

دینا سقایی

$$\begin{aligned} n \rightarrow x: f(-n) - x f(n) &= 2|n| + 1 \\ n \rightarrow -n: f(n) + x f(-n) &= 2|-n| + 1 \end{aligned} \quad \begin{cases} -x f(n) + n^2 f(n) = -x(2|n|+1) - 1 \\ f(n) + n f(n) = 2|n| + 1 \end{cases}$$

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

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

دینا سقایی

$$n=0 \rightarrow 2f(0) = 4 \rightarrow f(0) = 2$$

$$f(n^2) + 3 = n^2 - 2n^2 + 4 \rightarrow f(n^2) = n^2 - 2n^2 + 3$$

$$y^n - y = n^2 + n + 2$$

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

$$(1-y)^2 - 4(2+y) \geq 0 \rightarrow y^2 + 1 - 2y - 1 - 4y \geq 0$$

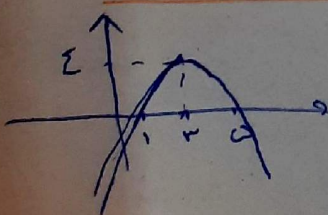
$$y^2 - 4y - 4 \geq 0$$

$$y \leq -1 \cup y \geq 5$$

$$S \Big| \frac{0}{x}$$

$$x \times \frac{2x}{x^2} - \frac{2x^2}{x^2} + 1 = \frac{2x - 2x + 1}{1} = -\frac{14}{1}$$

$$R_f = \left[-\frac{14}{1}, +\infty\right)$$



$$\sqrt{[0, 2]} = [0, 2]$$

(ج)

$$R_g = (-\infty, +\infty) \quad R_f = [0, +\infty)$$

(ج-ع)

$$f(x) = \log_{10} x$$

$$R_g = (-\infty, +\infty)$$

(ج-ع)

$$R_f = (-\infty, +\infty)$$

$$x = \frac{4y+1}{2y-1}$$

$$R_f = \left\{ \frac{1}{2} \right\}$$

(د-ف)

$$R_f = [0, +\infty) - \{1\}$$

(د-ج)

$$y = \frac{x^2 + x + 1}{\sqrt{x^2 + x}} = \sqrt{x^2 + x} + \frac{1}{\sqrt{x^2 + x}}$$

(د-ج)

$$\sqrt{x^2 + x} < +\infty \quad \sqrt{x^2 + x} + \frac{1}{\sqrt{x^2 + x}} = \frac{x}{\sqrt{x^2 + x}}$$

$$R_f = \left[\frac{1}{\sqrt{x^2 + x}}, +\infty \right)$$

$$x^2 + \varepsilon + \frac{1}{x^2 + \varepsilon} - \varepsilon$$

(د-ج)

$$\frac{1}{2} < x^2 + \varepsilon < +\infty \quad \frac{1}{2} < x^2 + \varepsilon + \frac{1}{x^2 + \varepsilon} < +\infty$$

$$\frac{1}{2} < x^2 + \varepsilon + \frac{1}{x^2 + \varepsilon} - \varepsilon < +\infty$$

$$R_f = \left[\frac{1}{2}, +\infty \right)$$

$$\frac{3D+2}{D-1} \quad \begin{cases} D=0 \rightarrow \frac{2}{-1} = -2 \\ D=+\infty \rightarrow 3 \end{cases}$$

- 4

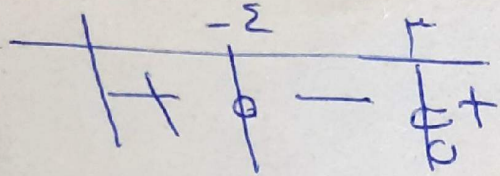
$$(-\infty, -2) \cup (3, +\infty)$$

نقطه 3

$$y \cdot n^2 - y = 2n^2 + 2$$

4 - ریشه اولی

$$\rightarrow -y - 2 = n^2(2 - y) \rightarrow n^2 = \frac{y+2}{y-2} \xrightarrow{y=0} n = \pm \sqrt{\frac{y+2}{y-2}}$$



$$\textcircled{B} R = (2, +\infty) \cup (-\infty, -2]$$

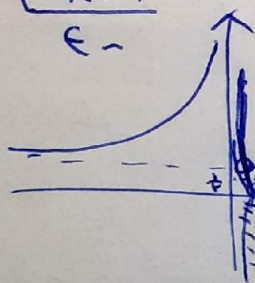
$$y = \frac{2x + 2}{x^2 - 2}$$

فصلانه صفر شده $\rightarrow x^2 - 2$

$$\begin{cases} x = -1 \rightarrow \frac{-2+2}{-2} = 0 = -\frac{1}{2} \\ x = 1 \rightarrow \frac{4}{-1} = -4 \end{cases} \rightarrow V$$

$$R_f = [-2, -\frac{1}{2}]$$

$$y = \frac{x-1}{x-2}$$

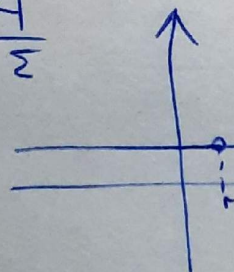


~~الف - 1~~

(الف - 1)

$$R_{\text{الف}} = [0, +\infty)$$

$$\sqrt{\frac{9(n-2)}{4(n-2)}} = \frac{3}{2}$$

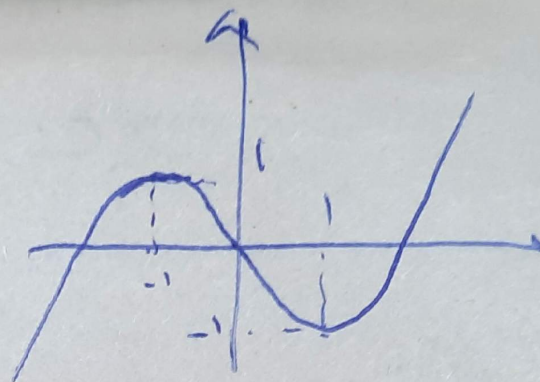


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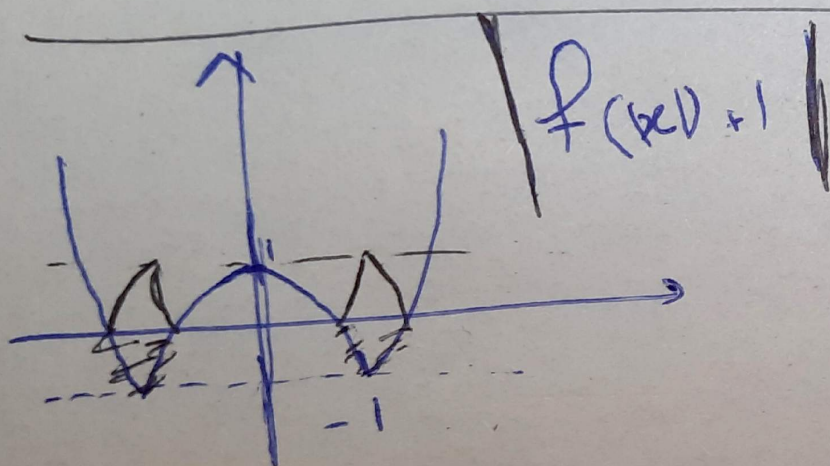
$$y = \frac{3}{2} = \frac{3}{2}$$

$$R_c = \left\{ \frac{3}{2} \right\}$$

$$\begin{cases} n^2 - 1 & n \geq 1 \\ -n^2 - 1 & n \leq 0 \end{cases}$$



$$R_f = (-\infty, +\infty)$$



$$-10$$