اسما روشن ۲۰

$x^2-5x+2=0 \to S=\frac{-(5)}{1}=5,\ P=\frac{2}{1}=2=\alpha\beta \to \beta=\frac{2}{\alpha}$

$\frac{4\alpha+\beta^5}{5\beta^2}=\frac{4\alpha}{5\beta^2}+\frac{\beta^3}{5}=\frac{4\alpha}{5\frac{4}{\alpha^2}}+\frac{\beta^3}{5}=\frac{\alpha^3+\beta^3}{5}=\frac{(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)}{5}$

$\frac{5^3-(3\times 2\times 5)}{5}=\frac{95}{5}=19$ ✓ 2

$\begin{cases}-4=9a+3b+c\\ -4=2.25a+1.5b+c\end{cases}\ b=-1.5a \to S=-\frac{b}{a}=\frac{-(-1.5a)}{a}=\boxed{1.5}$ ✓ 2

$|\alpha-\beta|=\frac{\sqrt{\Delta}}{|a|}=\frac{\sqrt{4k^2-20}}{1}=\frac{4}{3}k \to 2\sqrt{k^2-5}=\frac{4}{3}k=3\sqrt{k^2-5}=2k \to 9k^2-45=4k^2$

$5k^2=45 \to k^2=9 \to \left[\frac{9}{2}\right]=[4.5]=4$ ✓ 2

$-\frac{b}{2a}=\frac{-5+3}{2} \to -\frac{b}{a}=S=-2,\ S(-1,1)\}\ \alpha^2+\beta^2=(-2)^2-2P=5$

$P=-\frac{1}{2} \to y=a(x^2+2x-\frac{1}{2}) \to y=1, x=-1 \to a((-1)^2-2-\frac{1}{2})=1$

$a=-\frac{2}{3} \to y=-\frac{2}{3}(x^2+2x-\frac{1}{2}) \xrightarrow{x=0} y=-\frac{2}{3}(0+0-\frac{1}{2})=\boxed{\frac{1}{3}}$ ✓ 2

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① $x=\frac{-5\pm\sqrt{25+4m}}{-2}<\frac{9}{2} \to 5+\sqrt{25+4m}<9 \to \sqrt{25+4m}<4 \to 25+4m<16$

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

2

② $\Delta>0 \to 25+4m>0 \to -\frac{25}{4}<m\ \}$ ①,② $\to -\frac{25}{4}<m<-\frac{9}{4} \xrightarrow{\mathbb{Z}} -3,-4,-5,-6 \to 4$ عدد ✓

$y_{min}=2=-\frac{(144-20m^2+4m)}{4m}=\frac{5m^2-m-36}{m} \to 5m^2-3m-36=0 \to$

$(5m+12)(m-3)=0\ m\begin{cases}① 3\\ ② -\frac{12}{5}\end{cases}$

$\xrightarrow{m=3} y=3x^2-12x+14 \to -\frac{b}{2a}=\frac{-(-12)}{3\times 2}=2 \to x=2$ معادله محور تقارن ✓ 2

غ ق ق چون $m>0$

$\alpha, a, \beta \to a^2=\alpha\beta \to P \to 2a-1=a^2 \to -a^2+2a-1=0 \to -(a^2-2a+1)=0$

$-(a-1)^2=0$

$a=1$ ✓ 2

$x^4-7x^2-5,\ t^2-7t-5=0 \to t=\frac{7\pm\sqrt{69}}{2} \begin{cases}\frac{7+\sqrt{69}}{2}\\ \frac{7-\sqrt{69}}{2}<0\end{cases}$ غ ق ق

$\to x^2=\frac{7+\sqrt{69}}{2} \to x^2-(\frac{7+\sqrt{69}}{2})=0$

$S=0,\ P=-(\frac{7+\sqrt{69}}{2})\}\ 2P^2-6SP+2S=2\frac{(7+\sqrt{69})^2}{4}-0+0=\frac{49+69+14\sqrt{69}}{2}$

$\to 59+7\sqrt{69}$ ✓ 2

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

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

$$\frac{-4+2k}{k} = 0 \longrightarrow k = 2 \to \frac{-4-6k}{k} = \frac{-4-6(+2)}{2} = -8$$ ✓ ۲

$$\left.\begin{array}{l} y = -mx^2 + mx + 1 \\ y = -x - 2 \end{array}\right\} \to -mx^2 + mx + 1 = -x - 2 \to mx^2 + (-m-1)x - m - 1 = 0$$

جواب حقیقی ندارد $\to \Delta < 0 \to (m+1)^2 + 4m(m+1) < 0$

$$\to (m+1)(m+1+4m) < 0 \to (m+1)(5m+1) < 0 \to \begin{array}{ccccc} & -1 & & -\frac{1}{5} & \\ + & & - & & + \end{array}$$

$m \in \left(-1, -\frac{1}{5}\right)$ ← عدد صحیح وجود ندارد ✓ ۴