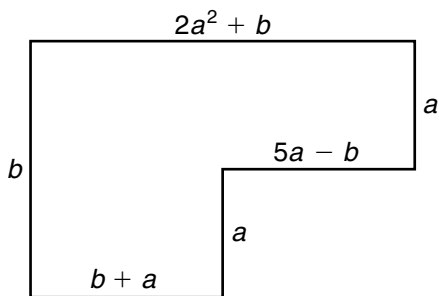


CHAPTER 11 **Cumulative Test**

Select the best answer.

- Find the multiplicative inverse of $-\frac{4}{7}$.
A $-\frac{7}{4}$ **C** $\frac{7}{4}$
B $-\frac{4}{7}$ **D** $\frac{4}{7}$
- The plan for a garden is shown below. What is the simplified expression for the perimeter of the garden?



- F** $10a + 2b$ **H** $2a^2 + 8a + 2b$
G $10a^2 + 3b$ **J** $2a^2 + 8a + 3b$
- Which relation below is a function?
A $\{(3, -1), (-1, 3), (-1, 4), (4, -1)\}$
B $\{(1, 4), (1, 5), (1, 11), (1, 90)\}$
C $\{(5, 1), (6, 1), (8, 1), (9, 1)\}$
D $\{(7, 3), (4, 3), (9, 3), (7, 2)\}$
 - Describe the transformation of the graph from $f(x) = 10x + 16$ to $g(x) = 10x + 11$.
F $g(x)$ is less steep.
G $g(x)$ is steeper.
J $g(x)$ is translated 5 units down.
H $g(x)$ is translated 5 units up.
 - A baker needs 5 eggs for a recipe that will make 30 servings. If he wants to make enough to feed 156 people, how many eggs does he need?
A 25 **C** 30
B 26 **D** 31

- Which line is perpendicular to $y = \frac{3}{4}x - 10$ and passes through $(12, -1)$?
F $y = \frac{3}{4}x - 4$ **H** $y = -\frac{4}{3}x + 15$
G $y = -\frac{3}{4}x + 8$ **J** $y = \frac{4}{3}x - 17$
- Karin's monthly cell phone bill in dollars can be determined by $f(x) = 25 + 0.2x$ where x is the number of minutes she uses her phone after the first 200 minutes. If the phone company raises the cost of the first 200 minutes by \$3, which function can be used to find her monthly bill?
A $f(x) = 25 + 3.2x$
B $f(x) = 28 + 0.2x$
C $f(x) = 25 + 0.2x$
D $f(x) = 28 + 3.2x$
- Solve $|x - 2| + 1 = 7$.
F $x = -4$ or $x = 8$ **H** $x = -8$ or $x = 4$
G $x = 8$ or $x = -8$ **J** $x = 4$ or $x = -4$
- At a used bookstore, paperbacks cost \$2 and hardcovers cost \$3.50. Karin buys 10 books for a total of \$27.50. How many of each type of book did she purchase?
A 0 paperbacks, 7 hardcovers
B 6 paperbacks, 4 hardcovers
C 5 paperbacks, 5 hardcovers
D 11 paperbacks, 1 hardcover
- Maximize the objective function $P = 10x - 2y$ under the constraints

$$\begin{cases} y \geq 4 \\ x \leq 10 \\ x + y \geq 8 \end{cases}$$
F $P = 32$ **H** $P = 86$
G $P = 58$ **J** $P = 92$

CHAPTER 11 **Cumulative Test** continued

11. $P = \begin{bmatrix} 4 & -9 \\ 5 & 0 \end{bmatrix}$ $Q = \begin{bmatrix} -3 & 6 \\ 1 & -1 \end{bmatrix}$

Which is the sum $P + Q$?

A $\begin{bmatrix} 7 & -15 \\ 4 & 1 \end{bmatrix}$ **C** $\begin{bmatrix} -12 & -54 \\ 5 & 0 \end{bmatrix}$

B $\begin{bmatrix} 1 & 11 \\ -8 & -1 \end{bmatrix}$ **D** $\begin{bmatrix} 1 & -3 \\ 6 & -1 \end{bmatrix}$

12. An architect makes a blueprint of a triangular roof with vertices at (2, 3), (8, 3) and (5, 9). Which matrix shows the vertices of the roof if she wants it to be twice as large?

F $\begin{bmatrix} 2 & 8 & 5 \\ 6 & 6 & 18 \end{bmatrix}$ **H** $\begin{bmatrix} 4 & 16 & 10 \\ 6 & 6 & 18 \end{bmatrix}$

G $\begin{bmatrix} 4 & 16 & 10 \\ 3 & 3 & 9 \end{bmatrix}$ **J** $\begin{bmatrix} 4 & 10 & 7 \\ 5 & 5 & 11 \end{bmatrix}$

13. What is the determinant of the matrix $\begin{bmatrix} 3 & 2 \\ -3 & 4 \end{bmatrix}$?

- A** -6 **C** 12
B 6 **D** 18

14. Which augmented matrix represents the system $\begin{cases} 2x = 9 - y \\ 3x + 2y = 14 \end{cases}$?

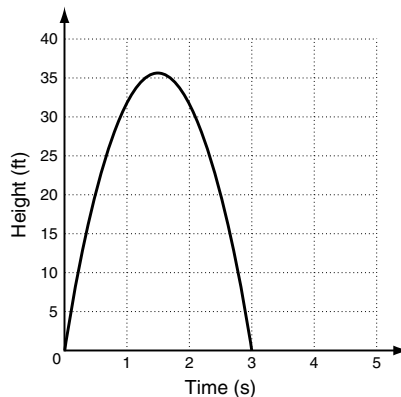
F $\left[\begin{array}{cc|c} 2 & 9 & -1 \\ 3 & 2 & 14 \end{array} \right]$ **H** $\left[\begin{array}{cc|c} 2 & -9 & -1 \\ 3 & 2 & 14 \end{array} \right]$

G $\left[\begin{array}{cc|c} 2 & 1 & 9 \\ 3 & 2 & 14 \end{array} \right]$ **J** $\left[\begin{array}{cc|c} 2 & -9 & 7 \\ 3 & 2 & 14 \end{array} \right]$

15. What is the stretch factor from $f(x) = 3(x - 2)^2 + 1$ to $g(x) = 6(x - 2)^2 + 2$?

- A** 1 **C** 3
B 2 **D** 6

16. Which situation could be graphed below?



- F** A ball is dropped from a height of 36 feet and lands after 1.5 seconds.
G A ball is dropped from a height of 36 feet and lands after 3 seconds.
H A ball is thrown into the air and reaches its maximum height after 1.5 seconds.
J A ball is thrown into the air and reaches its maximum height after 3 seconds.

17. Find the values of x and y that make the following equation true:

$-8x - (4y)i = 12i + 24.$

- A** $x = -3; y = -3$ **C** $x = 3; y = 3$
B $x = 1.5; y = 8$ **D** $x = -1.5; y = -8$

18. What is the degree of the polynomial $9x^2 + 6x^3 - 5 + 5x$?

- F** 2 **H** 4
G 3 **J** 9

19. The area of a carpet is described by the polynomial $2x^2 - 4x - 6$. The length of the carpet is $x - 3$. What is the width of the carpet?

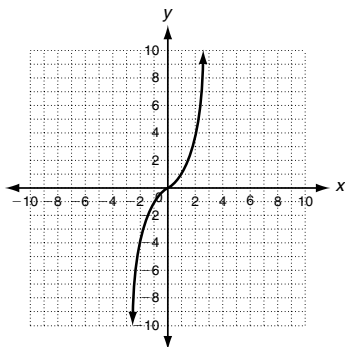
- A** $2x + 2$ **C** $2x - 3$
B $2x^2 - 3$ **D** $2x^2 + 2$

20. Factor $x^3 + 3x^2 - x - 3$ completely.

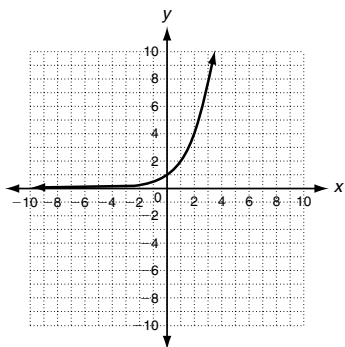
- F** $(x - 1)(x - 1)(x + 3)$
G $(x - 1)(x + 1)(x - 3)$
H $(x + 1)(x + 1)(x - 3)$
J $(x + 1)(x - 1)(x + 3)$

CHAPTER 11 **Cumulative Test**
continued

21. From the graph of $f(x)$ below, find whether the leading coefficient of $f(x)$ is positive or negative and odd or even.



- A positive and odd C negative and odd
B positive and even D negative and even
22. A species of frog doubles its population every 2 months. If the population starts at 30, how many frogs will there be in one year?
- F 390 H 1920
G 900 J 2250
23. This is the graph of which function?



- A $f(x) = \log_x 2$ C $f(x) = x^2$
B $f(x) = \log_2 x$ D $f(x) = 2^x$
24. The number of termites in a hill at time t in years can be found using the function $P = 250(1.1)^t$. Which function can be used to find the time elapsed based on the population?
- F $t = \log_{250}\left(\frac{1.1}{P}\right)$ H $t = \log_{1.1}\left(\frac{P}{250}\right)$
G $t = \log_{1.1}\left(\frac{250}{P}\right)$ J $t = \log_{250}\left(\frac{P}{1.1}\right)$

25. Solve $y = z^x$ for x .
- A $\frac{\log z}{\log y}$ C $\frac{z}{\log y}$
B $\frac{\log y}{\log z}$ D $\frac{y}{\log z}$
26. A certain beach has 350 yards of sand but erosion is decreasing it by 20% each year. Which expression represents the amount of beach as a function of time?
- F $b(t) = 20(350)^t$ H $b(t) = 350(0.2)^t$
G $b(t) = 350(0.8)^t$ J $b(t) = 0.8(350)^t$
27. The cost per person on a vacation varies as the number of people who go on the vacation. It will cost \$300 per person if 10 people go. How much will it cost if 15 people go on the vacation?
- A \$150 C \$400
B \$200 D \$450
28. For which values of x is the expression $\frac{x^2 + x - 2}{x^2 - 4x + 3}$ undefined?
- F -2 and 1 H 3 and 1
G -1 and 2 J -3 and -1
29. A carpenter and her apprentice working together can build a bed frame in 3 hours. The apprentice could build it by himself in 12 hours. How long would it take the carpenter if she were building it by herself?
- A 1 hour C 4 hours
B 2 hours D 6 hours
30. What are the x - and y -intercepts of the function $f(x) = -\frac{2}{3}x + 6$?
- F x -intercept: 9; y -intercept: -6
G x -intercept: 26; y -intercept: 9
H x -intercept: 6; y -intercept: -9
J x -intercept: 9; y -intercept: 6

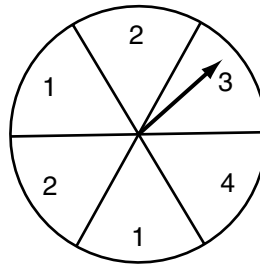
CHAPTER 11 **Cumulative Test**
continued

31. A worker's pay in dollars is based on the hours h she works, according to $f(h) = 10h + 100$. She puts 20% of her pay plus \$20 into her savings. Which expression shows her savings as a function of the hours she works?
- A** $f(h) = 10h + 20$
B $f(h) = 10h + 120$
C $f(h) = 2h + 40$
D $f(h) = 2h + 120$
32. A scout troop is making a map of their campsite. On their map, their circular mess tent has a diameter with endpoints at $(-2, 3)$ and $(6, -3)$. What are the center and radius of the tent?
- F** center $(2, 0)$, $r = 3$
G center $(2, 0)$, $r = 4$
H center $(2, 0)$, $r = 5$
J center $(2, 0)$, $r = 10$
33. Which is the constant difference for a hyperbola with foci $F_1(2, 0)$ and $F_2(6, 0)$ and the point on the hyperbola $(2, 3)$?
- A** 8 **C** 2
B -2 **D** 8
34. Which conic section is described by the equation $9x^2 - 4y^2 - 18x + 8y = -12$?
- F** circle
G parabola
H ellipse
J hyperbola
35. Ms. Banner's class has 9 students in it. How many ways can she choose 3 students to present their assignments to the class?
- A** 120 **C** 720
B 504 **D** 904

36. Three coins are flipped at the same time. What is the probability that they all show the same result (all heads or all tails)?

- F** $\frac{1}{8}$ **H** $\frac{1}{3}$
G $\frac{1}{4}$ **J** $\frac{1}{2}$

37. With the spinner below, what are the chances of spinning a 2 and then spinning a 3?



- A** $\frac{1}{18}$ **C** $\frac{1}{3}$
B $\frac{1}{12}$ **D** $\frac{1}{2}$
38. The numbers 1–12 are written on tokens and placed in a bag. What is the probability of choosing a multiple of 2 or a multiple of 3?
- F** $\frac{1}{6}$ **H** $\frac{2}{3}$
G $\frac{1}{3}$ **J** $\frac{5}{6}$
39. Find the mean and median of the number set $\{3, 3, 4, 7, 8\}$.
- A** mean = 5; median = 3
B mean = 3; median = 4
C mean = 4; median = 5
D mean = 5; median = 4
40. A raffle advertises that 1 in 10 tickets sold will be a winner. If Barlee buys 8 tickets, what is the approximate probability that she will win at least 1 prize?
- F** 20% **H** 57%
G 43% **J** 80%

Answer Key continued

4. independent events
5. $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$
6. rolling at least one CAR
7. $1 - \frac{1}{8} = \frac{7}{8}$
- 8a. $\frac{1}{2}$
- 8b. $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$
- 8c. $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$
- 8d. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{7}{8}$
9. The probability of rolling one, two, or three CARs in three rolls is the same as rolling one CAR (and keeping it) in one, two, or three rolls.
10. $\frac{16,807}{32,768} \approx 0.513$
11. the contestant; their chance of winning is greater than 50%, the chance of the game show owner winning (the contestant losing) is less than 50%

Cumulative Test

1. A
2. H
3. C
4. J
5. B
6. H
7. B
8. F
9. C
10. J
11. D
12. H
13. D
14. G
15. B
16. H
17. A
18. G
19. A
20. J
21. A
22. H
23. D
24. H
25. B
26. G
27. D
28. H
29. C
30. J
31. C
32. H
33. C
34. J
35. B
36. G
37. A
38. H
39. D
40. H

CHAPTER 12

Section Quiz: Lessons 12-1 to 12-3

1. C
2. F
3. C
4. G
5. A