

Solving Equations with Fractions

There are multiple techniques to consider to solve an equation that has fractions:

- Cross Multiplication
- Common Denominator
- Multiplying Through

1. Cross Multiplication

This technique is used when there is a **single fraction** on **both sides** of the equal sign.

Example: Solve for x.

$$\text{a) } \frac{3}{x} = \frac{9}{12}$$

$$\text{b) } \frac{10}{x} = -2$$

$$\text{c) } \frac{2}{x+1} = \frac{1}{2}$$

2. Common Denominator

A common denominator can be used when there are **multiple fractions** on one or both sides **of the equal sign**.

Example: Solve for x.

$$\text{a) } \frac{x}{2} + \frac{x}{5} = 14$$

$$\text{b) } \frac{2x}{3} - \frac{x}{5} = \frac{7}{15}$$

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

3. Multiplying Through

To multiply through, we again determine a common denominator, but this time, we multiply each term by this value cancelling out all fractions.

Example: Solve for x.

$$\text{a) } \frac{x}{2} + \frac{x}{5} = 14$$

$$\text{b) } \frac{2x}{3} - \frac{x}{5} = \frac{7}{15}$$

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

Practice Questions

Solve each question using a different technique.

$$\text{a) } \frac{x}{4} + \frac{x+1}{3} = 5$$

$$\text{b) } \frac{4}{x} = \frac{6}{x+1}$$

$$\text{c) } \frac{x}{3} - 5 = \frac{2x-18}{2}$$