۱- $\alpha \times \frac{۳}{۴} = \frac{۳}{۴} \Rightarrow \alpha = ۱$ ، $۱ - (-۱) = ۲$

$\alpha \times \frac{-۳}{۴} = \frac{۳}{۴} \Rightarrow \alpha = -۱$

$\alpha + ۳\alpha = ۴\alpha = \frac{۴}{۳} \Rightarrow \alpha = \frac{۱}{۳}$ ، $۳\alpha \times \alpha = ۳\alpha^۲ = \frac{۴}{۳} \Rightarrow \alpha^۲ = \frac{۴}{۹}$

۲- $۳m^۲ + ۳m + ۲ = ۰$

$S = \frac{-۳}{۳} = -۱$ ، $P = \frac{۲}{۳}$

$\frac{۱}{\sqrt{\alpha}} + \frac{۱}{\sqrt{\beta}} = \frac{\sqrt{\alpha} + \sqrt{\beta}}{\sqrt{\alpha\beta}} = ۵ \Rightarrow \sqrt{\alpha} + \sqrt{\beta} = \frac{۵}{۶}$ ، $\sqrt{\alpha\beta} = \frac{۱}{۶}$

$\alpha + \beta + ۲\sqrt{\alpha\beta} = \frac{۲۵}{۳۶} \rightarrow \frac{-۳+۱۴}{۳۶} + \frac{۲}{۶} = \frac{۲۵}{۳۶} \rightarrow -۳ + ۱۴ + ۱۲ = ۲۵ \rightarrow m = -۱$

$\frac{۲}{m} = -۲$

۳- $۴m^۳ + ۶m^۲ - ۹m - ۲ = ۰$

$S = ۱$

$P = -۲ \Rightarrow \beta = -\frac{۲}{\alpha}$

$\alpha + -\frac{۲}{\alpha} = ۱ \Rightarrow \frac{\alpha^۲ - ۲}{\alpha} = ۱ \Rightarrow \alpha^۲ - \alpha - ۲ = ۰$

$\alpha = ۲ ، \beta = -۱$

$m = ۲ \rightarrow ۳۲ + ۴k - ۱۸ - ۲ = ۰ \Rightarrow ۴k = -۱۲ \Rightarrow k = -۳$

۴- $S = -۶$ ، $P = ۵$ ، $\alpha < \beta < ۰$

$۳\alpha^۲ + ۲\beta^۲ = ۱۲\sqrt{۲} + ۸۵ \rightarrow \frac{۵}{۲}(\alpha^۲ + \beta^۲) + \frac{۱}{۲}(\alpha^۲ - \beta^۲)$

$(\alpha + \beta)^۲ - ۲\alpha\beta = ۳۶ - ۲۰ = ۱۶$

$(\alpha^۲ - \beta^۲) = (\alpha - \beta)(\alpha + \beta) = -۶\sqrt{۵}$

$۱۲\sqrt{۲} + ۸۵ = \frac{۵}{۲}(۳۶ - ۲۰) - ۶\sqrt{۵} \Rightarrow ۱۲\sqrt{۲} = ۶\sqrt{۵} = \sqrt{۵} = -۴\sqrt{۲}$

$$\frac{170}{5} = 36 - 2\alpha\beta \longrightarrow 34 - 36 = -2\alpha\beta \Rightarrow \alpha\beta = 1 \qquad \frac{c}{a} = 1 = \frac{a}{1} \Rightarrow a = 1$$

۵-

$$x^4 - 7x^2 - 5 = 0 \xrightarrow{x^2 = t} t^2 - 7t - 5 = 0 \qquad t = \frac{7 \pm \sqrt{49+20}}{2} \longrightarrow$$

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$$t = \frac{7+\sqrt{69}}{2} \Rightarrow x^2 = \frac{7+\sqrt{69}}{2} \Rightarrow x = \pm\sqrt{\frac{7+\sqrt{69}}{2}} \Rightarrow S = 0$$

$$\searrow P = \frac{-7-\sqrt{69}}{2}$$

$$2P^2 - 3SP + 2S = 2P^2 = 2\times\left(\frac{-7-\sqrt{69}}{2}\right)^2 = \frac{49+69+14\sqrt{69}}{2} = \frac{118+14\sqrt{69}}{2} = 59 + 7\sqrt{69}$$

۶-

$$S = \frac{a}{2} \qquad P = \frac{b}{2} \qquad 2ax^2 + ax - 6 = 0 \qquad \alpha + \frac{1}{2},\ \beta + \frac{1}{2}$$

$$S' = \frac{-a}{2a} = -\frac{1}{2} \qquad P' = \frac{-6}{2a} = \frac{-3}{a} \qquad S' = \alpha + \beta + 1 \Rightarrow -\frac{1}{2} = \frac{a}{2} + 1 \Rightarrow$$

$$a = -3 \qquad P' = \left(\alpha + \frac{1}{2}\right)\left(\beta + \frac{1}{2}\right) = \alpha\beta + \frac{1}{2}(\alpha+\beta) + \frac{1}{4} = \frac{b}{2} - \frac{3}{4} + \frac{1}{4} =$$

$$\frac{-3}{-3} = 1 \Rightarrow \frac{b}{2} = \frac{3}{2} \Rightarrow b = 3 \qquad \left[\frac{ab}{4}\right] = \left[\frac{-9}{4}\right] = -3$$

۸- (پاسخ سوال ۷ و ۸ را جا به جا نوشته‌ام)

$$x^2 - (a+1)x + a = 0 \longrightarrow \alpha,\ \alpha + 2$$

$$\left.\begin{aligned} S &= a + 1 = 2\alpha + 2 \\ P &= a = \alpha^2 + 2\alpha \end{aligned}\right\} \alpha^2 + 2\alpha + 1 = 2\alpha + 2 \Rightarrow \alpha^2 = 1 \Rightarrow \alpha = \pm 1 \xrightarrow{\text{بفرض مثبت}} a = 1\times 3 = 3$$

$x^2 - (\alpha+\beta)x + b = 0 \rightarrow \beta, \beta+2 \quad S = 10 = 2\beta + 2 \Rightarrow \beta = 4$

$b = 4 \times 9 = 36 \Rightarrow b - a = 36 - 5 = 31$

۷-

$ax^2 - bx - b = 0 \Rightarrow x^2 = \frac{ax+b}{2} \Rightarrow \beta^2 = \frac{a\beta + b}{2}$

$50 \times \frac{\alpha\beta + b}{a} + 20 \times \frac{a\alpha + b}{c} - 20\beta = 117 \xrightarrow{\times \alpha} 50\alpha\beta + 50b + 20a\alpha + 20b -$

$20\beta\alpha = 117\alpha \Rightarrow 20a + 50b = 117a \Rightarrow 50b = -83a \Rightarrow b = -\frac{83}{50}a$

$\alpha - \beta = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{a^2 + 4a \times \frac{-83}{50}a}}{|a|} = \frac{\sqrt{\frac{17}{25}a^2}}{|a|} = \sqrt{0/17}$

۹-

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

$S = -1$

$P = -1 - m^2$

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

$1 - 2(-1 - m^2) = 2m^2 + 2 \xrightarrow[m^2 \geq 0]{} \min_m = 2$

۱۰-

$x_v = \frac{2 + (-2)}{2} = -1 \rightarrow S(-1, 1) \quad y = a(x+1)^2 + 1$

$a(x+1)^2 + 1 = 0 \Rightarrow ax^2 + 2ax + a + 1 = 0 \Rightarrow S = -2$

$P = 1 + \frac{1}{a}$

$$\alpha^2+\beta^2=(\alpha+\beta)^2-2\alpha\beta=4-2\left(1+\frac{1}{a}\right)=2-\frac{2}{a}=a \Rightarrow a=-\frac{2}{3}$$

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