

Simplifying Complex Fractions

1. Find the lcd of all the denominators.
2. Multiply by $1 = \frac{lcd}{lcd}$ (be careful: multiply each term)
3. Make sure answer is in lowest terms.

Example:

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

$$\frac{\left(\frac{3}{x+1} - \frac{3}{x-1}\right) \cdot \frac{(x+1)(x-1)}{(x+1)(x-1)}}{\frac{5}{(x+1)(x-1)} \cdot \frac{(x+1)(x-1)}{(x+1)(x-1)}}$$

$$\frac{3(x-1) - 3(x+1)}{5}$$

$$\frac{3x - 3 - 3x - 3}{5}$$

$$-\frac{6}{5}$$

Dividing a Polynomial by a Monomial (Single Term)

1. Rewrite as separate fractions.
2. Simplify

Example:

$$\frac{25x^8 - 50x^7 + 3x^6 - 40x^5}{-5x^5}$$

$$\frac{25x^8}{-5x^5} - \frac{50x^7}{-5x^5} + \frac{3x^6}{-5x^5} - \frac{40x^5}{-5x^5}$$

$$-5x^3 + 10x^2 - \frac{3}{5}x + 8$$

Long Division

Example:

$$x-1 \overline{)x^3 + 6x^2 - 2x + 3}$$

Take the first term in the dividend (# under the division) and the first term in the divisor and form their quotient.

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

$$x-1 \overline{)x^3 + 6x^2 - 2x + 3} \quad \begin{array}{r} x^2 \\ \hline \end{array}$$

Now multiply $x^2(x-1) = x^3 - x^2$

$$x-1 \overline{)x^3 + 6x^2 - 2x + 3} \quad \begin{array}{r} x^2 \\ \hline x^3 - x^2 \\ \hline \end{array}$$