

# GCSE Maths: Simplifying algebraic fractions (Higher): answers

GCSE Maths - Fractions - Higher - Lesson 3.4

**Answers.** Final answers to the worksheet questions. Full step-by-step solutions for every question are free at [websink.site/gcse/maths/ch03-fractions/higher/simplifying-algebraic-fractions/](https://websink.site/gcse/maths/ch03-fractions/higher/simplifying-algebraic-fractions/)

## Exercise 3D Simplifying, multiplying and dividing algebraic fractions Non-calculator

### 1 Simplify.

(a)  $\frac{6x}{9}$

**Answer:**  $\frac{2x}{3}$

(b)  $\frac{12x^2}{8x}$

**Answer:**  $\frac{3x}{2}$

(c)  $\frac{5x^2y}{15xy^2}$

**Answer:**  $\frac{x}{3y}$

(d)  $\frac{3x+6}{9}$

**Answer:**  $\frac{x+2}{3}$

### 2 Factorise and simplify fully.

(a)  $\frac{x^2+4x}{x+4}$

**Answer:**  $x$

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

**Answer:**  $x-3$

(c)  $\frac{x^2+5x+6}{x+2}$

**Answer:**  $x+3$

(d)  $\frac{2x^2-8}{x^2-4x+4}$

**Answer:**  $\frac{2(x+2)}{x-2}$

(e)  $\frac{x^2-x-12}{x^2-16}$

**Answer:**  $\frac{x+3}{x+4}$

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

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

3 Work out. Give each answer in its simplest form.

(a)  $\frac{x}{4} \times \frac{8}{x^2}$

**Answer:**  $\frac{2}{x}$

(b)  $\frac{3x}{5} \div \frac{9x}{10}$

**Answer:**  $\frac{2}{3}$

(c)  $\frac{x+3}{x-2} \times \frac{x-2}{x+5}$

**Answer:**  $\frac{x+3}{x+5}$

(d)  $\frac{x^2 - 1}{x + 2} \div \frac{x + 1}{x + 2}$

**Answer:**  $x - 1$

(e)  $\frac{2x+4}{x^2-9} \times \frac{x-3}{x+2}$

**Answer:**  $\frac{2}{x+3}$

(f)  $\frac{x^2 + 3x}{x^2 - 1} \div \frac{x}{x - 1}$

**Answer:**  $\frac{x+3}{x+1}$

4 Ria says  $\frac{x+6}{x}$  simplifies to 7. Explain her mistake.

**Answer:** She cancelled the  $x$  terms, but they are added to 6, not multiplied. The expression cannot be simplified.

5 The area of a rectangle is  $(x^2 + 5x + 6)$  cm<sup>2</sup> and its length is  $(x + 3)$  cm. Find an expression for its width.

**Answer:**  $(x + 2)$  cm

6 Show that  $\frac{x^2 - 4}{x + 2} \times \frac{x}{x - 2}$  simplifies to  $x$ .

**Answer:**  $(x - 2)(x + 2)/(x + 2) = x - 2$ ; then  $\times x/(x - 2) = x$ .

7 **Challenge.** Simplify  $\frac{x^2 - 5x + 6}{x^2 - 4} \div \frac{x - 3}{x + 2}$

**Answer:** 1