

# GCSE Maths: Algebraic fractions and equations (Higher): answers

GCSE Maths - Fractions - Higher - Lesson 3.5

**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/algebraic-fractions-and-equations/](https://websink.site/gcse/maths/ch03-fractions/higher/algebraic-fractions-and-equations/)

## Exercise 3E Algebraic fractions and equations

Non-calculator

1 Write each as a single fraction in its simplest form.

(a)  $\frac{x}{3} + \frac{x}{4}$

**Answer:**  $\frac{7x}{12}$

(b)  $\frac{2x}{5} - \frac{x}{10}$

**Answer:**  $\frac{3x}{10}$

(c)  $\frac{3}{x} + \frac{2}{x^2}$

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

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

**Answer:**  $\frac{5x+1}{6}$

(e)  $\frac{2x-1}{4} - \frac{x+2}{6}$

**Answer:**  $\frac{4x-7}{12}$

2 Write each as a single fraction. Leave the denominator factorised.

(a)  $\frac{1}{x+1} + \frac{1}{x+2}$

**Answer:**  $\frac{2x+3}{(x+1)(x+2)}$

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

**Answer:**  $\frac{7-x}{(x-1)(x+2)}$

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

**Answer:**  $\frac{7x-1}{(x+2)(x-3)}$

3 Solve.

(a)  $\frac{x}{3} + \frac{x}{6} = 4$

**Answer:**  $x = 8$

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

**Answer:**  $x = 1$

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

**Answer:**  $x = 11$

(d)  $\frac{5}{x+1} = \frac{2}{x-2}$

**Answer:**  $x = 4$

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

**Answer:**  $x = 2$

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

**Answer:**  $x = \frac{7}{2}$

- 4 One third of a number plus one fifth of the same number is 16. Find the number.

**Answer:**  $n/3 + n/5 = 16$ . Multiply by 15:  $5n + 3n = 240$ , so  $n = 30$ .

- 5 The perimeter of a rectangle is 30 cm. The length is  $(x + 3)$  cm and the width is  $(x - 1)$  cm. Find  $x$ .

**Answer:**  $2(2x + 2) = 30$ , so  $2x + 2 = 15$  and  $x = 6.5$

- 6 Zak writes  $\frac{1}{x} + \frac{1}{y} = \frac{2}{x+y}$ . Show that this is wrong by choosing values for  $x$  and  $y$ .

**Answer:** Take  $x = 1$  and  $y = 1$ : left side = 2, right side =  $\frac{2}{2} = 1$ . The correct result is  $\frac{x+y}{xy}$ .

- 7 **Challenge.** Show that  $\frac{1}{n} - \frac{1}{n+1} = \frac{1}{n(n+1)}$ .

**Answer:**  $\frac{n+1}{n(n+1)} - \frac{n}{n(n+1)} = \frac{1}{n(n+1)}$