Solutions

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

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

2.1

- a **parabola** (a U-shaped curve)

2.2

- $(\mathbf{4}, \mathbf{2})$

2.3

- y-intercept $\mathbf{-5}$

2.4

- y-intercept: $x = 0$ gives $(-2)(5) = \mathbf{-10}$
- x-intercepts: $\mathbf{x = 2}$ and $\mathbf{x = -5}$

2.5

- $\mathbf{x = 0}$ and $\mathbf{y = 0}$: the curve gets close to both axes but never meets them

3.1

- half of 6 is 3, $3^2 = 9$
- $x^2 + 6x + 5 = (x + 3)^2 - 9 + 5 = \mathbf{(x + 3)^2 - 4}$

3.2

- turning point $(\mathbf{-3}, \mathbf{-4})$

3.3

- line of symmetry $\mathbf{x = -3}$

3.4

(a)

- $y = 0$: $x^2 - 8x + 12 = (x - 2)(x - 6) = 0$
- $\mathbf{x = 2}$ and $\mathbf{x = 6}$

(b)

- half of -8 is -4: $(x - 4)^2 - 16 + 12 = (x - 4)^2 - 4$
- turning point $(\mathbf{4},\ \mathbf{-4})$, a minimum

(c)

- $\mathbf{x = 4}$, halfway between the roots 2 and 6

3.5

(a)

- x-axis: $\mathbf{x = -1}$, $\mathbf{x = 2}$ and $\mathbf{x = 4}$
- y-axis: $x = 0$ gives $(1)(-2)(-4) = \mathbf{8}$

(b)

- the x^3 term has a positive coefficient, so y **increases without limit** (the curve rises to the right)