

Simplifying Algebraic Fractions by Factoring

Quick Review	
Fractions can be reduced by eliminating <i>common factors</i> in the numerator and denominator	Numerical example: $\frac{24}{60} = \frac{\cancel{12} \times 2}{\cancel{12} \times 5} = \frac{2}{5}$
<i>Common Factors</i> can be numbers, algebraic terms, or algebraic expressions.	Algebraic example: $\frac{5x-30}{4x-24} = \frac{5(\cancel{x-6})}{4(\cancel{x-6})} = \frac{5}{4}$
A <i>complex fraction</i> has a fraction in the numerator, the denominator or both. Simplify by multiplying numerator and denominator by the <i>lowest common denominator</i> ,	Simplify: $\frac{4 + \frac{2}{x}}{3 - \frac{1}{x^2}} = \frac{4 + \frac{2}{x}}{3 - \frac{1}{x^2}} \times \frac{x^2}{x^2}$ $= \frac{\left(4 + \frac{2}{x}\right)x^2}{\left(3 - \frac{1}{x^2}\right)x^2} = \frac{4x^2 + 2x}{3x^2 - 1}$

Problems

Reduce each fraction by first factoring the numerator and the denominator. Some of the fractions are already reduced as much as possible.

1. $\frac{5x^2 - 30}{4x^2 - 24}$

2. $\frac{70x^2y^3}{105x^4y^2}$

3. $\frac{x^2 - 9}{x + 3}$

4. $\frac{x - 15}{x - 5}$

5. $\frac{x^2 - 2x}{x - 2}$

6. $\frac{\frac{16}{x} - 2x^2}{24x^4 - 2x^3}$

7.
$$\frac{x^2 - 3x - 10}{x^2 + 4x - 45}$$

8.
$$\frac{6x^2 - x}{x}$$

9.
$$10x + \frac{\frac{5}{1-x} + 2x}{1-x}$$

10.
$$\frac{6 - 2x^2}{6 - 2x}$$