

I Evaluate Expressions: Negative, Zero, or Fractional Exponents

Simplify:

(a) $(16)^{-\frac{3}{4}}$

(b) $16^{\frac{1}{4}}$

(c) $(8)^{\frac{4}{3}}$

(d) $(36)^{\frac{1}{2}}$

(e) 4^0

(f) -4^0

(g) -3^{-3}

II Multiply Expressions with Signed Exponents and Fractional Exponents

(a) $16^{\frac{1}{4}} \cdot 4^{\frac{1}{2}}$

(b) $2^{\frac{1}{2}} \cdot 8^{\frac{4}{3}}$

(c) $\sqrt{x} \cdot \sqrt[3]{x}$

(d) $x^{\frac{1}{4}} \cdot x^{-\frac{1}{2}} \cdot x^3$

(e) $\frac{x^{\frac{1}{2}}}{x^{-\frac{2}{3}}}$

(f) $6x^5z^{10} \cdot \frac{4}{10x^{17}z} \cdot 10^{-1}$

III Divide Expressions with Positive Exponents and Negative Exponents

Simplify and rewrite using positive exponents:

(a) $\frac{x^5}{x^2}$

(b) $\frac{x^5y^3}{y^2}$

(c) $\frac{9x^7y^8z^7}{z^{14}}$

(d) $\frac{x^{-2}}{x^2}$

(e) $\frac{(x^2y^3)^2}{y^{-3}}$

(f) $\frac{x^{-1}y^{-5}z^2}{x^{-5}}$

(g) $\left(\frac{z^6x^2}{m^{24}}\right)^{\frac{5}{6}}$

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

IV Raise Products to Powers

(a) $2^3 \cdot 2^2 = 2^{\square}$

(b) $8 \cdot 2 = 2^{\square}$

(c) $27 \cdot 3 = 3^{\square}$

V Division and Power Properties of Exponents

Simplify and rewrite using positive exponents:

(a) $\frac{(2^3 \cdot 3^{-1})^2}{4}$

(b) $\frac{(4^{-1} \cdot 5^{-1})^{-4}}{25^{-\frac{1}{2}}}$

(c) $\frac{(x^{-2} \cdot y^{-4} \cdot 3)^{-1}}{3x^{-5}}$

VI Write Equations Given a Point and a Slope

- (a) Write the equation of a line with slope 3 passing through the point $(-4, -5)$ in:
(1) slope-intercept form (2) standard form (3) point-slope form

VII Write Equations Parallel or Perpendicular to a Line

- (a) Find the slope intercept form, standard form, and point-slope form of the line passing through the point $(-3, -6)$ and parallel to the line $y = 5x + 4$.
(b) Find the slope intercept form, standard form, and point-slope form of the line passing through the point $(1, -3)$ and perpendicular to the line $5x - 3y = 3x + 5y$.

VIII Solve Absolute Value Equations and Inequalities

Solve:

- (a) $2|x - 1| = 5$ (b) $2|x + 7| \leq 6$ (c) $3|x - 5| \geq 10$
(d) $|4x - 5| = 6$ (e) $|2x - 1| = -3$

IX Operations on Polynomials

Simplify:

- (a) $(3q^3 + 5) - (3q^2 + 3) + (8q^3 - q^2)$
(b) $(9w^4 - 6) - (5w^3 - 3) + (5w^4 - 5w^3)$
(c) $(3x^2 - 16x - 30) + (2x^2 + 9x + 15) - (x^2 + 5x - 26)$
(d) $(3t^4 - 5) - (3t - 5) + (4t^4 + 4t)$

Multiply:

- | | |
|---------------------------------|------------------------------------|
| (a) $(4d - e)^2$ | (b) $(4x + 5y)^2$ |
| (c) $(c + 5d)^2$ | (d) $(2x + 5y)^2$ |
| (e) $(x - 2)(x + 5)$ | (f) $(3x + 4)(5x - 2)$ |
| (g) $(4x + y)(2x + y)$ | (h) $(x - 1)(x + 7)$ |
| (i) $2y^3(y^4 + 2y^3 - 6y + 5)$ | (j) $-2x^2y(x^2 - 3xy + 5y^3)$ |
| (k) $-3x(5x - 3y)$ | (l) $-2x^2y^2(x^2 - 3x^5y^2 - 4y)$ |
| (m) $(x + 4)(x^2 - 4x + 2)$ | (n) $(2x + 2)(x^2 + 3x - 6)$ |
| (o) $(x - 2)(3x^2 - 3x - 3)$ | (p) $(x - 3)(x^2 - 4x - 2)$ |

X Simplify Rational Expressions Containing Polynomials

Simplify:

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|---|---|--|
| (a) $\frac{3y + yz}{2y}$ | (b) $\frac{-9x}{x + x^2}$ | (c) $\frac{4(x - 4)^2(x + 1)^9}{20(x - 4)^4(x + 1)^4}$ |
| (d) $\frac{3u + uv}{4u}$ | (e) $\frac{-x^2 + x + 2}{2 - x}$ | (f) $\frac{x^2 - 6x - 27}{x^2 - 9}$ |
| (g) $\frac{x^2 - 3x - 10}{5 - x}$ | (h) $\frac{2y^2}{5} \cdot \frac{15x}{6y}$ | (i) $\frac{15r^2 + 22r + 8}{5r^2 + 16r - 16} \cdot \frac{5r^2 - 4r}{4 - 9r^2}$ |
| (j) $\frac{x - 1}{4x - y} \cdot \frac{16x^2 - y^2}{2x^2 + x - 3}$ | (k) $\frac{x^2}{x + 7} \cdot \frac{x^2 + 6x - 7}{x^2 + 3x}$ | (l) $\frac{x + 2}{4x^2} - \frac{-2x - 1}{9x} + \frac{7x}{24}$ |
| (m) $\frac{4}{x^2 - 16} + \frac{6}{x - 6} - \frac{2}{x - 4}$ | (n) $\frac{x + 2}{4x^2} - \frac{x + 2}{9x} + \frac{5x}{24}$ | |

XI Factoring

Factor:

- | | | |
|--------------------------|--------------------------------------|------------------------------------|
| (a) $2x^2 - 7x - 15$ | (b) $3x^2 + 7x - 20$ | (c) $3x^2 - 2x - 5$ |
| (d) $8x^2 - 6x - 9$ | (e) $3x^3 - 3x^2 - 18x$ | (f) $72x^4y + 30x^3y^2 - 18x^2y^3$ |
| (g) $40x^2 + 68x - 80$ | (h) $3x^3 - 3x^2 - 18x$ | (i) $256x^4 - 625y^4$ |
| (j) $x^4 - 81y^4$ | (k) $16x^4 - 1$ | (l) $x^4 - 1$ |
| (m) $\frac{1}{4}x^2 - 1$ | (n) $\frac{9}{81}x^2 - \frac{1}{16}$ | |

XII Solve

- | | |
|----------------------------|---------------------------|
| (a) $x^2 = 9$ | (b) $(x + 4)^2 = 4$ |
| (c) $4(x - 4)^2 - 72 = 0$ | (d) $x^2 = 4$ |
| (e) $4x^2 - 5x - 9 = 0$ | (f) $3x^2 + 15x - 72 = 0$ |
| (g) $x^4 + 10x^2 + 16 = 0$ | (h) $2x^2 + 10x - 8 = 0$ |
| (i) $x^2 - 4x - 8 = 0$ | (j) $x^2 - 8x + 15 = 0$ |

XIII Solve Systems of Linear Equations by Graphing, Substitution, or Elimination

Solve each of the following systems by graphing:

(a)
$$\begin{cases} x + y = -1 \\ -4y = 4x - 8 \end{cases}$$

(b)
$$\begin{cases} 3x - y = -23 \\ 3x + y = -7 \end{cases}$$

(c)
$$\begin{cases} 3x + 5y = -5 \\ 3x + y = -3 \end{cases}$$

(d)
$$\begin{cases} 4x - 3y = 10 \\ x + 3y = 10 \end{cases}$$

(e)
$$\begin{cases} \frac{x}{4} + \frac{y}{2} = \frac{1}{4} \\ \frac{2x}{3} - \frac{y}{3} = \frac{-13}{3} \end{cases}$$

Solve each of the following systems by substitution or elimination:

(a)
$$\begin{cases} y = x - 4 \\ y = 2x \end{cases}$$

(b)
$$\begin{cases} 3x - 2y = 0 \\ y = 2x - 1 \end{cases}$$

(c)
$$\begin{cases} x + 4y = 5 \\ x - 3y = -9 \end{cases}$$

(d)
$$\begin{cases} -2x + y = -6 \\ -3x + y = 0 \end{cases}$$

(e) The sum of two numbers is one hundred fifteen. Their difference is forty-five. What are the numbers?

(f) The total height of a building and the flagpole on the roof is 200 feet. The building is 7 times as high as the flagpole. How high is the flagpole?

XIV Graph Systems, 2-Variable Inequalities

Graph:

(a)
$$\begin{cases} y \leq x - 8 \\ 4x + y \leq 8 \end{cases}$$

(b)
$$\begin{cases} x + 2y \geq 10 \\ x \leq y \\ y \leq 8 \end{cases}$$

XV Graph Linear Equations and Linear Inequalities

Graph:

(a) $y \leq 2x - 4$

(b) $x + y = 4$

(c) $f(x) = -4x + 8$

(d) $-2x - y \leq 10$

XVI Word Problems: Linear Equation

Hans pays \$223 in advance on his account at the athletic club. Each time he uses the club, \$5 is deducted from the account. Write an equation that represents the value remaining in his account after x visits to the club. Find the value remaining in the account after 9 visits.

XVII Rationalize Two Term Denominators

Rationalize:

(a) $\frac{\sqrt{x}}{\sqrt{x} - \sqrt{2}}$

(b) $\frac{1}{\sqrt{7} + \sqrt{5}}$

XVIII Adding and Subtracting Radicals

Simplify:

(a) $4\sqrt{3} - \sqrt{64} + 6\sqrt{27}$

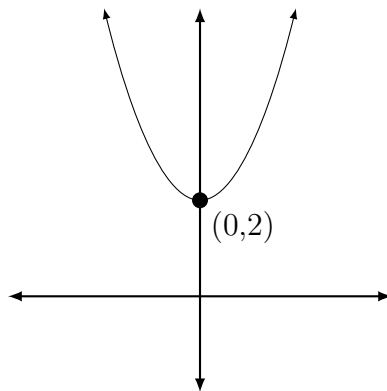
(b) $9\sqrt{3} - 2\sqrt{3} - 4\sqrt{3}$

XIX Domain and Range, Relations and Functions

(a) Determine the domain of the relation: $\{(-4, 3) (-6, -5) (4, 1)\}$

(b) Find the domain and range of the relation: $\{(x, y) \mid 4y < 20\}$

(c) Find the domain and range:



XX Solve Formulas for Specified Variables

(a) Solve for m : $F = ma$

(b) Solve for m : $E = mc^2$

(c) Solve for t : $B = 4c^2 + t$

(d) Solve for B : $A = \frac{7}{2}(-B + 9)$

XXI Constructive Response

- (a) Graph by finding the x -intercepts, y -intercept, axis of symmetry, and vertex.

$$f(x) = 4x^2 - 36x + 80$$

- (b) In 1985, there were 280 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 70% per year after 1985. How many cell phone subscribers were in Centerville in 1994?