

Simplify.

$$1. \frac{x-3}{x+4} \cdot \frac{x^2-16}{2x-6}$$

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

$$\boxed{\frac{x-4}{2}}$$

$$4. 5\sqrt{18} + 4\sqrt{2} - 3\sqrt{8}$$

$$5 \cdot 3\sqrt{2} + 4\sqrt{2} - 3 \cdot 2\sqrt{2}$$

$$15\sqrt{2} + 4\sqrt{2} - 6\sqrt{2}$$

$$\boxed{13\sqrt{2}}$$

$$7. \sqrt[3]{64x^6y^5}$$

$$\boxed{4x^2y^{\frac{5}{3}}}$$

$$\boxed{4x^2y^3\sqrt[3]{y^2}}$$

Solve each equation.

$$10. \sqrt{2n} + 3 = 9$$

$$\sqrt{2n} = 6$$

$$\sqrt{2n}^2 = 6^2$$

$$2n = 36$$

$$\boxed{n = 18}$$

$$2. \frac{3x+6}{x^2-9} \div \frac{6x^2+12}{4x+12}$$

$$\frac{3x+6}{x^2-9} \cdot \frac{4x+12}{6x^2+12}$$

$$\frac{3(x+2)}{(x+3)(x-3)} \cdot \frac{4(x+3)}{6(x+2)}$$

$$\boxed{\frac{2}{x-3}}$$

$$5. (3+\sqrt{2})(5-\sqrt{6})$$

$$15 - 3\sqrt{6} + 5\sqrt{2} - \sqrt{12}$$

$$\boxed{15 - 3\sqrt{6} + 5\sqrt{2} - 2\sqrt{3}}$$

$$8. \frac{3}{4\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{3\sqrt{6}}{4 \cdot 6}$$

$$= \frac{3\sqrt{6}}{24}$$

$$\boxed{\frac{\sqrt{6}}{8}}$$

$$3. \frac{16}{x^2-16} + \frac{2}{x+4}$$

$$\frac{16}{(x+4)(x-4)} + \frac{2(x-4)}{(x+4)(x-4)}$$

$$\frac{16}{(x+4)(x-4)} + \frac{2x-8}{(x+4)(x-4)} = \frac{2x+8}{(x+4)(x-4)}$$

$$6. x^{\frac{4}{5}} \cdot x^{\frac{6}{5}} = x^{\frac{4}{5} + \frac{6}{5}} = x^{\frac{10}{5}} = x^2$$

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

$$9. \frac{a^{\frac{5}{6}} \cdot b^{\frac{1}{2}}}{a^{\frac{2}{3}}} = a^{\left(\frac{5}{6} - \frac{2}{3}\right)} \cdot b^{\frac{1}{2}}$$

$$= \boxed{a^{\frac{1}{6}} b^{\frac{1}{2}}}$$

$$11. (3g+1)^{\frac{1}{2}} = 5$$

$$\left((3g+1)^{\frac{1}{2}}\right)^2 = 5^2$$

$$3g+1 = 25$$

$$3g = 24$$

$$\boxed{g = 8}$$

$$12. \frac{x}{x+2} + \frac{7}{x-5} = \frac{17}{x^2-3x-10}$$

$$\frac{x(x-5)}{(x+2)(x-5)} + \frac{7(x+2)}{(x-5)(x+2)} = \frac{17}{(x-5)(x+2)}$$

$$x^2 - 5x + 7x + 14 = 17$$

$$x^2 + 2x + 14 = 17$$

$$x^2 + 2x - 3 = 0$$

$$(x+3)(x-1) = 0$$

$$\boxed{x = -3, 1}$$

Find the solution set for each inequality. (Remember the domain!)

$$13. \sqrt{3n} + 2 \leq 8$$

$$\sqrt{3n} \leq 6$$

$$\sqrt{3n}^2 \leq 6^2$$

$$3n \leq 36$$

$$\boxed{n \leq 12 \text{ and } n \geq 0}$$

Domain  
 $3n \geq 0$   
 $n \geq 0$

$$14. (2x+6)^{\frac{1}{3}} < 4$$

$$\left((2x+6)^{\frac{1}{3}}\right)^3 < 4^3$$

$$2x+6 < 64$$

$$2x < 58$$

$$\boxed{x < 29}$$

Domain  
 $x \in \mathbb{R}$

$$15. 4x^{\frac{1}{2}} - 10 \geq 2$$

$$4x^{\frac{1}{2}} \geq 12$$

$$x^{\frac{1}{2}} \geq 3$$

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

$$\boxed{x \geq 9}$$

Domain  
 $x \geq 0$