

الف) $y = x^2 + 4x + 5 \rightarrow \min \rightarrow \text{ext} \left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{2} = -2 \\ 9 - 16 + 5 = y = -1 \end{array} \right. \Rightarrow \begin{bmatrix} -2 \\ -1 \end{bmatrix}$



الف) $y = -x^2 + 4x - 3 \rightarrow \max \rightarrow \text{ext} \left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ -4 + 16 - 3 = 9 \end{array} \right. \Rightarrow \begin{bmatrix} 2 \\ 9 \end{bmatrix}$

ب) $y = 0 \Rightarrow -x^2 + 4x - 3 = 0 \rightarrow \Delta = b^2 - 4ac = 16 - 12 = 4 \rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \begin{cases} x = \frac{-4+2}{-2} = 1 \\ x = \frac{-4-2}{-2} = 3 \end{cases}$

$\Delta = b^2 - 4ac = 9 - 16a > 0 \rightarrow -16a > -9 \rightarrow a < \frac{9}{16}$
 $\Delta = b^2 - 4ac = 9 - 16a = 0 \rightarrow -16a = -9 \rightarrow a = \frac{9}{16}$
 $\Delta = b^2 - 4ac = 9 - 16a < 0 \rightarrow -16a < -9 \rightarrow a < \frac{9}{16}$
 $\Delta = 9 - 16a \rightarrow a = 1 \rightarrow \Delta = 1 \rightarrow x = \frac{3 \pm \sqrt{1}}{-2} \Rightarrow x = -2 \text{ یا } x = -1$

الف) دو جواب $\Delta > 0$
 ب) یک ریشه مضاعف $\Delta = 0$
 ج) فاقد ریشه حقیقی $\Delta < 0$
 د) ریشه داشته باشد ؟

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

درج اول

ب) $x^2 - x - 1 = 0 \xrightarrow{+1/4} x^2 - x + 1/4 = 0 \rightarrow (x - 1/2)^2 = 0 \rightarrow x = 1/2$

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

درج اول

ب) $x^2 - x - 2 = 0 \rightarrow \Delta = 1 + 8 = 9 \rightarrow x = \frac{1 \pm \sqrt{9}}{2} \Rightarrow \begin{cases} x = \frac{1+3}{2} \\ x = \frac{1-3}{2} \end{cases}$

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جواب مستور

الف) $x^2 - 11x + 28 = 0 \rightarrow (x-7)(x-4) \Rightarrow \begin{matrix} x=7 \\ x=4 \end{matrix}$

ب) $x^2 + 3x - 28 = 0 \rightarrow (x-4)(x+7) \Rightarrow \begin{matrix} x=-7 \\ x=4 \end{matrix}$

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ادسی

الف) $5x^2 - 12x + 7 = 0 \rightarrow x^2 - 12x + 14 = 0 \Rightarrow (x-7)(x-2) \Rightarrow x = \frac{7}{5} \text{ یا } x = \frac{2}{5}$

ب) $3x^2 - 10x + 7 = 0 \rightarrow x^2 - 10x + 21 = 0 \rightarrow (x-7)(x-3) \Rightarrow x = \frac{7}{3} \text{ یا } x = \frac{3}{3} = 1$

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الف) $2x^2 - 5x + 3 = 0 \xrightarrow{\text{ادسی}} x^2 - 5x + 4 = 0 \rightarrow (x-4)(x-1) = 0 \rightarrow x = \frac{4}{2} = 2 \text{ یا } x = \frac{1}{2}$

ب) $2x^2 + 5x + 3 = 0 \xrightarrow{\text{ادسی}} x^2 + 5x + 4 = 0 \rightarrow (x+4)(x+1) = 0 \rightarrow x = -\frac{4}{2} = -2 \text{ یا } x = -\frac{1}{2}$

ج) $2x^2 - 5x + 1 = 0 \xrightarrow{\text{دلیا}} \Delta = 25 - 8 = 17 \rightarrow x = \frac{5 \pm \sqrt{17}}{4} \Rightarrow x = \frac{5 + \sqrt{17}}{4} \text{ یا } x = \frac{5 - \sqrt{17}}{4}$

د) $4x^2 + 7x + 9 = 0 \xrightarrow{\text{دلیا}} \Delta = 49 - 144 \Rightarrow \Delta \text{ منفی است و معادله جواب ندارد}$

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$S = \frac{-b}{a} = 3$ و $P = \frac{c}{a} = -2$

$\Delta = +9 - (4 \times 1 \times (-2)) = 17 \text{ ①}$

الف) $S^2 - 2P = 9 + 4 = 13$

ب) $S^3 - 3SP = 27 + 12 = 39$

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الف) $\binom{9}{5} + \binom{9}{2} = \frac{9!}{4! \times 5!} + \frac{9!}{7! \times 2!} = 21 + 36 = 57$

ب) $\binom{9}{4} - \binom{8}{2} = \frac{9!}{5! \times 4!} - \frac{8!}{3! \times 5!} = 126 - 28 = 98$

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