

1. Solve the following equation.

$$\frac{1}{2}y - \frac{1}{3}(y - 1) = 4y.$$

- a) $y = \frac{4}{3}$
 b) $y = \frac{5}{2}$
 c) $y = \frac{8}{9}$
 d) $y = \frac{2}{23}$

2. Solve
- $3 < 2x - 1 < 9$
- .

- a) (2, 5)
 b) (1, 4)
 c) (0, 3)
 d) (1, 5)

3. Solve
- $2|12 - 3x| + 3 \geq 9$
- .

- a) [3, 5]
 b) $(-\infty, 5)$
 c) $(-\infty, 3] \cup [5, \infty)$
 d) (3, ∞)

4. How much of a 60% orange juice drink must be mixed with 30 gallons of a 10% orange juice drink to obtain a mixture that is 50% orange juice.

- a) 1.2 gallons
 b) 120 gallons
 c) 18 gallons
 d) 180 gallons

5. Evaluate the function
- $h(x) = 3 + \sqrt{x - 1}$
- at
- $x = 10$
- .

- a) 4
 b) 5
 c) 6
 d) 7

6. Find an equation of the line passing through the points
- $(-9, -4)$
- and
- $(4, 8)$
- .

- a) $12x - 13y + 56 = 0$
 b) $4x + 5y - 56 = 0$
 c) $4x + 5y + 56 = 0$
 d) $12x + 13y - 152 = 0$

7. Solve the linear system.

$$\begin{cases} x + 4y = 5 \\ x - y = -10 \end{cases}$$

- a) $x = -1, y = 1$
 b) $x = -7, y = 3$
 c) $x = 4, y = 9$
 d) $x = 2, y = -5$

8. Simplify the following using the rules for exponents.

$$\left(\frac{-2a^4b^{-3}}{c^4}\right)^2 \left(\frac{3a^{-1}b^2}{c^{-1}}\right)^{-2}$$

- a) $\frac{4a^{10}}{9b^{10}c^{10}}$
 b) $-\frac{4a^{10}}{9b^{10}c^{10}}$
 c) $\frac{4a^6}{9b^2c^6}$
 d) $-\frac{36a^{10}}{b^{10}c^{10}}$

9. Find
- $(8y^3 - 5y + 6) - (-2y^3 + 6y^2 - 6y + 13)$
- .

- a) $6y^3 - 6y^2 - 11y - 7$
 b) $10y^3 - 11y^2 + 6y + 19$
 c) $6y^3 - 11y^2 + y - 7$
 d) $10y^3 - 6y^2 + y - 7$

10. Simplify the expression

$$(y + 3)(y^2 - 3y + 9)$$

- a) $y^3 + 3y^2 + 3y + 1$
 b) $y^3 + 27$
 c) $y^3 - 27$
 d) $y^3 - 9y^2 + 9y + 27$

11. Divide $\frac{3x^4 - 4x^2 + 1}{x + 1}$.

- a) $3x^3 + 2x - 4 - \frac{5}{x + 1}$
- b) $3x^3 - 3x^2 - 4x + 1$
- c) $3x^3 - 3x^2 - x + 1$
- d) $3x^3 + 3x^2 - x - 1 + \frac{2}{x^2 + 1}$

12. Factor $(m + n)^2 - 2(m + n) - 48$ completely.

- a) $(m - n - 6)(m - n + 8)$
- b) $(m + n - 8)(m + n + 6)$
- c) $(m + n + 24)(m + n - 2)$
- d) $(m + n - 12)(m + n + 4)$

13. Find the zeroes of the polynomial function $P(x) = (x^2 + 3x + 2)(x - 1)$

- a) $x = 0, x = 1, x = 2$
- b) $x = -1, x = 1, x = 2$
- c) $x = -2, x = -1, x = 1$
- d) $x = -1, x = 1$

14. Simplify the following.

$$\frac{2x - 10}{8x} \div \frac{x^2 - 25}{12x} \div \frac{x + 2}{x + 5}$$

- a) $\frac{3}{x + 2}$
- b) $\frac{(x - 5)^2(x + 2)}{48x^2}$
- c) $\frac{4(x + 2)}{(x + 5)^2}$
- d) $\frac{(x + 5)^2(x - 5)^2}{48x^2(x + 2)}$

15. Subtract and simplify: $\frac{2x + 1}{x^2 - 1} - \frac{6}{3x^2 - 2x - 1}$

- a) $\frac{-2x + 10}{(x + 1)(x - 1)(3x + 1)}$
- b) $\frac{6x + 5}{(x + 1)(3x + 1)}$
- c) $\frac{3x + 2}{(x - 1)(3x + 1)}$
- d) $\frac{-x + 3}{(x + 1)(x - 1)}$

16. Find the domain of the radical function

$$f(x) = \sqrt{6 - 2x}.$$

- a) $[0, \infty)$
- b) $(-\infty, 1]$
- c) $(-\infty, 3]$
- d) $[3, \infty)$

17. Multiply and simplify:

$$\sqrt[3]{5x^4} \cdot \sqrt[3]{25x^2}.$$

- a) $5x^2$
- b) $12x^2$
- c) $125x^3$
- d) $5x^3$

18. Give the solutions to the equation $\sqrt{x - 1} + 7 = x$.

- a) $x = 2, x = 16$
- b) $x = 1$
- c) $x = 5, x = 10$
- d) $x = 10$

19. Write the following complex number in standard form.

$$\frac{2 - 3i}{1 + i}$$

- a) $-\frac{1}{2} - \frac{1}{2}i$
- b) $\frac{5}{2} + \frac{5}{2}i$
- c) $\frac{5}{2} - \frac{5}{2}i$
- d) $-\frac{1}{2} - \frac{5}{2}i$

20. Solve: $5x^2 + 20 = -15x$.

- a) $\frac{-3 \pm i\sqrt{7}}{4}$
- b) $\frac{-3 \pm i}{2}$
- c) $\frac{-3 \pm i\sqrt{7}}{2}$
- d) $\frac{-3 \pm 7i}{4}$

21. Write the quadratic function $f(x) = -2x^2 + 4x + 1$ in the standard form $a(x - h)^2 + k$.

- a) $-2(x + 1)^2 + 3$
- b) $-2(x - 1)^2 + 3$
- c) $-2(x + 1)^2 - 4$
- d) $-2(x - 1)^2 + 4$

- 7. B
- 8. A
- 9. D
- 10. B
- 11. C
- 12. B
- 13. C
- 14. A
- 15. B
- 16. C
- 17. A
- 18. D
- 19. D
- 20. C
- 21. B
- 22. C
- 23. D
- 24. D
- 25. B

22. Find the vertex of the parabola represented by the quadratic function

$$f(x) = \frac{1}{2}x^2 + 10x + 49$$

- a) (5, 1)
- b) (-5, -1)
- c) (-10, -1)
- d) (10, 1)

23. A baseball player swings and hits a pop fly straight up in the air to the catcher. The height of the baseball in meters t seconds after it is hit is given by a quadratic function $h(t) = -5t^2 + 10t + 1$. What is the maximum height of the baseball?

- a) 1 meter
- b) 4 meters
- c) 8 meters
- d) 6 meters

24. Which of the following is an x -intercept of the circle with center $(0, -2)$ and radius 3?

- a) $x = 2 + 2\sqrt{2}$
- b) $x = -5$
- c) $x = 1$
- d) $x = \sqrt{5}$

25. Solve the inequality

$$\frac{10}{x + 2} \geq 2.$$

- a) $(-\infty, -2) \cup [3, \infty)$
- b) $(-2, 3]$
- c) $(-\infty, 3]$
- d) $(-2, \infty)$

- 1. D
- 2. A
- 3. C
- 4. B
- 5. C
- 6. A