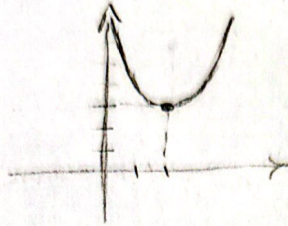


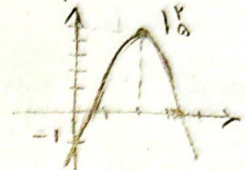
الف) $y = x^2 - 4x + 7$ $\Delta = 16 - 28 = -12 < 0$
 $a > 0 \Rightarrow x_{min}$

ext $-\frac{b}{2a} = \frac{4}{2} = 2$
 $-\frac{\Delta}{4a} = -\frac{12}{4} = -3$



ب) $y = -x^2 + 4x - 1$ $\Delta = 16 - 4 = 12 > 0$
 $a < 0 \Rightarrow x_{max}$ $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-4 \pm \sqrt{12}}{-2}$
 $= \frac{-4 + 2\sqrt{3}}{-2} = 2 - \sqrt{3}$, $\frac{-4 - 2\sqrt{3}}{-2} = 2 + \sqrt{3}$

ext $-\frac{b}{2a} = -\frac{4}{-2} = 2$
 $-\frac{\Delta}{4a} = -\frac{12}{-4} = 3$



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

الف) $\Delta > 0$ $\Delta = b^2 - 4ac$

$(m+1)^2 - 4(2)(\frac{1}{2}m + 2) > 0 \Rightarrow m^2 - 2m - 1 > 0$

$\Rightarrow (m-2)(m+1) > 0 \Rightarrow m < -1$ or $m > 2$

ج) $\Delta < 0$

$m^2 - 2m - 1 < 0 \Rightarrow (m-2)(m+1) < 0 \Rightarrow -1 < m < 2$

ب) $\Delta = 0$

$m^2 - 2m - 1 = 0 \Rightarrow (m-2)(m+1) = 0$

$\Rightarrow m = 2$ or $m = -1$

معادله را به صورت $2x^2 + (m+1)x + \frac{1}{2}m + 2 = 0$ در نظر بگیریم. $\Delta > 0$

$m^2 - 2m - 1 > 0 \Rightarrow m > 2$ or $m < -1$

$y = \frac{(m-2)x^2 - 2(m+1)x + 10}{a}$

الف) $\Delta > 0$ $S < 0$ $P > 0$

$S = -\frac{b}{a} = -\frac{-2(m+1)}{m-2} = \frac{2(m+1)}{m-2} < 0$

$P = \frac{c}{a} = \frac{10}{m-2} > 0 \Rightarrow m > 2$

این دو باره اشتراک را در نظر بگیریم. $m < -1$ or $m > 2$

$\Delta > 0 \Rightarrow 4m^2 - 44m + 11 > 0$ $S < 0$ $P < 0$

$\Delta = (-44)^2 - 4(4)(11) = 0$

$m = \frac{44 \pm \sqrt{0}}{8} = \frac{44}{8} = \frac{11}{2}$

$x_1 < 0 < x_2 \Rightarrow -1 < x_1 < 1 < x_2 \Rightarrow -1 < x_1 < x_2 < 1$

$S = 2x_1 + x_2 > 0 \Rightarrow -\frac{b}{a} = \frac{2(m+1)}{m-2} > 0$

$\Rightarrow m-2 < 0 \Rightarrow m < 2$

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

الف)

شرط عبور از نقطه $(0, 10)$: $\frac{c}{a} < 0 \Rightarrow \frac{10}{m-2} < 0 \Rightarrow m < 2$

ب) $x = -2$ محور تقارن

$-\frac{b}{2a} = -2 \Rightarrow \frac{b}{2a} = 2 \Rightarrow b = 4a$

$-2m - 2 = 4m - 8 \Rightarrow -6m = -6 \Rightarrow m = 1$

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

$\Delta = (-2\sin\alpha)^2 - 4(\frac{2}{3})(\frac{4}{3}) > 0 \Rightarrow 4\sin^2\alpha - \frac{32}{9} > 0 \Rightarrow \sin^2\alpha > \frac{8}{9} \Rightarrow \sin\alpha > \frac{2\sqrt{2}}{3}$

$\Rightarrow \sin\alpha > \frac{2\sqrt{2}}{3} \Rightarrow 0 \leq \sin\alpha \leq 1$

$$g = \frac{(2x^2 - 2x - 1)(2x^2 - 3x - 5)}{1 - x^2(1 - x)(1 + x)}$$

$$2x^2 - 2x - 1 = 0 \Rightarrow x = \frac{1 \pm \sqrt{5}}{2}$$

$$\frac{(x-1)(2x+1)(2x-5)(x+1)}{(1-x^2)(1+x)} = -(2x+1)(2x-5)$$

$$2x^2 - 3x - 5 = 0 \Rightarrow x = \frac{3 \pm \sqrt{49}}{2} = \frac{3 \pm 7}{2}$$

$$-(2x^2 - 3x - 5) = -2x^2 + 3x + 5 = 0$$

$$g_{\max} = -\frac{\Delta}{4a} = -\frac{14}{-4} = \frac{7}{2}$$

محل های بحرانی را در تابع قرار می دهیم و مقادیر آن را به دست می آوریم

$$\alpha + \beta = 5 = -\frac{b}{a} = \frac{m+1}{m}$$

$$2\left(\frac{m+1}{m}\right) + 1 = 0 \Rightarrow \frac{2m+2}{m} + 1 = 0$$

$$\alpha\beta = 6 = \frac{c}{a} = -\frac{1}{m}$$

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

$$-1/4x^2 - 0.1x - 1 = 0$$

$$\Rightarrow 10m = -4 \Rightarrow m = -0.4$$

$$\Rightarrow x^2 + \frac{1}{5}x + \frac{1}{10} = 0$$

$$S = -\frac{b}{c} = \frac{0.1}{1/10} = 1$$

$$x_1 + x_2 = \frac{(x_1 + x_2)^2 - x_1 x_2}{S} = \frac{(-0.1)^2 - (-1/10)}{1} = 0.101 + 0.1 = 0.201$$

$$\alpha + \beta = -\frac{b}{a} = 5 \quad \alpha\beta = \frac{c}{a} = 6 \Rightarrow \alpha = \frac{5 \pm \sqrt{25-24}}{2} = \frac{5 \pm 1}{2}$$

$$\beta = \alpha - 1$$

$$\beta^2 = \alpha^2 - 2\alpha + 1 = 6 - 2\alpha + 1 = 7 - 2\alpha$$

$$\beta^2 = (\alpha - 1)^2 = \alpha^2 - 2\alpha + 1 = 6 - 2\alpha + 1 = 7 - 2\alpha$$

$$\frac{5\alpha + \beta^2}{\alpha\beta^2} = \frac{5(\frac{5 \pm 1}{2}) + \beta^2}{\alpha\beta^2} = \frac{12.5 \pm 2.5 + \beta^2}{\alpha\beta^2} = \frac{15 \pm \beta^2}{\alpha\beta^2}$$

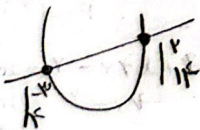
$$g_1 = ax^2 + bx + c$$

$$g_2 = 2x + 10$$

محل های تقاطع را پیدا می کنیم

$$c = 1$$

$$\begin{cases} 9a - 2b + 1 = 0 \\ 1a + 2b + 1 = 0 \end{cases} \Rightarrow \begin{cases} 9a - 2b = -1 \\ a + 2b = -1 \end{cases} \Rightarrow \begin{cases} 9a - 2b = -1 \\ 9a + 18b = -9 \end{cases} \Rightarrow \begin{cases} 9a - 2b = -1 \\ 20b = -8 \end{cases} \Rightarrow \begin{cases} 9a - 2b = -1 \\ b = -0.4 \end{cases} \Rightarrow \begin{cases} 9a - 2(-0.4) = -1 \\ 9a + 0.8 = -1 \\ 9a = -1.8 \\ a = -0.2 \end{cases}$$



$$x = -\frac{b}{2a} = -\frac{-0.4}{-0.2} = 2$$

$$g = 2x^2 + (m+1)x + m+4$$

$$g = x^2 \Rightarrow \Delta = 0$$

$$x = 2x^2 + (m+1)x + m+4$$

$$\Rightarrow 2x^2 + (m+1)x + m+4 = 0 \quad \Delta = m^2 - 4m - 4 = 0 \Rightarrow m = \frac{4 \pm \sqrt{16+16}}{2} = \frac{4 \pm 4\sqrt{2}}{2} = 2 \pm 2\sqrt{2}$$

$$\begin{cases} 2x^2 + 12x + 12 = 0 \Rightarrow x^2 + 6x + 6 = 0 \Rightarrow x = -3 \pm \sqrt{3} \\ 2x^2 - 4x + 4 = 0 \Rightarrow x^2 - 2x + 2 = 0 \Rightarrow x = 1 \pm i \end{cases}$$

$$\Rightarrow \begin{cases} 2x^2 - 4x + 4 = 0 \Rightarrow x^2 - 2x + 2 = 0 \Rightarrow x = 1 \pm i \end{cases}$$