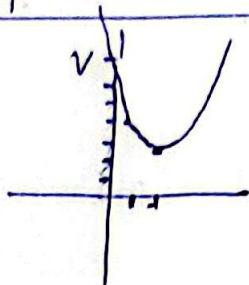


الف) $y = x^2 - 4x + 7$

$$\text{ext} \begin{cases} \frac{-b}{2a} = \frac{4}{2} = 2 \\ \Delta = 16 - 28 = -12 < 0 \end{cases}$$

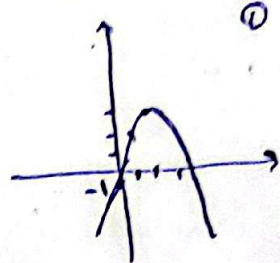
$\Delta < 0 \Rightarrow$ همیشه دارد



ب) $y = -x^2 + 4x - 1$

$$\text{ext} \begin{cases} \frac{-b}{2a} = \frac{4}{-2} = -2 \\ \Delta = 16 - 4 = 12 > 0 \end{cases}$$

ریشه ها: $x = \frac{-4 \pm \sqrt{12}}{-2} = 2 \pm \sqrt{3}$



$2m^2 + (m+1)n + \frac{1}{2}m + 2$

الف) $\Delta > 0 \Rightarrow m^2 + 2m + 1 - 4m - 16 > 0 \Rightarrow m^2 - 2m - 15 > 0 \Rightarrow \frac{-2}{2} < m < \frac{2}{2} \Rightarrow m \in (-\infty, -3) \cup (5, +\infty)$

ب) $\Delta \geq 0 \Rightarrow m^2 - 2m - 15 \geq 0 \Rightarrow (m+3)(m-5) \geq 0 \Rightarrow m \geq 5, -3$

ج) $\Delta < 0 \Rightarrow m^2 - 2m - 15 < 0 \Rightarrow (m+3)(m-5) < 0 \Rightarrow \frac{-3}{2} < m < \frac{5}{2} \Rightarrow m \in (m^3, 5)$

د) $\Delta \geq 0 \Rightarrow m^2 - 2m - 15 \geq 0 \Rightarrow (m+3)(m-5) \geq 0 \Rightarrow \frac{-3}{2} < m < \frac{5}{2} \Rightarrow m \in (-\infty, -3] \cup [5, +\infty)$

$y = (m-2)x^2 - 2(m+1)x + 1$

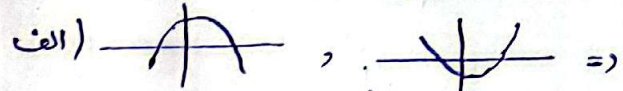
الف) $\begin{cases} \Delta > 0 \Rightarrow (-2m-2)^2 - 4(m-2)(1) > 0 \Rightarrow 4m^2 - 4m + 16 > 0 \Rightarrow \text{همیشه مثبت} \\ S < 0 \Rightarrow \frac{m+2}{m-2} < 0 \Rightarrow \frac{-1}{2} < m < 2 \\ P > 0 \Rightarrow \frac{1}{m-2} > 0 \Rightarrow m < 2 \end{cases}$

$\emptyset \cap \text{الف} \cap \text{ب} \Rightarrow \emptyset$

ب) $\begin{cases} P < 0 \\ S < 0 \end{cases} \Rightarrow \begin{cases} \frac{1}{m-2} < 0 \\ \frac{m+2}{m-2} < 0 \end{cases} \Rightarrow \frac{-1}{2} < m < 2$

$\Delta > 0 \Rightarrow$ همیشه دارد $\Rightarrow \frac{1}{2} < m < 2 \Rightarrow m \in (-1, 2)$

$y = (m-2)x^2 - 2(m+1)x + 1$



$m < 2 \Rightarrow m \in (-\infty, 2)$

min $\begin{cases} m-2 > 0 \Rightarrow m > 2 \\ \Delta > 0 \Rightarrow \text{همیشه مثبت} \\ \frac{c}{a} < 0 \Rightarrow \frac{1}{m-2} < 0 \Rightarrow \frac{-1}{2} < m < 2 \end{cases} \Rightarrow \emptyset$

max $\begin{cases} m-2 < 0 \Rightarrow m < 2 \\ \frac{c}{a} < 0 \Rightarrow \frac{1}{m-2} < 0 \Rightarrow \frac{-1}{2} < m < 2 \\ \Delta > 0 \Rightarrow \text{همیشه مثبت} \end{cases} \Rightarrow m < 2 \Rightarrow$

ب) $\frac{-b}{2a} = -2 \Rightarrow \frac{2m+2}{2m-2} = -2 \Rightarrow 2m+2 = -4m+4 \Rightarrow 6m = 2 \Rightarrow m = \frac{1}{3}$

$\frac{2m^2}{4} - (2 \sin \alpha)x + \frac{3}{4} = 0 \Rightarrow \Delta \geq 0 \Rightarrow 4 \sin^2 \alpha - (4)(\frac{2}{4})(\frac{3}{4}) \geq 0 \Rightarrow 4 \sin^2 \alpha - 3 \geq 0$

$4 \sin^2 \alpha \geq 3 \Rightarrow \sin^2 \alpha \geq \frac{3}{4} \Rightarrow \sin \alpha \geq \pm \frac{\sqrt{3}}{2} \Rightarrow \begin{cases} -1 < \frac{\sqrt{3}}{2} < 1 \Rightarrow \frac{2}{4} < 2x^2 + 4x + \frac{3}{4} < 2 \\ \text{یا} \frac{-2 \pm \sqrt{4-3}}{2} \Rightarrow x = \frac{-1 \pm \sqrt{3}}{2} \end{cases}$

$\sin = +1 \Rightarrow \frac{2m^2}{4} - 2x + \frac{3}{4} = 0 \Rightarrow 2m^2 - 4x + 3 = 0 \Rightarrow x = \frac{2m^2 + 3}{4}$

$\Delta \geq 0$

$$y_2 = \frac{(r_n^r - r_{n-1})(r_n^r - r_n - 6)}{1 - n^r} \Rightarrow \frac{(r_n^r - r_{n-1})(r_n^r - r_n - 6)}{(n-1)(n+1)} \Rightarrow \frac{9n^r - 13n^r - 11n^r + 13n^r + 6}{(n-1)(n+1)} \quad (9)$$

$$1 - n^r = -(n^r - 1) \quad 9n^r - 13n^r - 11n^r + 13n^r + 6 \mid \frac{n^r - 1}{-9n^r + 13n^r + 6} \Rightarrow$$

$$\frac{-9n^r + 13n^r + 6}{-9n^r + 13n^r + 6} \Rightarrow \left\{ \begin{array}{l} \frac{-6}{13} = \frac{-13}{-13} = \frac{13}{13} \\ y_2 = \frac{119}{13} \end{array} \right.$$

$$a < 0 \Rightarrow \max$$

$$m n^r - (m+1)n - r = 0$$

$$rS - \omega P = V \Rightarrow r \left(\frac{m+1}{m} \right) - \omega \left(\frac{-r}{m} \right) = V \Rightarrow \frac{r(m+1)}{m} - \frac{-1}{m} = V \quad (V)$$

$$r m^r + 19 = V m \Rightarrow r m = 19 \Rightarrow m = r$$

$$r n^r - 9n - r = 0 \Rightarrow \alpha^r + \beta^r = S^r - rP \Rightarrow \frac{9}{r} + \frac{r}{r} = \frac{13}{r}$$

$$n^r - 6n + r = 0, \quad \frac{r\alpha + \beta^6}{\omega\beta^r}, \quad 9\beta = r, \quad \alpha + \beta = 6, \quad \frac{r\alpha}{\omega\beta^r} + \frac{\beta^r}{\omega} = \quad (1)$$

$$\frac{r\alpha}{\omega \times \frac{r}{\alpha^r}} = \frac{\alpha^r}{\omega} \Rightarrow \frac{\alpha^3 + \beta^3}{\omega} = \frac{S^r - rSP}{\omega} \Rightarrow \frac{136 - r}{\omega} = 19$$

$$y_1 = a n^r + b n + c, \quad y_r = r n + 1, \quad c = r$$

$$n = r \Rightarrow r a + r b + r = r + 1 \Rightarrow r a + r b = 1 \Rightarrow r a + b = 6 \quad (1)$$

$$n = -r \Rightarrow 9a - r b + r = r \Rightarrow r a = b \quad (2)$$

$$y_1 = n^r + r n + r \Rightarrow \frac{-6}{13} = \frac{-r}{r}$$

$$(1), (2) \Rightarrow \begin{cases} r a + b = 6 \\ r a - b = 0 \end{cases} \Rightarrow \frac{\omega a = 6 \Rightarrow a = 1}{b = r}$$

$$y = r n^r + (m+1)n + m + 9 = n, \quad y = n, \quad \Delta \geq 0 \Rightarrow$$

$$r n^r + (m+1)n - n + m + 9 = 0 \Rightarrow$$

$$(m+1)^r - (r)(r)(m+9) \Rightarrow m^r + 1 - 11m + 11 = 0 \Rightarrow (m+1)(m-11) = 0 \Rightarrow m = 11$$

$$\text{if } m = 11 \Rightarrow r n^r + 11n + 1 = 0 \quad \Delta > 0 \quad \checkmark$$

$$m = 11$$

$$\text{if } m = -r \Rightarrow r n^r - 3n + r = 0 \quad \Delta < 0 \quad \checkmark$$