Guide to: Algebraic fractions

maths Links

Explanation:

Never cancel individual terms across a + or − sign; always **factorise the numerator and denominator fully** first, then cancel common bracketed factors. When multiplying fractions, factorise and cancel diagonally or vertically; when dividing, flip the second fraction and multiply.

To add or subtract algebraic fractions, rewrite both fractions over their lowest common denominator (usually the product of their linear denominators), expand the numerators carefully (watching out for a minus sign in front of a bracket), and simplify.

Example 1: Simplify fully $\frac{2x^2 + 5x - 3}{x^2 - 9}$

Solution:

Factorise numerator: $2x^2 + 6x - x - 3 =$ **$(2x - 1)(x + 3)$**

Factorise denominator (DOTS): $x^2 - 9 =$ **$(x - 3)(x + 3)$**

$= \frac{(2x - 1)(x + 3)}{(x - 3)(x + 3)}$

Cancel common factor $(x + 3)$:

Answer: $\frac{\mathbf{2x - 1}}{\mathbf{x - 3}}$

Example 2: Write $\frac{4}{x - 2} - \frac{3}{x + 1}$ as a single fraction.

Solution:

Common denominator is **$(x - 2)(x + 1)$**:

$= \frac{4(x + 1) - 3(x - 2)}{(x - 2)(x + 1)}$

Expand top: $4x + 4 - 3x + 6 =$ **$x + 10$**

Answer: $\frac{\mathbf{x + 10}}{\mathbf{(x - 2)(x + 1)}}$

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