$3x^2 - ax + 4 = 0$

$\alpha, 3\alpha \to P = \frac{4}{3} = 3\alpha^2 \to \alpha^2 = \frac{4}{9} \quad \alpha = \pm\frac{2}{3}$

① $S = \frac{2}{3} + 2 = \frac{2+6}{3} = \frac{8}{3}$ ② $S = -\frac{2}{3} - 2 = -\frac{8}{3}$ ① ۱

$24x^2 - (m+14)x + 1 = 0 \quad \alpha, \beta \to \frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = 5 \xrightarrow{(\,)^2}$ ۴

$S = \frac{m+14}{24} \quad P = \frac{1}{24}$

$\frac{1}{\alpha} + \frac{1}{\beta} + \frac{2\sqrt{\beta}}{\sqrt{\alpha\beta}} \to \frac{2}{1/4} = 12$

$\frac{\beta+\alpha}{\alpha\beta} \quad \frac{1}{\alpha\beta} = 24$

$\frac{m+14}{2} + 12 = 25$

$\frac{m+14}{24} \times 24 = \frac{m+14}{2}$

$\frac{m+14}{2} = 13 \quad m+14 = 26 \xrightarrow{2} m = 12$ ۲۵٪

$mx^2 + 3x + 2 = 0 \to P = \frac{2}{m} = \frac{2}{12} = \frac{1}{6}$

$kx^3 + kx^2 - 9x - 2$ ۳ ۵

$3\alpha^2 = \frac{k}{3} \to \alpha = \pm\frac{2}{3}$

$\alpha = -\frac{2}{3} \to \beta = 2 \to a = 8$

$\alpha = \frac{2}{3} \to \beta = -2 \to a = -8$ ۱

$8 - (-8) = 16$

$\beta = 1 - \alpha$ ۳

$\alpha(1-\alpha) = -2 \to \alpha = -1, 2$

$\frac{\alpha+\beta+2\sqrt{\alpha\beta}}{2\beta} = 25 \to \frac{m+14}{24} + 2\sqrt{\frac{1}{24}} \to m + 14 + 12 = 25 \to m = -1$ ۲

$\frac{1}{24}$

$\to -a^2 + 2a + 1 \to \frac{c}{a} = -2$

$\alpha = 2 \to k = -3$

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$\alpha = -1 \to k = -3$

۴

$x^2 + 4x + a \longrightarrow$

$\alpha < \beta < 0$

$2\alpha^2 + 2\beta^2 = 12\sqrt{2} + 18 \Rightarrow \alpha^2 + \beta^2 = 6\sqrt{2} + 9$ $\qquad$ $s^2 - 2p$

$s = \frac{-4 - \sqrt{16 - 4a}}{2}$ $\qquad$ $\alpha^2 = \frac{17 - 4a + 12\sqrt{16 - 4a}}{2}$ $\qquad$ $\Delta = 16 - 4a$

$s^2 - 2p \rightarrow \omega$ $\qquad$ $12\sqrt{16 - 4a} = 12\sqrt{2}$ $\qquad$ $\sqrt{16 - 4a} = 2\sqrt{2}$

$16 - 4a = 8$ $\qquad$ $a = 2$

۵

$x^4 - 7x^2 - 8 = 0$ $\qquad$ $x^2 = t$ $\qquad$ $t^2 - 7t - 8 = 0$

$\Delta = 49 - 4(-8) = 81$ $\qquad$ $t = \frac{7 \pm \sqrt{81}}{2}$ $\qquad$ $x = \pm\sqrt{\frac{7 + \sqrt{81}}{2}}$

$S = 0$ $\qquad$ $P = \frac{-7 - \sqrt{81}}{2}$ $\qquad$ $2P^2 - 3SP + 2S^2$

$2\left(\frac{88 + 14\sqrt{81}}{4}\right) = 81 + 7\sqrt{81}$

۶

$2x^2 - ax + b = 0$ $\qquad$ $\alpha + \frac{1}{2}, \beta + \frac{1}{2}$

$2ax^2 + ax - 4 = 0$ $\qquad$ $\alpha, \beta \longrightarrow S = \frac{-a}{4a} = -\frac{1}{4}$ $\qquad$ $P = \frac{-4}{2a} = -\frac{2}{a}$

$S' = S + 1 = -\frac{1}{4} + 1 = \frac{3}{4} = \frac{a}{4a} \longrightarrow a = 3$

$P' = \frac{1}{4} + (\alpha + \beta)\frac{1}{2} + \alpha\beta = \frac{1}{4} - \frac{1}{8} - 1 = \frac{1 - 2 - 4}{8} = -\frac{5}{4}$

$\frac{b}{2} = -\frac{5}{4}$ $\qquad$ $b = -\frac{5}{2}$

$\left[\frac{3x - \frac{5}{2}}{2}\right] = -1$

$-\frac{15}{8} = -1\frac{7}{8}$

$2x^2 - ax + b = 0 \begin{cases} S = \frac{a}{2} \\ P = \frac{b}{2} \end{cases}$ $\qquad$ $2ax^2 + ax - 4 \begin{cases} S = \frac{1}{4} \rightarrow \alpha + \beta = \frac{1}{2} = \frac{a}{2} \rightarrow a = 1 \\ P = -2 \rightarrow b = -4 \end{cases}$

$\left[\frac{ab}{4}\right] = -2$

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$ax^2 - cx - b = 0 \quad S = 1 \quad P = \frac{-b}{a}$ (۷)

$-۲۰\beta^2 + ۲۰\alpha^2 - ۲۰\beta = ۱۷$

$۲۰\beta^2 + ۲۰\beta^2 + ۲۰\alpha^2 - ۲۰\beta = ۱۷ \quad S^2 - ۲P$

$۲۰(\alpha^2 + \beta^2) + ۲۰(\beta^2 - \beta) = ۱۷$

$a\beta^2 - a\beta - b = ۰ \quad a(\beta^2 - \beta) - b = ۰ \quad (\beta^2 - \beta) = \frac{b}{a}$

$۲۰(۱ + \frac{۲b}{a}) + ۲۰(\frac{b}{a}) = ۱۷ \quad \frac{b}{a} = \frac{-۱}{۲۰}$ (۵)

$|\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{a^2 - ۴(a)(-b)}}{|a|} = \frac{\sqrt{a^2 + ۴ab}}{|a|} = \frac{|a|\sqrt{۱ + ۴\frac{b}{a}}}{|a|}$

$\sqrt{۱ + ۴(-\frac{۱}{۲۵})} = \sqrt{\frac{۴}{۵}} = \frac{۲}{\sqrt{۵}}$

$x^2 - (a+۱)x + a = ۰$ { جمع ضرایب $\to$ یکی $= ۱$ $\to a = ۳$ (۸)

$۱ + ۳ \quad P = ۳$

$x^2 - (۳a + ۱)x + b = ۰$ { یکی $= ۶$ (۵)

$۱۰ \quad P = ۲۴$

$۲۴ - ۳ = ۲۱$

$x^2 + x - ۱ - m^2 = ۰ \to S = -۱$ (۹)

$\min \alpha^2 + \beta^2 \quad P = -۱ - m^2 \quad \alpha^2 + \beta^2 = S^2 - ۲P$

$۱ - ۲(-۱ - m^2) =$

$۱ + ۲ + ۲m^2 = ۲m^2 + ۳$ (۳)

$\min = -\frac{\Delta}{۴a} = \frac{۲۴}{۸} =$ (۳) (۵)

$\Delta = ۰ - ۴(۲)(-۳) = ۲۴$

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(10)

$A(3, y) \rightarrow x_S = \frac{3 - (-2)}{2} = -1$

$B(-2, y) \qquad y_S = 1 - \frac{2}{3}$

$f(x) = a(x+1)^2 + 1 \qquad a(x^2 + 2x + 1) + 1$

$ax^2 + 2ax + a + 1 \qquad \alpha^2 + \beta^2 = 2 \qquad S^2 - 2P$

$S = \frac{-2a}{a} = (-2) \qquad P = \frac{a+1}{a} \qquad 4 - 2\left(\frac{a+1}{a}\right)$

$\frac{4}{1} = \frac{2a+2}{a} \cdot \frac{4a - 2a - 2}{a} = \frac{2a-2}{a} = 2$ (2)

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

عرض الرأس $= a + 1 = -\frac{2}{3} + 1 = \frac{1}{3}$

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