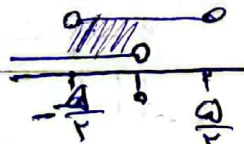
$\frac{-b}{2a} = 2 \Rightarrow a = \frac{3}{4}$ $\quad y = \frac{-1}{2}x^2 + x + 3 \xrightarrow{x=4} y = -1$ ✓ ①

$m < 0$ (I), $\Delta > 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow 4a - 4m^2 > 0$

$\Rightarrow 4a > 4m^2 \Rightarrow m^2 < \frac{4a}{4} \Rightarrow -\frac{a}{2} < m < +\frac{a}{2}$ (II) ③ ②

(I) $\cap$ (II) $\Rightarrow -\frac{a}{2} < m < 0$



$y = ax^2 + bx + c \Rightarrow y = ax^2 + 5x + 9 \quad S = 2, P = \frac{8}{9}$

$\Rightarrow y = ax^2 + \left(\frac{3-\sqrt{a}}{3} + \frac{3+\sqrt{a}}{3}\right)x + \left(\frac{3-\sqrt{a}}{3}\right)\left(\frac{3+\sqrt{a}}{3}\right)$ ⑤ ④

$y = ax^2 + \left(\frac{6}{3}\right)x + \frac{9-a}{9} \Rightarrow y = ax^2 + 2x + \frac{2}{3}$

$\Rightarrow y = x^2 + 2x + \frac{2}{3} \quad 9m^2 - 18 + 8$

$2x^2 - 8x + m + 2 = 0$, $\alpha < \beta$, $3\alpha^2 + \beta^2 = 12$, m? ⑥

$\Delta = b^2 - 4ac$.

$\Delta > 0 \Rightarrow 64 - 8 \times 2(m+2) > 0 \Rightarrow 64 - 8m - 16 > 0$ ⑦

$\Rightarrow 8m < 48 \Rightarrow m < 6$

$2(s^2 - 2p) - (s)\left(\frac{\sqrt{\Delta}}{|a|}\right) = 12$

$m = 8$

$3\alpha^2 + \beta^2 - 12 = 0 \qquad \alpha^2 + \beta^2 = s^2 - 2p = \left(\frac{8}{2}\right)^2 - 4$

$y = ax^2 + bx + c$ ، $\frac{-b}{2a} = 1 \Rightarrow -b = 2a \Rightarrow 2a + b = 0$ (1)

$-\frac{\Delta}{4a} = \frac{b^2 - 20a}{4a} = 9 \Rightarrow b^2 - 20a = 36a \Rightarrow b^2 - 56a = 0$

$a = -1 \quad (x-1)^2 < 9$

$-1 < x < 3$

$$\begin{cases} b^2 - 56a = 0 \\ b + 2a = 0 \end{cases} \Rightarrow \begin{cases} b^2 - 56a = 0 \\ 14b + 56a = 0 \end{cases} \Rightarrow b^2 + 14b = 0$$

$b(b + 14) = 0$

$b = 0$ يا $b = -14$

مرفوض ← مقبول

$a = \frac{7}{2}$

$y = \frac{7}{2}x^2 - 14x + 9 > 0$

$\Delta = 196 - 4 \times \frac{7}{2} \times 9 = \sqrt{124}$

$x_1, x_2 = \frac{14 \pm \sqrt{124}}{7} = 2 \pm \sqrt{31}$

	$2 - \sqrt{31}$		$2 + \sqrt{31}$	
	+	0	−	0

$\Rightarrow x < 2 - \sqrt{31}$ أو $x > 2 + \sqrt{31}$

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(2)

$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta + \alpha}{\alpha\beta} = \frac{\frac{7}{4}}{\frac{9}{4}} = \frac{7}{9}$

$\alpha + \beta = -\frac{b}{a} = \frac{7}{4}$

$\alpha\beta = \frac{c}{a} = \frac{9}{4}$

$\alpha\beta^2 - 7\beta + 9\beta \Rightarrow \frac{7}{\alpha}$

$\alpha\beta = \frac{9\beta}{4} \quad \alpha = \pm 2$

$\alpha = 2, \beta = \frac{3}{2}$

$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{7}{9}$

B? $\beta = x$

$\alpha = 2$

$۲m+m^۲=۸$ $\begin{cases} m=۲ & \Delta>۰ \checkmark \\ m=-۴ & \Delta<۰ \times \end{cases}$ $S=-m=-۲$ ۹ (۷)

$m<۰ , \Delta>۰ = ۱۶-۴m(\frac{m}{۲}+۷)>۰$ $\frac{-\Delta}{۴a}=۸$ $m=-۲$ $a=۲$

$۱۶-۲m^۲-۲۸>۰ \Rightarrow ۲m^۲<-۱۲$ ۹ (۱۰) (۱۱)

$a=\frac{-۱}{۲}$ $x^۲-۴x-۸=۰$ $\frac{۱}{\alpha}+\frac{۱}{\beta}=\frac{-۱}{۲}$ ۹ (۸) (۹)

$۲a+۲=t$ $۳a^۲+۶a+۳=۰ \Rightarrow ۳a^۲+۲۴a+۴۸+۳-۱$ ۹ (۲) (۱۵)

$t^۲-t۶+۳a^۲+۲۴a+۴۸-۱$

$t^۲-t۶+t+۳a^۲+۳a-۱$

$۳\alpha^۲-۳\alpha-۱=۰ \begin{cases} a=۱ \\ a=-\frac{۱}{۳} \end{cases}$

$a=۱ \begin{cases} x=۲ \\ x=۴ \end{cases}$ $a=-\frac{۱}{۳} \begin{cases} x=۲ \\ x=\frac{۲}{۳} \end{cases}$