

# Completing the Square



**Section A:** Express in the form  $(x + a)^2 + b$ .

1)  $x^2 + 2x$

5)  $x^2 + 2x - 6$

9)  $x^2 + 3x$

2)  $x^2 + 6x$

6)  $x^2 + 8x - 1$

10)  $x^2 - 7x$

3)  $x^2 - 4x$

7)  $x^2 - 4x + 5$

11)  $x^2 + x + 4$

4)  $x^2 - 10x$

8)  $x^2 - 10x - 7$

12)  $x^2 - 3x + 1$

**Section B:** Express in the form  $a(x + b)^2 + c$ .

1)  $2x^2 + 8x + 10$

5)  $4x^2 + 8x - 5$

9)  $2x^2 + 3x - 5$

2)  $3x^2 - 12x + 2$

6)  $3x^2 - 12x + 7$

10)  $3x^2 - 2x + 1$

3)  $4x^2 + 24x - 8$

7)  $2x^2 - 16x + 13$

11)  $4x^2 - 2x - 9$

4)  $5x^2 - 20x - 15$

8)  $5x^2 + 20x - 6$

12)  $12x^2 + 3x + 10$

**Section C:** Solve the equations by completing the square, leaving your answers as surds where appropriate.

1)  $y = x^2 + 2x - 3$

4)  $y = 2x^2 + 4x + 1$

7)  $y = 2x^2 + x - 4$

2)  $y = x^2 - 4x - 9$

5)  $y = 4x^2 - 16x - 9$

8)  $y = 4x^2 - 4x - 11$

3)  $y = x^2 - 6x - 10$

6)  $y = 3x^2 - 9x - 8$

9)  $y = -x^2 + x + \frac{1}{2}$

## Extension

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

- Write down the minimum point of the curve.
- Write down the coordinates of the point where the curve crosses the x-axis.
- Write down the coordinates of the point where the curve crosses the y-axis.
- What is the line of symmetry of the curve ?
- Sketch the curve showing the exact coordinates of its turning point and where it crosses the x and y axes.

Repeat the steps above for the curve  $y = 3x^2 + 6x - 5$