Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- numerator is a difference of two squares: $x^2 - 25 = (x-5)(x+5)$
- denominator factorises: $x^2 - 2x - 15 = (x-5)(x+3)$

$$= \frac{\mathbf{x+5}}{\mathbf{x+3}}$$

2.2

- common denominator 15: $\frac{5x}{15} + \frac{6x}{15}$

$$= \frac{\mathbf{11x}}{\mathbf{15}}$$

2.3

- divide the numbers by 3 and cancel one x and one y

$$= \frac{\mathbf{2x}}{\mathbf{3y^2}}$$

2.4

- factorise: $\frac{x(x+3)}{(x-3)(x+3)}$
- $= \frac{\boldsymbol{x}}{\boldsymbol{x-3}}$

2.5

- common denominator 4: $\frac{2(x+1)-(x-3)}{4}$
- $= \frac{2x+2-x+3}{4} = \frac{\boldsymbol{x+5}}{\mathbf{4}}$

3.1

- common denominator $(x-2)(x+1)$
- $\frac{3(x+1)+2(x-2)}{(x-2)(x+1)}$
- expand the numerator: $3x + 3 + 2x - 4$

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

3.2

- numerator: $2x^2 + 5x - 3 = (2x-1)(x+3)$
- denominator is a difference of two squares: $4x^2 - 1 = (2x-1)(2x+1)$

$$= \frac{\mathbf{x+3}}{\mathbf{2x+1}}$$

3.3

- factorise: $\frac{(x-2)(x+2)}{3x} \times \frac{6x^2}{x+2}$
- cancel $(x+2)$ and $3x$: $(x-2) \times 2x$
- $= \boldsymbol{2x(x-2)}$

3.4

- multiply by the reciprocal: $\frac{x+3}{x(x-1)} \times \frac{x}{(x-3)(x+3)}$
- cancel x and $(x+3)$
- $= \frac{\mathbf{1}}{\boldsymbol{(x-1)(x-3)}}$

3.5

- multiply by $(x-2)(x+1)$: $3(x+1) + 2(x-2) = (x-2)(x+1)$
- $5x - 1 = x^2 - x - 2$, so $x^2 - 6x - 1 = 0$
- $x = \frac{6 \pm \sqrt{36+4}}{2} = 3 \pm \sqrt{10}$
- $\boldsymbol{x = 6.16}$ or $\boldsymbol{x = -0.16}$