

Simplifying Rational Expressions

As with the more familiar numerical fractions we can reduce rational expressions by canceling common factors in the numerator and the denominator.

$$\frac{pk}{qk} = \frac{p}{q}$$

Examples;

Reduce $\frac{8x}{12x}$

$$\frac{8x}{12x} = \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{x}}{\cancel{2} \cdot \cancel{2} \cdot 3 \cdot \cancel{x}} = \frac{2}{3}$$

Reduce $\frac{12x^2y}{9xy^2}$

$$\frac{4x(\cancel{3xy})}{3y(\cancel{3xy})} = \frac{4x}{3y}$$

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

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

Warning: it is common to try factoring improperly. Remember, you can only factor out factors that in a product, not terms in an addition or subtraction

Proper reducing

$$\frac{\cancel{xy}}{\cancel{x}}$$

Improper reducing

$$\frac{\cancel{x+y}}{\cancel{x}}$$