

Reducing rational expressions.

Here we concern ourselves with reducing fractions where the numerator and denominator are polynomials. We will proceed by example.

We first remind you of the process of reducing fractions:

$$\text{Example: } \frac{40}{36} = \frac{4 \cdot 10}{4 \cdot 9} = \frac{10}{9}.$$

factor numerator
and denominator

$$\begin{aligned} \text{Example } \frac{32x^2 - 4xy}{2xy} &= \frac{2 \cdot 2x(8x - y)}{2xy} \\ &= \frac{2(8x - y)}{y}. \end{aligned}$$

provided $x \neq 0$ since the left side is undefined there for $y \neq 0$.
while the right side is. (it's $= -2$).

$$\text{Example } \frac{x^2 - 4}{x^2 + x - 6} = \frac{(x+2)(x-2)}{(x+3)(x-2)}$$

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

provided $x \neq 2$ (since the left side is undefined there while the right side is $\frac{4}{5}$).

Example: $\frac{x-1}{1-x} = \frac{x-1}{-(x-1)} = -1.$
