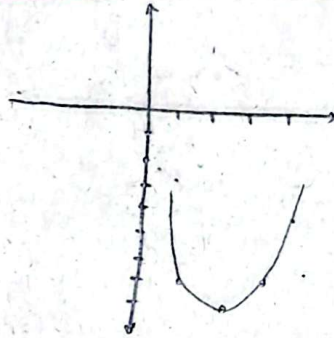


الف) $y = 2x^2 - 4x + 1 \rightarrow \text{ext} \left\{ \begin{array}{l} \frac{-b}{2a} = \frac{4}{4} = 1 \\ 2 \cdot 1 + 1 = -1 \end{array} \right. \xrightarrow{\text{Min}} (1, -1)$

ب) $y = -2x^2 + 4x - 5 \rightarrow \text{ext} \left\{ \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-4} = 1 \\ \frac{-9}{4} + \frac{16}{4} - \frac{20}{4} = \frac{-9}{4} \end{array} \right. \xrightarrow{\text{Max}} \left(1, -\frac{9}{4} \right)$

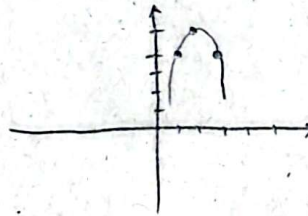
الف) $y = x^2 - 4x + 1 \rightarrow \text{ext} \left\{ \begin{array}{l} \frac{-b}{2a} = \frac{4}{2} = 2 \\ 4 - 16 + 1 = -11 \end{array} \right. \xrightarrow{\text{Min}} (2, -11)$

x	y
1	-3
2	-11
3	-10



ب) $y = -x^2 + 4x + 1 \rightarrow \text{ext} \left\{ \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ -4 + 16 + 1 = 13 \end{array} \right. \xrightarrow{\text{Max}} (2, 13)$

x	y
1	4
2	13
3	4



$4x^2 + kx^2 - 9x - 2 = 0$

$k = ? - 3$

$\alpha + \beta = 1 \rightarrow \alpha = 1 - \beta$

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

$\beta = 2 \rightarrow 4 + 4k - 18 - 2 = 4k - 16 = 0 \rightarrow k = 4$
 $\beta = -1 \rightarrow -4 + k + 9 - 2 = 0 \rightarrow k = -3$

$x^2 - 3mx + m = 0 \rightarrow S = 3m, P = m$

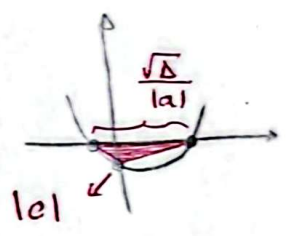
$(\sqrt{\alpha} - \sqrt{\beta} = 1)^2 \rightarrow \alpha + \beta - 2\sqrt{\alpha\beta} = 1 \rightarrow 3m - 2\sqrt{3m} - 1 = 0$
 $\sqrt{3m} = t \rightarrow 3t^2 - 2t - 1 = 0 \rightarrow t^2 - 2t - 1 = 0 \rightarrow (t - 3)(t + 1) = 0$
 $\rightarrow t = 3 \rightarrow \sqrt{m} = \frac{3}{\sqrt{3}} = \sqrt{3}$
 $\rightarrow t = -1 \rightarrow \sqrt{m} = \frac{-1}{\sqrt{3}}$

$\rightarrow 2x^2 - mx - m = 0 \rightarrow \text{محلها: } \frac{-m}{2} = \frac{-1}{2}$

$$y = 2x^2 - (m+2)x + m$$

-5

فاصله = $r_2 - r_1$ ارتفاع = $|m|$



یک مثلث قائم‌الزاویه می‌سازد
در شبیه‌سازی ۲ و ۲ در نظر می‌گیریم

$$(r_2 - r_1)^2 = (r_1 + r_2)^2 - 4r_1r_2$$

$$\downarrow |r_2 - r_1| = \sqrt{4r_1r_2 - (r_1 + r_2)^2} = \sqrt{4m - \left(\frac{m+2}{2}\right)^2} = \sqrt{\frac{4m - m^2 - 4 - 4m}{4}} = \sqrt{\frac{(m-2)^2}{4}}$$

$r_1r_2 = \frac{m}{2} \leftarrow \frac{c}{a} =$ ضرب
 $r_1 + r_2 = \frac{m+2}{2} \leftarrow \frac{-b}{a} =$ جمع

$$S = \frac{|m(m-2)|}{4} = \frac{3}{4} \Rightarrow |m(m-2)| = 3$$

$$\rightarrow m(m-2) = 3 \rightarrow m^2 - 2m - 3 = 0 \rightarrow m = 3, m = -1$$

$$\rightarrow m(m-2) = -3 \rightarrow m^2 - 2m + 3 = 0 \rightarrow \text{ریشه‌ها منفی می‌شود}$$

$$y = x^2 - mx + 1$$

$$\frac{m}{2} =$$

$$\rightarrow m = 3 \rightarrow \frac{3}{2}$$

$$\rightarrow m = -1 \rightarrow \frac{-1}{2}$$

$$y = ax^2 + 3x + a$$

-4

$$\frac{-A}{Fa} = \frac{V}{\Lambda} \rightarrow \frac{-9 + 3a^2}{3a} = \frac{V}{\Lambda} \rightarrow 2\Lambda a = -V^2 + 3^2 a^2 \rightarrow 3^2 a^2 - 2\Lambda a - V^2 = 0 \rightarrow \Lambda a^2 - Va - \Lambda = 0$$

$$\rightarrow a_1 = \frac{V + Va}{3^2} = 1$$

$$\rightarrow a_2 = \frac{V - Va}{3^2} = \frac{-1\Lambda}{3^2} \text{ از قی } \Rightarrow a = 2$$

$$x^2 - (a+1)x + a = 0 \xrightarrow{\text{ریشه‌ها عدد صحیح}} \frac{\sqrt{\Delta}}{|a|} = 2 \rightarrow \sqrt{\frac{(a+1)^2 - 4a}{(a+1)^2}} = 2 \rightarrow (a-1)^2 = 4$$

-V

$$(a-1-2)(a-1+2) = 0 \rightarrow (a-3)(a+1) = 0 \rightarrow a = -1 \rightarrow \text{از قی } \rightarrow x^2 - 1 = 0 \rightarrow x = \pm 1$$

$$x^2 - (3a+1)x + b = 0 \xrightarrow{\text{ریشه‌ها عدد صحیح}} \frac{\sqrt{\Delta}}{|a|} = 2 \rightarrow \sqrt{100 - 4b} = 2 \rightarrow 100 - 4b = 4 \rightarrow 4b = 96 \rightarrow b = 24$$

$P_2 = b = 24$

$$\text{فاصله حاصل ضرب ها} = |P_2 - P_1| = |24 - 3| = 21$$

$$y = -ax^r + ax + r \rightarrow S \begin{cases} -a = 1 \\ -ra = 1 \end{cases}$$

$$y' = rbx^r - bx - 1$$

$$b-a = ? \rightarrow S' \begin{cases} rb = 1 \\ \frac{b}{\lambda} - \frac{rb}{\lambda} - \frac{1}{\lambda} = \frac{-b-\lambda}{\lambda} \end{cases}$$

$$\xrightarrow{y, S \text{ (1) (2)}} \frac{-b-\lambda}{\lambda} = \frac{-a}{1} + \frac{ra}{1} + \frac{r^2}{1} = \frac{-rb-\lambda}{1} = \frac{ra+r^2}{1} \rightarrow ra+rb = -r\lambda \rightarrow -r^2+rb = -r\lambda$$

$$rb = -r\lambda \rightarrow \boxed{b = -\lambda}$$

$$\xrightarrow{y, S \text{ (1) (2)}} \frac{a+\lambda}{1} = \frac{b}{r} - \frac{b}{r} - 1 \rightarrow a+\lambda = -1 \rightarrow \boxed{a = -1}$$

$$\Rightarrow b-a = -\lambda+1 = 1$$

$$y = r\omega a x^r + r x + \beta$$

$$\beta > a$$

$$\begin{cases} r\omega a^r + r a + \beta = 0 \rightarrow * \\ r\omega a \beta^r + r \beta + \beta = 0 \rightarrow \omega \beta (a\beta + 1) = 0 \end{cases}$$

$$\beta = 0 \rightarrow \omega a \beta = -1 \rightarrow a\beta = -1 \rightarrow \beta = \frac{-1}{a} = \frac{\beta}{\omega a}$$

$$\Rightarrow -1 = \frac{\beta}{\omega a} \rightarrow \boxed{\beta = -\omega a}$$

$$* \xrightarrow{\beta = -\omega a} r\omega a^r + r a - \omega a = r\omega a^r - a = a(r\omega a^r - 1) = a(\omega a - 1)(\omega a + 1) = 0 \rightarrow a = 0 \text{ or } \omega a = 1$$

$$\Rightarrow y = -\omega x^r + r x + 1 \rightarrow S \begin{cases} -\omega = 1 \\ 1 = \lambda \end{cases}$$

$\omega = 1, \lambda = 1$
 $\rightarrow a = \frac{1}{\omega}, \beta = -1$
 $\rightarrow a = -1, \beta = 1$

$$x^r - (a^r + b^r - 1)r x + a + b - 1 = 0$$

$$a + b = 1$$

$$r = a + b - 1 = S - 1 *$$

$$S = a^r + b^r - 1r = S^r - rS - 1r$$

$$= S^r - rS - r - 1r = S^r - rS - 1 = S \rightarrow S^r - r^2 S - 1 = 0 \rightarrow (S-a)(S+r) = 0$$

$$\Rightarrow a+b = \omega$$