

## Answers - Completing the Square

$$\begin{aligned} \textcircled{4} \quad x^2 + 8x + 21 &= (x+4)^2 - 16 + 21 \\ &= (x+4)^2 + 5 \\ a &= 4, \quad b = 5 // \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad x^2 - 10x + 40 &= (x-5)^2 - 25 + 40 \\ &= (x-5)^2 + 15 \\ a &= 5, \quad b = 15 // \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad x^2 - 6x + 20 &= (x-3)^2 - 9 + 20 \\ &= (x-3)^2 + 11 \\ a &= -3, \quad b = 11 // \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad 2x^2 - 16x - 2 &= 2 \left[ x^2 - 8x - 1 \right] \\ &= 2 \left[ (x-4)^2 - 16 - 1 \right] \\ &= 2 \left[ (x-4)^2 - 17 \right] \\ &= 2(x-4)^2 - 34 // \\ a &= 2, \quad b = -4, \quad c = -34 // \end{aligned}$$

$$\begin{aligned} \textcircled{8} \\ \text{(a)} \quad 2x^2 + 8x - 6 &= 2 \left[ x^2 + 4x - 3 \right] \\ &= 2 \left[ (x+2)^2 - 4 - 3 \right] \\ &= 2 \left[ (x+2)^2 - 7 \right] \\ &= 2(x+2)^2 - 14 \\ a &= 2, \quad b = 2, \quad c = -14 // \end{aligned}$$

$$\begin{aligned}
 (b) \quad 3x^2 - 24x &= 3 [x^2 - 8x] \\
 &= 3 [(x-4)^2 - 16] \\
 &= 3(x-4)^2 - 48
 \end{aligned}$$

$$a = 3, b = -4, c = -48 //$$

$$(c) \quad 2x^2 - 10x - 8 = 2 [x^2 - 5x - 4]$$

$$= 2 \left[ \left(x - \frac{5}{2}\right)^2 - \frac{25}{4} - 4 \right]$$

$$= 2 \left[ \left(x - \frac{5}{2}\right)^2 - \frac{41}{4} \right]$$

$$= 2 \left(x - \frac{5}{2}\right)^2 - \frac{41}{2} //$$

$$a = 2, b = -5/2, c = -41/2 //$$

$$(d) \quad -x^2 + 12x + 5 = -1 [x^2 - 12x - 5]$$

$$= -1 [(x-6)^2 - 36 - 5]$$

$$= -1 [(x-6)^2 - 41]$$

$$= -(x-6)^2 + 41$$

$$a = -1, ~~b = -6~~, b = -6, c = 41 //$$

$$\begin{aligned}
 (9) \quad x^2 + 10x - 3 &= (x+5)^2 - 25 - 3 \\
 &= (x+5)^2 - 28
 \end{aligned}$$

$$a = 5, ~~b = 2~~ b = -28 //$$

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

$$a = 4, b = 5 //$$

$$\begin{aligned}
 (11) \quad x^2 - 12x + 17 &= ~~x^2~~ (x-6)^2 - 36 + 17 \\
 &= (x-6)^2 - 19
 \end{aligned}$$

$$a = -6, b = 19 //$$

$$\begin{aligned}
 (12) \quad x^2 - 2x - 13 &= (x-1)^2 - 1 - 13 \\
 &= (x-1)^2 - 14
 \end{aligned}$$

$$a = -1, b = -14 //$$