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$$q = a - b + c$$

$$r = a + b + c$$

$$\rightarrow 12 = 2a + 2c \rightarrow a + c = 6 \rightarrow b = -3$$

$$y = -\frac{3}{2}x^2 - 3x + \frac{15}{2}$$

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$$\rightarrow \frac{-b}{2a} = -1 \rightarrow \frac{3}{2a} = -1 \rightarrow 3 = -2a \rightarrow a = -\frac{3}{2}$$

$$q(-\frac{3}{2}) = \frac{15}{2} \rightarrow c = \frac{15}{2}$$

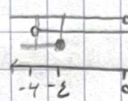
$$a > 0 \rightarrow 2$$

$$\Delta > 0 \rightarrow m^2 - 12m - 12 > 0 \rightarrow (m + 12)(m - 12) > 0$$

$$\rightarrow \begin{array}{c} -12 \quad 12 \\ + \quad - \quad + \end{array} \quad (-\infty, -12] \cup [12, +\infty)$$

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



$$m \in (-4, -2) \cup (12, +\infty)$$

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

$$x = \frac{1}{p} \rightarrow \frac{-b}{a} = \frac{a}{c} \rightarrow a^2 = (-b)(c) \rightarrow 9 = (2m+1)(2-m) \rightarrow 9 = 2m^2 - 4m + 2 \rightarrow -2m^2 + 4m - 7 = 0 \quad (*)$$

$$2m^2 + (2m-1)x + 2-m = 0 \rightarrow \Delta > 0 \rightarrow 4m^2 - 4m + 1 - 2\epsilon + 12m > 0 \rightarrow 4m^2 + 10m - 1 > 0 \rightarrow \text{نمی‌تواند باشد}$$

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$$\text{مثلاً } 2m^2 - 4m - 12 = 0 \rightarrow (m+2)(m-6) = 0 \rightarrow m = -2 \text{ یا } 6$$

$$\rightarrow m = \frac{6}{2}$$

$$x^2 - x - 2 = 0 \rightarrow \Delta > 0 \rightarrow 1 + 4 = 5 \rightarrow x_1, x_2 = \frac{1 \pm \sqrt{5}}{2}$$

$$\begin{aligned} \left(\frac{1+\sqrt{5}}{2}\right)^2 + \frac{1}{\frac{1+\sqrt{5}}{2}} &= \frac{1+1+\sqrt{5}}{2} + \frac{2}{1+\sqrt{5}} = \frac{2+\sqrt{5}}{2} + \frac{2}{1+\sqrt{5}} \\ \left(\frac{1-\sqrt{5}}{2}\right)^2 + \frac{1}{\frac{1-\sqrt{5}}{2}} &= \frac{1-1-\sqrt{5}}{2} + \frac{2}{1-\sqrt{5}} = \frac{-\sqrt{5}}{2} + \frac{2}{1-\sqrt{5}} \end{aligned}$$

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$$\sqrt{x} = t$$

$$\begin{aligned} \left(t^2 + \frac{1}{t^2} + 1\right)(t^2 - 1) &= 2t \\ (t^2 - 1) + t^2 - 1 &= 2t \rightarrow t^2 + t^2 - 2 = 2t \end{aligned}$$

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$$\begin{aligned} \sqrt{x} = t \rightarrow \left(t + \frac{1}{t} + 1\right)(t-1) &= t^2 - 2 + 2t = \frac{t^2-1}{t} \\ \frac{t^2-1}{t} = t^2 - 2 + 2t \rightarrow t^2 - 1 &= t^3 - 2t^2 + 2t^3 - 2t \rightarrow t^2 - 2t^2 + 2t^3 - 2t = 0 \end{aligned}$$

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$$P = \alpha\beta = \alpha \times r\alpha = \frac{r}{r} \rightarrow \alpha^2 = \frac{r}{r} \rightarrow \alpha = \pm \frac{r}{r} \rightarrow \beta = \pm r$$

$$S = \alpha + \beta = r\alpha + \alpha = r\alpha = r \times \pm \frac{r}{r} = \pm \frac{r}{r} \sim S = \frac{a}{r} = \pm \frac{r}{r} \rightarrow a = \pm r$$

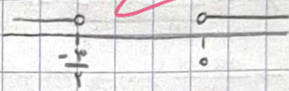
اصناف متناهی a برابر ۱۲ است

$$c > 0 \rightarrow c = 0$$

$$a > 0 \rightarrow a > 0$$

$$x_5 > 0 \rightarrow \frac{-b}{ra} > 0 \rightarrow \frac{-3-2a}{2a} > 0 \rightarrow -2a-3 > 0 \rightarrow 2a < -3 \rightarrow a < -\frac{3}{2}$$

به ازای همه مقادیر a از ناحیه سوم می گذرد



$$\frac{-a}{r} = \frac{r}{-r} \Rightarrow \frac{-a}{r} = -1 \rightarrow a = r$$

$$\begin{cases} x^2 + ax - r \rightarrow -\frac{b}{ra} = -\frac{a}{r} \\ -x^2 - rx + b \rightarrow -\frac{b}{ra} = \frac{r}{-r} \end{cases} \rightarrow \frac{-a}{r} = -1 \rightarrow a = r \rightarrow \begin{cases} y = x^2 + rx - r \\ y = 1 \end{cases} \rightarrow x^2 + rx - r = 1$$

$$-x^2 - rx + b \xrightarrow[y=1]{x=-r} -9 + 4 + b = 1 \rightarrow b = 4 \rightarrow \boxed{ab = 4}$$

$$\text{with } \rightarrow \frac{+a}{r} = 1 + \frac{-a}{ra} \rightarrow \frac{a}{r} = \frac{1}{r} \rightarrow a = 1$$

$$\text{with } \rightarrow \frac{1}{\varepsilon} \left(\frac{b}{r} \right) = \frac{4}{r} \rightarrow \frac{b}{1} = \frac{4}{r} \rightarrow rb = 4 \rightarrow b = 4\varepsilon$$

$$\begin{bmatrix} ab \\ \varepsilon \end{bmatrix} = \begin{bmatrix} 4\varepsilon \\ \varepsilon \end{bmatrix} = 4$$

جواب سیستم α

$$\begin{aligned} \alpha^2 + 4\alpha + m &= 0 \\ \alpha^2 + 2\alpha - 3m &= 0 \end{aligned} \rightarrow (\alpha^2 + 4\alpha + m) - (\alpha^2 + 2\alpha - 3m) = 0 \rightarrow 2\alpha + 4m = 0 \rightarrow m = -\alpha$$

$$\alpha^2 + 4\alpha - \alpha = 0 \rightarrow \alpha^2 + 3\alpha = 0 \rightarrow \alpha = 0 \text{ or } \alpha = -3 \rightarrow m = \alpha$$

$$x^2 + 4x + \alpha = 0 \rightarrow (x+1)(x+\alpha) = 0$$

$$x^2 + 2x - 1\alpha = 0 \rightarrow (x+\alpha)(x-3) = 0$$

$$\Rightarrow \begin{matrix} -\alpha \text{ سیستم دوم} \\ \text{در دستگاهی غیر متجانسی} \end{matrix} \rightarrow x = -1, x = 3 \rightarrow 3 - (-1) = 4$$

$$\frac{-b}{ra} = -1 \leadsto b = ra$$

$$f(-1) = 9 \rightarrow a - b + c = 9 \rightarrow a - ra + c = 9 \rightarrow c = 9 + a$$

$$f(r) = 1 \rightarrow 9a + rb + c = 1 \rightarrow 9a + 4a + 9 + a = 1 \rightarrow 14a = -8 \rightarrow a = -\frac{1}{r}$$

$$\leadsto b = -1$$

$$\leadsto c = 8/\Delta$$

$$\rightarrow y = -\frac{1}{r}x^2 - x + 8/\Delta$$

$$x^2 - x - 4 = 0 \rightarrow S = 1, P = -4$$

$$S' = (x_1^2 + x_2^2) + \left(\frac{1}{x_1} + \frac{1}{x_2}\right) \leadsto S' = S^2 - rSp + \frac{S}{P} = (1)^2 - (r)(-2)(1) + \frac{1}{-4} = -\frac{21}{4}$$

$$P' = (x_1 x_2)^2 + x_1^2 + x_2^2 + \frac{1}{x_1 x_2} \rightarrow P' = P^2 + S^2 - rP + \frac{1}{P}$$

$$P' = (-4)^2 + 1 - r(-2) - \frac{1}{-4} = -4 + 9 - \frac{1}{4} = -\frac{21}{4}$$

$$x^2 - S'x + P' = x^2 - \frac{21}{4}x - \frac{21}{4}$$

$$! \text{ مع } 2an^2 + an - 4 \text{ و } \omega_{\Delta}, \beta + \Delta, \alpha + \Delta, 2an^2 + an - 4 \text{ و } \omega_{\Delta}, \beta, \alpha$$

$$8 = \underbrace{\alpha + \beta}_{-\frac{a}{ra}} + 1 = \frac{a}{r} \leadsto \frac{a}{r} = \frac{1}{r} \leadsto a = 1$$

$$P = (\alpha + \Delta)(\beta + \Delta) = \alpha\beta + \Delta(\alpha + \beta) + \Delta^2 = -\frac{4}{ra} + \frac{1}{r}\left(-\frac{a}{ra}\right) + \frac{1}{r} = -\frac{4}{r} - \frac{1}{r} + \frac{1}{r} = -\frac{4}{r} \rightarrow b = -4$$

$$\left[\frac{ab}{\varepsilon}\right] = \left[-\frac{4}{\varepsilon}\right] = [-1, 0] = \boxed{-2}$$