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CHAPTER 4

Cumulative Test

Select the best answer.

1. Order the numbers $1.\overline{6}$, $\sqrt{3}$, 0, $\frac{\pi}{2}$, $-\sqrt{2}$ from least to greatest.

A 0, $1.\overline{6}$, $-\sqrt{2}$, $\sqrt{3}$, $\frac{\pi}{2}$

B $-\sqrt{2}$, 0, $1.\overline{6}$, $\frac{\pi}{2}$, $\sqrt{3}$

C $-\sqrt{2}$, 0, $\frac{\pi}{2}$, $1.\overline{6}$, $\sqrt{3}$

D $-\sqrt{2}$, 0, $1.\overline{6}$, $\sqrt{3}$, $\frac{\pi}{2}$

2. Use interval notation to represent $-4 \leq x < 3$.

F $[-4, 3]$ **H** $(-4, 3)$

G $[-4, 3)$ **J** $(-4, 3]$

3. Identify the property demonstrated by $3 + (2 + 5) = (2 + 5) + 3$.

A Associative Property

B Commutative Property

C Distributive Property

D Additive Identity Property

4. Simplify $\frac{3\sqrt{2}}{\sqrt{6}}$.

F $\sqrt{3}$ **H** $3\sqrt{3}$

G $2\sqrt{3}$ **J** $3\sqrt{2}$

5. Simplify $4\sqrt{18} - 3\sqrt{8}$.

A $\sqrt{10}$ **C** $8\sqrt{3} - 3\sqrt{8}$

B $4\sqrt{18} - 3\sqrt{8}$ **D** $6\sqrt{2}$

6. Evaluate $\frac{1}{2^{-3}}$.

F -8 **H** $\frac{1}{8}$

G $-\frac{1}{8}$ **J** 8

7. Simplify $\left(\frac{3x^2y^{-1}}{(xy)^3}\right)^2$. Assume all variables are nonzero.

A $\frac{9x}{y^5}$ **C** $\frac{9}{x^2y^8}$

B $\frac{9x^2}{y^8}$ **D** $\frac{9}{xy^5}$

8. Evaluate the expression $\frac{4.0 \times 10^{-3}}{5.0 \times 10^4}$ and write the answer using scientific notation.

F 0.8×10^{-7} **H** 8.0×10^{-7}

G 8.0×10^{-8} **J** 8.0×10^{-6}

9. Which of the following relations is **not** a function?

A from student to math teacher

B from math teacher to student

C from student to height

D from math teacher to number of classes

10. Evaluate $f(-2)$ for $f(x) = \frac{x + 1}{x - 1}$.

F -3 **H** $\frac{1}{3}$

G $-\frac{1}{3}$ **J** 3

11. Which function C represents the cost, in dollars, of p pencils that cost 5 cents each?

A $C(p) = 500p$ **C** $C(p) = 20p$

B $C(p) = \frac{500}{p}$ **D** $C(p) = \frac{p}{20}$

12. Solve $6x - 2(2 + x) = 9x + (4 - 5x)$.

F $x = 0$ **H** all real numbers

G $x = 8$ **J** no solution

13. Solve $\frac{12}{2x + 1} = \frac{20}{3x}$.

A $x = -5$ **C** $x = 12$

B $x = 5$ **D** $x = 17$

14. The right triangles ABC and DEF are similar. The hypotenuse of $\triangle ABC$ measures 12 cm and the hypotenuse of $\triangle DEF$ measures 18 cm. If one of the legs of $\triangle DEF$ measures 15 cm, what does the corresponding leg of $\triangle ABC$ measure?

F 5 cm **H** 10 cm

G 9 cm **J** 22.5 cm

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Cumulative Test

continued

15. Which set of points could represent a linear function?

A $\{(1, 1), (1, 2), (1, 3), (1, 4)\}$

B $\{(1, 9), (2, 12), (4, 15), (8, 18)\}$

C $\{(1, 6), (3, 10), (5, 14), (7, 20)\}$

D $\{(1, 6), (4, 4), (7, 2), (10, 0)\}$

16. A line has slope $-\frac{3}{2}$ and passes through $(5, 3)$. Which of these points is also on the line?

F $(-4, 9)$ **H** $(7, 6)$

G $(2, 6)$ **J** $(9, 9)$

17. What is $4x + 3y = 12$ in slope-intercept form?

A $y = -\frac{4}{3}x - 12$ **C** $y = \frac{4}{3}x + 12$

B $y = -\frac{4}{3}x + 4$ **D** $y = -\frac{4}{3}x + 4$

18. Which is the equation of the line perpendicular to $y = 2x + 7$ and passing through $(1, -8)$?

F $y = -\frac{1}{2}x - \frac{15}{2}$ **H** $y = -\frac{1}{2}x - 9$

G $y = \frac{1}{2}x - \frac{15}{2}$ **J** $y = \frac{1}{2}x - 9$

19. If $g(x)$ is a horizontal compression by a factor of $\frac{1}{4}$ followed by a translation of 3 units down of $f(x) = 4x - 5$, what is the rule for $g(x)$?

A $g(x) = -x - 2$

B $g(x) = -x + 2$

C $g(x) = -16x - 8$

D $g(x) = -16x + 8$

20. Which linear equation best fits this data set?

x	1	4	6	8	11
y	2	3	6	5	8

F $y = \frac{3}{5}x + \frac{5}{4}$ **H** $y = x + 1$

G $y = \frac{2}{3}x + \frac{5}{2}$ **J** $y = \frac{4}{3}x - \frac{1}{2}$

21. Solve $\frac{|2x - 1|}{3} \geq 4$.

A $\left\{x \left| -\frac{13}{2} \leq x \leq \frac{13}{2}\right.\right\}$

B $\left\{x \left| x \leq -\frac{13}{2} \text{ or } x \geq \frac{13}{2}\right.\right\}$

C $\left\{x \left| -\frac{11}{2} \leq x \leq \frac{13}{2}\right.\right\}$

D $\left\{x \left| x \leq -\frac{11}{2} \text{ or } x \geq \frac{13}{2}\right.\right\}$

22. If $g(x)$ is a vertical stretch by a factor of 4 of $f(x) = 2|x| + 3$, what is the rule for $g(x)$?

F $g(x) = -\frac{1}{2}|x| - 3$

G $g(x) = -\frac{1}{2}|x| + 3$

H $g(x) = -8|x| - 12$

J $g(x) = -8|x| + 12$

23. The system $\begin{cases} -3x + y = 14 \\ 4y - 30 = 12x \end{cases}$ is

A consistent, with no solution.

B consistent, with infinitely many solutions.

C inconsistent, with no solution.

D inconsistent, with infinitely many solutions.

24. Cinema City charges a \$15 membership fee, plus a charge of \$2.50 per movie rental. Movie World charges no membership fee but charges \$3.25 per rental. For what number of rentals is the total cost of membership and rentals the same for both stores?

F 5 **H** 15

G 10 **J** 20

25. Solve $\begin{cases} 2x + 3y = 1 \\ 5x - 4y = 37 \end{cases}$.

A $\left(4, -\frac{7}{3}\right)$ **C** $\left(\frac{119}{46}, -\frac{32}{33}\right)$

B $(5, -3)$ **D** $(8, -5)$

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Cumulative Test

continued

26. Tickets to the school musical are \$5 for adults and \$2 for students. 120 tickets are sold for the Sunday matinee for a total of \$429. How many adult tickets were sold for the Sunday matinee?

F 53 **H** 63

G 57 **J** 67

27. Which point is a solution of $\begin{cases} y > 2x - 3 \\ y < -\frac{1}{2}x \end{cases}$?

A $(-1, -1)$ **C** $(1, -1)$

B $(-1, 1)$ **D** $(1, 1)$

28. What are the vertices of the feasible region for the constraints $\begin{cases} x \geq 1 \\ y \geq 2 \\ x + y \leq 8 \\ 3x + 5y \leq 30 \end{cases}$?

F $\{(1, 5.4), (6, 2), (5, 3)\}$

G $\{(1, 2), (1, 7), (6, 2), (5, 3)\}$

H $\{(1, 2), (1, 5.4), (6, 2), (5, 3)\}$

J $\{(1, 2), (1, 7), (6, 2)\}$

29. On a feasible region whose vertices are $\{(2, 3), (9, 3), (7, 6), (3, 8)\}$, what is the maximum of the objective function $R = 2x + 5y$, and where does it occur?

A 19 at $(2, 3)$ **C** 46 at $(3, 8)$

B 33 at $(9, 3)$ **D** 48 at $(7, 6)$

30. Which point is the z-intercept of the plane $3x - 2y - 4z = 48$?

F $(16, 0, 0)$ **H** $(0, 0, -12)$

G $(0, -24, 0)$ **J** $(16, -24, -12)$

31. Which ordered triple represents the point that is 3 units up from the origin, 2 units left from the origin, and 6 units backward along the x-axis from the origin?

A $(-6, -2, 3)$ **C** $(3, -2, -6)$

B $(-6, 2, 3)$ **D** $(3, 2, -6)$

32. Use elimination to solve $\begin{cases} x + 2y + 4z = 19 \\ 3x - 2y + 3z = 15 \\ 5x + y - 5z = 18 \end{cases}$.

F $(3, 2, 3)$ **H** $(6, 7, 1)$

G $(5, 3, 2)$ **J** $(9, 3, 1)$

33. The system $\begin{cases} 2x + y + z = 26 \\ x + 2y - z = 7 \\ 2x + 5y - 3z = 10 \end{cases}$ is

A inconsistent, with no solutions.

B inconsistent, with infinitely many solutions.

C dependent, with infinitely many solutions.

D dependent, with no solutions.

34. If $C = \begin{bmatrix} 1 & -5 \\ 6 & 0 \\ -3 & 2 \end{bmatrix}$ and $D = \begin{bmatrix} 4 & 2 \\ -1 & 4 \\ -5 & -3 \end{bmatrix}$, evaluate $2C - D$.

F $\begin{bmatrix} -6 & -14 \\ 14 & -8 \\ 4 & 10 \end{bmatrix}$ **H** $\begin{bmatrix} -2 & -12 \\ 13 & -8 \\ -1 & 7 \end{bmatrix}$

G $\begin{bmatrix} -3 & -7 \\ 7 & -4 \\ 2 & 5 \end{bmatrix}$ **J** $\begin{bmatrix} 6 & -8 \\ 11 & 4 \\ -11 & 1 \end{bmatrix}$

35. For $S_{2 \times 4}$, $T_{4 \times 2}$, and $V_{2 \times 4}$, what are the dimensions of VTS?

A 2×2 **C** 4×2

B 2×4 **D** 4×4

36. If $P = \begin{bmatrix} 2 & -1 & 4 \\ -1 & 3 & 0 \end{bmatrix}$ and $Q = \begin{bmatrix} 3 & 2 \\ 1 & 1 \\ -2 & 0 \end{bmatrix}$, evaluate PQ.

F $\begin{bmatrix} -3 & 3 \\ 0 & 1 \end{bmatrix}$ **H** $\begin{bmatrix} 6 & -1 & 8 \\ -2 & 3 & 0 \end{bmatrix}$

G $\begin{bmatrix} 6 & 8 \\ 2 & 0 \end{bmatrix}$ **J** $\begin{bmatrix} 4 & 3 & 12 \\ 1 & 2 & 4 \\ -4 & 2 & -8 \end{bmatrix}$

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continued

37. If $A = \begin{bmatrix} 4 & -1 \\ -3 & 2 \end{bmatrix}$, evaluate A^2.

A $\begin{bmatrix} 16 & 1 \\ 9 & 4 \end{bmatrix}$ **C** $\begin{bmatrix} 19 & -18 \\ -6 & 7 \end{bmatrix}$

B $\begin{bmatrix} 16 & 9 \\ 1 & 4 \end{bmatrix}$ **D** $\begin{bmatrix} 19 & -6 \\ -18 & 7 \end{bmatrix}$

38. If $\triangle ABC$ is defined by the matrix $P = \begin{bmatrix} 7 & 4 & 2 \\ -3 & 2 & 1 \end{bmatrix}$, what are the coordinates of $\triangle ABC$ after it has been reflected using the reflection matrix $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$?

F $\begin{bmatrix} -7 & -4 & -2 \\ -3 & 2 & 1 \end{bmatrix}$ **H** $\begin{bmatrix} 3 & -2 & -1 \\ -7 & -4 & -2 \end{bmatrix}$

G $\begin{bmatrix} -3 & 2 & 1 \\ 7 & 4 & 2 \end{bmatrix}$ **J** $\begin{bmatrix} 7 & 4 & 2 \\ 3 & -2 & -1 \end{bmatrix}$

39. $\triangle ABC$ has vertices $A(6, 1)$, $B(3, -2)$, $C(-2, 1)$. What are the coordinates of the image of $\triangle ABC$ after it has been rotated using the rotation matrix $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$?

A $A'(-6, 1)$, $B'(-3, -2)$, $C'(2, 1)$

B $A'(-1, 6)$, $B'(2, 3)$, $C'(-1, -2)$

C $A'(1, 6)$, $B'(-2, 3)$, $C'(1, -2)$

D $A'(6, -1)$, $B'(3, 2)$, $C'(-2, -1)$

40. Find the determinant of $\begin{bmatrix} 0.5 & -1 \\ -0.5 & -2 \end{bmatrix}$.

F -1.5 **H** 0.5

G -0.5 **J** 1.5

41. Find the determinant of $\begin{bmatrix} -1 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 1 & -1 \end{bmatrix}$.

A -2 **C** 2

B 0 **D** 4

42. Which matrix is the inverse of $\begin{bmatrix} 3 & 2 \\ -1 & 4 \end{bmatrix}$?

F $\frac{1}{14}\begin{bmatrix} 4 & -2 \\ 1 & 3 \end{bmatrix}$ **H** $\begin{bmatrix} 4 & -2 \\ 1 & 3 \end{bmatrix}$

G $\frac{1}{14}\begin{bmatrix} -3 & -1 \\ 2 & -4 \end{bmatrix}$ **J** $\begin{bmatrix} -3 & -1 \\ 2 & -4 \end{bmatrix}$

43. The game of *Trip Chip* is played with colored chips. Each color is worth a certain number of points. The chart below shows the chips for three players and the total value of their chips. How much is each color worth?

	Blue	Green	Red	Total Value
Ted	6	4	1	49
Emily	3	2	5	38
Carlos	1	6	4	41

A 4 for blue, 4 for green, and 1 for red

B 4 for blue, 6 for green, and 9 for red

C 5 for blue, 3 for green, and 3 for red

D 5 for blue, 4 for green, and 7 for red

44. What is the augmented matrix for the system of equations $\begin{cases} -2y + 4 = 3x \\ 6 = 7x + 5y \end{cases}$?

F $\left[\begin{array}{cc|c} -3 & -2 & -4 \\ -7 & -5 & -6 \end{array}\right]$

G $\left[\begin{array}{cc|c} -2 & 4 & 3 \\ 6 & 7 & 5 \end{array}\right]$

H $\left[\begin{array}{cc|c} 1 & 0 & -4 \\ 0 & 1 & -6 \end{array}\right]$

J $\left[\begin{array}{cc|c} 3 & -2 & 4 \\ 7 & 5 & 6 \end{array}\right]$

45. What is $\left[\begin{array}{cc|c} 6 & -1 & 32 \\ 4 & 3 & 14 \end{array}\right]$ in reduced row-echelon form?

A $\left[\begin{array}{cc|c} 0 & 0 & 5 \\ 0 & 0 & -2 \end{array}\right]$

B $\left[\begin{array}{cc|c} 1 & 0 & 5 \\ 0 & 1 & -2 \end{array}\right]$

C $\left[\begin{array}{cc|c} 12 & -2 & 64 \\ 0 & 1 & -2 \end{array}\right]$

D $\left[\begin{array}{cc|c} 12 & 0 & 60 \\ 0 & 1 & -2 \end{array}\right]$

2. $\begin{bmatrix} -10 & -11 & 15 \\ 5 & 7 & -15 \end{bmatrix}$

3. $\begin{bmatrix} 11 & -19 \\ 23 & 6 \\ -20 & 29 \end{bmatrix}$

4. *VS*

5. $\begin{bmatrix} 24 & 15 & 0 \\ -8 & 18 & 0 \\ 2 & 7 & -4 \end{bmatrix}$

6. $\begin{bmatrix} 1 & 0 \\ 1 & -1 \end{bmatrix}$

7. $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

8. $A'(3, -3)$, $B'(7, -2)$, and $C'(4, -4)$

9. -2

10. 18

11. $x = -5$, $y = -7$

12. $\pm\sqrt{12}$

13. $\begin{bmatrix} -\frac{1}{\pi} & 1 \\ 2 & -\pi \end{bmatrix}$

14. $\left[\begin{array}{cc|c} 4 & 3 & 7 \\ -5 & -1 & -2 \end{array}\right]$

15. $\left[\begin{array}{cc|c} 1 & 0 & 11 \\ 0 & 1 & 8 \end{array}\right]$

16. apple: \$0.75, pear: \$0.85, orange: \$0.55.

Performance Assessment

1.

	Blue	Green	Red	Points
Kim	4	4	2	54
Pat	3	7	0	56
Robin	5	3	2	56

2. $\left[\begin{array}{ccc|c} 4 & 4 & 2 & 54 \\ 3 & 7 & 0 & 56 \\ 5 & 3 & 2 & 56 \end{array}\right]$

3. $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 3 \end{array}\right]$

4. blue, 7; green, 5; red, 3.

Cumulative Test

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

36. F
37. D
38. F
39. B
40. G
41. D
42. F
43. C

CHAPTER 5

Section Quiz: Section A

1. D
2. G
3. C
4. F
5. B
6. J
7. B
8. F

Section Quiz: Section B

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

Chapter Test Form A

1. C
2. A
3. B
4. B
5. B
6. A
7. C
8. B
9. A
10. A
11. B
12. B
13. A
14. B
15. A
16. A
17. C
18. A
19. D
20. B

Chapter Test Form B

1. B
2. H
3. A
4. H
5. D
6. G
7. C
8. F
9. B
10. G
11. C
12. H
13. D