

الف) $y = 2x^2 - 4x + 1$ $S \left| \begin{array}{l} -\frac{b}{2a} \\ \frac{\Delta}{4a} \end{array} \right.$ $-\frac{b}{2a} = \frac{4}{4} = 1$ $\frac{\Delta}{4a} = \frac{16-4}{4} = 3$ $y = 2(1)^2 - 4(1) + 1 \rightarrow y = -1$ $S \left| \begin{array}{l} 1 \\ -1 \end{array} \right.$ $a > 0 \Rightarrow \text{Min}$

ب) $y = -2x^2 + 4x - 1$ $S \left| \begin{array}{l} -\frac{b}{2a} \\ \frac{\Delta}{4a} \end{array} \right.$ $-\frac{b}{2a} = \frac{-4}{-4} = 1$ $\frac{\Delta}{4a} = \frac{16-8}{-4} = -2$ $y = -2(1)^2 + 4(1) - 1 \rightarrow y = -1$ $S \left| \begin{array}{l} 1 \\ -1 \end{array} \right.$ $a < 0 \Rightarrow \text{Max}$

الف) $y = x^2 - 4x + 1$ $S \left| \begin{array}{l} -\frac{b}{2a} \\ \frac{\Delta}{4a} \end{array} \right.$ $-\frac{b}{2a} = \frac{4}{2} = 2$ $\frac{\Delta}{4a} = \frac{16-4}{4} = 3$ $y = 9 - 16 + 1 \rightarrow y = -6$ $S \left| \begin{array}{l} 2 \\ -6 \end{array} \right.$ $a > 0 \Rightarrow \text{Min}$

ب) $y = -x^2 + 4x + 1$ $S \left| \begin{array}{l} -\frac{b}{2a} \\ \frac{\Delta}{4a} \end{array} \right.$ $-\frac{b}{2a} = \frac{-4}{-2} = 2$ $\frac{\Delta}{4a} = \frac{16-4}{-4} = -3$ $y = -4 + 16 + 1 \rightarrow y = 13$ $S \left| \begin{array}{l} 2 \\ 13 \end{array} \right.$ $a < 0 \Rightarrow \text{Max}$

$4x^2 + kx^2 - 9x - 7 = 0$ $\alpha + \beta = 1$ $\alpha\beta = -7$

$(x-\alpha)(x-\beta)(x-\gamma) = (x^2 + kx^2 - 9x - 7) \rightarrow x^3 - (\alpha+\beta)x^2 + (\alpha\beta)x - x\gamma + (\alpha+\beta)x\gamma - \alpha\beta\gamma = (x^2 + kx^2 - 9x - 7)$

$x^3 - (\alpha+\beta+\gamma)x^2 + (\alpha\beta+\alpha\gamma+\beta\gamma)x - \alpha\beta\gamma = x^3 + kx^2 - 9x - 7$

$\begin{cases} \alpha+\beta+\gamma = 1 \\ \alpha\beta+\alpha\gamma+\beta\gamma = k \\ \alpha\beta\gamma = -7 \end{cases}$

① $\alpha\beta\gamma = -7 \rightarrow \alpha\beta\gamma = 1 \rightarrow -7\gamma = 1 \rightarrow \gamma = -\frac{1}{7}$

② $-\alpha(\alpha+\beta+\gamma) = k \rightarrow -\alpha(1-\frac{1}{7}) = k \rightarrow -\alpha(\frac{6}{7}) = k \rightarrow \alpha = -\frac{7k}{6}$ **جواب: $k = -14$**

$x^2 - 2mx + m = 0$ $\sqrt{\alpha} - \sqrt{\beta} = 1$ $p = m$ $S = 4m$ $(\sqrt{\alpha} - \sqrt{\beta})^2 = 1 \rightarrow \alpha + \beta - 2\sqrt{\alpha\beta} = 1$

$2x^2 - 2mx - m = 0 \rightarrow p = ?$ $2m - 2\sqrt{m} = 1 \rightarrow \frac{2m}{2} - \frac{2\sqrt{m}}{2} = 1 \rightarrow m - \sqrt{m} = 1 \rightarrow m^2 - 2m - 1 = 0$ $x = \frac{-b \pm \sqrt{\Delta}}{2a}$

$x = \frac{2 \pm \sqrt{4+4m}}{4} \rightarrow \frac{1 \pm \sqrt{1+m}}{2}$ $\frac{1}{2} = 1 \checkmark$ $\frac{1}{2} = -\frac{1}{2} \checkmark$ $z = 1$ $z = \sqrt{m} \rightarrow \sqrt{m} = 1 \rightarrow m = 1$ $2x^2 - x - 1 = 0$ $p = \frac{c}{a} = \frac{-1}{2}$ **جواب: $\frac{-1}{2}$**

$y = 2x^2 - (m+2)x + m$ $x_1 = 1$ $x_2 = \frac{c}{a} = \frac{m}{2}$ $S_{\Delta} = \frac{ah}{r} \rightarrow S_{\Delta} = \frac{r}{2}$ $C = m$

$\frac{(m/2 - 1)m}{2} = \frac{r}{2} \rightarrow \frac{m^2}{2} - m = \frac{r}{2} \rightarrow \frac{m^2 - 2m}{2} = \frac{r}{2} \rightarrow m^2 - 2m = r \rightarrow m^2 - 2m - r = 0$ $m = \frac{2 \pm \sqrt{4+4r}}{2} \rightarrow m_1 = 1 + \sqrt{1+r}$ $m_2 = 1 - \sqrt{1+r} = -1$

$y = x^2 - mx + 1 \rightarrow y = x^2 + x + 1 \rightarrow \frac{-b}{2a} = \frac{-1}{2}$ **جواب: $\frac{-1}{2}$**

$y = x^2 - 2x + 1 \rightarrow \frac{-b}{2a} = \frac{2}{2} = 1$ **جواب: 1**

$y = ax^2 + 4x + a$ $\min \left| \begin{array}{l} -\frac{b}{2a} \\ \frac{\Delta}{4a} \end{array} \right.$ $-\frac{b}{2a} = \frac{4}{2a} = \frac{2}{a}$ $\frac{\Delta}{4a} = \frac{16-4a^2}{4a} = \frac{4-a^2}{a}$ $\frac{4-a^2}{a} = \frac{2}{a} \rightarrow 4-a^2 = 2 \rightarrow a^2 = 2 \rightarrow a = \sqrt{2}$

$a^2 - 1 = va \rightarrow a^2 - va - 1 = 0 \rightarrow a^2 - va - 12k = 0$ $(a-4)(a+9) = (a-2)(a+9)$ $a = 2$ $b = \frac{-9}{a}$

$a = 2, a = \frac{-9}{a} \rightarrow a = \frac{-9}{2}$ **جواب: $a = \frac{-9}{2}$**

$x^2 - (a+1)x + a = 0$ عوض $x=1$ در معادله $1 - (a+1) + a = 0 \Rightarrow x_1 = 1$ ریشه $x_1 = 1 \rightarrow 0 = 9 - 2a - 2 + a$

$x_2 = \frac{c}{a} = \frac{a}{a} = 1$ ریشه دوم $x_2 = 3 \rightarrow 0 = 4 - 2a \rightarrow 2a = 4 \rightarrow a = 2$

$P_1 = 2 \times 1 = 2$ محصول $P_2 - P_1 = 2 - 2 = 0$ جواب

$x^2 - (2+1)x + 2 = 0 \rightarrow x^2 - 3x + 2 = 0$ معادله $S = \frac{-b}{a} = 3$ $\rightarrow x + (x+2) = 3 \rightarrow 2x + 2 = 3 \rightarrow 2x = 1 \rightarrow x_1 = \frac{1}{2}$

$P_1 = 2 \times \frac{1}{2} = 1$ محصول $P_2 - P_1 = 2 - 1 = 1$ جواب

$y = -ax^2 + ax + r$ معادله $\frac{-b}{2a} = \frac{-a}{-2a} = \frac{1}{2}$ $\frac{\Delta}{4a^2} = \frac{a^2 - 4ar}{4a^2} = \frac{a^2 - 4ar}{4a^2} = \frac{a^2 - 4ar}{4a^2}$ ساختار

$y = 2bx^2 - bx - 1$ معادله $\frac{-b}{2a} = \frac{b}{4b} = \frac{1}{4}$ $\frac{\Delta}{4a^2} = \frac{b^2 - 4(-1)(-b)}{4b^2} = \frac{b^2 - 4b}{4b^2} = \frac{b^2 - 4b}{4b^2}$ ساختار

$\frac{a+1}{r} = \frac{b}{r} - \frac{b}{r} - 1 \rightarrow a+1 = -2 \rightarrow a = -3$ جواب

$\frac{-b-1}{a} = \frac{r}{a} - r + 1 \rightarrow \frac{-b-1}{r} = \frac{r-1r+1}{r} \rightarrow -b-1 = -2 \rightarrow -b = 1 \rightarrow b = -1$ جواب

$y = 2\alpha x^2 + \beta x + \gamma$ معادله $0 = 2\alpha\beta^2 + \beta^2 + \beta \rightarrow 0 = 2\alpha\beta^2 + \beta^2 + \beta \rightarrow \beta(2\alpha\beta + \beta + 1) = 0$

$\beta = 1$ جواب $\alpha = \frac{-1}{2\beta} = \frac{-1}{2}$ $y = -\frac{1}{2}x^2 + x + 1$

$\alpha = \frac{-1}{2\beta} = \frac{-1}{2}$ جواب $\beta = 1$ $y = -\frac{1}{2}x^2 + x + 1$

$x^2 - (a^2 + b^2 - 12)x + a + b - 1 = 0$ معادله $S = \frac{-b}{a} = a^2 + b^2 - 12$ $P = \frac{c}{a} = \frac{a+b-1}{a^2 + b^2 - 12}$

$a^2 + b^2 - 12 = a + b$ معادله $a + b - 1 = ab$ $a^2 + b^2 = (a+b)^2 - 2ab$

$(a+b)^2 - 2(a+b) - 12 = a+b$ معادله $\rightarrow t^2 - 3t - 10 = 0$ $(t-5)(t+2) = 0$

$t = 5$ $t = -2$ جواب $a+b = 5$ $a+b = -2$