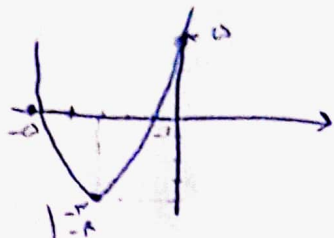


الف) $y = x^2 + 4x + 5 \Rightarrow \text{Min} \left| \frac{-b}{2a} \right| = \left| \frac{-4}{2} \right| = -2$ $\text{Min} = -4$



ب) $\Leftarrow$

الف) $y = -x^2 + 4x - 3 \Rightarrow \text{Max} \left| \frac{-b}{2a} \right| = \left| \frac{-4}{-2} \right| = 2$

$-x^2 + 4x - 3 = 0$
 $-(x^2 - 4x + 3) = 0 \Rightarrow -(x-1)(x-3) = 0 \Rightarrow \begin{cases} x_1 = 1 \\ x_2 = 3 \end{cases}$

الف) $bx^2 - rx + a = 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow 9 - 4a > 0 \Rightarrow 9 > 4a \Rightarrow a < \frac{9}{4}$

ب) $b^2 - 4ac = 0 \Rightarrow b^2 = 4ac \Rightarrow 9 = 4a \Rightarrow a = \frac{9}{4}$

ج) $b^2 - 4ac < 0 \Rightarrow b^2 < 4ac \Rightarrow 9 < 4a \Rightarrow a > \frac{9}{4}$

د) $b^2 - 4ac \geq 0 \Rightarrow b^2 \geq 4ac \Rightarrow 9 \geq 4a \Rightarrow \frac{9}{4} \geq a$

الف) $x^2 - 2x - 1 + 2 = +2 \Rightarrow x^2 - 2x + 1 = 2 \Rightarrow (x-1)^2 = 2$

$\Rightarrow x-1 = \pm \sqrt{2} \Rightarrow \begin{cases} x_1 = 1 + \sqrt{2} \\ x_2 = 1 - \sqrt{2} \end{cases}$

ب) $x^2 - x - 1 = 0 \Rightarrow x^2 - x - 1 + \frac{1}{x} = \frac{1}{x} \Rightarrow x^2 - x + \frac{1}{x} = \frac{1}{x} \Rightarrow (x - \frac{1}{x})^2 = \frac{1}{x^2}$

$x - \frac{1}{x} = \pm \frac{\sqrt{1}}{x} \Rightarrow x = \frac{1 \pm \sqrt{1}}{x} = \frac{1 \pm 1}{x}$

الف) $x^2 - 2x - 1 = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 + 4}}{2} \Rightarrow \begin{cases} x_1 = 1 + \sqrt{2} \\ x_2 = 1 - \sqrt{2} \end{cases}$

ب) $x^2 + x - 1 = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{1 + 4}}{2} \Rightarrow \begin{cases} x_1 = \frac{-1 + \sqrt{5}}{2} \\ x_2 = \frac{-1 - \sqrt{5}}{2} \end{cases}$

$$\text{الف) } x^2 - 11x + 28 = 0 \Rightarrow (x - 4)(x - 7) = 0 \Rightarrow \begin{cases} x_1 = 4 \\ x_2 = 7 \end{cases}$$

$$\text{ب) } x^2 + 3x - 28 = 0 \Rightarrow (x + 7)(x - 4) = 0 \Rightarrow \begin{cases} x_1 = -7 \\ x_2 = 4 \end{cases}$$

$$\text{الف) } \omega x^2 - 12x + 7 = 0 \Rightarrow x^2 - 12x + 3\omega = 0 \Rightarrow (x - \omega)(x - 7) = 0 \Rightarrow \begin{cases} x_1 = \frac{\omega}{\omega} = 1 \\ x_2 = \frac{7}{\omega} \end{cases}$$

$$\text{ب) } 3x^2 - 10x + 7 = 0 \Rightarrow x^2 - 10x + 21 = 0 \Rightarrow (x - 3)(x - 7) = 0 \Rightarrow \begin{cases} x_1 = \frac{3}{3} = 1 \\ x_2 = \frac{7}{3} \end{cases}$$

$$\text{الف) } 2x^2 - 5x + 3 = 0 \quad a + b + c = 0 \Rightarrow x_1 = 1, x_2 = \frac{c}{a} = \frac{3}{2}$$

$$\text{ب) } 2x^2 + 5x + 3 = 0 \quad a + c = b \Rightarrow x_1 = -1, x_2 = -\frac{c}{a} = -\frac{3}{2}$$

$$\text{ج) } 5x^2 - \omega x + 1 = 0 \quad \Delta \Rightarrow \frac{\omega \pm \sqrt{1\omega}}{5} \Rightarrow x_1 = \frac{\omega + \sqrt{1\omega}}{5}, x_2 = \frac{\omega - \sqrt{1\omega}}{5}$$

$$\text{د) } 4x^2 + 7x + 9 = 0 \quad \Delta \Rightarrow \frac{-7 \pm \sqrt{-9\omega}}{4} \Rightarrow \text{ریشه ندارد}$$

$$x^2 - 3x - 2 = 0 \quad S = \frac{-b}{a} \quad P = \frac{c}{a} \Rightarrow S = 3 \quad P = -2$$

$$\text{الف) } S^2 - 2P = 3^2 - 2(-2) = 13$$

$$\text{ب) } S^2 - 3SP = 3^2 - 3 \times 3 \times (-2) = 45$$

$$\text{الف) } \begin{pmatrix} 1 \\ \omega \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 7 \end{pmatrix} = \begin{pmatrix} 1 \\ 7 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 7 \end{pmatrix} = \frac{1 \times 1}{1!} + \frac{7 \times 7}{1!} = \omega 7$$

$$\text{ب) } \begin{pmatrix} 1 \\ 7 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 7 \end{pmatrix} = \frac{1 \times 1}{1!} + \frac{7 \times 7}{1!} = \omega 7$$