سارا عزیزی سری ۲۲

(۱)

$\alpha = 5 - \beta$

$\alpha + \beta = 5 \ , \ \alpha\beta = 2$

$\beta^2 = 5\beta - 2 \rightarrow \beta^3 = 5\beta^2 - 2\beta = 5(5\beta - 2) - 2\beta = 23\beta - 10 \rightarrow \beta^4 = 23\beta^2 - 10\beta =$

$23(5\beta - 2) - 10\beta = 105\beta - 46 \rightarrow \beta^5 = 105\beta^2 - 46\beta = 105(5\beta - 2) - 46\beta$

$\rightarrow \beta^5 = 479\beta - 210 \rightarrow \dfrac{4\alpha + \beta^5}{5\beta^2} = \dfrac{4\alpha + 479\beta - 210}{5(5\beta - 2)} = \dfrac{95(5\beta - 2)}{5(5\beta - 2)} = \boxed{19}$

(۲)

$x = \dfrac{x_1 + x_2}{2} = \dfrac{3 - 1.5}{2} = 0.75$ ، راس منحنی $= \dfrac{-b}{2a}$ ، جمع ریشه‌ها $= \dfrac{-b}{a}$

$\dfrac{-b}{2a} = \dfrac{3}{4} \rightarrow \dfrac{-b}{a} = \boxed{\dfrac{3}{2}}$

(۳)

فاصله ریشه‌ها $= \dfrac{\sqrt{\Delta}}{|a|} = \dfrac{\sqrt{4k^2 - 20}}{1} = \cancel{2}\sqrt{k^2 - 5} = \dfrac{\cancel{2}}{3}k \rightarrow k^2 - 5 = \dfrac{4}{9}k^2$

$\dfrac{5}{9}k^2 = 5 \rightarrow k^2 = 9 \rightarrow \left[\dfrac{k^2}{2}\right] = \left[\dfrac{9}{2}\right] = [4.5] = 4$

(۴)

$\left.\begin{array}{l} y = 25a - 5b + c \\ y = 9a + 3b + c \end{array}\right\} 16a - 8b = 0 \rightarrow 2a = b$

$ex + t \ \Big| \ \dfrac{-b}{2a} = \dfrac{-b}{b} = -1$

-1

$\alpha^2 + \beta^2 = 4 - 2p = 5 \rightarrow -2p = 1 \rightarrow p = -\dfrac{1}{2}$

$\alpha + \beta = \dfrac{-b}{a} = -2 \rightarrow S^2 = 4 \rightarrow y = x^2 - Sx + P = x^2 + 2x - \dfrac{1}{2}$

$\rightarrow y = a\left(x^2 + 2x - \dfrac{1}{2}\right) \rightarrow 1 = a\left(1 - 2 - \dfrac{1}{2}\right) \rightarrow a = -\dfrac{2}{3} \rightarrow y = -\dfrac{2}{3}\left(x^2 + 2x - \dfrac{1}{2}\right)$

$\rightarrow y = \dfrac{1}{3}$

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$-x^2+5x+m=0 \to \Delta=25+4m \qquad x=\frac{-5\pm\sqrt{25+4m}}{-2}$ ④

$\to \frac{-5+\sqrt{25+4m}}{-2}<\frac{9}{2} \to -\sqrt{25+4m}<4 \to 4<\sqrt{25+4m} \to 16<25+4m$

$-9<4m \to -\frac{9}{4}<m$

$\to \frac{-5-\sqrt{25+4m}}{-2}<\frac{9}{2} \to 25+4m<196 \to 4m<171 \to m<\frac{171}{4}$

$\to -\frac{9}{4}<m<\frac{171}{4} \to -2,-1,0,1,2,\dots,42 \to$ ۴۵ تا

③ $\frac{-\Delta}{4a}=\frac{144-4m(5m-1)}{4}=3 \to 5m^2-m-36=2m \to 5m^2-3m-36=0$

$\to 25m^2-15m-180=0 \to (m-\frac{15}{5})(5m+12)=(m-3)(5m+12)=0$

$\to m-3=0 \to m=3$ ✓ $\to y=3x^2-12x+15$

$\to 5m+12=0 \to 5m=-12 \to m=\frac{-12}{5} \to a>0 \to \times$

$\to$ طول رأس $=x=\frac{-b}{2a}=\frac{+12}{6}=\boxed{2}$

ریشه مضاعف $\to \alpha^2=\alpha\beta=\frac{2a-1}{1} \to a^2-2a+1=0 \to (a-1)^2=0 \to \boxed{a=1}$ ⑦

⑧ $x^4-7x^2-5=0 \to t^2-7t-5=0 \to \Delta=49-4(-5)=69$

$\to t=\frac{7\pm\sqrt{69}}{2} \to x_1,x_2=\sqrt{\frac{7+\sqrt{69}}{2}},\ -\sqrt{\frac{7+\sqrt{69}}{2}}$

$\to S=x_1+x_2=0, \quad P=x_1x_2=-\frac{7+\sqrt{69}}{2}$

$\to 2P^2-\frac{2SP}{0}+\frac{2S}{0}=2P^2=2\left(-\frac{7+\sqrt{69}}{2}\right)^2=59+7\sqrt{69}$

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(۹)

ex+ | $x = \frac{-۴}{۲k} = \frac{-۲}{k}$ $\longrightarrow$ $y = -۴x - ۶$

$y = k\left(\frac{۲}{k}\right)^۲ - ۴\left(\frac{۲}{k}\right) - ۶ = -\frac{۴}{k} - ۶$

$\rightarrow -\frac{۴}{k} - ۶ = -۴\left(\frac{۲}{k}\right) - ۶ \rightarrow \frac{۴}{k} = ۲ \rightarrow k = ۲$

$\rightarrow y = -\frac{۴}{k} - ۶ = -۸$

5

(۱۰)

$-mx^۲ + mx + ۱ = -m - x \rightarrow -mx^۲ + (m+۱)x + ۱ + m = ۰$

$\rightarrow (m+۱)^۲ + ۴m(m+۱) = m^۲ + ۱ + ۲m + ۴m^۲ + ۴m < ۰$

$(m+۱)(۵m+۱) < ۰ \rightarrow \begin{array}{c} -۱ \quad -\frac{۱}{۵} \\ + \quad - \quad + \end{array} \rightarrow \left(-۱, -\frac{۱}{۵}\right) \rightarrow$ مسز