



# Completing the Square (Tricky ones!)

←  
**REVISE THIS TOPIC**

1 Write  $2x^2 + 4x + 9$  in the form  $a(x + b)^2 + c$

$$\begin{aligned} & 2[x^2 + 2x] + 9 \\ &= 2[(x+1)^2 - 1] + 9 \\ &= 2(x+1)^2 - 2 + 9 \end{aligned}$$

$$\underline{2(x+1)^2 + 7}$$

(Total for Question 1 is 3 marks)

2 Write  $3x^2 + 12x + 10$  in the form  $a(x + b)^2 - c$

$$\begin{aligned} & 3[x^2 + 4x] + 10 \\ &= 3[(x+2)^2 - 4] + 10 \\ &= 3(x+2)^2 - 12 + 10 \end{aligned}$$

$$\underline{3(x+2)^2 - 2}$$

(Total for Question 2 is 3 marks)

3 Write  $2x^2 + 12x + 39$  in the form  $a(x + b)^2 + c$

$$\begin{aligned} & 2[x^2 + 6x] + 39 \\ &= 2[(x+3)^2 - 9] + 39 \\ &= 2(x+3)^2 - 18 + 39 \end{aligned}$$

$$\underline{2(x+3)^2 + 21}$$

(Total for Question 3 is 3 marks)



4 Write  $5x^2 - 40x + 21$  in the form  $a(x - b)^2 - c$

$$\begin{aligned}
 &5[x^2 - 8x] + 21 \\
 &= 5[(x - 4)^2 - 16] + 21 \\
 &= 5(x - 4)^2 - 80 + 21
 \end{aligned}$$

$$5(x - 4)^2 - 59$$

(Total for Question 4 is 3 marks)

5 Write  $9x^2 - 18x - 7$  in the form  $a(x - b)^2 - c$

$$\begin{aligned}
 &9[x^2 - 2x] - 7 \\
 &= 9[(x - 1)^2 - 1] - 7 \\
 &= 9(x - 1)^2 - 9 - 7
 \end{aligned}$$

$$9(x - 1)^2 - 16$$

(Total for Question 5 is 3 marks)

6 Write  $4x^2 + 40x - 1$  in the form  $a(x + b)^2 - c$

$$\begin{aligned}
 &4[x^2 + 10x] - 1 \\
 &= 4[(x + 5)^2 - 25] - 1 \\
 &= 4(x + 5)^2 - 100 - 1
 \end{aligned}$$

$$4(x + 5)^2 - 101$$

(Total for Question 6 is 3 marks)

7 Write  $3x^2 - 48x + 200$  in the form  $a(x - b)^2 + c$

$$\begin{aligned}
 &3[x^2 - 16x] + 200 \\
 &= 3[(x - 8)^2 - 64] + 200 \\
 &= 3(x - 8)^2 - 192 + 200
 \end{aligned}$$

$$3(x - 8)^2 + 8$$

(Total for Question 7 is 3 marks)



8 Write  $3x^2 + 9x + 10$  in the form  $a(x + b)^2 + c$

$$\begin{aligned}
 & 3[x^2 + 3x] + 10 \\
 &= 3\left[\left(x + \frac{3}{2}\right)^2 - \frac{9}{4}\right] + 10 \\
 &= 3\left(x + \frac{3}{2}\right)^2 - \frac{27}{4} + 10 \\
 &= 3\left(x + \frac{3}{2}\right)^2 - \frac{27}{4} + \frac{40}{4}
 \end{aligned}$$

$$3\left(x + \frac{3}{2}\right)^2 + \frac{13}{4}$$

(Total for Question 8 is 4 marks)

9 Write  $2x^2 + 14x - 3$  in the form  $a(x + b)^2 - c$

$$\begin{aligned}
 & 2[x^2 + 7x] - 3 \\
 &= 2\left[\left(x + \frac{7}{2}\right)^2 - \frac{49}{4}\right] - 3 \\
 &= 2\left(x + \frac{7}{2}\right)^2 - \frac{98}{4} - 3 \\
 &= 2\left(x + \frac{7}{2}\right)^2 - \frac{49}{2} - \frac{6}{2}
 \end{aligned}$$

$$2\left(x + \frac{7}{2}\right)^2 - \frac{55}{2}$$

(Total for Question 9 is 4 marks)

10 Write  $6x^2 - 30x - 5$  in the form  $a(x - b)^2 - c$

$$\begin{aligned}
 & 6[x^2 - 5x] - 5 \\
 &= 6\left[\left(x - \frac{5}{2}\right)^2 - \frac{25}{4}\right] - 5 \\
 &= 6\left(x - \frac{5}{2}\right)^2 - \frac{150}{4} - 5 \\
 &= 6\left(x - \frac{5}{2}\right)^2 - \frac{75}{2} - \frac{10}{2}
 \end{aligned}$$

$$6\left(x - \frac{5}{2}\right)^2 - \frac{85}{2}$$

(Total for Question 10 is 4 marks)

