۱- الف) ۲

$y = 2x^2 - 4x + 1 \quad a > 0 \rightarrow$ ext: min

ext $\left| \begin{array}{l} \frac{-b}{2a} = \frac{4}{4} = 1 \\ \frac{-\Delta}{4a} = \frac{4ac - b^2}{8} = \frac{8 - 16}{8} = -1 \end{array} \right.$

ب)

$y = -2x^2 + 2x - 3 \quad a < 0 \rightarrow$ ext : max

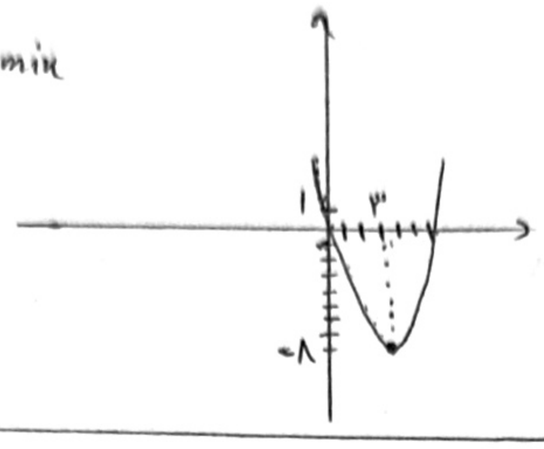
ext $\left| \begin{array}{l} \frac{-b}{2a} = \frac{-2}{-4} = \frac{1}{2} \\ \frac{-\Delta}{4a} = \frac{4ac - b^2}{-8} = \frac{24 - 9}{-8} = \frac{-15}{8} \end{array} \right.$

۲- الف) ۲

$y = x^2 - 4x + 1 \quad a > 0 \rightarrow$ ext: min

ext $\left| \begin{array}{l} \frac{4}{2} = 2 \\ \frac{8 - 16}{4} = \frac{-8}{4} = -2 \end{array} \right.$

$x = 0 \rightarrow y = 1$

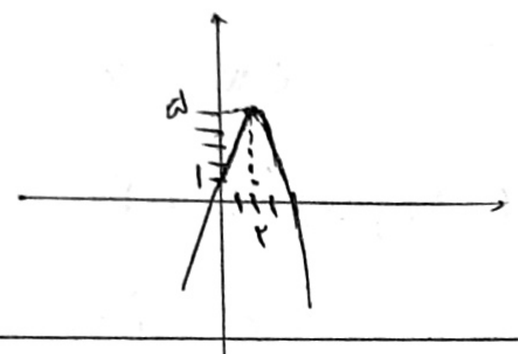


ب)

$y = -x^2 + 4x + 1 \quad a < 0 \rightarrow$ ext : max

ext $\left| \begin{array}{l} \frac{-4}{-2} = 2 \\ \frac{-4 - 16}{-4} = \frac{-20}{-4} = 5 \end{array} \right.$

$x = 0 \rightarrow y = 1$



۳- $4x^3 + kx^2 - 9x - 2 = 0 \quad \alpha + \beta = 1 \quad \alpha\beta = -2$

$x^2 - (\alpha + \beta)x + \alpha\beta = 0 \rightarrow x^2 - x - 2 = 0 \rightarrow (x-2)(x+1) = 0 \quad \alpha = 2 \quad \beta = -1$

$4(2)^3 + k(2)^2 - 9(2) - 2 = 0 \rightarrow 32 + 4k - 18 - 2 = 0 \rightarrow 12 + 4k = 0 \rightarrow k = -3$

۴- $x^2 - 2mx + m = 0 \quad \alpha + \beta = 2m \quad \alpha\beta = m \quad |\sqrt{\alpha} - \sqrt{\beta}| = 1$

$(\sqrt{\alpha} - \sqrt{\beta})^2 = 1 \rightarrow \alpha + \beta - 2\sqrt{\alpha\beta} = 1 \rightarrow 2m - 2\sqrt{m} = 1 \xrightarrow{\sqrt{m} = t} 2t^2 - 2t - 1 = 0$

$t = \frac{2 \pm \sqrt{4 + 8}}{4} = \frac{2 \pm 4}{4} \rightarrow t = 1, \left(-\frac{1}{2}\right) \rightarrow$ ق ق ق $\rightarrow \sqrt{m} = 1 \quad m = 1$

۵- $y = 2x^2 - (m-2)x + m \quad \alpha + \beta = \frac{m+2}{2} \quad \alpha\beta = \frac{m}{2} \quad |\alpha - \beta| = \sqrt{(\alpha+\beta)^2 - 4\alpha\beta}$

$= \sqrt{\frac{(m+2)^2}{4} - 2m} = \sqrt{\frac{(m-2)^2}{4}} = \frac{|m-2|}{2}$

فاصله ها : $(0, m)$

$S = \frac{1}{2} \times |\alpha - \beta| \times |m| = \frac{1}{2} \times \frac{|m-2|}{2} \times |m| = \frac{|m(m-2)|}{4} = \frac{3}{4}$

$|m(m-2)| = 3$

$m(m-2) = 3 \qquad m(m-2) = -3$

$m = 3, -1 \qquad m = 1 + \sqrt{4}, 1 - \sqrt{4}$

$y = x^2 - mx + 1$

$\frac{-b}{2a} = \frac{m}{2} \rightarrow \frac{3}{2}, \frac{-1}{2}, \frac{1+\sqrt{4}}{2}, \frac{1-\sqrt{4}}{2}$

(۴

$y = ax^2 + bx + c$

$y = a\left(-\frac{\mu}{2a}\right)^2 + \mu\left(\frac{-\mu}{2a}\right) + a = a - \frac{9}{4a} = \frac{V}{\Lambda}$

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

$\Lambda a^2 - 1\Lambda = Va$

$a = \frac{V \pm \sqrt{(-V)^2 - 4 \times \Lambda(-1)}}{14} = \frac{V \pm 9a}{14} \Rightarrow \frac{\mu^2}{14} = 2 \quad , \quad \frac{-1\Lambda}{14} = -\frac{9}{\Lambda}$

$\Lambda a^2 - Va - 1\Lambda = 0$

۵

(۷

① $x^2 - (a+1)x + a = 0$

$\alpha + \beta = a + 1 \longrightarrow n_4(n+2) = 2n + 2$

$\alpha\beta = a \longrightarrow n(n+2) = a \longrightarrow n^2 + 2n = 2n + 1 \longrightarrow n = 1 \qquad a = 2n + 1 = 2(1) + 1 = 3$

② $\alpha + \beta = 3a + 1 = 3 \times 3 + 1 = 10$

$m + 2$, m ریشه‌ها

$m + m + 2 = 2m + 2 = 10 \quad 2m = 8 \quad m = 4 \qquad b = m(m+2) = 4 \times 6 = 24$

$b - a = 24 - 3 = 21$

۴

ریشه‌ها: ۱ و ۳

(۸

$y_1 = -ax^2 + ax + 2 \qquad -\frac{b}{2a} = -\frac{a}{2(-a)} = \frac{1}{2} \qquad y = -a\left(\frac{1}{2}\right)^2 + a \times \frac{1}{2} + 2 = \frac{a}{4} + 2$

$y_2 = 2bx^2 - bx - 1 \qquad 2b\left(\frac{1}{2}\right)^2 - b \times \frac{1}{2} - 1 = -1$

۲

$\left.\begin{array}{l} \frac{a}{4} + 2 = -1 \\ \frac{a}{4} = -3 \rightarrow a = -12 \end{array}\right\}$

$y = -(-12) \times \frac{1}{14} + (-12) \times \frac{1}{4} + 2 = \frac{3(-12)}{14} + 2 = \frac{-36}{14} + 2 = -2/57 + 2 = -0/57$

$-\frac{b}{8} - 1 = -0/57 \rightarrow -\frac{b}{8} = 0/43 \rightarrow b = -4$

$b - a = -4 - (-12) = 4$

(۹

$y = 2ax^2 + 2x + \beta$

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

$\rightarrow \alpha > 0 \; ; x_{راس} = \frac{-2}{2a} < 0 \rightarrow y_{راس} < \beta$

$a < 0 \; , x_{راس} = \frac{-2}{2a} > 0 \rightarrow y_{راس} > \beta$

۵

ربع ۱ : $\alpha < 0$ ، $\beta < 0$

ربع ۲ : $\alpha > 0$

(۱۰

$x^4 - (a^2 + b^2 - 12)x + (a + b - 1) = 0$

$a + b = a^2 + b^2 - 12$

$ab = a + b - 1 \longrightarrow ab - a - b + 1 = 0 \longrightarrow (a-1)(b-1) = 0$

$a = 1 \quad b = 1$

if: $a = 1 \qquad 1 + b = 1^2 + b^2 - 12 \rightarrow 1 + b = 1 + b^2 - 12 \rightarrow b = b^2 - 12 \rightarrow b^2 - b - 12 = 0$

$b = \frac{1 \pm \sqrt{1 + 48}}{2} = \frac{1 \pm 7}{2}$ $\qquad$ یا $b = -3$ $\qquad b = 4$

$a + b = 1 + 4 = 5$

۲