Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- The highest power is 1: **linear**.

2.2

- $x^2 = 16$ at a root: $x = -4, 4$.

2.3

- Negative square term means **downwards**; at $x = 0$, $(0, 9)$.

2.4

- Take the midpoint: $x = (-2 + 6)/2 = 2$, so $x = 2$.

3.1

(a)

- $x^2 = 4$, so $x = -2, 2$.

(b)

- At $x = 0$, $y = 4$, so $(0, 4)$. Symmetry is $x = 0$.

(c)

- **Downward smooth curve through** $(-2, 0), (0, 4), (2, 0)$, symmetric about the y-axis.

3.2

(a)

- The roots are **-3 and 3**.
- The y-intercept is **(0,−9)** and symmetry is **$\mathbf{x = 0}$**.
- Draw a smooth upward-opening U-shape through the labelled crossings.

(b)

- The line has x-intercept **(2,0)** and y-intercept **(0,−6)**.
- Draw the straight line through them.
- The quadratic has two crossings because $x^2 = 9$ has positive and negative roots; the nonhorizontal line has one.

3.3

(a)

- Each bracket is zero at a root: $(\mathbf{1},\ \mathbf{0})$ and $(\mathbf{5},\ \mathbf{0})$.

(b)

- At $x = 0$, $y = (-1)(-5) = 5$: $(\mathbf{0},\ \mathbf{5})$.

(c)

- Halfway between the roots, $\dfrac{1+5}{2} = 3$: $\boldsymbol{x = 3}$.

3.4

- At $x = 0$: $y = -8$, giving $(\mathbf{0},\ -\mathbf{8})$.
- At $y = 0$: $2x = 8$, so $x = 4$, giving $(\mathbf{4},\ \mathbf{0})$.