

3. Simplify this compound rational expression. No need to state restrictions on the variables.

Method 1: get all denominators to be the same then cancel all of them

$$\begin{aligned} \frac{3xy^2}{3xy^2} \cdot \frac{3}{4x^2y} - \frac{4x}{y^3} \cdot \frac{12x^3}{12x^3} &= \frac{9xy^2}{12x^3y^3} - \frac{48x^4}{12x^3y^3} \\ \frac{12x^2y}{12x^2y} \cdot \frac{2}{xy^2} + \frac{5}{6x^3} \cdot \frac{2y^3}{2y^3} &= \frac{24x^2y}{12x^3y^3} + \frac{10y^3}{12x^3y^3} \\ \frac{9xy^2 - 48x^4}{24x^2y + 10y^3} \end{aligned}$$

Method 2: Multiply the numerator and denominator by the LCM of all the denominators: $12x^3y^3$

$$\begin{aligned} \frac{3}{4x^2y} - \frac{4x}{y^3} &\cdot \frac{12x^3y^3}{12x^3y^3} \\ \frac{2}{xy^2} + \frac{5}{6x^3} &\cdot \frac{12x^3y^3}{12x^3y^3} \\ \frac{9xy^2 - 48x^4}{24x^2y + 10y^3} \end{aligned}$$

Simplify:

$$\begin{aligned} \frac{6 + \frac{2}{x-5}}{\frac{1}{x-5} - 8} &= \frac{6x-30+2}{1-8x+40} \\ &= \frac{6x-28}{-8x+41} \end{aligned}$$

Simplify:

$$\begin{aligned} \frac{3}{x+2} \cdot \frac{(x+5)(x+2)}{(x+5)(x+2)} &= \frac{3(x+5)}{(x+5)(x+2)} \\ \frac{1}{x+5} + \frac{10x}{x^2+7x+10} &= \frac{1}{x+5} + \frac{10x}{(x+5)(x+2)} \\ \frac{1}{x+5} &\cdot \frac{(x+2)}{(x+2)} \\ \frac{1(x+2)}{1(x+2) + 10x} &= \frac{x+2}{11x+2} \\ \frac{3x+15}{11x+2} \end{aligned}$$

the (x+2) cancels leaving only 3(x+5)

both (x+5) & (x+2) cancel leaving only 10x

the (x+5) cancels leaving only 1(x+2)

Use distributive property in the numerator and combine like terms in the denominator

Simplify:

$$\frac{\frac{4x}{x^2 + 8x + 7}}{\frac{5x}{x^2 + 6x - 7} + \frac{6}{x^2 - 1}} = \frac{\frac{4x}{(x+1)(x+7)}}{\frac{5x}{(x+7)(x-1)} + \frac{6}{(x+1)(x-1)}} \cdot \frac{(x+1)(x+7)(x-1)}{(x+1)(x+7)(x-1)}$$
$$\frac{4x(x-1)}{5x(x+1) + 6(x+7)}$$
$$\frac{4x^2 - 4x}{5x^2 + 5x + 6x + 42}$$
$$\frac{4x^2 - 4x}{5x^2 + 11x + 42}$$

Hwk #34:

Pages 517-518

Problems 12, 14, 15, 19, 21, 44, 47, 48