

$$f(-x) - xf(x) = 2|x| + 1 \rightarrow \begin{cases} f(-x) = 2|x| + 1 + xf(x) \\ f(x) = 2|x| + 1 + xf(-x) \end{cases}$$

$$\Rightarrow x(2|x| + 1) + x^2 f(x) + f(x) = 2|x| + 1 \rightarrow (1 + x^2)f(x) = (2|x| + 1)(1 - x)$$

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

$$2f(0) = 6 \Rightarrow f(0) = 3 \Rightarrow f(x) = x^2 - 3x + 3$$

$$f(x^2) = x^4 - 3x^2 + 3$$

$$yx - y = x^2 + x + 2 \rightarrow x^2 + (1 - y)x + (y + 2) = 0$$

$$\Delta \geq 0 \Rightarrow (1 - y)^2 - 4(y + 2) \geq 0 \rightarrow 1 - 2y + y^2 - 4y - 8 \geq 0$$

$$y^2 - 6y - 7 \geq 0 \rightarrow \frac{-1 \pm \sqrt{1 + 28}}{2} \Rightarrow (-\infty, -1] \cup [7, +\infty)$$

$$\min(y) = \frac{-\Delta}{fa} \rightarrow \frac{-(2d-1)}{1} = \frac{-17}{1} \rightarrow \left[\frac{-17}{1}, +\infty \right) \quad \text{الف}$$

$$-(x^2 + 4x + 4) \rightarrow -(x+2)^2 \geq 0 \quad x \leq -2 \rightarrow \sqrt{-9 + 18 - 4} = 2 \quad \text{ب}$$

$$\begin{cases} x=0 \rightarrow y=1 \\ x=-1 \rightarrow y=-7 \end{cases} \rightarrow \text{منفرد} \rightarrow [0, +\infty) \quad \text{ج}$$

$$\begin{cases} x=0 \rightarrow y=4 \\ x=-1 \rightarrow y=-10 \end{cases} \rightarrow \text{منفرد} \rightarrow (0, +\infty) \quad \text{د}$$

$$x = -\frac{-2y-1}{2y-3} \rightarrow \frac{2y+1}{2y-3} = x \rightarrow R_y = \mathbb{R} - \left\{ \frac{3}{2} \right\} \quad \text{الف}$$

$$R_y = [0, +\infty) - \left\{ \frac{3}{2} \right\} \rightarrow R_y = [0, +\infty) - \left\{ \frac{3}{2} \right\} \quad \text{ب}$$

$$x \geq 0 \rightarrow \frac{4}{\sqrt{3}} \rightarrow \left[\frac{4}{\sqrt{3}}, +\infty \right) \quad \text{ج}$$

$$x \geq 0 \rightarrow \left[\frac{1}{2}, +\infty \right) \quad \text{د}$$

$$(y \propto^2 y) = 3x + 4 \rightarrow x^2 = \frac{y+4}{y-3} \rightarrow x = \sqrt{\frac{y+4}{y-3}} \quad \frac{-4}{+1-1} +$$

$$x^2 \geq 0 \rightarrow 3 + \frac{4}{x^2-1} \rightarrow \text{[scribbled out]} (-\infty, +4] \rightarrow (-\infty, -4] \cup (3, +\infty)$$

$$x^2 \neq 1 \rightarrow x^2 > 1 \rightarrow \frac{4}{x^2-1} > 0 \rightarrow (3, +\infty)$$

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$$-1 \leq \sin x \leq 1 \rightarrow \left\{ \begin{array}{l} \sin x = -1 \rightarrow \frac{y}{-1} = \frac{1}{-1} \\ \sin x = 1 \rightarrow \frac{y}{-1} = -1 \end{array} \right\} \left[-1, -\frac{1}{1} \right] = R_f$$

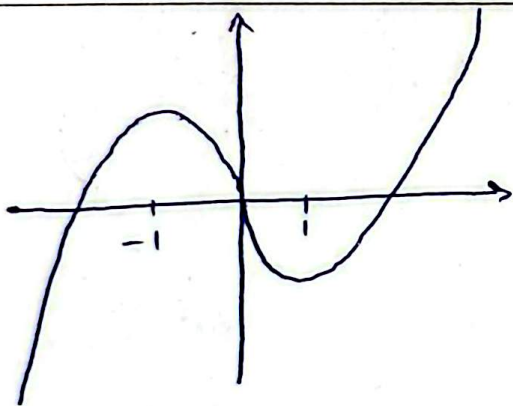
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الف ($\rightarrow [0, +\infty) \rightarrow x = \frac{1}{1-y} \rightarrow y \neq \frac{1}{1}$ [scribbled out])

المعادلات در $\rightarrow |y| = \frac{1}{1-y} \Rightarrow y = \frac{1}{1-y} \rightarrow [0, +\infty) = R_f$

تکمیل است $\frac{9x-11}{9x-1} \geq 0, y \neq \sqrt{\frac{9}{1}} \Rightarrow [0, +\infty) - \left\{ \frac{3}{1} \right\}$

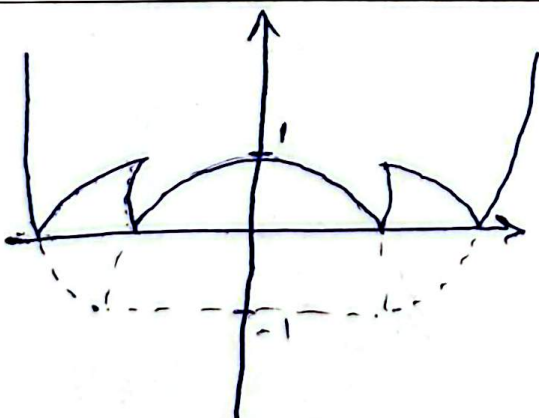
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$$R_f = \mathbb{R}$$

$$\begin{cases} x > 0 \rightarrow x^2 - 2x \rightarrow x_3 = +1 \\ x < 0 \rightarrow x^2 - 2x \rightarrow x_3 = -1 \end{cases}$$

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$$f(x) \leftarrow \text{فردی نمی کند}$$

$$f(x) + 1 \leftarrow \text{یکی بالای 1}$$

$$|f(x) + 1| \leftarrow \text{از محور } x \text{ ها نسبت به محور}$$

قرینه می شوند.

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