

$$\frac{-b}{2a} = 1 \Rightarrow \frac{-1}{2(u-1)} = 1 \Rightarrow f(u-1) = -1 \Rightarrow \begin{cases} u=3 \Rightarrow u \leq \frac{3}{\varepsilon} \\ u=-1 \end{cases}$$

$$\Rightarrow y = -\frac{1}{\varepsilon}u^2 + u + 3 = 0 \Rightarrow u^2 - (u-1)^2(u-4)(u+2) = 0 \Rightarrow \begin{cases} u=3 \\ u=-1 \end{cases}$$

✓ $y = 0$ حذف

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$$f(u) = mu^2 - 2u + m \Rightarrow u < 0 \Rightarrow m < 0 \Rightarrow \frac{c}{u} = \frac{m}{m} = 1 \Rightarrow u_1, m_1 < 0 \leq u_1, m_1 > 0 \Rightarrow m < 0$$

$$\Delta > 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow 4 - 4m^2 > 0 \Rightarrow 4 > 4m^2 \Rightarrow \frac{4}{\varepsilon} > m^2 \Rightarrow -\frac{2}{\sqrt{\varepsilon}} < m < \frac{2}{\sqrt{\varepsilon}}$$

$$I \cap II \Rightarrow (0, 0) \cap (-\frac{2}{\sqrt{\varepsilon}}, \frac{2}{\sqrt{\varepsilon}}) \Rightarrow (-\frac{2}{\sqrt{\varepsilon}}, 0) \checkmark$$

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$$\alpha = \frac{3-\sqrt{2}}{3} \quad \beta = \frac{3+\sqrt{2}}{3} \Rightarrow \alpha\beta(p) = \frac{(3-\sqrt{2})(3+\sqrt{2})}{9} = \frac{9-2}{9} = \frac{7}{9}$$

$$\alpha + \beta \notin S = \frac{3+3}{3} = \frac{6}{3} = 2 \Rightarrow u^2 - 2u + p \Rightarrow u^2 - 2u + \frac{7}{9} \Rightarrow 9u^2 - 18u + 7 = 0 \checkmark$$

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$$p u^2 - 18u + m + 7 = 0 \Rightarrow p u^2 + p = 12 \Rightarrow p u^2 + p - 12 = 0 \Rightarrow p u^2 + (4-m-2) = 12 \Rightarrow p u^2 - m = -2$$

$$\Rightarrow p u^2 + p = m \Rightarrow p u^2 - 18u + p u^2 + p = 0 \Rightarrow \varepsilon u^2 - 18u + \varepsilon = 0 \Rightarrow u^2 - 18u + 1 = 0 \Rightarrow (u-1)^2 = 0$$

$$u=1 \Rightarrow u=1 \Rightarrow p - 18 + m + 7 = 0 \Rightarrow m - \varepsilon = 0 \Rightarrow \boxed{m = \varepsilon} \checkmark$$

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$$S(p, q) \Rightarrow \frac{-b}{2a} = 1 \Rightarrow -b = 2a \Rightarrow \frac{-a}{\varepsilon a} = 1 \Rightarrow -a = 2a \Rightarrow -9b = -a \Rightarrow 9b = a$$

$$u=2 \Rightarrow \varepsilon u^2 + 2b + a = 9 \Rightarrow \varepsilon u^2 + 2b = \varepsilon \Rightarrow u^2 + b = 2 \Rightarrow u = \frac{2-b}{\sqrt{\varepsilon}}$$

$$\Rightarrow b^2 - 4ac = 9b \Rightarrow b^2 - 4 \cdot 0 \cdot a = 9b \Rightarrow b^2 - 4 \cdot 0 + 4b = 9b \Rightarrow b^2 + 4b - 9b = 0 \Rightarrow b^2 - 5b = 0 \Rightarrow b = 0 \text{ or } b = 5$$

$$b = 5 \Rightarrow a = -1 \text{ and } c = 2 \Rightarrow -u^2 + \varepsilon u + 2 \Rightarrow -(u-2)(u+1) \Rightarrow \begin{cases} u=2 \\ u=-1 \end{cases}$$

✓ $(-1, 2) \Rightarrow$ در این بازه‌ها می‌تواند

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است

$$\begin{aligned} 4u^2 - 4u + 9\beta &= 0 \Rightarrow u^2 - \frac{1}{2}u + \frac{9\beta}{4} = 0 \Rightarrow \Delta = \frac{1}{4} - 9\beta \Rightarrow \Delta = 0 \Rightarrow \beta = \frac{1}{36} \\ \Rightarrow \Delta < 0 \Rightarrow \beta > \frac{1}{36} \Rightarrow \Delta > 0 \Rightarrow \beta < \frac{1}{36} \Rightarrow \beta = \frac{1}{36} \\ \frac{1}{4} + \frac{1}{\beta} &\Rightarrow -\frac{1}{4} + \frac{9}{4} \Rightarrow -\frac{1}{4} + \frac{9}{4} = \frac{2}{1} \checkmark \end{aligned}$$

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$$\begin{aligned} u^2 + mu - 1 &= 0 \Rightarrow u^2 - m\beta = 1 \Rightarrow u^2 - m\beta - 1 = 0 \Rightarrow u^2 - m(\frac{1}{4} + \beta) - 1 = 0 \Rightarrow u^2 - m(\frac{1}{4} + \beta) - 1 = 0 \\ m^2 + m - 1 &= 0 \Rightarrow m^2 + m - 1 = 0 \Rightarrow (m+1)(m-1) = 0 \Rightarrow m = -1 \text{ or } m = 1 \\ m = 1 \Rightarrow \Delta > 0 \Rightarrow m = 1 \Rightarrow u^2 + u - 1 = 0 \Rightarrow \Delta = \frac{1}{4} + 1 = \frac{5}{4} \Rightarrow u = \frac{-1 \pm \sqrt{5}}{2} \checkmark \\ m = -1 \Rightarrow \Delta < 0 \end{aligned}$$

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$$\begin{aligned} mu^2 + \xi u + \frac{m+1}{4} &\Rightarrow -\frac{b}{a} \leq 1 \Rightarrow -\frac{1}{\xi} \leq 1 \Rightarrow \xi \leq 1 \Rightarrow \xi = 1 \Rightarrow \xi = 1 \Rightarrow \xi = 1 \\ \Rightarrow -1 + \xi(m)(\frac{m+1}{4}) &= 0 \Rightarrow -1 + \xi(m)(\frac{m+1}{4}) = 0 \Rightarrow \xi = \frac{4}{m(m+1)} \\ \Rightarrow m^2 + (1-\xi)m - 1 &= 0 \Rightarrow m^2 + (1-\xi)m - 1 = 0 \Rightarrow (m+1)(m-1) = 0 \Rightarrow m = -1 \text{ or } m = 1 \\ \Rightarrow -1 + \xi(m)(\frac{m+1}{4}) &= 0 \Rightarrow -1 + \xi(m)(\frac{m+1}{4}) = 0 \Rightarrow \xi = \frac{4}{m(m+1)} \\ \Rightarrow \xi = 1 \checkmark \end{aligned}$$

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$$\begin{aligned} au^2 + bu + c &= 0 \Rightarrow a = 1 \Rightarrow \xi u + \gamma b + c = 0 \Rightarrow c = \xi \Rightarrow \xi u + \gamma b + \xi = 0 \Rightarrow \xi(u + \gamma + 1) = 0 \\ -\frac{b}{a} &= 1 \Rightarrow \xi u = -b \Rightarrow b = 1 \Rightarrow a = -\frac{1}{\xi} \Rightarrow -b + \gamma b + \xi = 0 \Rightarrow b = 1 \Rightarrow \xi = 1 \\ -\frac{1}{\xi}u^2 + \xi u + \xi &= 0 \Rightarrow \frac{1}{\xi} + \frac{1}{\beta} = \frac{\xi + \beta}{\xi\beta} = \frac{5}{\beta} \Rightarrow \xi = \frac{5}{\beta} \\ \Rightarrow \xi = 1 \checkmark \end{aligned}$$

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$$\begin{aligned} u^2 - (\xi u + \xi)u + (\xi u^2 + \gamma u + \xi) &= 0 \Rightarrow u = 1 \Rightarrow \xi - \xi u - 1 + \xi u^2 + \gamma u + \xi = 0 \\ \Rightarrow \xi u^2 - \xi u - 1 &= 0 \Rightarrow \xi u^2 - \xi u - 1 = 0 \Rightarrow \xi(u^2 - u - 1) = 0 \\ u = 1 \checkmark \end{aligned}$$

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