

(ب)	(الف) $y = x^2 + 4x + 5 \xrightarrow{a > 0} \min$ $\text{ext} \left \begin{array}{l} -\frac{b}{2a} = -\frac{4}{2} = -2 \\ -\frac{\Delta}{4a} = \frac{-16}{4} = -4 \end{array} \right. \min \begin{bmatrix} -2 \\ -4 \end{bmatrix}$ $\Delta = b^2 - 4ac = 16 - 20 = -4$
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(ب) $0 = -x^2 + 9x - 3$ $x = \begin{cases} x = 1 \\ x = \frac{c}{a} = \frac{-3}{-1} = 3 \end{cases}$ $\left[\begin{smallmatrix} 1 \\ 0 \end{smallmatrix} \right], \left[\begin{smallmatrix} 3 \\ 0 \end{smallmatrix} \right] \Rightarrow$	(الف) $y = -x^2 + 4x - 3 \xrightarrow{a < 0} \max$ $\text{ext} \left \begin{array}{l} -\frac{b}{2a} = -\frac{4}{-2} = 2 \\ -\frac{\Delta}{4a} = \frac{-4}{-4} = 1 \end{array} \right. \max \begin{bmatrix} 2 \\ 1 \end{bmatrix}$ $\Delta = b^2 - 4ac = 16 - 12 = 4$
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(الف) $2x^2 - 3x + 1 = 0 \rightarrow 2 - 3 + 1 = 0 \Rightarrow x = 1 \rightarrow a = 1$
 $x = \frac{1}{2}$

(ب) $\Delta = b^2 - 4ac \Rightarrow (-3)^2 - 4ac \Rightarrow 9 - 4ac = 0 \Rightarrow 4ac = 9 \Rightarrow c = \frac{9}{4} \Rightarrow a = \frac{9}{4}$

(ج) $\Delta = b^2 - 4ac \Rightarrow 9 - 4ac \Rightarrow c > 2 \Rightarrow a \in \mathbb{R}, a > 2$

د) $2x^2 - 3x + a = 0 \Rightarrow a \in \mathbb{R}, a \leq 1$

(الف) $x^2 - 2x - 1 = 0 \xrightarrow{+2} x^2 - 2x + 1 = 2 \Rightarrow (x-1)^2 = 2 \Rightarrow x-1 = \pm \sqrt{2} \Rightarrow x = \begin{cases} 1 + \sqrt{2} \\ 1 - \sqrt{2} \end{cases}$

(ب) $x^2 - x - 1 = 0 \xrightarrow{+\frac{1}{4}} x^2 - x + \frac{1}{4} = 1 + \frac{1}{4} \Rightarrow \left(x - \frac{1}{2}\right)^2 = \frac{5}{4} \Rightarrow x - \frac{1}{2} = \pm \sqrt{\frac{5}{4}} \Rightarrow x = \frac{1}{2} + \frac{\sqrt{5}}{2} \text{ و } x = \frac{1}{2} - \frac{\sqrt{5}}{2}$

(الف) $\Delta = b^2 - 4ac \Rightarrow \Delta = (-r)^2 - 4(-1) = r^2 + 4 = 16 \Rightarrow r = \pm \sqrt{12} = \pm 2\sqrt{3}$

$x = \frac{r \pm \sqrt{12}}{2} = \begin{cases} \frac{r + 2\sqrt{3}}{2} \\ \frac{r - 2\sqrt{3}}{2} \end{cases}$

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

$$\text{الف) } x^2 - 11x + 18 = 0 \Rightarrow (x - 2)(x - 9) \Rightarrow x \begin{cases} = 2 \\ = 9 \end{cases}$$

$$\text{ب) } x^2 + 7x - 18 = 0 \Rightarrow (x + 9)(x - 2) \Rightarrow x \begin{cases} = -9 \\ = 2 \end{cases}$$

$$\text{الف) } 2x^2 - 12x + 5 = 0 \rightarrow x^2 - 6x + 2.5 = 0 \Rightarrow (x - 3)(x - 0.5) \Rightarrow x \begin{cases} = 3 \\ = 0.5 \end{cases}$$

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

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

$$\text{ب) } a + c = b \Rightarrow \begin{cases} x = -1 \\ x = -\frac{c}{a} = -\frac{3}{2} \end{cases}$$

$$\text{ج) } 2x^2 + 2x + 1 = 0 \Rightarrow \Delta = b^2 - 4ac = 2^2 - 4 = 0 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm 0}{4} = -\frac{1}{2}$$

$$\text{د) } 4x^2 + 7x + 9 = 0 \Rightarrow \Delta = 7^2 - 4 \cdot 4 \cdot 9 = -95 < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$S^2 - 2SP = 3^2 - 2(-1) = 9 + 2 = 11$$

$$S = -\frac{b}{a} = -\frac{-2}{1} = 2$$

$$P = \frac{c}{a} = \frac{-1}{1} = -1$$

$$S^2 - 2P = 3^2 - 2(-1) = 9 - (-2) = 11$$

$$\text{الف) } \binom{5}{2} + \binom{9}{2} = \frac{5!}{(5-2)!2!} + \frac{9!}{(9-2)!2!} = \frac{5 \times 4 \times 3!}{2! \times 3!} + \frac{9 \times 8 \times 7!}{2! \times 7!} = 10 + 36 = 46$$

$$\text{ب) } \binom{9}{3} - \binom{1}{2} = \frac{9!}{(9-3)!3!} - \frac{1!}{(1-2)!2!} = \frac{9 \times 8 \times 7 \times 2!}{3! \times 2!} - \frac{1 \times 1 \times 1!}{1! \times 1!} = 84 - 1 = 83$$