

$$1. \quad y = 4x^2 - 12x - 41$$

$$\textcircled{1} \quad y + 41 = 4x^2 - 12x$$

$$\textcircled{2} \quad y + 41 = 4(x^2 - 3x)$$

$$\textcircled{3} \quad y + 41 + \frac{36}{4} = 4(x^2 - 3x + \frac{9}{4})$$

$$\textcircled{4} \quad y + 41 + 9 = 4(x - \frac{3}{2})^2$$

$$y + 50 = 4(x - \frac{3}{2})^2$$

$$\textcircled{5} \quad (\text{SF}) \quad y = 4(x - \frac{3}{2})^2 - 50$$

$$(\text{TF}) \quad \frac{1}{4}(y + 50) = (x - \frac{3}{2})^2$$

$$2. \quad y = -x^2 + 8x + 7$$

$$\textcircled{1} \quad y - 7 = -x^2 + 8x$$

$$\textcircled{2} \quad y - 7 = -(x^2 - 8x)$$

$$\textcircled{3} \quad y - 7 - 16 = -(x^2 - 8x + 16)$$

$$\textcircled{4} \quad y - 23 = -(x - 4)^2$$

$$\textcircled{5} \quad (\text{SF}) \quad y = -(x - 4)^2 + 23$$

$$(\text{TF}) \quad -(y - 23) = (x - 4)^2$$

$$3. \quad y = 7x^2 + 14x - 21$$

$$\textcircled{1} \quad y + 21 = 7x^2 + 14x$$

$$\textcircled{2} \quad y + 21 = 7(x^2 + 2x)$$

$$\textcircled{3} \quad y + 21 + 7 = 7(x^2 + 2x + 1)$$

$$\textcircled{4} \quad y + 28 = 7(x + 1)^2$$

$$\textcircled{5} \quad (\text{SF}) \quad y = 7(x + 1)^2 - 28$$

$$(\text{TF}) \quad \frac{1}{7}(y + 28) = (x + 1)^2$$

$$4. \quad y = 4x^2 + 20x - 25$$

$$\textcircled{1} \quad y + 25 = 4x^2 + 20x$$

$$\textcircled{2} \quad y + 25 = 4(x^2 + 5x)$$

$$\textcircled{3} \quad y + 25 + \frac{100}{4} = 4(x^2 + 5x + \frac{25}{4})$$

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

$$y + 50 = 4(x + \frac{5}{2})^2$$

$$\textcircled{5} \quad (\text{SF}) \quad y = 4(x + \frac{5}{2})^2 - 50$$

$$(\text{TF}) \quad \frac{1}{4}(y + 50) = (x + \frac{5}{2})^2$$

$$5. y = x^2 - 6x - 27$$

$$\textcircled{1} y + 27 = x^2 - 6x$$

$$\textcircled{3} y + 27 + 9 = (x^2 - 6x + 9)$$

$$\textcircled{4} y + 36 = (x - 3)^2$$

$$\textcircled{5} \text{ (SF) } y = (x - 3)^2 - 36$$

$$\text{ (TF) } | (y + 36) = (x - 3)^2$$

$$6. \quad y = -3x^2 + 12x - 32$$

$$\textcircled{1} \quad y + 32 = -3x^2 + 12x$$

$$\textcircled{2} \quad y + 32 = -3(x^2 - 4x)$$

$$\textcircled{3} \quad y + 32 - 12 = -3(x^2 - 4x + 4)$$

$$\textcircled{4} \quad y + 20 = -3(x - 2)^2$$

$$\textcircled{5} \quad (\text{SF}) \quad y = -3(x - 2)^2 - 20$$

$$(\text{TF}) \quad \frac{-1}{3} (y + 20) = (x - 2)^2$$