

# Algebraic Fractions: Simplifying

Mathematicards

Grade 5-9

## PRO TIP: Factorising

Never cancel terms separated by a + or -.  
Only cancel **factors**!

$$\frac{x+2}{x} \text{ (Cannot be simplified)}$$

$$\frac{x(x+2)}{x} \text{ (Can be simplified)}$$

## KEY PATTERN: DOTS

The Difference of Two Squares is your best friend:

$$x^2 - a^2 = (x - a)(x + a)$$

Watch out for:

$$4x^2 - 25 = (2x - 5)(2x + 5)$$

## Section 1: The Essentials (Grade 5-7)

Factorise completely, then simplify.

1.  $\frac{4x+12}{x^2+3x}$

2.  $\frac{x^2+7x+10}{x+5}$

3.  $\frac{x^2-25}{2x+10}$

4.  $\frac{x^2-9}{x^2+6x+9}$

5.  $\frac{x^2-3x-10}{x^2-4}$

6.  $\frac{x^2-8x+15}{x^2-5x}$

7.  $\frac{3x-21}{x^2-49}$

8.  $\frac{x^2+x-12}{x^2+5x+4}$

## Section 2: Higher Tier (Grade 8-9)

Factorise quadratics ( $a > 1$  included) and perform operations.

### OPERATIONS

**Multiply:** Numerator  $\times$  Numerator, Denominator  $\times$  Denominator.

**Divide:** Multiply by the **reciprocal**.

9.  $\frac{2x^2+5x+3}{x+1}$

10.  $\frac{3x^2-10x+3}{x^2-9}$

11.  $\frac{5x^2-13x-6}{x-3}$

12.  $\frac{4x^2-25}{2x^2-x-10}$

$$13. \frac{x+1}{3} \times \frac{12}{2x+2}$$

$$14. \frac{x^2-1}{4x} \times \frac{2x}{x+1}$$

$$15. \frac{x^2-4}{x+3} \div (x-2)$$

$$16. \frac{x^2+5x+6}{x^2-1} \times \frac{x-1}{x+2}$$

$$17. \frac{3x^2+14x-5}{x^2+10x+25} \div \frac{3x-1}{x}$$

$$18. \frac{x^2-9}{x^2+4x+4} \times \frac{2x+4}{x+3}$$

$$19. \frac{x^2-36}{x^2-12x+36} \div \frac{x+6}{x^2-6x}$$

$$20. \frac{2x^2-7x-4}{x^2-16} \times \frac{x+4}{2x^2+x}$$