

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

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

$$\omega x^2 - 12x + 4 = 0 \quad x^2 - 12x + 4 \times \omega = x^2 - 12x + 4\omega$$

$$(x - \omega)(x - 4) = 0 \Rightarrow \begin{cases} x_1 = \frac{\omega}{\omega} = 1 \\ x_2 = \frac{4}{\omega} = 1, 4 \end{cases} \quad \text{الف}$$

$$3x^2 - 10x + 4 = 0 \quad \therefore x^2 - 10x + 4 = 0$$

$$(x - 3)(x - 4) = 0 \Rightarrow \begin{cases} x_1 = \frac{3}{3} = 1 \\ x_2 = \frac{4}{3} = 1, \frac{4}{3} \end{cases} \quad \text{ب}$$

$$\text{الف) } 4x^2 - \omega x + 3 = 0 \quad a + b + c = 0 \Rightarrow x = \begin{cases} \frac{c}{a} = \frac{3}{4} = 1, a \\ -\frac{c}{a} = -\frac{3}{4} = -1, a \end{cases}$$

$$\text{ب) } 4x^2 + \omega x + 3 = 0 \quad a + c = b \Rightarrow x = \begin{cases} -1 \\ -\frac{c}{a} = -\frac{3}{4} = -1, a \end{cases}$$

$$\text{ج) } 4x^2 - \omega x + 1 = 0 \quad x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{\omega \pm \sqrt{\omega^2 - 4 \times 4 \times 1}}{8} = \frac{\omega \pm \sqrt{\omega^2 - 16}}{8} \Rightarrow x = \begin{cases} \frac{\omega + \sqrt{\omega^2 - 16}}{8} \\ \frac{\omega - \sqrt{\omega^2 - 16}}{8} \end{cases}$$

$$\text{د) } 4x^2 + 4x + 9 = 0 \quad x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-4 \pm \sqrt{16 - 4 \times 4 \times 9}}{8} \Rightarrow \Delta < 0 \Rightarrow \text{لا يوجد حلا حقيقي}$$

$$x^2 - 3x - 4 = 0 \quad S = \frac{-b}{a} = \frac{-(-3)}{1} = 3 \quad P = \frac{c}{a} = \frac{-4}{1} = -4$$

$$\text{الف) } S^2 - 4P = 3^2 - 4(-4) = 9 + 16 = 25$$

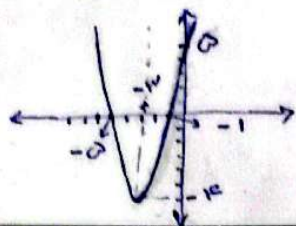
$$\text{ب) } S^2 - 4SP = 3^2 - 4 \times 3 \times (-4) = 9 + 48 = 57$$

$$\text{الف) } \begin{pmatrix} 4 \\ \omega \end{pmatrix} + \begin{pmatrix} 9 \\ 4 \end{pmatrix} = \frac{4! \times \omega!}{\omega! \times 4!} + \frac{9! \times 4!}{4! \times 9!} = 4 + 9 = 13$$

$$\text{ب) } \begin{pmatrix} 9 \\ 3 \end{pmatrix} + \begin{pmatrix} 1 \\ 4 \end{pmatrix} = \frac{9! \times 3!}{3! \times 9!} + \frac{1! \times 4!}{4! \times 1!} = 9 + 4 = 13$$

الف) نوع $\text{Min} = \text{ext}$

$$\text{Min} \left| \begin{aligned} \frac{-b}{2a} &= \frac{-4}{2} = -2 \\ \text{مقیاس برای} &= x^2 + 4x + 5 = (-2)^2 + 4(-2) + 5 = 4 - 8 + 5 = -1 \end{aligned} \right.$$

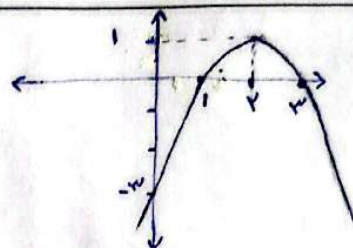


ب)

$$a+c=b \Rightarrow \begin{cases} x = -1 \\ x = \frac{-c}{a} = \frac{-5}{1} = -5 \end{cases}$$

الف)

$$\text{Max} \left| \begin{aligned} \frac{-b}{2a} &= \frac{-4}{-2} = 2 \\ \text{مقیاس برای} &= -x^2 + 4x - 5 = -4 + 8 - 5 = -1 \end{aligned} \right.$$



ب)

$$a+c+b = -1+4-5 = 0 \Rightarrow \begin{cases} x = 1 \\ x = \frac{-c}{a} = \frac{-5}{-1} = 5 \end{cases}$$

الف) $\Delta > 0 \Rightarrow b^2 - 4ac = 4 - 4 \times 1 \times a > 0 \Rightarrow 4 > 4a \Rightarrow \frac{1}{a} > 1, a \in \mathbb{R}$
 ب) $\Delta = 0 \Rightarrow b^2 - 4ac = 4 - 4a = 0 \Rightarrow 4 = 4a \Rightarrow a = 1, a \in \mathbb{R}$
 ج) $\Delta < 0 \Rightarrow b^2 - 4ac = 4 - 4a < 0 \Rightarrow 4 < 4a \Rightarrow a > 1, a \in \mathbb{R}$
 د) $\Delta \geq 0 \Rightarrow b^2 - 4ac = 4 - 4a \geq 0 \Rightarrow 4 \geq 4a \Rightarrow \frac{1}{a} \geq 1, a \in \mathbb{R}$

الف)

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

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

ب)

$$x^2 - x - 1 = 0 \quad x^2 - x - 1 + \frac{1}{4} = x^2 - x + \frac{1}{4} = \frac{5}{4}$$

$$(x - \frac{1}{2})^2 = \frac{5}{4} \quad \sqrt{(x - \frac{1}{2})^2} = \pm \frac{\sqrt{5}}{2} \Rightarrow x - \frac{1}{2} = \pm \frac{\sqrt{5}}{2} \Rightarrow \begin{cases} x_1 = \frac{1 + \sqrt{5}}{2} \\ x_2 = \frac{1 - \sqrt{5}}{2} \end{cases}$$

الف)

$$x^2 - 2x - 1 = 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 - 4 \times 1 \times (-1)}}{2}$$

$$\frac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2} \Rightarrow \begin{cases} x_1 = 1 + \sqrt{2} \\ x_2 = 1 - \sqrt{2} \end{cases}$$

ب)

$$x^2 + x - 4 = 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{1 - 4 \times 1 \times (-4)}}{2}$$

$$\frac{-1 \pm \sqrt{17}}{2} \Rightarrow \begin{cases} x_1 = \frac{-1 + \sqrt{17}}{2} \\ x_2 = \frac{-1 - \sqrt{17}}{2} \end{cases}$$