

Algebraic Equations Mastery

Practice Worksheet (Compact Layout)

I DO

Solve the equation:

$$\frac{4}{x-2} - \frac{2}{x+1} = 1$$

Show clear algebraic working.

WE DO

Solve the equation:

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

Show clear algebraic working.

YOU DO 1

Solve the equation:

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

Show clear algebraic working.

YOU DO 2

Solve the equation:

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

Show clear algebraic working.

CHALLENGE

Solve the equation:

$$\frac{5}{x-2} - \frac{14}{2x-1} = 1$$

Show clear algebraic working.

ANSWERS & WORKED SOLUTIONS**I Do**

Step 1: Multiply every term by $(x-2)(x+1)$ to clear the fractions: $4(x+1) - 2(x-2) = (x-2)(x+1)$.

Step 2: Expand the brackets on the left: $4x + 4 - 2x + 4 = 2x + 8$.

Step 3: Expand the brackets on the right: $x^2 - x - 2$.

Step 4: Set the equation to zero: $x^2 - x - 2 = 2x + 8 \rightarrow x^2 - 3x - 10 = 0$.

Step 5: Factorise: $(x-5)(x+2) = 0$. **Answer: $x = 5, x = -2$**

We Do

Step 1: Multiply by $(x-3)(x+2)$: $6(x+2) - 2(x-3) = (x-3)(x+2)$.

Step 2: Expand left side: $6x + 12 - 2x + 6 = 4x + 18$.

Step 3: Expand right side: $x^2 - x - 6$.

Step 4: Set to zero: $x^2 - x - 6 = 4x + 18 \rightarrow x^2 - 5x - 24 = 0$.

Step 5: Factorise: $(x-8)(x+3) = 0$. **Answer: $x = 8, x = -3$**

You Do 1

Step 1: Multiply by $(x-1)(x+3)$: $5(x+3) - 2(x-1) = (x-1)(x+3)$.

Step 2: Expand left side: $5x + 15 - 2x + 2 = 3x + 17$.

Step 3: Expand right side: $x^2 + 2x - 3$.

Step 4: Set to zero: $x^2 + 2x - 3 = 3x + 17 \rightarrow x^2 - x - 20 = 0$.

Step 5: Factorise: $(x-5)(x+4) = 0$. **Answer: $x = 5, x = -4$**

ANSWERS & WORKED SOLUTIONS (CONTINUED)

You Do 2

Step 1: Multiply by $(x - 4)(x + 1)$: $6(x + 1) - 2(x - 4) = (x - 4)(x + 1)$.

Step 2: Expand left side: $6x + 6 - 2x + 8 = 4x + 14$.

Step 3: Expand right side: $x^2 - 3x - 4$.

Step 4: Set to zero: $x^2 - 3x - 4 = 4x + 14 \rightarrow x^2 - 7x - 18 = 0$.

Step 5: Factorise: $(x - 9)(x + 2) = 0$. **Answer: $x = 9$, $x = -2$**

Challenge

Step 1: Multiply by $(x - 2)(2x - 1)$: $5(2x - 1) - 14(x - 2) = (x - 2)(2x - 1)$.

Step 2: Expand left side: $10x - 5 - 14x + 28 = -4x + 23$.

Step 3: Expand right side carefully: $2x^2 - x - 4x + 2 = 2x^2 - 5x + 2$.

Step 4: Set to zero: $2x^2 - 5x + 2 = -4x + 23 \rightarrow 2x^2 - x - 21 = 0$.

Step 5: Factorise $(2x - 7)(x + 3) = 0$. **Answer: $x = 3.5$, $x = -3$**