۱-

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

$\hookrightarrow \alpha=5-\beta$

$\beta=5-\alpha$

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

$\beta^4=23\beta^2-10\beta=23(5\beta-2)-10\beta=105\beta-46 \rightarrow \beta^5=105\beta^2-46\beta=105(5\beta-2)-46\beta=479\beta-210$

$\frac{4\alpha+\beta^5}{5\beta^2}=\frac{\overset{\alpha=5-\beta}{4\alpha}+479\beta-210}{5(5\beta-2)}=\frac{475\beta-190}{25\beta-10}=\frac{95(5\beta-2)}{5(5\beta-2)}=19$

۲-

$x=\frac{x_1+x_2}{2}=\frac{3-1.5}{2}=0.75=$ محور تقارن $=-\frac{b}{2a}$

$\rightarrow$ جمع ریشه‌ها $=-\frac{b}{a}=? \rightarrow -\frac{b}{2a}=0.75 \rightarrow -\frac{b}{a}=1.5$

۳-

$|\alpha-\beta|=\frac{\sqrt{\Delta}}{|a|} \rightarrow \frac{4}{3}k=\frac{\sqrt{b^2-4ac}}{|1|}=\sqrt{4k^2-20}=2\sqrt{k^2-5} \rightarrow \frac{2}{3}k=\sqrt{k^2-5}$

$\xrightarrow{\text{توان ۲}} \frac{4}{9}k^2=k^2-5 \rightarrow 5=\frac{5}{9}k^2 \rightarrow k^2=9 \qquad \left[\frac{\overset{9}{\cancel{k^2}}}{2}\right]=4$

۴-

$\frac{\alpha+\beta}{2}=\frac{-5+3}{2}=-1$ یا $\alpha+\beta=-2 \rightarrow x_s=\frac{-2}{2}=-1 \qquad ext \left| \begin{array}{l} -1 \\ 1 \end{array} \right.$

$\alpha^2+\beta^2=5 \rightarrow (\alpha+\beta)^2-2\alpha\beta=5 \rightarrow \alpha\beta=-\frac{1}{2}$

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

۵-

$x^2-5x-m=0 \qquad x_1,x_2=\frac{5\pm\sqrt{25+4m}}{2}$

$x_{max}=\frac{5+\sqrt{25+4m}}{2}<\frac{9}{2} \rightarrow 5+\sqrt{25+4m}<9 \rightarrow \sqrt{25+4m}<4 \xrightarrow{\text{توان ۲}} 4m<-9 \rightarrow m<-\frac{9}{4}$ ①

$\Delta=25+4m\geq 0 \rightarrow m\geq -\frac{25}{4}$ ②

①,② $\rightarrow -6.25<m<-2.25 \rightarrow -6,-5,-4,-3$

۶-

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

$5m^2-3m-36=0 \rightarrow (m-3)(5m+12)=0 \rightarrow m=3,-\frac{12}{5}$ ← غ ق ق ← تابع min دارا است

$\rightarrow$ محور تقارن : $x=-\frac{b}{2a}=\frac{+12}{6}=2$

۷-

$\alpha+\beta=-2a-2 \ , \ \alpha\beta=2a-1$

$a^2=\alpha\beta=2a-1$

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

۸-

$x^2=t \rightarrow t^2-7t-5=0 \qquad \Delta=49+20=69$

$t=\frac{7\pm\sqrt{69}}{2} \rightarrow t_1=\frac{7+\sqrt{69}}{2}$ ق ق $\qquad t_2=\frac{7-\sqrt{69}}{2}$ غ ق ق $\rightarrow t=x^2>0$

$x^2=\frac{7+\sqrt{69}}{2} \rightarrow x_1,x_2=\pm\sqrt{\frac{7+\sqrt{69}}{2}} \qquad S=0 \qquad P=\frac{7+\sqrt{69}}{2}$

$2P^2-\underset{0}{\cancel{3SP}}+\underset{0}{\cancel{2S}} \rightarrow 2P^2=2\left(\frac{7+\sqrt{69}}{2}\right)^2=2\left(\frac{49+14\sqrt{69}+69}{4}\right)=59+7\sqrt{69}$

-۹

$$ex+\left|\begin{array}{l} x=\dfrac{4}{2k}=\dfrac{2}{k} \\ y=\dfrac{-(16+24k)}{4k}=-\dfrac{4}{k}-6 \end{array}\right. \longrightarrow \left|\begin{array}{l} \dfrac{2}{k} \\ -\dfrac{4}{k}-6 \end{array}\right.$$

این نقطه روی خط
$y=-4x-4$
قرار داره

$$\longrightarrow -\frac{4}{k}-6=-4\left(\frac{2}{k}\right)-4 \rightarrow k=2 \qquad y=-\frac{4}{2}-6=-8$$

-۱۰

$$-mx^2+mx+1=-x-m \longrightarrow -mx^2+(m+1)x+1+m=0$$

$$\longrightarrow \Delta<0 \longrightarrow b^2-4ac<0 \longrightarrow \underbrace{(m+1)^2-4(-m)(m+1)}_{m^2+1+2m+4m^2+4m=5m^2+6m+1=(5m+1)(m+1)}<0$$

$$\longrightarrow (5m+1)(m+1)<0 \longrightarrow -1<m<-0.2 \longrightarrow$$ عدد صحیحی در این بازه نیست