

$$y = (a-1)x^2 + x + 3$$

$$\text{چون } x=2 \text{ نسبت به نقطه } \rightarrow x_5 = 2 \rightarrow \frac{-b}{2a} = 2$$

$$\frac{-b}{2a} = \frac{-1}{2a-2} = 2 \rightarrow 4a-4 = -1 \rightarrow a = \frac{3}{4}$$

$$y = -\frac{1}{4}x^2 + x + 3 \xrightarrow{\times 4} y = x^2 - 4x - 12 \rightarrow y = (x-4)(x+2) \rightarrow \begin{cases} x_1 = 4 \\ x_2 = -2 \end{cases}$$

چون بین ۲ ریشه مخالف ضریب x^2 است پس ضریب x^2 منفی بوده که
 بین ۲ ریشه مثبت شده $\leftarrow m < 0$ ①

$$\Delta > 0 \rightarrow \Delta = b^2 - 4ac \rightarrow 2\Delta - 4(m)(m) > 0 \rightarrow 4m^2 < 2\Delta$$

$$m^2 < \frac{2\Delta}{4} \rightarrow \frac{-\Delta}{4} < m < \frac{\Delta}{4} \quad \text{②} \quad \text{①} \cap \text{②} = m \in \left(-\frac{\Delta}{4}, \frac{\Delta}{4}\right)$$

$$y = x^2 - 5x + p$$

$$p = x_1 x_2 = \frac{3-\sqrt{5}}{3} \times \frac{3+\sqrt{5}}{3} = \frac{4}{9} \rightarrow y = x^2 - 5x + \frac{4}{9}$$

$$S = x_1 + x_2 = 3 - \frac{\sqrt{5} + 3 + \sqrt{5}}{3} = 2$$

$$y = 9x^2 - 18x + 4$$

$$3\alpha^2 + \beta^2 = 12 \rightarrow 2\alpha^2 + \alpha^2 + \beta^2 - \beta^2 = 12 \rightarrow 2(\alpha^2 + \beta^2) + \alpha^2 - \beta^2 = 12$$

$$2(14 - 2m - 2) + \frac{(\alpha+\beta)(\alpha-\beta)}{5} = 12 \rightarrow (14 - 2m) + \frac{\sqrt{44-1(m+2)}}{5} = 4$$

$$\sqrt{44-1(m+2)} = 2m - 18 \rightarrow 44 - 1(m+2) = (2m-18)^2 \rightarrow 44 - m - 2 = 4m^2 - 72m + 324$$

$$m^2 - 18m + 14 = 0 \rightarrow m = 4$$

$$y = a(x-h)^2 + k \xrightarrow{\text{ext } \frac{1}{4}} y = a(x-2)^2 + 9 \xrightarrow{(0,5)} 5 = 4a + 9 \rightarrow a = -1$$

$$\rightarrow a = -1 \rightarrow y = -x^2 + 4x + 5 \quad \frac{-x^2 + 4x + 5}{x = -1, 5} > 0 \quad \begin{array}{c} -1 \quad 5 \\ | \quad | \\ - \quad + \end{array}$$

در بازه (۵، -۱) سی در بالای محور x ها قرار دارد

$$S = \frac{-b}{2a} = \frac{V}{\alpha} = \alpha + \beta \quad P = \alpha\beta = \frac{9\beta}{\alpha} \rightarrow \alpha^2 = 9\beta \rightarrow \alpha = \pm 3$$

$$\begin{aligned} \alpha = +3 &\rightarrow \frac{V}{\alpha} = \alpha + \beta \rightarrow \beta = \frac{-2}{3} \quad \text{O.O.E.} \\ \alpha = -3 &\rightarrow \frac{-V}{\alpha} = -\alpha + \beta \rightarrow \boxed{\beta = \frac{2}{3}} \quad \checkmark \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} \boxed{\alpha = -3}$$

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{-1}{3} + \frac{2}{3} = \frac{V}{4}$$

6

$$\alpha^2 = -m\alpha + 2m \rightarrow \alpha^2 - m\beta = \Lambda \rightarrow -m\alpha + 2m - m\beta = \Lambda$$

$$S = -m \quad P = -\Lambda$$

$$-m(\alpha + \beta - 2) = \Lambda \rightarrow m^2 + 2m - \Lambda = 0 \quad \left. \begin{array}{l} \rightarrow m = 2 \\ \rightarrow m = -\epsilon \end{array} \right\} \text{O.O.E.}$$

$$m = -\epsilon \rightarrow x^2 - \epsilon x + \Lambda = 0 \rightarrow \Delta < 0 \quad \text{O.O.E.}$$

$$m = 2 \rightarrow x^2 + 2x - \epsilon \rightarrow \Delta > 0 \quad \checkmark$$

$$\alpha + \beta = \frac{-b}{a} = \frac{-(4)}{1} = -4$$

7

$$\text{ext} \left| \begin{array}{l} \frac{-b}{2a} = \frac{-\epsilon}{2m} = \frac{-2}{m} \\ \epsilon \end{array} \right\} \xrightarrow{x = \frac{-2}{m}} m\left(\frac{\epsilon}{m}\right) + \epsilon\left(\frac{-2}{m}\right) + \frac{m}{\epsilon} + V = \Lambda$$

$$\frac{\frac{\epsilon}{m} - \frac{\Lambda}{m} + \frac{m}{\epsilon}}{\frac{-\epsilon}{m}} = 1 \quad \frac{-\Lambda + m^2}{\epsilon m} = 1 \rightarrow m^2 - \epsilon m - \Lambda = 0 \quad \left. \begin{array}{l} \rightarrow m = \epsilon \quad \text{O.O.E.} \\ \rightarrow m = -2 \end{array} \right\}$$

8

$$m = \epsilon \rightarrow \epsilon x^2 + \epsilon x + 9 = 0 \rightarrow \Delta < 0 \quad \text{O.O.E.} \quad m = -2 \rightarrow -2x^2 + \epsilon x + 4 \rightarrow \Delta > 0 \quad \checkmark$$

$$f(x) = -2x^2 + \epsilon x + 4 \xrightarrow{\text{discriminant}} -2x^2 + \epsilon x + 4 = 0 \quad \left. \begin{array}{l} \rightarrow x = -1 \\ \rightarrow x = 2 \end{array} \right\} \xrightarrow{K > 0} \boxed{|K| = 3}$$

$$\text{ext} \left| \begin{array}{l} \frac{V}{4} \\ 4 \end{array} \right\} y = a(n-h)^2 + K \rightarrow y = a(n-2)^2 + 4 \xrightarrow{\text{O.O.E.}} \epsilon = 8a + 4 \rightarrow a = \frac{-1}{4}$$

$$y = \frac{-n^2}{4} + 2n + \epsilon \rightarrow S = \epsilon \quad P = -\Lambda$$

9

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta + \alpha}{\alpha\beta} = \frac{S}{P} = \frac{\epsilon}{-\Lambda} = \frac{-1}{4}$$

9

$$n = 2 \xrightarrow{\text{discriminant}} \epsilon - \Lambda a - \Lambda + 3a^2 + 4a + 3 = 0 \rightarrow 3a^2 - 2a - 1 = 0 \quad \left. \begin{array}{l} \rightarrow a = 1 \\ \rightarrow a = -\frac{1}{3} \end{array} \right\}$$

$$a = 1 \rightarrow x^2 - \Lambda x + 13 = 0 \quad \left. \begin{array}{l} \rightarrow x = 2 \\ \rightarrow x = 4 \end{array} \right\} \boxed{n = 4}$$

10

$$a = -\frac{1}{3} \rightarrow x^2 - \frac{\Lambda}{3}x + \frac{\epsilon}{3} = 0 \quad \left. \begin{array}{l} \rightarrow x = 2 \\ \rightarrow x = \frac{2}{3} \end{array} \right\} \boxed{n = \frac{2}{3}}$$

$$(x^2 - 2)(x - \frac{2}{3}) = 0$$

10