

Solutions

2.1

Distribute 3 to both terms.

$$E = 3(2x - 5) + 4x = 6x - 15 + 4x$$

$$E = 10x - 15$$

Correct simplified expression.

2.2

Add 7 to both sides, then divide by 5.

$$5x = 18 + 7 = 25$$

$$x = \frac{25}{5} = 5$$

Correct solution.

2.3

Two numbers with product negative 12 and sum negative 1 are negative 4 and 3.

$$x^2 - x - 12 = (x - 4)(x + 3)$$

Correct factorisation. A zero product means at least one factor is zero.

$$x - 4 = 0 \text{ or } x + 3 = 0$$

$$x = 4 \text{ or } x = -3$$

Both roots.

2.4

Subtract 4, then divide by negative 2 and reverse the sign.

$$-2x \leq 10 - 4 = 6$$

$$x \geq \frac{6}{-2} = -3$$

Correct inequality. Negative 3 is included because the original sign allows equality.

3.1

Let a and s be the adult and student prices. Translate both totals.

$$3a + 2s = 46, \quad 2a + 4s = 44$$

Double the first equation so the student coefficients match.

$$6a + 4s = 92$$

Subtract the second equation.

$$4a = 92 - 44 = 48$$

$$a = \frac{48}{4} = 12$$

Adult price 12.

$$s = \frac{46 - 3a}{2} = \frac{46 - 3(12)}{2} = 5$$

Student price 5. Checks: $3(12) + 2(5) = 46$ and $2(12) + 4(5) = 44$. Both checks earn B1.

3.2

Area equals length times width.

$$A = lw$$

$$40 = x(x + 3) \implies x^2 + 3x - 40 = 0$$

Correct equation. Factorise.

$$x^2 + 3x - 40 = (x + 8)(x - 5)$$

$$x = -8 \text{ or } x = 5$$

Both roots. Choose $x = 5$ because a physical width must be positive.

$$P = 2(l + w) = 2((5 + 3) + 5) = 26 \text{ m}$$

Perimeter 26 m.

$$\Delta A = A_2 - A_1 = x(x + 5) - x(x + 3)$$

Valid comparison.

$$\Delta A = 5(5 + 5) - 5(5 + 3) = 50 - 40 = 10 \text{ m}^2$$

Increase 10 square metres.