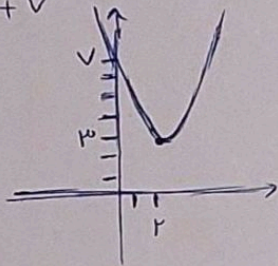


الف) $y = x^2 - 4x + 7$

$a > 0$

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

$y = 3$

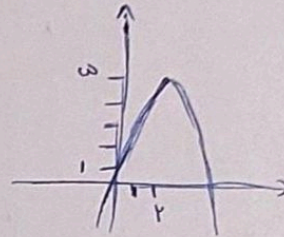


ب) $y = -x^2 + 4x - 1$

$a < 0$

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

$y = 3$



۱

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

الف) $\Delta > 0 \quad (m+1)^2 - 4 \times \frac{1}{2} \times (m+2) = m^2 + 2m + 1 - 2m - 4 = m^2 - 3 > 0 \Rightarrow m - \sqrt{3} > 0 \Rightarrow m > \sqrt{3}$

$(-\infty, -\sqrt{3}) \cup (\sqrt{3}, +\infty)$

ب) $\Delta = 0 \quad (m-\sqrt{3})(m+\sqrt{3}) = 0 \Rightarrow m = \sqrt{3}, -\sqrt{3}$

ج) $\Delta < 0 \quad (m-\sqrt{3})(m+\sqrt{3}) < 0 \Rightarrow (-\sqrt{3}, \sqrt{3})$

د) $\Delta \geq 0 \quad (m-\sqrt{3})(m+\sqrt{3}) \geq 0 \Rightarrow (-\infty, -\sqrt{3}] \cup [\sqrt{3}, +\infty)$

۲

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

الف) $\frac{c}{a} < 0 \Rightarrow \frac{10}{m-2} < 0 \Rightarrow \frac{-1}{-1+} < 0 \Rightarrow \frac{c}{a} > 0 \Rightarrow \frac{10}{m-2} > 0 \Rightarrow \frac{2}{-1+} \neq \emptyset$

ب) $\frac{c}{a} < 0 \Rightarrow \frac{10}{m-2} < 0 \Rightarrow m < 2$

$\frac{-b}{a} < 0 \Rightarrow \frac{2m+2}{m-2} < 0 \Rightarrow -1 < m < 2$

۳

الف) $\frac{c}{a} < 0 \Rightarrow \frac{10}{m-2} < 0 \Rightarrow \frac{2}{-1+} < 0 \Rightarrow m < 2$

ب) $\frac{-b}{2a} = -2 \Rightarrow \frac{2m+2}{2m-4} = -2 \Rightarrow 2m+2 = -4m+8 \Rightarrow 6m = 6 \Rightarrow m = 1$

۴

$\frac{2x^2}{3} - (2\sin\alpha)x + \frac{1}{3} = 0$

$\Delta \geq 0 \quad (-2\sin\alpha)^2 - 4 \times \frac{2}{3} \times \frac{1}{3} = 4\sin^2\alpha - \frac{8}{9} \geq 0 \Rightarrow \sin^2\alpha \geq \frac{2}{9} \Rightarrow \sin\alpha = \pm \frac{\sqrt{2}}{3}$

$\sin\alpha = 1 \Rightarrow \boxed{x = \frac{1}{2}} \quad \sin\alpha = -1 \Rightarrow x = -\frac{1}{2}$

۵

$y = \frac{(13x^2 - 2x - 1)(13x^2 - 13x - 2)}{1 - x^2} \Rightarrow \frac{(13x+1)(x-1)(13x-2)(x+1)}{-(x-1)(x+1)} \Rightarrow$ $-(13x^2 - 12x + 2x - 2) \rightarrow -13x^2 + 14x + 2 \quad x = \frac{-b}{2a} = \frac{+14}{2 \times 13}$ $y_{\max} = -7\left(\frac{14}{13}\right)^2 + 13 \times \frac{14}{13} + 2 = \frac{149}{13} = \boxed{\frac{149}{13}}$	6
$13(\alpha + \beta) = \omega(\alpha\beta) + V \quad 13\left(\frac{m+2}{m}\right) = \omega\left(\frac{-2}{m}\right) + V \quad \frac{13m+14}{m} = V$ $\frac{-b}{a} \quad \frac{c}{a} \quad 14 = 2m \quad \boxed{m=7}$ $13x^2 - 4x - 2 = 0 \quad \alpha + \beta = \frac{4}{13} \rightarrow \left(\frac{13}{13}\right)^2 - 2\left(-\frac{1}{13}\right) = \frac{9}{13} + 1 = \boxed{\frac{14}{13}}$ $\begin{cases} s = \frac{13}{13} \\ p = -\frac{1}{13} \end{cases}$	7
$\beta^2 - \omega\beta + 2 = 0 \quad \beta^2 = \omega\beta - 2 \quad \beta^3 = \beta \times \beta^2 = \omega\beta^2 - 2\beta = 23\beta - 10$ $\beta^4 = 23\beta^2 - 10\beta \rightarrow 10\omega\beta - 24 \quad \beta^5 = \beta \times \beta^4 = 10\omega\beta^2 - 24\beta \rightarrow 249\beta - 210$ $\alpha\beta = 2 \quad a = \frac{2}{\beta} \quad \frac{13\alpha + \beta}{\alpha\beta^2} \Rightarrow \frac{\frac{13}{\beta} + 249\beta - 210}{\omega(\omega\beta - 2)}$	8
$y_1 = ax^2 + bx + c \rightarrow y = f \quad x=0 \quad a(0) + b(0) + c = f \quad c = f$ $x=2 \quad \begin{cases} 4a + 2b + c = 15 \\ 16a + 4b = 10 \end{cases} \quad a=1 \quad b=3$ $x=-3 \quad \begin{cases} 9a - 3b + c = f \\ 11a - 9b = 0 \end{cases}$ $ax^2 + bx + c \rightarrow x^2 + 3x + 1 \quad \frac{-b}{2a} = \boxed{\frac{-3}{2}}$	9
$x=y \quad 13x^2 + (m+1)x + m + 4 = x \quad 13x^2 + mx + m + 4 = 0$ $\Delta = 0 \quad (m)^2 - 4 \times 13 \times (m+4) = 0 \quad m^2 - 12m - 16 = 0 \quad (m-12)(m+4) = 0$ $\underline{m=12} \quad 13x^2 + 13x + 16 = 0 \quad x^2 + x + \frac{16}{13} = 0 \quad (x+\frac{13}{13})^2 = 0 \quad x = -1 \quad \text{Not possible} \quad \left(-\frac{13}{13}\right)$ $\underline{m=-4} \quad 13x^2 - 13x + 1 = 0 \quad x^2 - x + 1 = 0 \quad (x-1)^2 = 0 \quad \boxed{x=1} \quad \text{Not possible} \quad \checkmark \quad \begin{pmatrix} 1 \\ 1 \end{pmatrix}$	10