

$$f(x) = x^2 - 6x - 3$$

$$\begin{aligned} 1) \quad (x-3)^2 - 12 &= x^2 - 6x + 9 - 12 \\ &= x^2 - 6x - 3 \\ &= f(x) \end{aligned}$$

$$\text{D-c} \quad f(x) = (x-3)^2 - 12$$

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

$$\begin{aligned} 3) \quad a) \quad f(x) &= -12 \Leftrightarrow (x-3)^2 - 12 = -12 \Leftrightarrow (x-3)^2 = 0 \\ &\Leftrightarrow x-3 = 0 \Leftrightarrow \underline{\underline{x=3}} \end{aligned}$$

$$\begin{aligned} b) \quad f(x) &= 0 \Leftrightarrow (x-3-2\sqrt{3})(x-3+2\sqrt{3}) = 0 \\ &\Leftrightarrow x-3-2\sqrt{3} = 0 \quad \text{ou} \quad x-3+2\sqrt{3} = 0 \\ &\Leftrightarrow \underline{\underline{x=3+2\sqrt{3}}} \quad \text{ou} \quad \underline{\underline{x=3-2\sqrt{3}}} \end{aligned}$$

$$\begin{aligned} c) \quad f(x) &= -6x \Leftrightarrow x^2 - 6x - 3 = -6x \Leftrightarrow x^2 - 3 = 0 \\ &\Leftrightarrow x^2 = 3 \Leftrightarrow \underline{\underline{x=\sqrt{3}}} \quad \text{ou} \quad \underline{\underline{x=-\sqrt{3}}} \end{aligned}$$