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①

$\alpha , \beta = 3\alpha \Rightarrow P = 3\alpha^2 = \frac{4}{3} \Rightarrow \alpha^2 = \frac{4}{9}$

$S = 4\alpha = \frac{\pm 8}{3} = \frac{a}{3} \rightarrow \boxed{a = 8 \text{ یا } -8}$ $\quad \alpha = \pm\frac{2}{3}$

$8 - (-8) = 16$ $\quad \boxed{\beta = \pm 2}$

②

$\left(\sqrt{\frac{1}{\alpha}} + \sqrt{\frac{1}{\beta}}\right)^2 = \frac{1}{\alpha} + \frac{1}{\beta} + 2\sqrt{\frac{1}{\alpha\beta}} = 25$

$\frac{\alpha+\beta}{\alpha\beta} = \frac{S}{P} = \frac{\frac{m+12}{36}}{\frac{1}{36}} = m+12$

$\Rightarrow m + 12 + 12 = 25 \Rightarrow \boxed{m = -1} \Rightarrow -x^2 + 3x + 2 = 0$

$\Rightarrow P = \frac{2}{-1} = -2$

③

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

$\Rightarrow \alpha^2 + \beta^2 - 4 = 1 \Rightarrow \alpha^2 + \beta^2 + \underbrace{4}_{-2\alpha\beta} = 9 \Rightarrow \alpha - \beta = 3$

$\begin{cases} \alpha + \beta = 1 \\ \alpha - \beta = 3 \end{cases} \Rightarrow \begin{cases} \alpha = 2 \\ \beta = -1 \end{cases} \Rightarrow -4 + k + 9 - 2 = 0$

$\boxed{k = -3}$

④

$2/5\alpha^2 + 2/5\beta^2 + 0/5\alpha^2 - 0/5\beta^2 = 2/5(\alpha^2 + \beta^2) + 0/5(\alpha^2 - \beta^2)$

$2/5(S^2 - 2P) + 0/5\left(S\sqrt{S^2 - 4P}\right)$ $\quad \{ S = -6 , P = a$

$2/5(36 - 2a) + 0/5\left(-6\sqrt{36 - 4a}\right)$

$\underbrace{90 - 5a}_{} + \underbrace{3\sqrt{36 - 4a}}_{} = 85 + 12\sqrt{2}$

$85 \Rightarrow \boxed{a = 1}$ $\quad 6\sqrt{9 - a} = 12\sqrt{2}$

$\boxed{a = 1}$

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(۵) $t^2 - 7t - 5 = 0 \Rightarrow t = \underbrace{\frac{7 - \sqrt{69}}{2}}_{<0} < \frac{7 + \sqrt{69}}{2}$

$x^2 = \frac{7 + \sqrt{69}}{2} \Rightarrow \boxed{S = 0}$ $\quad \left(\frac{7 + \sqrt{69}}{2}\right)^2 = \frac{49 + 69 + 14\sqrt{69}}{4}$

$P^2 = \frac{118 + 14\sqrt{69}}{4} \Rightarrow 2P^2 = \frac{118 + 14\sqrt{69}}{2}$

(۶) $\alpha, \beta \longrightarrow \alpha + 1, \beta + 1$

$S_1 = \alpha + \beta = \frac{a}{2}$ $\quad S_2 = \alpha + \beta + 2 = S_1 + 2$

$P_1 = \alpha\beta = \frac{b}{2}$ $\quad P_2 = \alpha\beta + 1(\alpha + \beta) + 1 = P_1 + S_1 + 1$

$S_2 = \frac{-a}{2a} = \frac{-1}{2} = \frac{a}{2} + 2 \Rightarrow \boxed{a = -2}$

$P_2 = \frac{-6}{2(-2)} = 1 = \frac{b}{2} + \frac{1}{2}\left(\frac{-2}{2}\right) + \frac{1}{4}$ $\quad \Rightarrow \boxed{\frac{(2b - 2)}{4}} = -3$

$\frac{2b}{4} + \frac{-2}{4} + \frac{1}{4} = 1 \Rightarrow \boxed{b = 2}$

(۷) $20\beta^2 + 10\beta^4 + 20\alpha^2 - 20\beta = 12$

$20(\beta^2 + \alpha^2) + 20(\beta^2 - \beta) = 12$

$20(S^2 - 2P) + 20(\beta^2 - \beta) = 12$ $\quad \Rightarrow 2(\beta^2 - \beta) = \frac{b}{a} = \boxed{-P}$

$20S^2 - 40P + 20P = 20S^2 - 20P = 12 \Rightarrow 20 - 20P = 12$ $\quad S = \frac{a}{a} = 1$

$20P = 8 \Rightarrow P = \frac{1}{20}$ $\quad \sqrt{S^2 - 4P} = \sqrt{1 - \frac{4}{20}} = \sqrt{\frac{16}{20}} = \frac{4}{2\sqrt{5}} = \boxed{\frac{2}{\sqrt{5}}}$

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(۸) $\sqrt{S^2 - 2P} = 2 = S^2 - 2P = 4$

$\Rightarrow (a+1)^2 - 4a - 4 = 0$

$a^2 + 2a + 1 - 4a - 4 \Rightarrow$ ~~...~~

$a^2 - 2a - 3 = 0 \Rightarrow a = 3, -1$ (غ ق ق) $\Rightarrow 2 \cdot 4 \times 3 = 24$

$S^2 - 4P = 4 \Rightarrow 100 - 4b = 4 \Rightarrow b = 24$

(۹) $y = \alpha^2 + \beta^2 = S^2 - 2P \Rightarrow 1 - 2(-1 - m^2) = y$

$1 + 2 + 2m^2 = 2m^2 + 3 = y \quad m_{min} = 0 \Rightarrow y_{min} = 3$

(۱۱) ~~...~~

(۱۰) $\frac{-a+3}{2} = -1 \Rightarrow a(x+1)^2 + 1 = y$

$ax^2 + 2ax + a + 1 = y$

$\alpha^2 + \beta^2 = S^2 - 2P = \frac{-2a-2}{a} = 0 \Rightarrow$ ~~...~~

~~...~~

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

$1 - \frac{2}{3} = \frac{1}{3}$

$-2a - 2 = a \quad -2 = 3a$

$a = \frac{-2}{3}$