

5.3 Adding and Subtracting Rational Expressions

$$1. \frac{3y^2}{8y^2} \frac{8}{3x^3y} + \frac{4}{9xy^3} \frac{x^2}{x^2} = \frac{24y^2}{9x^3y^3} + \frac{4x^2}{9x^3y^3}$$

$$= \frac{24y^2 + 4x^2}{9x^3y^3} = \boxed{\frac{4(6y^2 + x^2)}{9x^3y^3}} \quad x \neq 0, y \neq 0$$

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

$$\frac{3x^3-x^2-x}{x^2-2} \quad x \neq \sqrt{2}$$

$$3. \frac{5x}{2y+4} - \frac{6}{y^2+2y} = \frac{y}{y} \frac{5x}{2(y+2)} - \frac{6}{y(y+2)} \cdot \frac{2}{2}$$

com den: $2y(y+2)$

$$= \frac{5xy}{2y(y+2)} - \frac{12}{2y(y+2)} = \boxed{\frac{5xy-12}{2y(y+2)}} \quad y \neq 0, -2$$

$$4. \frac{7}{5y+25} - \frac{4}{3y+15} = \frac{3}{3} \frac{7}{5(y+5)} - \frac{4}{3(y+5)} \cdot \frac{5}{5}$$

com Den: $15(y+5)$

$$= \frac{21}{15(y+5)} - \frac{20}{15(y+5)} = \boxed{\frac{1}{15(y+5)}} \quad y \neq -5$$

$$5. \frac{4x}{4x} \frac{7}{2xy^2} + \frac{3}{8x^2y} \frac{y}{y} = \frac{28x}{8x^2y^2} + \frac{3y}{8x^2y^2} = \boxed{\frac{28x+3y}{8x^2y^2}}$$

$$x \neq 0, y \neq 0$$

$$6. \frac{6y-4}{y^2-5} + \frac{3y+1}{y^2-5} = \frac{6y-4+3y+1}{y^2-5} = \boxed{\frac{9y-3}{y^2-5}} \quad y \neq \sqrt{5}$$

$$7. \frac{x+2}{x^2+4x+4} + \frac{2}{x+2} = \frac{x+2}{(x+2)(x+2)} + \frac{2}{(x+2)}$$

$$= \frac{1}{x+2} + \frac{2}{x+2} = \boxed{\frac{3}{x+2}} \quad x \neq -2, 2$$

$$8. \frac{x^2}{5} + \frac{x^2}{5} = \boxed{\frac{2x^2}{5}} \quad \text{no restrictions}$$

$$9. \frac{y}{4y+8} - \frac{1}{y^2+2y} = \frac{y}{y} \cdot \frac{y}{4(y+2)} - \frac{1}{y(y+2)} \cdot \frac{4}{4}$$

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

$$= \boxed{\frac{y-2}{4y}} \quad y \neq 0, -2$$