Mathematics 11U

2.7 – Adding and Subtracting Rational Expressions

Mr. D. Hagen

$$\frac{2}{5}+\frac{5}{6} = \frac{2(6)}{5(6)} + \frac{5(5)}{6(5)}$$

$$= \frac{12}{30} + \frac{25}{30}$$

$$= \frac{37}{30}$$

$$\frac{3}{8x^2}+\frac{1}{4x}-\frac{5}{6x^3}$$

$24x^3$

$$\frac{3(3x)}{24x^3}+\frac{1(6x^2)}{24x^3}-\frac{5(4)}{24x^3}$$

$$\frac{9x+6x^2-20}{24x^3}$$

$$\frac{6x^2+9x-20}{24x^3} \qquad \{x \neq 0\}$$

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

$-\frac{1}{2}$ $\quad$ 3

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

$$= \frac{3x^2 - 9x + 8x + 4}{(2x+1)(x-3)}$$

$$= \frac{3x^2 - x + 4}{(2x+1)(x-3)} \qquad \left\{x \neq -\frac{1}{2}, 3\right\}$$

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

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

$-1 \quad 1 \qquad\qquad 4$

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

$$= \frac{2x^2-8x-x^2-x+2}{(x+1)(x-1)(x-4)} = \frac{x^2-9x+2}{(x+1)(x-1)(x-4)} \qquad \{x \neq -1, 1, 4\}$$

$$\frac{2}{3} - \frac{4}{7} \div \frac{9}{14}$$

$$= \frac{2}{3} - \frac{4}{1} \times \frac{2\cancel{14}}{9}$$

$$= \frac{2(3)}{3(3)} - \frac{8}{9}$$

$$= \frac{6}{9} - \frac{8}{9}$$

$$= \frac{-2}{9}$$

$$\frac{x+1}{x^2+5x+6} - \frac{3x+12}{x^2-4} \div \frac{x^2+7x+12}{x^2+4x+4}$$

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

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

$$= \frac{x^2-x-2}{(x+2)(x+3)(x-2)} - \frac{(3x^2+12x+12)}{(x-2)(x+3)(x+2)}$$

$$= \frac{-2x^2-13x-14}{(x+2)(x+3)(x-2)} \quad \{x \neq -4, -3, -2, 2\}$$