$\frac{-b}{2a} = -1 \Rightarrow b = 2a$

$a - b + c = 9 \Rightarrow -a + c = 9$

$9a + 3b + c = 1 \Rightarrow 12a + c = 1$ $\Big\}$ $14a = -8 \Rightarrow a = \frac{-1}{2} \Rightarrow b = -1 \Rightarrow c = \frac{17}{2}$

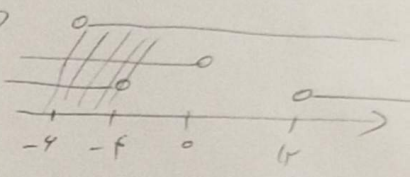
$\Rightarrow y = \frac{-x^2}{2} - x + \frac{17}{2} \Rightarrow y = \frac{-x^2 - 2x + 17}{2}$

۴-

$2x^2 + mx + m + 4 = 0$ — ریشه $\rightarrow m^2 - 8m - 48 > 0 \Rightarrow$ (نمودار: -4، 12)

$S > 0 \rightarrow \frac{-b}{a} > 0 \Rightarrow \frac{-m}{2} > 0 \Rightarrow m < 0$

$P > 0 \rightarrow \frac{c}{a} > 0 \Rightarrow \frac{m+4}{2} > 0 \Rightarrow m > -4$



$\Rightarrow m \in (-4, -4)$

۴-

$S = \frac{1}{P} \Rightarrow \frac{-2m+1}{2} = \frac{3}{-m+2} \Rightarrow 2m^2 - 5m + 2 = 9 \Rightarrow 2m^2 - 5m - 7 = 0$

ریشه‌ها: -1، $\frac{-c}{a} = \frac{7}{2}$

$\Rightarrow m = -1$ or $\frac{7}{2}$

$2x^2 - 2x + 3 = 0 \longrightarrow$ ریشه حقیقی ندارد ✗

$2x^2 + 4x - \frac{3}{2} = 0 \longrightarrow$ ۲ ریشه حقیقی دارد ✓ $\longrightarrow m = \frac{7}{2}$

۴-

$S = x_1 + x_2 = 1$، $P = x_1 \cdot x_2 = -4$

$\Rightarrow S_{\frac{1}{x}} = x_1^2 + x_2^2 + \frac{1}{x_1} + \frac{1}{x_2} = (x_1 + x_2)\left((x_1 + x_2)^2 - 2x_1 x_2\right) + \frac{x_1 + x_2}{x_1 x_2} = 1\left(1^2 + 12\right) + \frac{1}{-4} = \boxed{12,75}$

$\Rightarrow P_{\frac{1}{x}} = \left(x_1^2 + \frac{1}{x_2}\right)\left(x_2^2 + \frac{1}{x_1}\right) = (x_1 x_2)^2 + x_1^2 + x_2^2 + \frac{1}{x_1 x_2}$

$(x_1 x_2)^2 + (x_1 + x_2)^2 - 2x_1 x_2 + \frac{1}{x_1 x_2} = -4^2 + 1 + 8 - \frac{1}{4} = \boxed{-4,25}$

$\Rightarrow 0 = x^2 - Sx + P = \boxed{x^2 - 12,75x - 4,25}$

۵-

$\left(\sqrt[3]{x^2} + \frac{1}{\sqrt[3]{x^2}} + 1\right)\left(\sqrt[3]{x} - \frac{1}{\sqrt[3]{x}}\right) = \left(\sqrt[3]{x^2} + \frac{1}{\sqrt[3]{x^2}} + 1\right)\left(\frac{\sqrt[3]{x^2} - 1}{\sqrt[3]{x}}\right) = x - \frac{1}{x}$

$\Rightarrow \left(\sqrt[3]{x^2} + \frac{1}{\sqrt[3]{x^2}} + 1\right)\left(\sqrt[3]{x^2} - 1\right) = \left(x - \frac{1}{x}\right)\sqrt[3]{x} = x\sqrt[3]{x} \Rightarrow x - \frac{1}{x} = 2 \Rightarrow x - 2 - \frac{1}{x} = 0$

$\Rightarrow x^2 - 2x - 1 = 0$

$\Rightarrow S = \frac{-b}{a} = \boxed{2}$

$P = \frac{4}{c} \Rightarrow 2a^2 = \frac{4}{c} \Rightarrow a^2 = \frac{4}{9} \Rightarrow a = \pm\frac{2}{c}$

$\Rightarrow \left|\frac{2}{c} - \left(-\frac{2}{c}\right)\right| = \boxed{\frac{4}{c}}$

$x_{ext} \longrightarrow$ نقطه مینیمم $\begin{cases} \frac{-c-2a}{2a} > 0 \longrightarrow \frac{-\frac{c}{2}}{-1+\frac{1}{2}} \rightarrow (-\frac{2}{2}, 0) \\ a > 0 \end{cases} \xrightarrow{\cap} \alpha$

α جواب $\rightarrow a > 0$

$\frac{+2}{-2} = \frac{-a}{2} \Rightarrow a = 2$

$1 = x^2 + 2x - 2 \Rightarrow x = 1$

$\Rightarrow -1 - 2 + 2b = 1 \Rightarrow b = 4$

$\Rightarrow ab = 8$

$\frac{a}{2} = \frac{-a}{2a} \cdot 2 = \frac{1}{2} \Rightarrow a = 1$

$(\alpha + 0/2)(\beta + 0/2) = \alpha\beta + 0/2(\alpha+\beta) + 0/2 = P + \frac{S}{2} + 0/2 = \frac{b}{2}$

$\Rightarrow -2 + \frac{-1}{4} + \frac{1}{4} = \frac{b}{2} \Rightarrow b = -4$

$\Rightarrow \left[\frac{ab}{4}\right] = \left[\frac{-4}{c}\right] = \boxed{-2}$

$\alpha \longrightarrow$ ریشه مشترک

$\Rightarrow \begin{cases} \alpha^2 + 2\alpha - cm = 0 \\ c\alpha^2 + 18\alpha + cm = 0 \end{cases} \times 2 \Rightarrow 4\alpha^2 + 20\alpha = 0 \Rightarrow \alpha = 0 \times \text{ or } \alpha = -5$

$\Rightarrow m = 5$

$x^2 + 4x + 5 \begin{cases} \xrightarrow{-1} \\ \xrightarrow{-5} \end{cases}$

$x^2 + 2x - 15 = (x+5)(x-3)$

$\begin{matrix} -5 \\ +3 \end{matrix}$

$\left.\begin{matrix} \\ \\ \end{matrix}\right\} |-2-(-1)| = \boxed{1}$