

1. Simplify the expression $\sqrt[3]{\frac{x^{11}y^5}{x^2y^2}}$

A) $x^{\frac{11}{2}}y^{\frac{3}{2}}$ B) x^3y C) $x^4y\sqrt[3]{xy}$ D) x^2

2. Simplify the expression $\frac{x^2 + 2x - 15}{x^2 - 8x + 15}$

A) $-\frac{1}{4}$ B) $\frac{x+3}{x-3}$ C) -1 D) $\frac{x+5}{x-5}$

3. Simplify the expression $\sqrt{12} - 2\sqrt{75} + \sqrt{48}$

A) $-4\sqrt{3}$ B) $9\sqrt{3} + \sqrt{10}$ C) $\sqrt{3}$ D) $-3\sqrt{10}$

4. Solve the system of equations given below.

$$\begin{aligned} 2x - 3y &= 16 \\ x + 8y &= -87 \end{aligned}$$

A) $(-4, -8)$ B) $(23, 10)$ C) $(-7, -10)$ D) The system is dependent.

5. Perform the indicated operations and simplify. $(3 - 2\sqrt{5})(\sqrt{5} - 1)$

A) $-8\sqrt{5}$ B) $\sqrt{5} + 7$ C) $5\sqrt{5} - 13$ D) $5\sqrt{5} - 17$

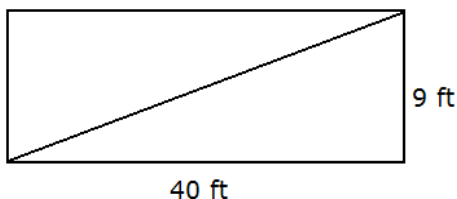
6. Find the **exact value** of the expression $27^{-\frac{2}{3}}$.

A) -18 B) $\frac{1}{9}$ C) $\frac{\sqrt{3}}{243}$ D) 0.11

7. Find all real solutions of the equation $x^2 = 2x + 1$

A) $x = 1 + \sqrt{8}$ or $x = 1 - \sqrt{8}$ C) There is no real solution.
 B) $x = -1$ D) $x = 1 + \sqrt{2}$ or $x = 1 - \sqrt{2}$

8. Find the length of the diagonal of the rectangle shown on the picture below.



A) $7\sqrt{31}$ ft B) 41 ft C) 49 ft D) $6\sqrt{10}$ ft

9. Solve the equation $\frac{2x+3}{5} - \frac{x-5}{3} = 1$
- A) There is no solution. B) 31 C) -33 D) -19
10. Solve the equation $\left| \frac{1}{3}x - 1 \right| + 3 = 7$.
- A) -9, 15 B) -27, 15 C) -11, 13 D) 9
11. Rationalize the denominator in the expression $\frac{3}{\sqrt{10}+1}$.
- A) $\frac{\sqrt{10}-1}{3}$ B) $\sqrt{10}+3$ C) $\frac{\sqrt{10}+1}{3}$ D) $\sqrt{10}-3$
12. Solve the inequality $-2 \leq \frac{1}{3}x - 1 \leq 5$
- A) $[-9, 12]$ B) $[-9, 18]$ C) $[-5, 16]$ D) $[-3, 18]$
13. How many liters of a 17% acid solution should be mixed with 8 liters of an 11% acid solution to obtain a mixture that is 15%?
- A) 11 liters B) 13 liters C) 16 liters D) 19 liters
14. We have invested a total of \$5000 in two bank accounts. One account earns 7% interest per year, the other earns 8% per year. After one year, the combined interest from the two account was \$382. How much money did we invest at 8%?
- A) \$1700 B) \$2500 C) \$3200 D) \$4200
15. Find the distance between the points $(-4, -5)$ and $(1, 7)$.
- A) 13 units B) $\frac{12}{5}$ units C) 17 units D) $\sqrt{119}$ units
16. Simplify the expression $(3 - \sqrt{5})^2$.
- A) 4 B) $14 - 6\sqrt{5}$ C) $8\sqrt{5}$ D) 20
17. Find all real solutions of the equation $x^2 + 2x + 5 = 0$.
- A) There is no solution among the real numbers C) $-1 + \sqrt{6}$ and $-1 - \sqrt{6}$
B) $-2\sqrt{5}$ D) $-1 + \sqrt{24}$ and $-1 - \sqrt{24}$

18. Find an equation of the straight line that is parallel to $y - 7 = -2(x + 2)$ and passes through the point $(-6, 1)$.

- A) $y = \frac{1}{2}x + 4$ B) $y = -\frac{1}{2}x - 2$ C) $y = 2x + 13$ D) $y = -2x - 11$

19. Find an equation of the straight line that is perpendicular to $y - 7 = -2(x + 2)$ and passes through the point $(-6, 1)$.

- A) $y = \frac{1}{2}x + 4$ B) $y = -\frac{1}{2}x - 2$ C) $y = 2x + 13$ D) $y = -2x - 11$

20. Factor completely: $3x^3 - 24$

- A) $3(x - 2)^3$ C) $3(x - 2)(x^2 + 2x + 4)$
B) $3(x - 2)(x^2 - 2x + 4)$ D) $(3x - 2)(x^2 + 2x + 12)$

21. Simplify: $\frac{2m - 1}{m^2 - m - 2} - \frac{1}{m + 1}$

- A) $\frac{m - 3}{m^2 - m - 2}$ B) $\frac{1}{m - 2}$ C) $\frac{2(m - 1)}{m^2 - 2m - 1}$ D) $\frac{-m - 3}{2m + 2}$

22. Simplify: $\frac{\frac{3}{x - 1} - 1}{\frac{2}{x - 1} + 1}$

- A) $\frac{-x + 2}{x + 1}$ B) $\frac{3}{2}$ C) $\frac{2}{3}$ D) $\frac{-x + 4}{x + 1}$

23. Find all solutions of the equation $\frac{3}{p - 7} + \frac{p + 7}{p} = \frac{7p - 28}{p(p - 7)}$

- A) $p = 14$ B) $p = -11$ or $p = 7$ C) $p = -3$ or $p = 7$ D) $p = -3$

24. Solve the equation $|x + 1| = |3x - 1|$

- A) $x = 0$ or $x = 1$ B) $x = 0$ C) $x = 1$ D) $x = 1$ or $x = -1$

25. Suppose that f is a function given by $f(x) = x^2 + 4x + 2$. Compute the value of $f(-5)$.

- A) 7 B) -43 C) -3 D) 3

26. Suppose that f is a function given by $f(x) = \frac{1}{x^2 - 16}$. What is the domain of f ?

A) $(-\infty, -4) \cup (4, \infty)$

B) all real numbers except -4 and 4

C) $[-4, 4]$

D) 4 and -4

27. The graph of which equation shown below is a parabola with its vertex at $(3, -4)$?

A) $y = x^2 - 3x - 4$

B) $y = x^2 + 3x - 22$

C) $y = x^2 - 6x + 5$

D) $y = x^2 + 6x - 31$

28. Solve the compound inequality given below.

$$3 - x \geq -2x + 5 \quad \text{and} \quad 2(x - 7) < x + 4$$

A) $[2, 18)$

B) $(-\infty, 2] \cup (18, \infty)$

C) $(-\infty, 2]$

D) $(-\infty, \infty)$

29. Solve the compound inequality given below.

$$3 - x \geq -2x + 5 \quad \text{or} \quad 2(x - 7) < x + 4$$

A) $[2, 18)$

B) $(-\infty, 2] \cup (18, \infty)$

C) $(-\infty, 2]$

D) $(-\infty, \infty)$

30. Completely factor $2abx^2y - 24abz - 8aby + 6abx^2z$

A) $2ab(x^2 - 4)(y + 3z)$

B) $2ab(x + 2)(x - 2)(y + 3z)$

C) $2ab(x^2 + 4)(y - 3z)$

D) $2(ax - 2)(ax + 2)(yb + 3z)$