

Perform the indicated operation. Make sure your answer is in simplest form.

$$LCO = (x+3)(x-2)$$

$$1. \frac{2}{x-2} - \frac{9}{x+3}$$

$$\frac{2(x+3) - 9(x-2)}{(x+3)(x-2)}$$

$$\frac{2x+6 - 9x+18}{(x+3)(x-2)}$$

$$\frac{-7x+24}{(x+3)(x-2)}$$

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

$$5x(x-3) \quad (x-3)(x+2)$$

$$\frac{2(x+2) - x(5x)}{5x(x-3)(x+2)}$$

$$\frac{2x+4-5x^2}{5x(x-3)(x+2)} = \frac{-5x^2+2x+4}{5x(x-3)(x+2)}$$

$$LCO = 5x(x-3)(x+2)$$

$$3. \frac{5}{x^2+6x+9} + \frac{3x}{x^2-9}$$

$$(x+3)(x+3) \quad (x+3)(x-3)$$

$$\frac{5(x-3)}{(x+3)(x+3)(x-3)} + \frac{3x(x+3)}{(x+3)(x+3)(x-3)}$$

$$\frac{5x-15 + 3x^2+9x}{(x+3)(x+3)(x-3)}$$

$$\frac{3x^2+14x-15}{(x+3)(x+3)(x-3)}$$

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

$$\frac{x(x-3) + 2(x+3) - (x+9)}{(x+3)(x-3)}$$

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

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

$$= \frac{x+1}{x+3}$$

$$5. \quad \frac{72x-12x^2}{8x+32} \cdot \frac{x^2+10x+24}{x^2-36}$$

$$\frac{12x(\cancel{6x})}{8(x+4)} \cdot \frac{(x+6)(x+4)}{(x+6)(x-6)} = \frac{-12x\cancel{6}}{8} = -\frac{3x}{2}$$

$$6. \quad \frac{x^2-64}{3x^2+26x+16} \div \frac{x^2-4x-32}{15x+10}$$

$$\frac{(x+8)(x-8)}{3(x+2)(x+8)} \cdot \frac{5(x+2)}{(x-8)(x-4)} = \frac{5}{x-4}$$

$$7. \quad \frac{x^2-16}{x^2+3x+2} \cdot \frac{2x^2+12x+16}{x^2+2x-8}$$

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

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

## Solve the Following Rational Equations

$$8. \frac{5}{x-3} = \frac{9}{x+2}$$

$$9(x-3) = 5(x+2)$$

$$9x - 27 = 5x + 10$$

$$4x = 37$$

$$x = \frac{37}{4}$$

$$9. \frac{3}{x^2-4} = \frac{1}{x-2} + \frac{1}{x+2}$$

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

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

$$3 = 2x$$

$$x = \frac{3}{2}$$

$$10. \frac{x-15}{x^2-9x+18} = \frac{4}{x-3} + \frac{2}{x-6}$$

$$(x-6)(x-3)$$

$$x-15 = 4(x-6) + 2(x-3)$$

$$x-15 = 4x-24+2x-6$$

$$x-15 = 6x-30$$

$$15 = 5x$$

$$x = 3$$

No Solution

$$11. \frac{3}{x+8} - \frac{2}{x-2} = 1$$

$$3(x-2) - 2(x+8) = (x+8)(x-2)$$

$$3x-6-2x-16 = x^2+6x-16$$

$$x-22 = x^2+6x-16$$

$$0 = x^2+5x+6$$

$$(x+2)(x+3) = 0$$

$$x = -2 \quad x = -3$$

Simplify the Complex Fraction:

12.

$$\frac{\frac{4y}{y+5} + \frac{2}{y+6}}{3y}$$

$$\frac{4y^2 + 11y + 30}{y^2 + 11y + 30}$$

$$\frac{\frac{4y(y+6) + 2(y+5)}{(y+5)(y+6)}}{3y}$$

$$\frac{\frac{4y^2 + 24y + 2y + 10}{(y+5)(y+6)}}{3y}$$

$$\frac{4y^2 + 26y + 10}{(y+5)(y+6)} \cdot \frac{(y+5)(y+6)}{3y}$$

$$\frac{4y^2 + 26y + 10}{3y}$$

13.

$$\frac{\frac{n}{m} + \frac{1}{n}}{\frac{1}{n} - \frac{n}{m}}$$

$$\frac{\frac{n^2 + m}{mn}}{\frac{m - n^2}{mn}}$$

$$= \frac{\frac{n^2 + m}{mn} \cdot \frac{mn}{m - n^2}}{\frac{m - n^2}{mn}}$$

$$\frac{n^2 + m}{m - n^2}$$