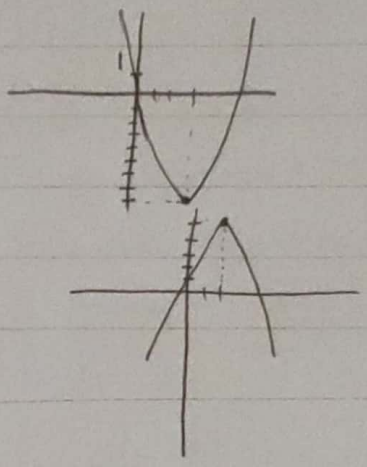
① الف) $2x^2-4x+1 \longrightarrow \left|\begin{matrix}\frac{-b}{2a}=1 \\ \text{جای‌گذاری} \rightarrow 2-4+1=-1\end{matrix}\right| \quad \left|\begin{matrix}1\\-1\end{matrix}\right.$

ب) $-2x^2+3x-5 \longrightarrow \left|\begin{matrix}\frac{-b}{2a}=\frac{3}{4} \\ \text{جای‌گذاری} \rightarrow -\frac{18}{16}+\frac{36}{16}-\frac{80}{16}=-\frac{31}{8}\end{matrix}\right| \quad \left|\begin{matrix}\frac{3}{4}\\-\frac{31}{8}\end{matrix}\right.$

② الف) $x^2-6x+1 \quad a>0 \quad \left|\begin{matrix}\frac{-b}{2a}=3 \\ \text{جای‌گذاری} \rightarrow 9-18\end{matrix}\right.$

ب) $-x^2+6x+1 \quad a<0 \quad \left|\begin{matrix}\frac{-b}{2a}=2 \\ \text{جای‌گذاری} \rightarrow -4+8+1=5\end{matrix}\right.$



③ $6x^3+kx^2-9x-2=0 \quad \alpha+\beta=1 \quad \alpha\beta=-2 \longrightarrow x^2-x-2=0$

$6x^3+kx^2-9x-2 \;,\; x^2-x-2 \longrightarrow 6x^3+(k-1)x^2-8x=0$

$6x^2+(k-1)x-8=x^2-x-2 \longrightarrow 5x^2+kx-6=0$

$3x^2+kx-6=x^2-x-2 \longrightarrow 2x^2+(k+1)x-4=0$

$2x^2+(k+1)x-4=x^2-x-2 \longrightarrow x^2+(k+2)x-2=0$

$x^2+(k+2)x-2=x^2-x-2 \longrightarrow (k+2)x=-x \Rightarrow \boxed{k=-3}$

④ $(\sqrt{\alpha}-\sqrt{\beta})^2 \rightarrow \alpha+\beta-2\sqrt{\alpha\beta}=1 \longrightarrow 3m-2\sqrt{m}=1 \Rightarrow m=1$

$S=3m \qquad P=m$

$2x^2-x-1=0 \Longrightarrow P=\frac{c}{a}=\boxed{-\frac{1}{2}}$

⑤ $\frac{\sqrt{\Delta}}{|a|}=\frac{\sqrt{b^2-4ac}}{|a|}=\frac{\sqrt{m^2+4+4m-8m}}{2} \qquad \frac{\sqrt{(m-2)^2}}{2}=\frac{m-2}{2}$

$m\times\left(\frac{m-2}{2}\right)\times\frac{1}{2}=\frac{m^2-2m}{4}=\frac{3}{4} \longrightarrow m^2-2m=3 \longrightarrow (m-3)(m+1)=0 \lessgtr \begin{matrix}3\\-1\end{matrix}$

$y=x^2-mx+1 \rightarrow x_S=\frac{m}{2} < \boxed{\begin{matrix}\frac{3}{2}\\-\frac{1}{2}\end{matrix}}$

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۶) $y = ax^2 + 2x + a \to \min \to a > 0$

$\frac{4ac-b^2}{4a} = \frac{4\times a\times a - 9}{4a} \to \frac{4a^2-9}{4a} = \frac{7}{18}$

$18a^2 - 18 = 7a \to 18a^2 - 7a - 18 = 0 \xrightarrow{\times 9} (18a-14)(18a+9) = 0$

$\frac{18(a-2)(18a+9)}{18} = 0 \to (a-2)(18a+9) \to a = 2 \checkmark \quad a = -\frac{9}{18} \times$

۷) $x^2 - (a+1)x + a = 0 \quad \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{a^2+1+2a-4a}}{1} \to a-1$

$a-1 = 2 \to a = 3 \quad x^2 - (2a+1)x + b = 0 \quad x^2 - 10x + b = 0$

$\frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{\Delta}}{1} = \sqrt{\Delta} = \sqrt{100 - 4b} = \sqrt{4} \to b = 24 \quad b - a = 24 - 3 = 21$

۸) $y = -ax^2 + ax + 2 \quad \frac{-b}{2a} = \frac{1}{2} \to \frac{-a}{2(-a)} = \frac{1}{2}$

$\frac{4ac-b^2}{4a} = \frac{4(-a)\times 2 - a^2}{4(-a)} = 2 + \frac{a}{4} \quad -\frac{b}{2a} = \frac{b}{4b} = \frac{1}{4}$

$\frac{4ac-b^2}{4a} = \frac{4(2b)(-1) - 4b^2}{4(2b)} = -1 - \frac{b}{8} \quad b - a = 4$

$2 + \frac{a}{4} = \frac{1}{2}b - \frac{1}{2}b - 1 \Rightarrow a = -12 \quad -1 - \frac{b}{8} = -\frac{1}{14}a + \frac{1}{4}a + 2 \to b = -9$

۱۰) $x^2 - (a^2+b^2-12)x + a + b - 1 = 0$

$\frac{a+b-1}{1} = ab \to a+b = ab+1 \quad \frac{a^2+b^2-12}{1} = a+b \to a+b = a^2+b^2-12$

$a^2 + b^2 + 2ab = a^2b^2 + 1 + 2ab \to a^2b^2 + 1 - 12 = ab + 1 \to a^2b^2 - ab - 12 = 0$

$(ab-4)(ab+3) = 0 \to ab = 4 \quad ab \neq -3 \times \to a+b = 4+1 = 5$

۹) $y = 2\sqrt{3}\alpha x^2 + 4x + \beta \to -\frac{4}{2\sqrt{3}\alpha} = \alpha + \beta \quad \frac{\beta}{2\sqrt{3}\alpha} = \alpha.\beta \to 2\sqrt{3}\alpha^2 = 1$

$\alpha^2 = \frac{1}{12} \to \alpha = \pm\frac{1}{\sqrt{3}}$

$\alpha = \frac{1}{\sqrt{3}} \quad \frac{-4}{2\sqrt{3}\times\frac{1}{\sqrt{3}}} = \frac{1}{\sqrt{3}} + \beta \to -\frac{4}{3} = \frac{1+\sqrt{3}\beta}{\sqrt{3}} \to \beta = -1$ غیرقابل قبول $\beta < \alpha$

$\alpha = -\frac{1}{\sqrt{3}} \quad \frac{-4}{2\sqrt{3}(-\frac{1}{\sqrt{3}})} = -\frac{1}{\sqrt{3}} + \beta \to \beta = 1 \quad \left\} \frac{-b}{2a} = \frac{-4}{2\sqrt{3}\alpha} = \frac{4}{10} \to \alpha > 0\right.$

$\frac{4ac-b^2}{4a} = \frac{2(2\sqrt{3}\times -\frac{1}{\sqrt{3}}) \times 1 - 16}{100\times -\frac{1}{\alpha}} \to \frac{-36}{-20} \to \beta > 0 \to \frac{1}{\alpha}$