

الف) $y = 2x^2 - 4x + 1 \rightarrow \text{Min} \left| \begin{array}{l} \frac{-(-4)}{2(2)} = 1 \\ 2(1)^2 - 4(1) + 1 = -1 \end{array} \right. \quad \text{ب) } y = -2x^2 + 4x - 5 \rightarrow \text{Max} \left| \begin{array}{l} \frac{-4}{2(-2)} = \frac{1}{2} \\ -2(\frac{1}{2})^2 + 4(\frac{1}{2}) - 5 = -\frac{31}{2} \end{array} \right.$

الف) $y = x^2 - 2x + 1 \rightarrow \text{Min} \left| \begin{array}{l} \frac{-(-2)}{2(1)} = 1 \\ 1^2 - 2(1) + 1 = 0 \end{array} \right. \Rightarrow \begin{array}{l} x=2 \Rightarrow y = 2^2 - 2(2) + 1 = -1 \\ x=4 \Rightarrow y = 4^2 - 2(4) + 1 = -7 \\ x=0 \Rightarrow y = 0^2 - 2(0) + 1 = 1 \end{array}$

ب) $y = -x^2 + 4x + 1 \rightarrow \text{Max} \left| \begin{array}{l} \frac{-4}{2(-1)} = 2 \\ -(2)^2 + 4(2) + 1 = 5 \end{array} \right. \Rightarrow \begin{array}{l} x=1 \Rightarrow y = -(1)^2 + 4(1) + 1 = 4 \\ x=3 \Rightarrow y = -(3)^2 + 4(3) + 1 = 4 \\ x=0 \Rightarrow y = -(0)^2 + 4(0) + 1 = 1 \end{array}$

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

$4x^2 + Kx - 9x - 2 = 0 \Rightarrow x = 2 \Rightarrow 4(2)^2 + K(2) - 9(2) - 2 = 0 \Rightarrow 16 + 2K - 18 - 2 = 0 \Rightarrow 2K - 4 = 0 \Rightarrow K = 2$

$x = -1 \Rightarrow 4(-1)^2 + K(-1) - 9(-1) - 2 = 0 \Rightarrow 4 - K + 9 - 2 = 0 \Rightarrow 11 - K = 0 \Rightarrow K = 11$

$|\sqrt{\alpha} - \sqrt{\beta}| = 1 \Rightarrow \alpha + \beta - 2\sqrt{\alpha\beta} = 1 \Rightarrow x^2 - 3mx + m = 0 \Rightarrow \Delta = (-3m)^2 - 4m = 9m^2 - 4m = 0 \Rightarrow m(9m - 4) = 0 \Rightarrow m = 0, \frac{4}{9}$

$\frac{c}{a} = \frac{-1}{3} \Rightarrow \sqrt{m} = \frac{-1}{3} \Rightarrow m = \frac{1}{9}$

$2x^2 - mx - m = 0 \Rightarrow P = \alpha\beta = \frac{-m}{2} = \frac{-1}{2}$

$h = \frac{\sqrt{\Delta}}{2a} = \frac{\sqrt{9m^2 - 4m}}{2m} = \frac{3m - \frac{2}{3}}{2m} = \frac{3m^2 - \frac{2}{3}}{2m^2} = \frac{3m^2 - \frac{2}{3}}{2m^2}$

$m|m-2| = 3 \Rightarrow m^2 - 2m - 3 = 0 \Rightarrow (m-3)(m+1) = 0 \Rightarrow m = 3, -1$

$m < 2 \Rightarrow m^2 - 2m + 3 = 0 \Rightarrow \Delta = 4 - 12 = -8 < 0$

$y = -\frac{\Delta}{\epsilon a} = -\frac{9 - \epsilon(\alpha^2)}{\epsilon a} = \frac{V}{\Lambda} \Rightarrow 32\alpha^2 - 21\alpha - 17 = 0 \Rightarrow \Delta = 21^2 + 4 \cdot 32 \cdot 17 = 21^2 + 2176 = 2209 = 47^2$

$\alpha = \frac{21 \pm 47}{64} \Rightarrow \alpha = \frac{34}{64} = \frac{17}{32}, \alpha = \frac{-26}{64} = -\frac{13}{32}$

$\alpha = \frac{17}{32} \Rightarrow \frac{9}{\Lambda} = \frac{17}{32} \Rightarrow \Lambda = \frac{9 \cdot 32}{17} = \frac{288}{17}$

$\alpha = -\frac{13}{32} \Rightarrow \frac{9}{\Lambda} = -\frac{13}{32} \Rightarrow \Lambda = -\frac{9 \cdot 32}{13} = -\frac{288}{13}$

$x^2 - (\alpha+1)x + \alpha = 0 \Rightarrow \frac{\sqrt{\Delta}}{2a} = 2 \Rightarrow \sqrt{\alpha^2 + 4\alpha - \epsilon a} = 2 \Rightarrow |\alpha - 1| = 2 \Rightarrow \alpha = 3, -1$

$\alpha = 3 \Rightarrow x^2 - 4x + 3 = 0 \Rightarrow (x-1)(x-3) = 0 \Rightarrow x = 1, 3 \Rightarrow P_1 = \frac{3}{1}$

$\alpha = -1 \Rightarrow x^2 - 0x - 1 = 0 \Rightarrow x = \pm 1$

$x^2 - (3\alpha+1)x + b = 0 \Rightarrow \frac{\sqrt{\Delta}}{2a} = 2 \Rightarrow \sqrt{9\alpha^2 + 4\alpha - \epsilon b} = 2 \Rightarrow \sqrt{11 + 4 + 11 - \epsilon b} = 2 \Rightarrow \sqrt{26 - \epsilon b} = 2 \Rightarrow 26 - \epsilon b = 4 \Rightarrow \epsilon b = 22 \Rightarrow b = \frac{22}{\epsilon}$

$P_1 - P_2 = |3 - \frac{22}{\epsilon}| = |21|$

$$\textcircled{1} y = -ax^2 + ax + 1 \Rightarrow \text{ext} \left| \begin{array}{l} -a \\ 2(-a) \end{array} \right| = \frac{1}{2} \\ \left| \begin{array}{l} -a \\ \frac{-a}{2} + \frac{a}{2} + 1 \end{array} \right| = \frac{a+1}{2}$$

$$\textcircled{2} y = 2bx^2 - bx - 1 \Rightarrow \text{ext} \left| \begin{array}{l} -(-b) \\ 2(2b) \end{array} \right| = \frac{1}{4} \\ \left| \begin{array}{l} b \\ \frac{b}{2} - \frac{b}{4} - 1 \end{array} \right| = \frac{-b-1}{2}$$

$$\textcircled{P} x = \frac{1}{2}, y = \frac{a+1}{2} \Rightarrow \frac{b}{2} - \frac{b}{4} - 1 = \frac{a+1}{2} \Rightarrow a = -12 \\ -1 = -2b - 1 \Rightarrow b = 0 \Rightarrow \boxed{b - a = -0 - (-12) = 12}$$

$$\textcircled{1} x = \frac{1}{2}, y = \frac{-b-1}{2} \Rightarrow \frac{-a}{2} + \frac{-a}{4} + 1 = \frac{-b-1}{2} \Rightarrow \frac{12 - 4a + 4}{4} = \frac{-b-1}{2} \Rightarrow \frac{16 - 4a}{4} = \frac{-b-1}{2} \Rightarrow 4 - a = \frac{-b-1}{2}$$

$$* y = 2\omega\alpha x^2 + (\alpha + \beta)x + 1 \Rightarrow \begin{cases} \textcircled{1} 2\omega\alpha^2 + (\alpha + \beta) = 0 \Rightarrow 2\omega\alpha^2 + (\alpha - \omega\alpha) = 0 \Rightarrow \alpha(2\omega\alpha - 1) = 0 \Rightarrow \alpha(\omega\alpha - 1)(\omega\alpha + 1) = 0 \\ \textcircled{2} 2\omega\beta^2 + \omega\beta = 0 \Rightarrow \omega\beta(\omega\beta + 1) = 0 \Rightarrow \beta(\omega\beta + 1) = 0 \end{cases}$$

$\textcircled{1} \alpha = 0 \Rightarrow \alpha = 0$
 $\textcircled{2} \alpha = \frac{1}{\omega}, \beta = -1$
 $\textcircled{3} \alpha = -\frac{1}{\omega}, \beta = 1$

$$* x = \frac{-1}{\omega}, \beta = 1 \Rightarrow -\omega x^2 + (\alpha + 1)x + 1 = \text{ext} \left| \begin{array}{l} -\omega \\ 2(-\omega) \end{array} \right| = \frac{1}{2\omega} \\ \left| \begin{array}{l} -\omega \\ -\omega(\frac{1}{\omega}) + (\frac{1}{\omega}) + 1 \end{array} \right| = \frac{1}{\omega} \Rightarrow \boxed{\text{D}_m}$$

$$\alpha + b = S, \alpha b = P \Rightarrow \left\{ \begin{array}{l} S = -(-(\alpha^2 + b^2 - 1)) = S^2 - 2P \\ P = \alpha + b - 1 = S - 1 \end{array} \right\} \Rightarrow S^2 - 2(S-1) - 1 = S \Rightarrow S^2 - 2S - 1 = S \Rightarrow S^2 - 3S - 1 = 0 \Rightarrow (S - \omega)(S + 2) = 0 \Rightarrow S = \omega$$

$$S \begin{cases} \textcircled{1} \omega = \alpha + b \Rightarrow P = \omega - 1 = 1 - 1 = 0 \\ \textcircled{2} -2 = \alpha + b \Rightarrow P = \alpha + b - 1 = -2 - 1 = -3 \end{cases}$$

چون $P \neq 0$ پس یکی از ریشه‌ها
 منق و شذور و چون باید طبیعی باشد قابل قبول نیست α