

۲۰. حدیثی خوب نوشتی

$$\left. \begin{aligned} f(-n) - a f(n) &= 2|n| + 1 \xrightarrow{\times 2^r} a f(-n) - a^2 f(n) = 2^n |n| + 2^n \\ f(n) + a f(-n) &= 2|-n| + 1 = 2|n| + 1 \end{aligned} \right\} \xrightarrow{\text{تفریق}}$$

$$f(n) + a f(-n) - a f(-n) + a^2 f(n) = 2|n| + 1 - 2^n |n| - a$$

$$f(n) + a^2 f(n) = 2|n| - 2^n |n| - a + 1$$

$$f(n)(1 + a^2) = (2|n| + 1)(1 - a) \Rightarrow f(n) = \frac{(2|n| + 1)(1 - a)}{1 + a^2}$$

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$$a=0 \rightarrow f(0) + f(0) = 4 \rightarrow f(0) = 2$$

$$\Rightarrow f(n) = 2^n - 3n + 3 \rightarrow f(n^2) = 2^{n^2} - 3n^2 + 3$$

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$$y_n - y = n^2 + n + 2 \rightarrow n^2 + n + 2 - y_n + y = 0 \rightarrow n^2 + (1-y)n + y + 2 = 0$$

$$n = \frac{-(1-y) \pm \sqrt{(1-y)^2 - 4(y+2)}}{2} \sim \Delta \geq 0 \rightarrow y^2 - 2y + 1 - 4y - 8 \geq 0$$

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۳

$$\rightarrow y^2 - 4y - 7 \geq 0 \quad \frac{-1}{+} \frac{7}{-} \Rightarrow R_f: (-\infty, -1] \cup [7, +\infty)$$

$$\text{الف) } a = \frac{2}{3} \rightarrow 2\left(\frac{2}{3}\right)^2 - 2\left(\frac{2}{3}\right) + 1 = \frac{14}{9} \rightarrow R_f: \left[-\frac{14}{9}, +\infty\right)$$

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$$\text{ب) } a = \frac{-9}{-4} = \frac{9}{4} \rightarrow -9 + 18 - 2 = 7 \Rightarrow \sqrt{7} \rightarrow R_f: [0, \sqrt{7}]$$

۴

$$\text{ج) } \sqrt{(-\infty, +\infty)} \rightarrow R_f: [0, +\infty)$$

$$1) f_y(-\infty, +\infty) \rightarrow f_y(0, +\infty) \rightarrow R_f: (-\infty, +\infty)$$

$$\text{د) } \rightarrow R: \left\{\frac{9}{2}\right\} \Rightarrow R_f: \mathbb{R} - \left\{\frac{9}{2}\right\}$$

۲

$$\text{ب) } \sqrt{18 - \{4\}} \rightarrow R_f: [0, +\infty) - \{2\}$$

$$\text{ج) } \frac{2n^2 + 3}{\sqrt{2n^2 + 3}} = \sqrt{2n^2 + 3} + \frac{1}{\sqrt{2n^2 + 3}} \rightarrow R_f: \left[\frac{\sqrt{2}}{2}, +\infty\right)$$

۵

$$1) n^2 + 2 + \frac{1}{n^2 + 2} - 2 \rightarrow R_f: \left[\frac{1}{2}, +\infty\right)$$

$$\text{دریافتی} \Rightarrow y_{n+1} - y_n = 2n^2 + \varepsilon \rightarrow y_{n+1} - 2n^2 = y + \varepsilon \rightarrow n^2 = \frac{y + \varepsilon}{y - 2}$$

$$\Rightarrow \frac{y + \varepsilon}{y - 2} > 0 \quad \frac{-2 \pm \sqrt{4 + 4(y + \varepsilon)}}{2} = R_2: (-\infty, -\varepsilon] \cup (2, +\infty)$$

تذکره: $n^2 < 0 \Rightarrow \frac{y + \varepsilon}{y - 2} < 0 \xrightarrow{\text{خرج منفی شود}} R_2: (-\infty, -\varepsilon] \cup (2, +\infty)$

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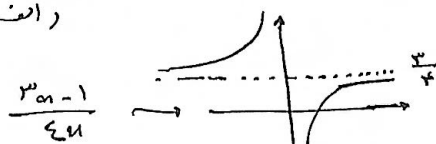
6

$$\frac{y_{n+1} + \varepsilon}{y_{n+1} - 2} < \begin{cases} x_n = 1 \rightarrow \frac{y + \varepsilon}{y - 2}, -2 \\ x_n = -1 \rightarrow \frac{-y + \varepsilon}{-y - 2}, -\frac{1}{2} \end{cases} \xrightarrow{\text{خرج منفی شود}} [-2, -\frac{1}{2}]$$

(2)

7

دایره



$$\sqrt{\frac{4(n-2)}{5(n-2)}} \xrightarrow{n \neq 2} \sqrt{\frac{4}{5}} = \frac{2}{\sqrt{5}}$$

$$\Rightarrow R_4: \left\{ \frac{2}{\sqrt{5}} \right\}$$

فردمطلق



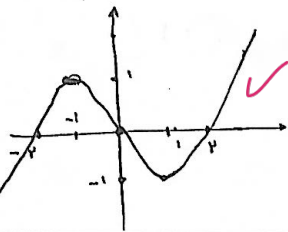
$$\sim R_2: (0, +\infty)$$

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8

$$n > 0 \rightarrow n^2 - 2n = n(n-2) \rightarrow n \in [1, 2]$$

$$n < 0 \rightarrow -n^2 - 2n = -(n)(n+2) \rightarrow n \in [-1, 0]$$

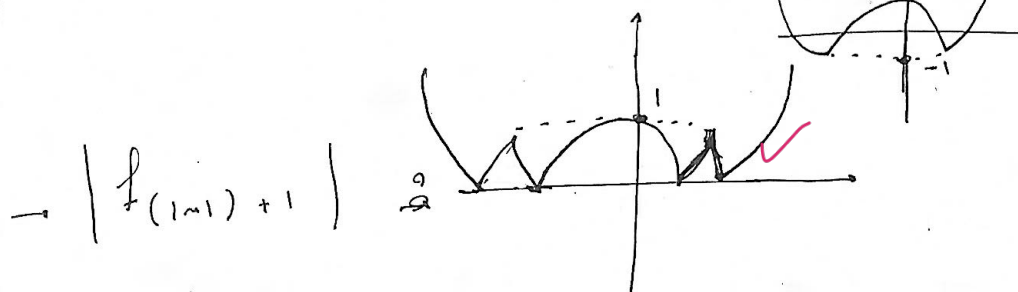


$$\sim R_1: (-\infty, +\infty)$$

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9

$$f(|n|) = f(n) \sim f(|n|) + 1$$



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10