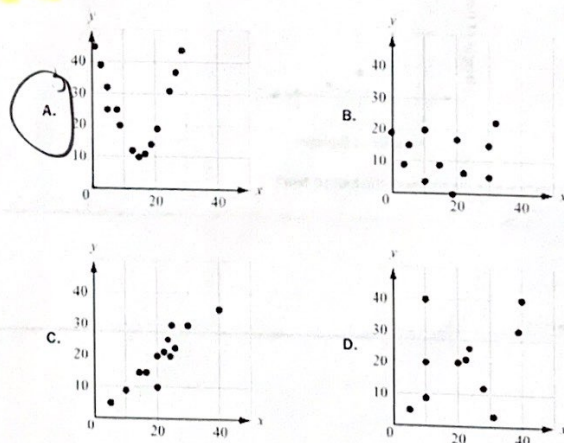
x	g(x)
0	-2
1	-1
2	1
3	5
4	13
5	29

Which statement compares the graphs of $f(x)$ and $g(x)$ over the interval $[0, 5]$?

- A. The graph of $f(x)$ always exceeds the graph of $g(x)$ over the interval $[0, 5]$.
- B. The graph of $g(x)$ always exceeds the graph of $f(x)$ over the interval $[0, 5]$.
- C. The graph of $g(x)$ exceeds the graph of $f(x)$ over the interval $[0, 4]$, the graphs intersect at a point between 4 and 5, and then the graph of $f(x)$ exceeds the graph of $g(x)$.
- D. The graph of $f(x)$ exceeds the graph of $g(x)$ over the interval $[0, 4]$, the graphs intersect at a point between 4 and 5, and then the graph of $g(x)$ exceeds the graph of $f(x)$.

Correct Answer: D

1. Which graph MOST clearly displays a set of data for which a quadratic function is the model of best fit?



Correct Answer: A

Unit 9—Data

1. This table shows the average low temperature, in °F, recorded in Macon, GA, and Charlotte, NC, over a six-day period.

Day	1	2	3	4	5	6
Temperature in Macon, GA (°F)	71	72	66	69	71	73
Temperature in Charlotte, NC (°F)	69	64	68	74	71	75

Which conclusion can be drawn from the data?

- A. The interquartile range of the temperatures is the same for both cities.
- B. The lower quartile for the temperatures in Macon is less than the lower quartile for the temperatures in Charlotte.
- C. The mean and median temperatures in Macon were higher than the mean and median temperatures in Charlotte.
- D. The upper quartile for the temperatures in Charlotte was less than the upper quartile for the temperatures in Macon.

Correct Answer: C

2. A school was having a coat drive for a local shelter. A teacher determined the median number of coats collected per class and the interquartile range of the number of coats collected per class for the freshmen and for the sophomores.

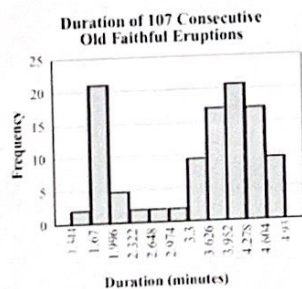
- The freshmen collected a median number of coats per class of 10, and the interquartile range was 6.
- The sophomores collected a median number of coats per class of 10, and the interquartile range was 4.

Which range of numbers includes the third quartile of coats collected for both freshmen and sophomore classes?

- A. 4 to 14
- B. 6 to 14
- C. 10 to 16
- D. 12 to 15

Correct Answer: C

6. This histogram shows the frequency distribution of duration times for 107 consecutive eruptions of the Old Faithful geyser. The duration of an eruption is the length of time, in minutes, from the beginning of the spewing of water until it stops. What is the BEST description for the distribution?



- A. bimodal
- B. uniform
- C. multiple outlier
- D. skewed to the right

Correct Answer: A

3. A reading teacher recorded the number of pages read in an hour by each of her students. The numbers are shown below.

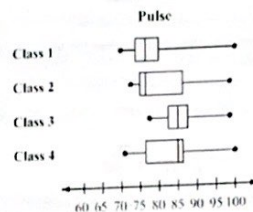
44, 49, 39, 43, 50, 44, 45, 49, 51

For this data, which summary statistic is NOT correct?

- A. The minimum is 39.
- B. The lower quartile is 44.
- C. The median is 45.
- D. The maximum is 51.

Correct Answer: B

4. A science teacher recorded the pulse of each of the students in her classes after the students had climbed a set of stairs. She displayed the results, by class, using the box plots shown.



Which class generally had the highest pulse after climbing the stairs?

- A. Class 1
- B. Class 2
- C. Class 3
- D. Class 4

Correct Answer: C

5. Peter went bowling, Monday to Friday, two weeks in a row. He only bowled one game each time he went. He kept track of his scores below.

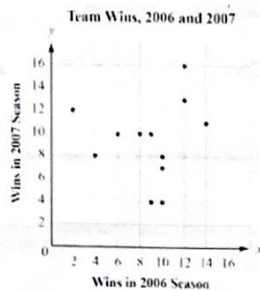
Week 1: 70, 70, 70, 73, 75
Week 2: 72, 64, 73, 73, 75

What is the BEST explanation for why Peter's Week 2 mean score was lower than his Week 1 mean score?

- A. Peter received the same score three times in Week 1.
- B. Peter had one very low score in Week 2.
- C. Peter did not beat his high score from Week 1 in Week 2.
- D. Peter had one very high score in Week 1.

Correct Answer: B

2. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.

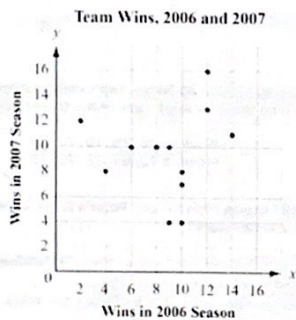


Which equation BEST represents a line that matches the trend of the data?

- A. $y = x + 2$
- B. $y = x + 7$
- C. $y = \frac{3}{5}x + 1$
- D. $y = \frac{3}{5}x + 5$

Correct Answer: D

1. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.

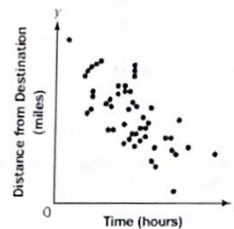


Based on the regression model, what is the predicted number of 2007 wins for a team that won 5 games in 2006?

- A. 4
- B. 7
- C. 8
- D. 12

Correct Answer: C

2. Which BEST describes the correlation of the two variables shown in the scatter plot?



- A. weak positive
- B. strong positive
- C. weak negative
- D. strong negative

Correct Answer: D

3. Which of these statements is an example of causation?

- A. When the weather becomes warmer, more meat is purchased at the supermarket.
- B. More people go to the mall when students go back to school.
- C. The greater the number of new television shows, the fewer the number of moviegoers.
- D. After operating costs are paid at a toy shop, as more toys are sold, more money is made.

Correct Answer: D

4. To rent a carpet cleaner at the hardware store, there is a set fee and an hourly rate. The rental cost, c , can be determined using this equation when the carpet cleaner is rented for h hours.

$$c = 25 + 3h$$

Which of these is the hourly rate?

- A. 3
- B. $3h$
- C. 25
- D. $25h$

Correct Answer: A