

Simplify.

1.  $(-5x^3y^2)(-2x^{-11}y^{-2})$

$10x^{-8}$

$\frac{10}{x^8}$

2.  $\frac{7x^5y^6}{28x^{15}y^{-2}}$

$\frac{x^{-10}y^8}{4}$

$\frac{y^8}{4x^{10}}$

3.  $\frac{\sqrt{96x^3}}{\sqrt{2x}} \sqrt{\frac{96x^3}{2x}}$

$\sqrt{48x^2}$

$4x\sqrt{3}$

4.  $2\sqrt{50} + 3\sqrt{8}$

$2 \cdot 5\sqrt{2} + 3 \cdot 2\sqrt{2}$

$10\sqrt{2} + 6\sqrt{2}$

$16\sqrt{2}$

5.  $\frac{5}{(6+\sqrt{3})} \cdot \frac{(6-\sqrt{3})}{(6-\sqrt{3})}$

$\frac{30-5\sqrt{3}}{36-3}$

$\frac{30-5\sqrt{3}}{33}$

6.  $\frac{15x^{\frac{3}{4}}}{5x^{\frac{1}{2}}}$

$3x^{\frac{1}{4}}$  or  $3\sqrt[4]{x}$

7.  $\frac{3}{\sqrt[4]{18x^2}}$

$\frac{3}{\sqrt[4]{2^3 \cdot 3^2 \cdot x^2}} \cdot \frac{\sqrt[4]{2^3 \cdot 3^2 \cdot x^2}}{\sqrt[4]{2^3 \cdot 3^2 \cdot x^2}}$

$\frac{3 \sqrt[4]{72x^2}}{6x}$

$\frac{\sqrt[4]{72x^2}}{2x}$

Factor completely.

8.  $x^3 - 8$

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

9.  $3x^4 - 9x^3 - 30x^2$

$3x^2(x^2-3x-10)$

$3x^2(x-5)(x+2)$

10.  $x^3 - 3x^2 - 9x + 27$

$x^2(x-3) - 9(x-3)$

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

11.  $x^2 + 18x + 81 - y^2$

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

$(x+9-y)(x+9+y)$

12.  $6x^2 - 17x + 12$

$(2x-3)(3x-4)$

Simplify. Give domain.

13.  $\frac{x^2-5x-24}{x^2-x-12} \div \frac{x^2-10x+16}{x^2+x-6}$

$\frac{(x-8)(x+3)}{(x-4)(x+3)} \cdot \frac{(x+3)(x-2)}{(x-2)(x-8)}$

$\frac{x+3}{x-4}$

D:  $\mathbb{R} \neq 4, 3, 2, 8$

14.  $\frac{4x-1}{2x^2+5x-3} - \frac{x+3}{6x^2+x-2}$

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

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

$\frac{12x^2+5x-2 - x^2-6x-9}{(2x-1)(x+3)(3x+2)}$

$\frac{11x^2 - x - 11}{(2x-1)(x+3)(3x+2)}$

D:  $\mathbb{R} \neq -3, \frac{1}{2}, \frac{-1}{3}$

$$15. \frac{3 + \frac{12}{x}}{1 - \frac{16}{x^2}}$$

$$\frac{\frac{3x}{x} + \frac{12}{x}}{\frac{x^2}{x^2} - \frac{16}{x^2}}$$

$$\frac{\frac{3x+12}{x}}{\frac{x^2-16}{x^2}}$$

$$\frac{3x+12}{x} \cdot \frac{x^2}{x^2-16}$$

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

$$\boxed{\frac{3x}{x-4}}$$

$D: \mathbb{R} \neq 0, 4, -4$

Solve. Check answers.

$$16. \left( \frac{1}{x-1} + \frac{1}{x+1} = \frac{2}{x^2-1} \right) (x-1)(x+1)$$

$$x+1 + x-1 = 2$$

$$2x = 2$$

$$x = 1 \text{ extraneous}$$

$$\boxed{\phi}$$

$$17. \left( \frac{2x}{x^2+6x+8} = \frac{x}{x+4} - \frac{2}{x+2} \right) (x+2)(x+4)$$

$$2x = x(x+2) - 2(x+4)$$

$$2x = x^2 + 2x - 2x - 8$$

$$0 = x^2 - 2x - 8$$

$$0 = (x-4)(x+2)$$

$$x = 4, -2$$

$\uparrow$   
extraneous

$$\boxed{x=4}$$

$$18. \sqrt{2x-3} + x = 3$$

$$\sqrt{2x-3} = 3-x$$

$$2x-3 = (3-x)^2$$

$$2x-3 = 9-6x+x^2$$

$$0 = x^2 - 8x + 12$$

$$0 = (x-6)(x-2)$$

$$x = 6, 2$$

$\uparrow$   
extraneous

$$\boxed{x=2}$$

$$19. |2x+5| - 7 \geq -6$$

$$|2x+5| \geq 1$$

$$2x+5 \geq 1 \quad \text{or} \quad -2x-5 \geq 1$$

$$x \geq -2 \quad \quad \quad x \leq -3$$



$$\boxed{(-\infty, -3] \cup [-2, \infty)}$$

20. A car rental company rents a certain car for \$40 per day with unlimited mileage or \$24 per day plus \$0.20 per mile. How far can a customer drive per day for the \$24 option to be the better deal?

$$24 + .2x < 40$$

$$.2x < 16$$

$$x < 80$$

LESS THAN 80 miles