

CHAPTER

9

Cumulative Test

Select the best answer.

1. Simplify $\frac{4\sqrt{12}}{\sqrt{20}}$.
- A $\frac{4\sqrt{3}}{5}$ C $\frac{4\sqrt{15}}{5}$
- B $\frac{8\sqrt{3}}{5}$ D $\frac{8\sqrt{15}}{5}$
2. Simplify $\frac{1}{2^{-2} + 2^{-3}}$. Assume all variables are nonzero.
- F $\frac{8}{3}$ H 32
- G 12 J 64
3. Evaluate $f(4)$ if $f(x) = \frac{2^x}{\log_2 x}$.
- A 2 C 8
- B 4 D 16
4. It costs \$250 for the ski club to charter a bus for a ski trip. Which function $C(P)$ represents the cost per person for P students going on the trip if it costs \$25 per person to rent equipment and each person pays an equal share of the bus ride?
- F $C(P) = 25P + 250$
- G $C(P) = \frac{275}{P}$
- H $C(P) = 250 + \frac{25}{P}$
- J $C(P) = 25 + \frac{250}{P}$
5. Solve $\frac{15}{x-1} = \frac{24}{2x}$.
- A $x = -6.5$ C $x = 4$
- B $x = -4$ D $x = 5$
6. Which set of points could NOT represent a linear function?
- F $\{(1, 5), (3, 5), (6, 5), (10, 5)\}$
- G $\{(1, 8), (2, 7), (4, 5), (8, 1)\}$
- H $\{(1, 31), (11, 21), (21, 11), (31, 1)\}$
- J $\{(3, 24), (6, 12), (12, 6), (24, 3)\}$
7. A line has slope $\frac{4}{7}$ and passes through $(4, 7)$. Which of these points is also on the line?
- A $(0, 0)$ C $(0, 5)$
- B $(0, \frac{33}{7})$ D $(0, \frac{65}{7})$
8. Which is the equation of the line perpendicular to $2x + 5y = 13$ and passing through $(7, -1)$?
- F $2x - 5y = 19$ H $5x - 2y = 37$
- G $2x + 5y = 9$ J $5x + 2y = 33$
9. At the Bucket-O'-Fun Amusement Park, there is a \$10 entrance fee and rides are \$1.50. At the Thrill Ville Amusement Park, there is a \$5 entrance fee and rides are \$2.25. What is the least number of rides you must go on for Bucket-O'-Fun to be less expensive?
- A 5 C 7
- B 6 D 8
10. Solve $\begin{cases} x - 6y = 10 \\ 3x + 2y = 40 \end{cases}$.
- F $(10, 0)$ H $(16, 1)$
- G $(13, 0.5)$ J no solution
11. At a wedding banquet there are small tables that seat 8 and large tables that seat 10. If there are 16 tables in all and the total number of seats is 138, how many of the tables are small?
- A 5 C 9
- B 7 D 11
12. The system $\begin{cases} x + y + z = 12 \\ 2x + 3y + 4z = 30 \\ 6x + 8y + 10z = 88 \end{cases}$ is
- F inconsistent, with no solutions.
- G dependent, with infinitely many solutions.
- H independent, with one solution.
- J dependent, with one solution.

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13. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, evaluate A^3 .
- A** $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ **C** $\begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$
- B** $\begin{bmatrix} 3 & 3 \\ 3 & 3 \end{bmatrix}$ **D** $\begin{bmatrix} 6 & 6 \\ 6 & 6 \end{bmatrix}$
14. $\triangle ABC$ has vertices $A(2, 1)$, $B(-5, 2)$, and $C(-3, 4)$. What are the coordinates of the image of $\triangle ABC$ after it has been reflected using the matrix $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$?
- F** $A'(-2, 1)$, $B'(5, 2)$, $C'(3, 4)$
G $A'(-1, -2)$, $B'(-2, 5)$, $C'(-4, 3)$
H $A'(1, 2)$, $B'(2, -5)$, $C'(4, -3)$
J $A'(2, -1)$, $B'(-5, -2)$, $C'(-3, -4)$

15. Which matrix is the inverse of $\begin{bmatrix} 3 & 8 \\ 2 & 6 \end{bmatrix}$?
- A** $\begin{bmatrix} -3 & 2 \\ 8 & -6 \end{bmatrix}$ **C** $\begin{bmatrix} 3 & -4 \\ -1 & 1.5 \end{bmatrix}$
- B** $\begin{bmatrix} -1.5 & -1 \\ 4 & -3 \end{bmatrix}$ **D** $\begin{bmatrix} 6 & -8 \\ -2 & 3 \end{bmatrix}$
16. $\begin{bmatrix} 1 & 0 & \vdots & 4 \\ 0 & 1 & \vdots & -3 \end{bmatrix}$ is the reduced row-echelon form of which matrix?
- F** $\begin{bmatrix} -3 & 2 & \vdots & -6 \\ 5 & 1 & \vdots & 17 \end{bmatrix}$ **H** $\begin{bmatrix} 4 & 6 & \vdots & -2 \\ 3 & -2 & \vdots & 6 \end{bmatrix}$
- G** $\begin{bmatrix} 2 & -5 & \vdots & 23 \\ 1 & 8 & \vdots & -28 \end{bmatrix}$ **J** $\begin{bmatrix} 5 & 3 & \vdots & 11 \\ -2 & 4 & \vdots & -20 \end{bmatrix}$

17. The chart below shows the first, second, and third place finishes, and the total points earned by each of three schools competing in a track meet. How much is a first place finish in an event worth?

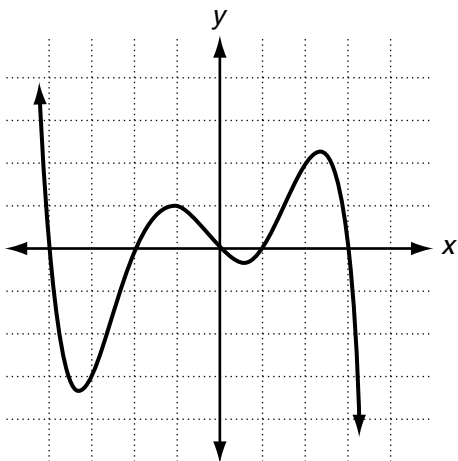
	First	Second	Third	Total Score
Washington High	7	5	4	100
Jefferson High	5	8	3	94
Lincoln High	4	3	9	78

- A** 7 **C** 9
B 8 **D** 10
18. Which function has a maximum value of 10?
- F** $f(x) = -2x^2 + 4x - 12$
G $g(x) = -2x^2 + 8x + 2$
H $h(x) = -x^2 + 6x + 10$
J $j(x) = x^2 - 4x + 14$
19. Write a quadratic function in standard form having zeros of $\frac{1}{4}$ and $-\frac{1}{2}$.
- A** $a(x) = 4x^2 + x - 1$
B $b(x) = 4x^2 - x - 1$
C $c(x) = 8x^2 - 2x - 1$
D $d(x) = 8x^2 + 2x - 1$
20. Write $f(x) = 2x^2 - 8x + 10$ in vertex form.
- F** $f(x) = 2(x - 2)^2 + 2$
G $f(x) = 2(x - 2)^2 + 6$
H $f(x) = 2(x - 4)^2 - 22$
J $f(x) = 2(x - 4)^2 - 6$
21. What are the solutions to $x^2 + 4x + 12 = 0$?
- A** $-2 \pm 2i$ **C** $-2 \pm 2\sqrt{2}i$
B $-2 \pm \sqrt{2}i$ **D** $-2 \pm 4\sqrt{2}i$

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22. Simplify $\frac{4 + 2i}{1 + i}$.
- F** $4 - 2i$ **H** $2 + 2i$
G $3 - i$ **J** $3 - 2i$
23. Which is equal to $(2x + y)^5$?
- A** $32x^5 + 80x^4y + 80x^3y^2 + 40x^2y^3 + 10xy^4 + y^5$
B $32x^5 + 64x^4y + 128x^3y^2 + 64x^2y^3 + 16xy^4 + y^5$
C $32x^5 + 16x^4y + 8x^3y^2 + 4x^2y^3 + 2xy^4 + y^5$
D $32x^5 + y^5$
24. Which is NOT a factor of $(x^4 + 5x^3 + x^2 - 21x - 18)$?
- F** $x + 1$ **H** $x + 2$
G $x - 2$ **J** $x + 3$
25. If $(1 - \sqrt{2})$ and $(2 - 3\sqrt{2})$ are two of the roots of a fourth degree polynomial with integer coefficients, what is the product of the other two roots?
- A** $-8 - 5\sqrt{2}$ **C** $8 - 5\sqrt{2}$
B $-8 + 5\sqrt{2}$ **D** $8 + 5\sqrt{2}$
26. Which statement about the function shown must be true?



- F** Its leading coefficient is positive.
G It has a pair of non-real roots.
H Its constant term is zero.
J It has a double root.

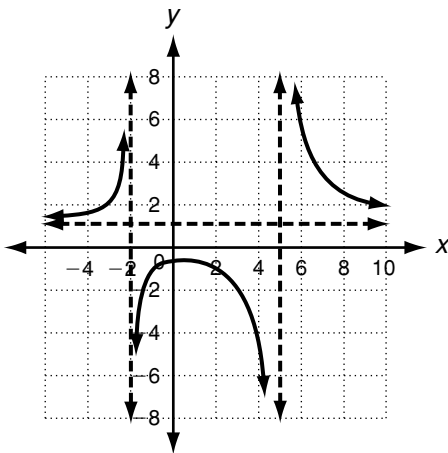
27. If $f(x) = x^3 + 2x^2 - 3x$, and $g(x)$ is a translation of $f(x)$ 2 units to the right, which of the following is equal to $g(x)$?
- A** $x^3 - 4x^2 + x + 2$
B $x^3 - 4x^2 + x + 6$
C $x^3 + 8x^2 + 17x + 4$
D $x^3 + 8x^2 + 17x + 10$
28. Which expression shows the value of a \$10,000 investment that has lost 1.2% of its value for five years in a row?
- F** $10,000(.94)$
G $10,000(.88)^5$
H $10,000(.988)^5$
J $10,000 - 10,000(.012)^5$
29. Which is the inverse of $f(x) = 4\ln x$?
- A** $f^{-1}(x) = e^{0.25x}$
B $f^{-1}(x) = e^{4x}$
C $f^{-1}(x) = \frac{e^x}{4}$
D $f^{-1}(x) = 4e^x$
30. Evaluate $\log(\log 10)$.
- F** 0 **H** 1
G 0.1 **J** 10
31. Which is equal to $\log_4 12 + \log_4 8 - \log_4 3$?
- A** 2.5 **C** $\log 8$
B $\frac{\log 17}{\log 4}$ **D** $\log 32$
32. Solve $3^{2x} = 100$.
- F** $\frac{1}{\log 3}$ **H** $\frac{1}{2\log 3}$
G $\frac{2}{\log 3}$ **J** $\frac{\log 50}{\log 3}$
33. P varies jointly with Q and R , and $P = 6$ when $Q = 3$ and $R = 12$. Find P when $Q = 4$ and $R = 16$.
- A** 6 **C** 10
B 8 **D** $10\bar{6}$

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continued

34. Which is equal to $\frac{\frac{2}{x} - 1}{\frac{1}{x} - 1}$?

- F $\frac{2-x}{x-1}$ H $\frac{x-2}{x-1}$
G $\frac{1-x}{x-2}$ J $\frac{x-1}{x-2}$

35. Which could be the equation for the graph?



- A $a(x) = \frac{x^2 + x + 6}{x^2 - 3x - 10}$
B $b(x) = \frac{x^2 + x + 6}{x^2 + 3x - 10}$
C $c(x) = \frac{2x^2 + x + 6}{x^2 - 3x - 10}$
D $d(x) = \frac{2x^2 + x + 6}{x^2 + 3x - 10}$

36. What is the sum of all the solutions of the equation $\frac{2}{x-1} - \frac{4}{2x+1} = 3$?

- F -1.5 H 0.5
G -0.5 J 1.5

37. Which is an extraneous solution to $\sqrt{9x+1} = 2x-6$?

- A $x = 1.25$
B $x = 3.5$
C $x = 7$
D There is no extraneous solution.

38. $f(x) = \begin{cases} 2x + 4 & \text{if } x < 2 \\ 4x & \text{if } x \geq 2 \end{cases}$ and $g(x) = f(2x)$. What is $g(x)$?

- F $g(x) = \begin{cases} x + 4 & \text{if } x < 1 \\ 2x & \text{if } x \geq 1 \end{cases}$
G $g(x) = \begin{cases} x + 4 & \text{if } x < 4 \\ 2x & \text{if } x \geq 4 \end{cases}$
H $g(x) = \begin{cases} 4x + 4 & \text{if } x < 1 \\ 8x & \text{if } x \geq 1 \end{cases}$
J $g(x) = \begin{cases} 4x + 4 & \text{if } x < 4 \\ 8x & \text{if } x \geq 4 \end{cases}$

39. Given $f(x) = \frac{1}{1-x}$, find $f(f(0.5))$.

- A -1 C 1
B -0.5 D 2

40. Given $f(x) = 2x + 3$ and $g(x) = x^2 - 4$, find $g(f(x))$.

- F $x^2 + 2x - 1$
G $2x^2 - 5$
H $4x^2 + 12x + 5$
J $2x^3 + 3x^2 - 8x - 12$

41. What are the domain and range of the inverse of $y = \frac{1}{x^2} + 1$?

- A D: \mathbb{R} ; R: $y \neq 0$.
B D: $x \neq 0$; R: \mathbb{R}
C D: $x \neq 0$; R: $y > 1$
D D: $x > 1$; R: $y \neq 0$

42. Use constant differences or ratios to determine which parent function would best model the given data set.

x	0	3	8	15	24	35
y	2	4	6	8	10	12

- F exponential H quadratic
G linear J square root

Answer Key continued

2. $D: x \neq -\frac{1}{2}$. Denominator cannot be zero.
3. $R: y \neq \frac{1}{2}$. The range of a function is equal to the domain of its inverse.
4. horizontal and vertical asymptotes
5. The numerator and denominator of the inverse function have the same degree, and the ratio of the leading coefficients is $\frac{1}{2}$.

Cumulative Test

1. C
2. F
3. C
4. J
5. B
6. J
7. B
8. H
9. C
10. G
11. D
12. F
13. C
14. J
15. C
16. J
17. C
18. G
19. D
20. F
21. C
22. G
23. A
24. H
25. D

26. G
27. B
28. H
29. A
30. F
31. A
32. F
33. D
34. H
35. A
36. H
37. A
38. H
39. A
40. H
41. A
42. D

CHAPTER 10

Section Quiz: Lessons 10-1 to 10-5

1. B
2. G
3. C
4. G
5. C
6. J
7. A
8. H
9. D

Section Quiz: Lessons 10-6 to 10-7

1. C
2. J
3. D
4. H