

**A17b Part 2 Solving equations involving algebraic fractions
where the unknown is on both sides of the equation** © BossMaths

Warm-up activity

Solve the following equations:

1) $w + 1 = 3w - 17$

2) $11 - 2x = 16 + x$

3) $4y = 7y - 9$

4) $7k - 2 = 13k + 3$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Alpha Exercise

Solve the following equations:

1) $4a + 3 = \frac{2a}{7}$

2) $8n - 13 = \frac{n}{6}$

3) $\frac{5x}{11} = -x + 3$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Alpha Exercise (contd.)

Solve the following equations:

4) $\frac{3}{2}u - 5 = -\frac{1}{2}u$

5) $\frac{8v}{5} = \frac{-4v}{5} + 6$

6) $\frac{-4(y+5)}{7} = \frac{12y}{7}$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Alpha Exercise (contd.)

Solve the following equations:

$$7) \quad \frac{-2(p-5)}{4} = \frac{p}{4}$$

$$8) \quad 4x - 11 = \frac{13x}{6}$$

$$9) \quad \frac{4(t-2)+1}{12} = \frac{5}{12}t$$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Beta Exercise

Solve the following equations:

1) $\frac{2}{3}x + 4 = \frac{1}{6}x$

2) $\frac{2x + 4}{3} = \frac{x}{6}$

3) $\frac{2x + 4}{3} = \frac{x}{9}$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Beta Exercise (contd.)

Solve the following equations:

4) $\frac{2x+4}{6} = \frac{x}{9}$

5) $\frac{2(x+4)}{6} = \frac{x}{9}$

6) $\frac{2(x+4)}{6} = \frac{x+1}{9}$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Beta Exercise (contd.)

Solve the following equations:

$$7) \quad \frac{2(x+4)}{6} = \frac{x}{5}$$

$$8) \quad \frac{2(x+4)+1}{6} = \frac{x}{5} - 2$$

$$9) \quad \frac{2(x+4)}{6} + 1 = \frac{x}{5} - 2$$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Gamma Exercise

Solve the following equations:

1) $\frac{3}{p} = \frac{5}{2p+1}$

2) $\frac{8}{3t-1} = \frac{5}{t}$

3) $\frac{2}{b} = \frac{-1}{b+7}$

**A17b Part 2 Solving equations involving algebraic fractions
where the unknown is on both sides of the equation** © BossMaths



Gamma Exercise (contd.)

Solve the following equations:

4)
$$\frac{5}{4-n} = \frac{7}{2n}$$

5)
$$\frac{3}{1-2d} = \frac{5}{2(d+6)}$$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Gamma Exercise (contd.)

Solve the following equations:

6)
$$\frac{2}{x} - \frac{5}{3x} = \frac{1}{x-1}$$

7)
$$\frac{2}{3(y+1)} = \frac{5}{7(5-y)}$$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Gamma Exercise (contd.)

Solve the following equations:

8)
$$\frac{3}{1-5q} = \frac{8}{4(q+2)}$$

9)
$$\frac{7}{15m} - \frac{3}{20m} = \frac{1}{5+m}$$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Delta Exercise

Given that each of the three equations has a solution of $\frac{7}{2}$, find whole numbers to fill in the blanks.

$$1) \quad \frac{7x}{5} + \square = \frac{22 + 5x}{5}$$

$$2) \quad -3x = \frac{\square}{2} - 6x$$

$$3) \quad \frac{2}{7} = \frac{\square}{3x}$$

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths



Explain the mistake

Alice is trying to solve the following equation:

$$\frac{p}{7} + 9 = \frac{2p}{7}$$

Alice decides to multiply both sides of the equation by 7. She writes:

$$\begin{aligned} p+9 &= 2p \\ 9 &= p \end{aligned}$$

What mistake has Alice made?

**A17b Part 2 Solving equations involving algebraic fractions
where the unknown is on both sides of the equation** © BossMaths

Exam-style question

Solve the following equations:

a) $\frac{7 + 4x}{5} = \frac{2x + 9}{3}$

b) $\frac{5}{7 + 4x} = \frac{3}{2x + 9}$

c) What do you notice?

A17b Part 2 Solving equations involving algebraic fractions where the unknown is on both sides of the equation © BossMaths

Challenge

The following equations have no solutions:

$$\frac{6}{7+3x} = \frac{4}{2x-5}$$

$$\frac{9}{10+6x} = \frac{3}{2x+7}$$

$$\frac{-4}{5x-1} = \frac{8}{3-10x}$$

- a) Can you explain why they have no solutions?
- b) Come up with some equations involving algebraic fractions that also have no solutions.