

Algebraic fractions and rearranging formulae

Topic cliff notes / objectives, key ideas and examples

Learning objectives

- Simplify and add algebraic fractions while retaining excluded values.
- Rearrange a formula by collecting and factoring the required subject.

Key ideas

- Record original denominator exclusions before cancelling.

$$\text{denominator} \neq 0$$

- Cancel common factors, never separate terms of a sum.

$$\frac{ab}{ac} = \frac{b}{c} \quad (a \neq 0, c \neq 0)$$

- Use a common denominator to add or subtract.
- If the subject appears twice, collect its terms, factor, then divide by a non-zero factor.

Worked example

Simplify the fraction and state its excluded values.

$$\frac{x^2 - 9}{x^2 + 3x} = \frac{(x - 3)(x + 3)}{x(x + 3)}$$

The original denominator must stay non-zero.

$$x \neq 0, \quad x \neq -3$$

Answer

$$\frac{x - 3}{x}, \quad x \neq 0, -3$$

Quick example

Add the fractions using a common denominator.

$$\frac{1}{x} + \frac{1}{x + 1} = \frac{x + 1 + x}{x(x + 1)}$$

Answer

$$\frac{2x + 1}{x(x + 1)}, \quad x \neq 0, -1$$

Watch out

Cancelling a factor does not remove its original excluded value. Keep every original denominator non-zero.

