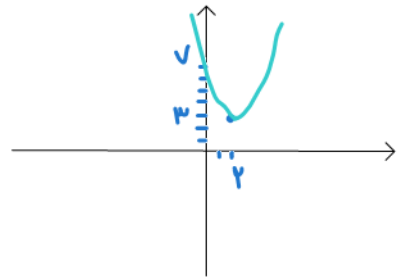


الف) $y = x^2 - 4x + 7$

$$\min \left| \begin{array}{l} \frac{-b}{2a} = \frac{4}{2} = 2 \\ 4 - 1 + 7 = 10 \end{array} \right.$$

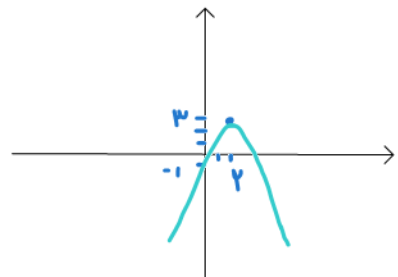


-۱

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ب) $y = -x^2 + 4x - 1$

$$\max \left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ -4 + 1 - 1 = -4 \end{array} \right.$$



-۲

۳

الف)

$$y = 2x^2 + (m+1)x + \frac{1}{2}m + 2 = 0$$

$$\Delta \geq 0 \Rightarrow (m+1)^2 - 4 \times 2 \times \left(\frac{1}{2}m + 2\right) \geq 0$$

$$\Rightarrow m^2 + 2m + 1 - 4m - 8 \geq 0$$

$$\begin{array}{c} m^2 - 2m - 7 \geq 0 \\ \hookrightarrow (m-5)(m+3) \end{array} \quad \begin{array}{c} -3 \quad 5 \\ + \quad - \end{array}$$

$$m \in (-\infty, -3) \cup (5, +\infty)$$

$$\Delta = 0 \Rightarrow (m+1)^2 - 4 \times 2 \times \left(\frac{1}{2}m + 2\right) = 0$$

$$m^2 + 2m + 1 - 4m - 8 = 0$$

$$m^2 - 2m - 7 = 0 \Rightarrow (m-5)(m+3) = 0 \quad \begin{array}{l} \rightarrow m = -3 \\ \rightarrow m = 5 \end{array}$$

ب)

$$\Delta < 0 \Rightarrow (m+1)^2 - 4 \times 2 \times \left(\frac{1}{2}m + 2\right) < 0$$

$$\Rightarrow m^2 + 2m + 1 - 4m - 8 < 0$$

$$\begin{array}{c} m^2 - 2m - 7 < 0 \\ \hookrightarrow (m-5)(m+3) \end{array} \quad \begin{array}{c} -3 \quad 5 \\ + \quad - \end{array}$$

$$m \in (-3, 5)$$

ج)

$$\Delta \geq 0 \Rightarrow (m+1)^2 - 4 \times 2 \times \left(\frac{1}{2}m + 2\right) \geq 0$$

$$\Rightarrow m^2 + 2m + 1 - 4m - 8 \geq 0$$

$$\begin{array}{c} m^2 - 2m - 7 \geq 0 \\ \hookrightarrow (m-5)(m+3) \end{array} \quad \begin{array}{c} -3 \quad 5 \\ + \quad - \end{array}$$

$$m \in (-\infty, -3] \cup [5, +\infty)$$

د)

$$y = (m-2)x^2 - 2(m+1)x + 10$$

-۳

$$\Delta y = 0 \Rightarrow (2m+2)^2 - 4 \times 10 \times (m-2) = 0$$

(الف)

$$4m^2 + 4m + 4 - 40m + 80 = 0$$

$$4m^2 - 36m + 84 = 0$$

$$m^2 - 9m + 21 = 0 \rightarrow \text{دو راه به قدر است}$$

$$\Delta = 81 - 84 < 0$$

$$\textcircled{1} \cap \textcircled{2} = \emptyset$$

ج

$$P y = 0 \Rightarrow \frac{10}{m-2} > 0 \Rightarrow m-2 > 0 \Rightarrow m > 2 \quad \textcircled{1}$$

$$S < 0 \Rightarrow \frac{2m+2}{m-2} < 0 \Rightarrow \frac{-1}{0} \quad \frac{2}{2} \Rightarrow -1 < m < 2 \quad \textcircled{2}$$

$$\Delta y = 0 \Rightarrow (2m+2)^2 - 4 \times 10 \times (m-2) = 0$$

(ب)

$$4m^2 + 4m + 4 - 40m + 80 = 0$$

$$4m^2 - 36m + 84 = 0$$

$$m^2 - 9m + 21 = 0 \rightarrow \text{دو راه به قدر است}$$

$$\Delta = 81 - 84 < 0$$

$$\textcircled{1} \cap \textcircled{2}$$

$$\rightarrow m \in (-1, 2)$$

$$S < 0 \Rightarrow \frac{2m+2}{m-2} < 0 \Rightarrow \frac{-1}{0} \quad \frac{2}{2} \Rightarrow -1 < m < 2 \quad \textcircled{1}$$

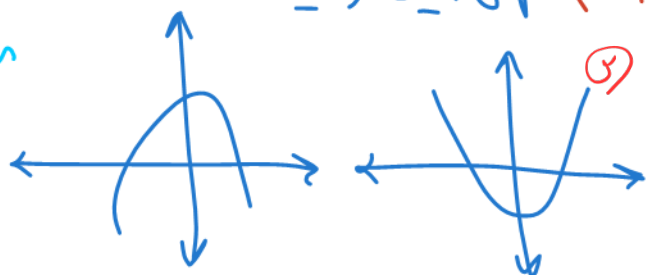
$$P < 0 \Rightarrow \frac{10}{m-2} < 0 \Rightarrow m-2 < 0 \Rightarrow m < 2 \quad \textcircled{2}$$

$$y = (m-2)x^2 - 2(m+1)x + 10$$

-۴

$$m \in (-\infty, 2) \Leftarrow \begin{array}{l} \text{میتوان چیزی نمی توان گفت این} \\ \text{است که ضرایب ریشه ها منفی باشد} \end{array}$$

(الف) سهمی به بیکی از این دو شکل است:



$$P < 0 \Rightarrow \frac{10}{m-2} < 0 \Rightarrow m-2 < 0 \Rightarrow m < 2$$

(ب) طول رأس سهمی برابر ۲- است:

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

$$\frac{r x^p}{w} - (r \sin \alpha) x + \frac{w}{r} = 0$$

-3

$$\Delta \geq 0 \Rightarrow r \sin^2 \alpha - r x \frac{r}{w} x \frac{w}{r} \geq 0 \Rightarrow r \sin^2 \alpha - r \geq 0 \Rightarrow$$

$$r \sin^2 \alpha \geq r \Rightarrow \sin^2 \alpha \geq 1 \Rightarrow \sin^2 \alpha \leq 1 \Rightarrow \sin^2 \alpha = 1 \Rightarrow \sin \alpha = \pm 1$$

5

$$\sin \alpha = 1 \rightarrow \frac{r}{w} x^p - r x + \frac{w}{r} = 0$$

$$\Delta = r - r x \frac{r}{w} x \frac{w}{r} = 0 \quad x = \frac{r \pm \sqrt{\Delta}}{\frac{r}{w}} = \frac{w}{r}$$

$$\sin \alpha = -1 \rightarrow \frac{r}{w} x^p + r x + \frac{w}{r} = 0$$

$$\Delta = r - r x \frac{r}{w} x \frac{w}{r} = 0 \quad x = \frac{-r \pm \sqrt{\Delta}}{\frac{r}{w}} = -\frac{w}{r}$$

$$y = \frac{(w x^p - r x - 1)(r x^p - w x - \omega)}{1 - x^r}$$

-4

$$\text{مع ضرب متواسط: } x_1 = 1 \quad x_r = -\frac{1}{w}$$

$$= \frac{(\frac{-1}{w} - 1)(w x + 1)(x + 1)(r x - \omega)}{(1 - x)(x + 1)} = (w x + 1)(\omega - r x) = -4 x^p + 13 x + \omega$$

5

$$y_s = \frac{-\Delta}{r a} = \frac{-219}{-12} = \frac{18.25}{12}$$

$$m x^p - (m + r) x - r = 0$$

-5

$$w s = \omega p + v \Rightarrow w x \frac{m+r}{m} = \frac{-r}{m} x \omega + v$$

$$\frac{w m + r}{m} = \frac{v m - \omega}{m}$$

$$\Rightarrow w m + r = v m - \omega \Rightarrow r m = 14 \Rightarrow m = r$$

5

$$\alpha^p + \beta^p = s^p - r p = \left(\frac{m+r}{m} \right)^p - r \left(\frac{-r}{m} \right) = \frac{9}{r} + 1 = \frac{10}{r}$$

$$x^r - \alpha x + \gamma = 0$$

$$\alpha\beta = \gamma \Rightarrow \beta = \frac{\gamma}{\alpha}, \quad \delta = \alpha$$

$$\frac{\kappa\alpha + \beta^\omega}{\alpha\beta^r} = \frac{\cancel{\kappa\alpha} + \beta^\omega}{\cancel{\alpha\beta^r}} + \frac{\beta^\omega}{\alpha\beta^r} = \frac{\alpha^\mu}{\alpha} + \frac{\beta^\mu}{\alpha} = \frac{\delta^\mu - \mu\delta\rho}{\alpha} = \frac{12\omega - 10x\omega x\rho}{\alpha} \Rightarrow \frac{9\omega}{\alpha} = 19$$

$$\frac{\frac{\kappa\alpha}{1}}{\frac{\gamma_0}{\alpha^r}} = \frac{\alpha^\mu}{\alpha}$$

$$y_1 = ax^r + bx + c \xrightarrow{(0, \kappa)} c = \kappa$$

$$y_r = rx + 10 \xrightarrow{x=r} y = 1\kappa \Rightarrow 1\kappa = \kappa a + r b + \varepsilon \Rightarrow \kappa a + r b = 10$$

$$\xrightarrow{x=-r} y = \kappa \Rightarrow \kappa a + 10a = \omega \Rightarrow a = 1, b = r$$

$$\kappa a + 10a = \omega \Rightarrow a = 1, b = r \Rightarrow \kappa = 9a - 13b + \varepsilon \Rightarrow 9a = 13b \Rightarrow b = \frac{9}{13}$$

$$\text{نقطه بحرانی: } x = \frac{-b}{\kappa a} = \frac{-r}{r}$$

$$y = rx^r + (m+1)x + m + r$$

$$rx^r + (m+1)x + m + r = x \Rightarrow rx^r + mx + m + r = 0 \quad \Delta \text{ را به این شکل بنویسید}$$

$$m^r - \varepsilon x^r x(m+4) = 0$$

$$\Rightarrow m^r - 1m - \varepsilon 1 = 0$$

$$(m-12)(m+5) = 0 \Rightarrow \begin{cases} m = 12 \rightarrow \Delta = 2 \vee \\ m = -5 \end{cases}$$

$$\Delta = 9 - 1 \times 4 = -5$$