

$$\begin{aligned} \frac{-b}{a} &= -1 \rightarrow 2ab \\ (-1, 9) \rightarrow a-b+c &= 9 \quad 2ab & -a+c &= 9 \rightarrow \begin{cases} a-c = -9 \rightarrow c = 9+a = \frac{11}{4} - \frac{1}{4} = \frac{10}{4} \\ 15a-c = 1 \end{cases} \\ (1, 0) \rightarrow 9a+2b+c &= 1 \quad 15a-c = 1 \quad \frac{15a-c=1}{14a=-1} \rightarrow a = -\frac{1}{14}, b = -1, c = \frac{10}{14} \\ g &= -\frac{1}{14}x^2 - 1x + \frac{10}{14} \end{aligned}$$

$$\begin{aligned} ① \frac{c}{a} > 0 &\rightarrow \frac{m+4}{4} > 0 \rightarrow m+4 > 0 \rightarrow m > -4 \\ ② \frac{-b}{a} > 0 &\rightarrow \frac{-m}{4} > 0 \rightarrow -m > 0 \rightarrow m < 0 \\ ③ \Delta > 0 &\rightarrow m^2 - 12m + 4 > 0 \rightarrow (m-12)(m+4) > 0 \rightarrow m = 12, -4 \rightarrow (-\infty, -4) \cup (12, +\infty) \\ &\quad \begin{array}{c} -\infty \quad -4 \quad 12 \quad +\infty \\ + \quad - \quad + \quad - \\ + \quad - \quad + \quad - \end{array} \end{aligned}$$

$$\begin{aligned} \frac{-b}{a} = \frac{a}{c} &\rightarrow a^2 = -bc \rightarrow (2m-1)(m-2)9 \rightarrow 2m^2 - 5m - 2 = 0 \rightarrow m = \frac{5 \pm 9}{4} \rightarrow \begin{cases} -1 \\ \frac{14}{4} \end{cases} \\ m = -1 &\rightarrow 3x^2 - 2x + 3 = 0 \rightarrow x_1, x_2 = 0 \rightarrow \Delta = 1 - 36 < 0 \times \\ m = \frac{14}{4} &\rightarrow 3x^2 - 4x - \frac{14}{4} = 0 \rightarrow \Delta = 16 + 42 > 0 \checkmark \end{aligned}$$

$$\begin{aligned} S_{\text{میان}} &= x_1^3 + x_2^3 + \frac{1}{x_1} + \frac{1}{x_2} \rightarrow \frac{a^3 + b^3}{ab} + \frac{-b}{a} = \frac{-b}{c} = \frac{-b}{c} = \frac{1}{4} \rightarrow S = \frac{51}{4} \\ S_{\text{پایین}} &= 1, 11, 17 \\ P_{\text{میان}} &= (x_1^2 + \frac{1}{x_1^2})(x_2^2 + \frac{1}{x_2^2}) = x_1^2 x_2^2 + x_1^2 x_2^2 + \frac{1}{x_1^2 x_2^2} = \frac{-21}{4} \\ x_1^2 x_2^2 + P &= 0 \rightarrow x^2 - \frac{51}{4}x - \frac{21}{4} = 0 \\ 4x^2 - 51x - 21 &= 0 \end{aligned}$$

$$\begin{aligned} \sqrt{x^2+1} + \sqrt{x^2} - \sqrt{x^2} - \frac{1}{\sqrt{x^2}} - 1 - \sqrt{x^2} &= 0 \rightarrow \sqrt{x^2} - 2\sqrt{x^2} - \frac{1}{\sqrt{x^2}} = 0 \rightarrow \frac{\sqrt{x^2}}{x^2} (x^2 - 2x^2 - 1) = 0 \\ S &= \frac{-b}{a} = \frac{2}{1} = 2 \end{aligned}$$

