

Simplifying Rational Expressions Using Addition and Subtraction

Perform the indicated operation.

$$1. \frac{5}{3} + \frac{1}{3}$$

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

$$= \boxed{2}$$

$$2. \frac{2}{7} + \frac{4}{5}$$

$$= \frac{2 \cdot 5}{7 \cdot 5} + \frac{4 \cdot 7}{5 \cdot 7}$$

$$= \frac{10 + 28}{35}$$

$$= \boxed{\frac{38}{35}}$$

$$3. \frac{1}{2} - \frac{4}{5}$$

$$= \frac{1 \cdot 5}{2 \cdot 5} - \frac{4 \cdot 2}{5 \cdot 2}$$

$$= \frac{5 - 8}{10}$$

$$= \boxed{-\frac{3}{10}}$$

$$4. \frac{5}{7} - \frac{1}{7}$$

$$= \boxed{\frac{4}{7}}$$

$$5. \frac{x^2 - 5x}{x+3} + \frac{3x - 15}{x+3}$$

$$= \frac{x^2 - 5x + 3x - 15}{x+3}$$

$$= \frac{x^2 - 2x - 15}{x+3}$$

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

$$= \boxed{x-5}$$

$$6. \frac{5x^2 - 7x + 1}{x-3} - \frac{4x^2 + 3x - 20}{x-3}$$

$$= \frac{5x^2 - 7x + 1 - (4x^2 + 3x - 20)}{x-3}$$

$$= \frac{5x^2 - 7x + 1 - 4x^2 - 3x + 20}{x-3}$$

$$= \frac{x^2 - 10x + 21}{x-3}$$

$$= \frac{(x-7)(x-3)}{(x-3)} = \boxed{x-7}$$

$$7. \frac{9x+5}{x+2} + \frac{1-6x}{x+2}$$

$$= \frac{9x+5+1-6x}{x+2}$$

$$= \frac{3x+6}{x+2}$$

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

$$= \boxed{3}$$

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

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

$$= \frac{x^2 + 3x + 2x^2 - 10x}{(x-5)(x+3)}$$

$$= \boxed{\frac{3x^2 - 7x}{(x-5)(x+3)}}$$

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

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

$$= \frac{x-1+3x^2-6x}{(x+2)(x-2)}$$

$$= \boxed{\frac{3x^2 - 5x - 1}{(x+2)(x-2)}}$$

$$10. \frac{4x-1}{x^2+3x+2} + \frac{3}{x+1}$$

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

$$= \frac{4x-1+3x+6}{(x+2)(x+1)}$$

$$= \frac{7x+5}{(x+2)(x+1)}$$

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

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

$$= \frac{9x+6x-4}{6(x-1)}$$

$$= \frac{15x-4}{6(x-1)}$$

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

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

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

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

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

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

$$13. \frac{2x+1}{x^2-8x+15} - \frac{7}{x^2-5x}$$

$$= \frac{(2x+1) \cdot x}{(x-3)(x-5) \cdot x} + \frac{-7(x-3)}{x(x-5)(x-3)}$$

$$= \frac{2x^2+x-7x+21}{x(x-3)(x-5)}$$

$$= \frac{2x^2-6x+21}{x(x-3)(x-5)}$$