

$$-\frac{b}{2a} = -\frac{4}{2} = -2$$

$$-\frac{\Delta}{4a} = -\frac{16 - 4(1 \times 5)}{4} = -1$$

الف) $\begin{matrix} \text{Min} \\ -3 \\ -4 \end{matrix}$

ب)

$$-\frac{b}{2a} = -\frac{4}{-2} = 2$$

$$-\frac{\Delta}{4a} = -\frac{16 - 4(1 \times -3)}{-4} = 1$$

الف) $\begin{matrix} \text{Max} \\ 2 \\ 1 \end{matrix}$

ب) $\begin{bmatrix} \square \\ 0 \end{bmatrix} \Rightarrow x^2 + 4x - 3 = 0 \Rightarrow x^2 - 4x + 3 = 0$
 $\Rightarrow (x-1)(x-3) \Rightarrow x=3, x=1 \Rightarrow \text{نقاط ۱ و ۳}$

الف) $a > 0 \Leftrightarrow (-3)^2 - 4 \times 1 \times a = 1 \times a \Rightarrow \Delta > 0$

ب) $a = \{0\} \Leftrightarrow (-3)^2 - 4 \times 1 \times a = 1 \times a \Rightarrow \Delta = 0$

ج) $a < 0 \Leftrightarrow (-3)^2 - 4 \times 1 \times a = 1 \times a \Rightarrow \Delta < 0$

د) $a \geq 0 \Leftrightarrow (-3)^2 - 4 \times 1 \times a = 1 \times a \Rightarrow \Delta \geq 0$

الف) $x^2 - 2x - 1 = 0 \Rightarrow x^2 - 2x + 1 = 2 \Rightarrow (x-1)^2 = 2 \Rightarrow x-1 = \pm\sqrt{2}$
 $\Rightarrow x = 1 + \sqrt{2} \quad \vee \quad x = 1 - \sqrt{2}$

ب) $x^2 - x - 1 = 0 \Rightarrow x^2 - x + \frac{1}{x} = 1 + \frac{1}{x} \Rightarrow (x - \frac{1}{x})^2 = \frac{5}{x^2} \Rightarrow x - \frac{1}{x} = \pm\sqrt{\frac{5}{x^2}}$
 $x - \frac{1}{x} = \pm \frac{\sqrt{5}}{x} \Rightarrow x = \frac{1}{x} \pm \frac{\sqrt{5}}{x} \Rightarrow x = \frac{1}{x} + \frac{\sqrt{5}}{x} \quad \vee \quad \frac{1}{x} - \frac{\sqrt{5}}{x}$

الف) $x^2 - 2x - 1 = 0$ $\Delta = b^2 - 4ac \Rightarrow (-2)^2 - 4(1 \times -1) = 4$

$x = \frac{2 \pm \sqrt{4}}{2} = \frac{2 \pm 2}{2}$

ب) $x^2 + x - 4 = 0$ $\Delta = 1 - 4(1 \times -4) = 17$

$x = \frac{-1 \pm \sqrt{17}}{2}$

$$\text{الف) } x^2 - 11x + 18 = 0 \Rightarrow (x-4)(x-7) \begin{cases} x=4 \\ x=7 \end{cases}$$

$$\text{ب) } x^2 + 3x - 18 = 0 \Rightarrow (x-4)(x+7) \begin{cases} x=-7 \\ x=4 \end{cases}$$

$$\text{الف) } \Delta x^2 - 12x + 7 = 0 \Rightarrow x^2 - 12x + 3\Delta = 0 \Rightarrow (x-7)(x-\Delta) \Rightarrow$$

$$x = \frac{\Delta}{\Delta} = 1 \quad \underline{\quad} \quad x = \frac{7}{\Delta}$$

$$\text{ب) } 3x^2 - 10x + 7 = 0 \Rightarrow x^2 - 10x + 21 = 0 \Rightarrow (x-3)(x-7) \Rightarrow$$

$$x = \frac{7}{3} = 1 \quad \underline{\quad} \quad x = \frac{7}{3}$$

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

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

$$\text{ج) } 2x^2 - 5x + 1 = 0 \Rightarrow \Delta = 25 - 4 = 17 \quad x = \frac{5 \pm \sqrt{17}}{4} \Rightarrow x = \frac{5 + \sqrt{17}}{4} \quad \underline{\quad} \quad x = \frac{5 - \sqrt{17}}{4}$$

$$\text{د) } 4x^2 + 7x + 9 = 0 \Rightarrow \Delta = 49 - 144 = -95 \quad \text{ریشه حقیقی ندارد}$$

$$\text{الف) } S^2 - 2P = 3^2 - \underbrace{2 \times 1 - 2}_{-2} = 13$$

$$S = -\frac{b}{a} = -\frac{-3}{1} = 3 \quad P = \frac{c}{a} = \frac{-1}{1} = -1$$

$$\text{ب) } S^2 - 3SP = (3)^2 - 3(\underbrace{3 \times 1 - 2}_{-2}) = 9 + 6 = 15$$

$$\text{الف) } \begin{pmatrix} 7 \\ 5 \end{pmatrix} + \begin{pmatrix} 9 \\ 2 \end{pmatrix} = \begin{pmatrix} 16 \\ 7 \end{pmatrix}$$

$$\text{ب) } \begin{pmatrix} 9 \\ 3 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \end{pmatrix} = \begin{pmatrix} 8 \\ 1 \end{pmatrix}$$