

## ANSWERS $\rightarrow$ Completing the Square Worksheet

①  $x^2 + 14x + 50$

$\hookrightarrow y = x^2 + 14x + 50$

$y - 50 = (x^2 + 14x)$

$y - 50 + 49 = (x^2 + 14x + 49)$

$y - 1 = (x + 7)^2 \{TF\}$

OR

$y = (x + 7)^2 + 1 \{SF\}$

②  $x^2 - 4x + 6$

$\hookrightarrow y = x^2 - 4x + 6$

$y - 6 = (x^2 - 4x)$

$y - 6 + 4 = (x^2 - 4x + 4)$

$y - 2 = (x - 2)^2 \{TF\}$

OR

$y = (x - 2)^2 + 2 \{SF\}$

③  $x^2 + 30x + 250$

$\hookrightarrow y = x^2 + 30x + 250$

$y - 250 = (x^2 + 30x)$

$y - 250 + 225 = (x^2 + 30x + 225)$

$y - 25 = (x + 15)^2 \{TF\}$

OR

$y = (x + 15)^2 + 25 \{SF\}$

④  $x^2 - 6x$

$\hookrightarrow y = x^2 - 6x$

$y + 9 = (x^2 - 6x + 9)$

$y + 9 = (x - 3)^2 \{TF\}$

OR

$y = (x - 3)^2 - 9 \{SF\}$

⑤  $x^2 + 7x$

$\hookrightarrow y = x^2 + 7x$

$y + \frac{49}{4} = (x^2 + 7x + \frac{49}{4})$

$y + \frac{49}{4} = (x + \frac{7}{2})^2 \{TF\}$

OR

$y = (x + \frac{7}{2})^2 - \frac{49}{4}$

⑥  $x^2 + 5x + 4$

$\hookrightarrow y = x^2 + 5x + 4$

$y - 4 = (x^2 + 5x)$

$y - 4 + \frac{25}{4} = (x^2 + 5x + \frac{25}{4})$

$y - \frac{16}{4} + \frac{25}{4} = (x + \frac{5}{2})^2$

$y + \frac{9}{4} = (x + \frac{5}{2})^2 \{TF\}$

OR

$y = (x + \frac{5}{2})^2 - \frac{9}{4}$

⑦  $y = 2x^2 + 12x + 15$

$y - 15 = 2(x^2 + 6x)$

$y - 15 + 18 = 2(x^2 + 6x + 9)$

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

$\frac{1}{2}(y + 3) = (x + 3)^2 \{TF\}$

OR

$y = 2(x + 3)^2 - 3 \{SF\}$

⑧  $y = 4x^2 - 16x + 30$

$y - 30 = 4(x^2 - 4x)$

$y - 30 + 16 = 4(x^2 - 4x + 4)$

$y - 14 = 4(x - 2)^2$

$\frac{1}{4}(y - 14) = (x - 2)^2$

OR

$y = 4(x - 2)^2 + 14$

$$\begin{aligned}
 \textcircled{9} \quad & y = 3x^2 + 12x + 11 \\
 & y - 11 = 3(x^2 + 4x) \\
 & y - 11 + 12 = 3(x^2 + 4x + 4) \\
 & y + 1 = 3(x + 2)^2 \\
 & \left[ \frac{1}{3}(y + 1) = (x + 2)^2 \text{ \{TF\}} \right. \\
 & \quad \underline{\text{OR}} \\
 & \left. \rightarrow y = 3(x + 2)^2 - 1 \text{ \{SF\}} \right]
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{10} \quad & y = -x^2 + 4x + 5 \\
 & y - 5 = -(x^2 - 4x) \\
 & y - 5 - 4 = -(x^2 - 4x + 4) \\
 & y - 9 = -(x - 2)^2 \\
 & \left[ -(y - 9) = (x - 2)^2 \text{ \{TF\}} \right. \\
 & \quad \underline{\text{OR}} \\
 & \left. \rightarrow y = -(x - 2)^2 + 9 \text{ \{SF\}} \right]
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{11} \quad & y = -x^2 + 6x + 5 \\
 & y - 5 = -(x^2 - 6x) \\
 & y - 5 - 9 = -(x^2 - 6x + 9) \\
 & y - 14 = -(x - 3)^2 \\
 & \left[ -(y - 14) = (x - 3)^2 \text{ \{TF\}} \right. \\
 & \left. \rightarrow y = -(x - 3)^2 + 14 \right]
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{12} \quad & y = -2x^2 + 12x - 9 \\
 & y + 9 = -2(x^2 - 6x) \\
 & y + 9 - 18 = -2(x^2 - 6x + 9) \\
 & y - 9 = -2(x - 3)^2 \\
 & \left[ -\frac{1}{2}(y - 9) = (x - 3)^2 \text{ \{TF\}} \right. \\
 & \quad \underline{\text{OR}} \\
 & \left. \rightarrow y = -2(x - 3)^2 + 9 \text{ \{SF\}} \right]
 \end{aligned}$$