

E2.5 Equations

Name: _____ Class: _____ Date: _____

Total: 14 marks

Objective

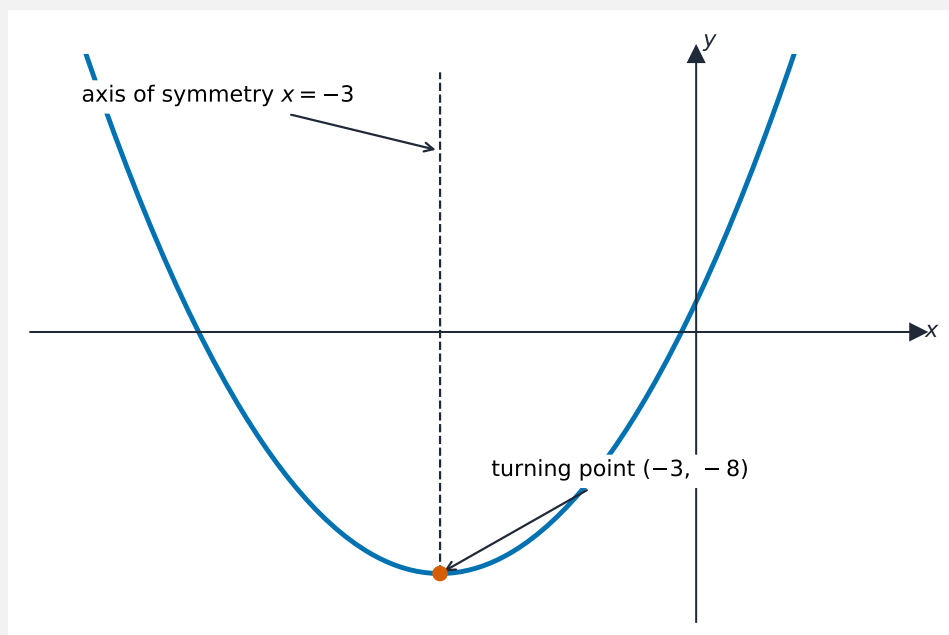
Build the skills to answer Extended exam questions on **equations** 方程—**linear** 一次, **simultaneous** 联立, and **quadratic** 二次 equations (factorising and the formula).

You must be able to:

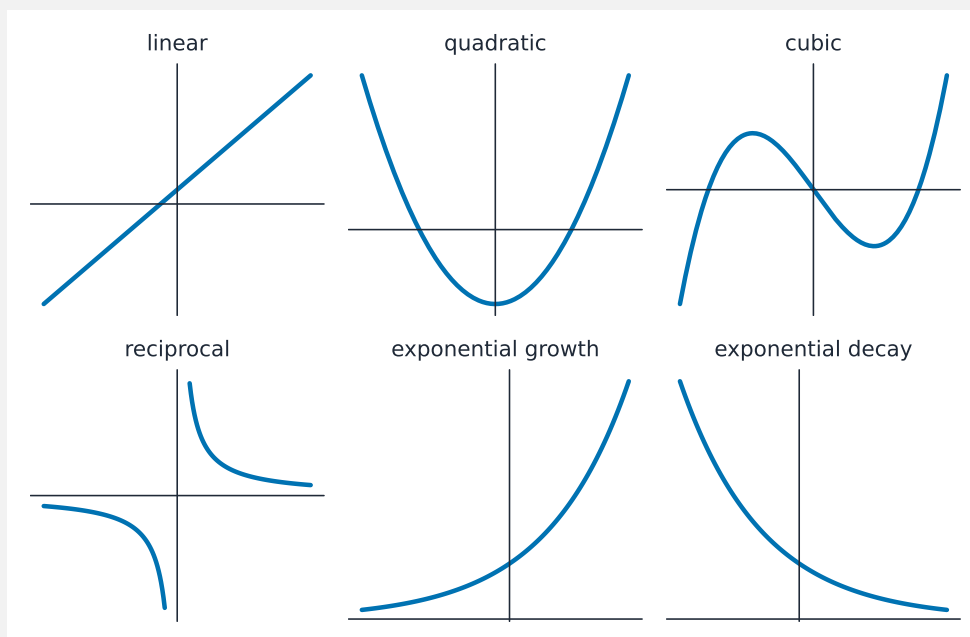
- solve a linear equation with brackets
- solve simultaneous linear equations
- solve a quadratic by factorising or the formula

1 Worked examples

■ Solving equations



Do the same to both sides until the unknown is alone



An equation is solved graphically where curves cross

- **Linear:** $5 - 2x = 3(x + 7) \rightarrow -16 = 5x \rightarrow x = -\frac{16}{5}$.
- **Simultaneous:** $2x + y = 7$, $3x - y = 8 \rightarrow$ add: $5x = 15$, $x = 3$, $y = 1$.
- **Quadratic formula:** $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Answer shapes: **M1** a correct method, **A1** the correct answer.

2 Practice

2.1 Solve $3x - 7 = 11$.

[2]

2.2 Solve $x^2 + 5x + 6 = 0$.

[2]

2.3 Solve $4(x - 1) = 2x + 6$.

[2]

3 Exam-style questions

3.1 Solve the simultaneous equations $3x + 2y = 12$ and $x - 2y = 4$. [3]

3.2 Solve $x^2 - 2x - 8 = 0$. [2]

3.3 Solve $2x^2 + 3x - 4 = 0$, giving your answers correct to 2 decimal places. [3]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **E2.5 Equations** past-paper sheet in the Library, or try these in **Practice mode**:

- 0580/23 N25 —Q15 (equations)
- 0580/42 N25 —Q17 (quadratic equation)

Solutions

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

2.1 $3x = 18 \rightarrow x = 6.$

2.2 $(x + 2)(x + 3) = 0 \rightarrow x = -2 \text{ or } x = -3.$

2.3 $4x - 4 = 2x + 6 \rightarrow 2x = 10 \rightarrow x = 5.$

3.1 add the two equations: $4x = 16 \rightarrow x = 4$; then $4 - 2y = 4 \rightarrow y = 0.$

3.2 $(x - 4)(x + 2) = 0 \rightarrow x = 4 \text{ or } x = -2.$

3.3 $a = 2, b = 3, c = -4$: $x = \frac{-3 \pm \sqrt{9+32}}{4} = \frac{-3 \pm \sqrt{41}}{4} \rightarrow x = 0.85 \text{ or } x = -2.35.$