

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

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

(1)

$$a = \frac{1}{2}$$

$$\Rightarrow y = -\frac{1}{2}x^2 + x + 3$$

$$\Rightarrow x = \frac{-1 \pm \sqrt{1}}{-1} \rightarrow \begin{cases} + \\ - \end{cases} \rightarrow \begin{cases} -2 \\ 6 \end{cases}$$

$$\Rightarrow x = 4$$

$$f(x) = mx^2 - \Delta x + m$$

x	x	x
f(x)	-	+

$$\begin{cases} \text{چون مربع } x^2 \text{ منفی نیست} \\ m < 0 \end{cases} \rightarrow m < 0 \quad I$$

(2)

$$\begin{cases} \text{چون مربع } x^2 \text{ مثبت است} \\ \Delta > 0 \end{cases} \rightarrow 2\Delta - 4m^2 > 0 \rightarrow -\frac{\Delta}{2} < m < \frac{\Delta}{2} \quad II$$

$$m^2 - \frac{\Delta}{4} < 0$$

$$(m - \frac{\Delta}{2}) / (m + \frac{\Delta}{2}) < 0$$

$$\frac{-\frac{\Delta}{2}}{+\frac{\Delta}{2}} \quad - \quad \frac{+\frac{\Delta}{2}}{+\frac{\Delta}{2}}$$

$$\Rightarrow I \cap II \Rightarrow m \in (-\frac{\Delta}{2}, 0)$$

$$x = \frac{1 \pm \sqrt{\Delta}}{2}$$

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

$$\Rightarrow x^2 - 2x + \frac{1}{2} \xrightarrow{\times 2} 2x^2 - 4x + 1$$

$$\alpha < \beta \quad 2x^2 - 4x + m + 2 = 0 \quad 3\alpha^2 + \beta^2 = 12 \quad m = ?$$

$$\alpha + \beta = \frac{-b}{a} = \frac{4}{2} = 2 \rightarrow \beta = 2 - \alpha$$

(3)

$$\rightarrow 3\alpha^2 + \beta^2 \rightarrow 3\alpha^2 + (2-\alpha)^2 = 12 \rightarrow 4\alpha^2 - 4\alpha + 4 = 0 \xrightarrow{\div 4} \alpha^2 - \alpha + 1 = 0$$

$$\Rightarrow \beta = 2 - \alpha = 2 - 1 = 1 \Rightarrow \alpha = \beta$$

$$\rightarrow (\alpha - 1)^2 = 0 \rightarrow \alpha = 1$$

$$\frac{c}{a} = \frac{m+2}{2} = 3 \rightarrow m+2 = 6 \rightarrow m = 4$$

$$C_1 \rightarrow (2, 9) \rightarrow (h, k)$$

(5)

$$\Rightarrow a(x-h)^2 + k \xrightarrow[y=\omega]{x=0} \omega = a(0-2)^2 + 9 \Rightarrow -\epsilon = 4a$$

$$\boxed{a = -1}$$

$$\Rightarrow y = -1(x-2)^2 + 9 \Rightarrow y = -x^2 + 4x - 4 + 9 \rightarrow -x^2 + 4x + 5 > 0$$

$$\Rightarrow -x^2 + 4x + 5 < 0 \rightarrow (x-5)(x+1) < 0$$

$$\begin{array}{c} -1 \quad 5 \\ + \quad | \quad - \quad | \quad + \end{array}$$

$$\Rightarrow \boxed{x \in (-1, 5)}$$

$$\alpha, \beta \quad ax^2 - vx + 9\beta = 0 \quad \beta > 0 \quad \frac{1}{\alpha} + \frac{1}{\beta}$$

(6)

$$\alpha + \beta = -\frac{b}{a} = \frac{v}{a}$$

$$\alpha\beta = \frac{c}{a} \sim \frac{9\beta}{\alpha} \rightarrow \alpha\beta = \frac{9\beta}{\alpha} = \alpha^2 = 9 \rightarrow \alpha = \pm 3$$

$$\Rightarrow \frac{1}{\alpha} + \frac{1}{\beta} = \frac{1}{-3} + \frac{1}{3} = \left(\frac{v}{9}\right)$$

$$\alpha, \beta \quad x^2 + mx - 2m = 0 \quad \alpha^2 - m\beta = 1$$

$$\xrightarrow[x=0]{x=\beta} \beta^2 + \beta m - 2m = 0 \rightarrow -m\beta = \beta^2 - 2m$$

$$\Rightarrow \alpha^2 + \beta^2 - 2m = 1 \rightarrow 5 - 2\beta - 2m = 1 \Rightarrow m^2 + 4m - 1 = 0$$

$$\Rightarrow x^2 + 2x - 4 = 0$$

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

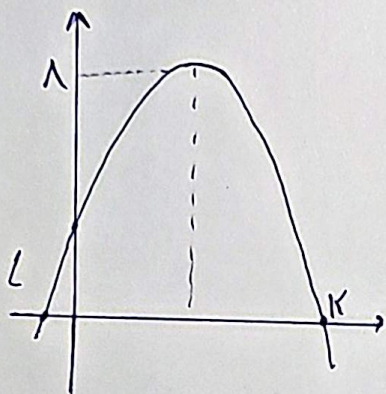
$$(m+2)/(m-2) = 0$$

$$m \xrightarrow{-4} \text{ (2) } \Delta < 0 \text{ , } \Delta > 0$$

$$\alpha + \beta = -\frac{b}{a} = (-2)$$

(7)

$$f(x) = mx^2 + ex + \frac{m}{r} + V$$



$$x_s = -\frac{b}{2a} = -\frac{e}{2m} \rightarrow x_s = -\frac{r}{m}$$

$$\frac{x_s = -\frac{r}{m}}{y_s = 1} \rightarrow m\left(-\frac{r}{m}\right)^2 + e\left(-\frac{r}{m}\right) + \frac{m}{r} + V = 1$$

$$\frac{e}{m} - \frac{1}{m} + \frac{m}{r} + V = 1$$

$$x'm \rightarrow 1 - 1/r + m^2 + 1/m = 1/m$$

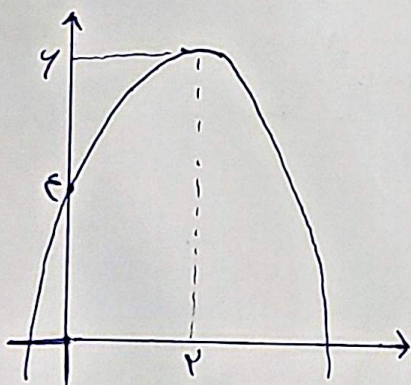
$$m^2 - 2m - 1 = 0$$

$$(m-1)(m+1) = 0 \rightarrow \begin{cases} m = -1 \\ m = 1 \end{cases} \xrightarrow{\text{max}} m = 1$$

$$\Rightarrow f(x) = -x^2 + ex + 1$$

$$y=0 \rightarrow x \in \left[-\frac{1}{r}\right] \Rightarrow K > L \Rightarrow \boxed{K=1}$$

$$\frac{1}{a} + \frac{1}{b} = ?$$



$$y = a(x-h)^2 + k \rightarrow y = a(x-r)^2 + 1$$

$$\frac{x=0}{y=e} \rightarrow e = a + 1 \rightarrow \boxed{a = -\frac{1}{r}}$$

$$y = -\frac{1}{r}(x-r)^2 + 1 \rightarrow -\frac{1}{r}x^2 + 2x - r + 1$$

$$-\frac{1}{r}x^2 + 2x + e = 0$$

$$\frac{1}{a} + \frac{1}{b} = \frac{a+b}{ab} = \frac{5}{p} = \frac{r}{-1} = \boxed{-\frac{1}{r}}$$

1

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$$x^r(\epsilon a + \epsilon)x + (ra^r + \gamma a + r) = 0$$

(10)

$$\underline{x=r} \rightarrow \epsilon - \Lambda a - \Lambda + ra^r + \gamma a + r = 0 \Rightarrow ra^r - ra - 1 = 0 \begin{cases} a=1 \\ a=-\frac{1}{r} \end{cases}$$

$$a \rightarrow 1 \Rightarrow \begin{cases} xr = \gamma \\ \text{الحل } \underline{r} \end{cases}$$

$$a \rightarrow -\frac{1}{r} \Rightarrow \begin{cases} xr = -\frac{r}{\epsilon} \\ \text{الحل } \underline{r} \end{cases}$$

$$\textcircled{a=1} \rightarrow x_1 + xr = \epsilon a + \epsilon \rightarrow x_1 + xr = \Lambda \rightarrow \boxed{xr = \gamma}$$

$$\textcircled{a=-\frac{1}{r}} \rightarrow x_1 + xr = \epsilon a + \epsilon \rightarrow x_1 + xr = -\frac{\Lambda}{r} \rightarrow \boxed{xr = -\frac{r}{\epsilon}}$$