

1. Express the following as an inequality.

The quotient of x and y is at least $\frac{1}{8}$.

A. $\frac{x}{y} \geq \frac{1}{8}$

B. $xy \leq \frac{1}{8}$

C. $\frac{x}{y} \leq \frac{1}{8}$

D. $xy \geq \frac{1}{8}$

E. None of the above.

2. Simplify. Do not leave negative exponents in your answer.

$$\left(-4x^{-5}y^3\right)\left(\frac{x^3}{12y^{-2}}\right)$$

A. $\frac{y^5}{48x^2}$

B. $\frac{3y^6}{x^2}$

C. $-\frac{y^6}{48x^2}$

D. $-\frac{y^5}{3x^2}$

E. None of the above.

3. Simplify completely.

$$\left(\sqrt{10x^3y^7}\right)\left(\sqrt{5x^9y^2}\right)$$

A. $x^6y^4\left(\sqrt{15y}\right)$

B. $5x^3y^3\left(\sqrt{2x}\right)$

C. $5x^6y^4\left(\sqrt{2y}\right)$

D. $x^{13}y^7\left(\sqrt{15x}\right)$

E. $5x^{13}y^7\left(\sqrt{2x}\right)$

4. Simplify.

$$\left(\frac{64a^{12}}{b^9}\right)^{\frac{2}{3}}$$

- A. $\frac{128a^{\frac{38}{3}}}{3b^{\frac{29}{3}}}$
- B. $\frac{16a^8}{b^6}$
- C. $\frac{16a^4}{b^3}$
- D. $\frac{16a^{\frac{38}{3}}}{b^{\frac{29}{3}}}$
- E. $\frac{128a^8}{3b^6}$

5. Perform the indicated operations and express as a polynomial.

$$(2x-5)^2 - (x^2 - 4x + 11)$$

- A. $3x^2 - 24x + 36$
- B. $3x^2 - 16x + 14$
- C. $3x^2 - 4x + 36$
- D. $3x^2 + 4x + 14$
- E. None of the above.

6. Divide and express as a polynomial.

$$\frac{8a^4b^2 + 10a^7b^3 - 2a^3b^{10}}{2a^3b^2}$$

- A. $4a + 10a^7b^3 - 2a^3b^{10}$
- B. $8a^{11}b^{13}$
- C. $6a + 8a^4b$
- D. $6a + 10a^7b^3 - 2a^3b^{10}$
- E. $4a + 5a^4b - b^8$

7. Which of the following is a factor of $25x^8 - y^2$?

- A. $25x^2 - y$
- B. $5x^2 + y^2$
- C. $25x - y^2$
- D. $5x^4 + y$
- E. Cannot be factored.

8. Factor completely. Given: $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$.

$$y^6 - 6y^3 - 16$$

- A. $(y^3 + 2)(y - 2)(y^2 + 2y + 4)$
- B. $(y^3 + 2)(y - 2)^3$
- C. $(y^3 + 2)(y - 8)(y^2 + 8y + 64)$
- D. $(y^3 + 2)(y - 2)(y^4 + 8y^2 + 512)$
- E. $(y^3 + 2)(y - 8)(y^4 + 2y^2 + 64)$

9. Rationalize the denominator and simplify.

$$\frac{\sqrt{t} + 3}{\sqrt{t} + 5}$$

- A. $\frac{t + 8\sqrt{t} + 15}{t + 5}$
- B. $\frac{t + 9}{t + 25}$
- C. $\frac{t - 15}{t - 25}$
- D. $\frac{t + 15}{t - 5}$
- E. $\frac{t - 2\sqrt{t} - 15}{t - 25}$

10. Simplify completely.

$$\frac{4x^2 + 4x + 1}{x^2 + 3x - 4} \div \frac{2x^2 - 7x - 4}{(x+4)(x-4)}$$

- A. $\frac{(2x+1)(x-4)}{x+1}$
- B. $\frac{2x+1}{x-1}$
- C. $\frac{2(x+2)}{3x-1}$
- D. $\frac{(2x-1)(x+4)}{(x+1)(x-4)}$
- E. None of the above.

11. Solve for x . Choose the answer that best describes the solution(s).

$$\frac{4x}{x-3} + 5 = \frac{12}{x-3}$$

- A. There is only one solution.
It is less than 0 .
- B. There is only one solution.
It is between 0 and 10.
- C. There is only one solution.
It is greater than 10.
- D. There is no solution for x .
- E. All real numbers are solutions
except $x = 3$.

12. Solve $P = \frac{1+wb}{x}$ for w .

- A. $w = Px - b$
- B. $w = \frac{Px-1}{b}$
- C. $w = \frac{Pb-1}{x}$
- D. $w = \frac{x-P}{b}$
- E. $w = \frac{P-1}{bx}$

13. Jacob inherited \$25,000 and decided to invest the money into two accounts. One account pays 7.5% simple interest and the other account pays 4% simple interest. Let x represent the amount of money Jacob invests in the 7.5% account. Choose the equation that would solve x if the total annual interest is to be \$1200.

A. $0.075x + 0.04(25,000 - x) = 1200$

B. $0.075x + 1200 = 0.04(25,000 - x)$

C. $0.075x + 0.04x = 1200$

D. $0.075x + 0.04(1200) = 25,000 - x$

E. $0.075x + 1200 = 0.04x$

14. At 8:00 am, a bicyclist travels at a constant speed of 5 mph. At 10:00 am, his brother begins traveling the same path on his moped at a constant speed and reaches the bicyclist 30 minutes later. Find the speed of the moped.

A. 30 mph

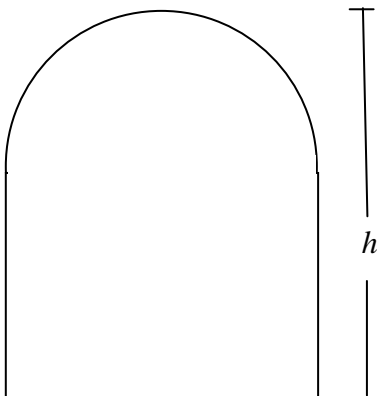
B. 18 mph

C. 21 mph

D. 25 mph

E. None of the above.

15. A doorway in a new building is designed to be handicapped accessible. The shape of the doorway will be a rectangle surmounted by a semicircle (see the figure). The width of the door is to be 6 feet and the height, h , has yet to be determined. If the area of the doorway is to be 32 square feet, choose the equation used to find h . Simplify your equation.



A. $6h + 36\pi = 32$

B. $6h + 9\pi = 32$

C. $6h + \frac{9}{2}\pi = 50$

D. $6h + 36\pi = 50$

E. $6h + \frac{9}{2}\pi = 32$