

$$x \rightarrow -x \rightarrow f(x) + x f(-x) = r|x| + 1 \xrightarrow{A=f(x) \quad B=f(-x) \quad C=r|x|+1} B - xA = C, \quad A + xB = C$$

$$B - x(C - xB) = C \Rightarrow (1 + x^2)B = C(1 + x)$$

$$A = C - xB$$

$$f_{(-x)} = \frac{(r|x|+1)(1+x)}{1+x^2} \rightarrow f_{(x)} = \frac{(r|x|+1)(1-x)}{1+x^2}$$

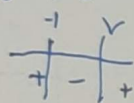
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$$x=0 \rightarrow r f_{(0)} = 4 \rightarrow f_{(0)} = 4 \rightarrow f_{(x)} = x^2 - 2x + 4 \rightarrow f_{(x^2)} = x^4 - 2x^2 + 4$$

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$$y(x-1) = x^2 + x + 2 \rightarrow x^2 + (1-y)x + (y+2) = 0 \rightarrow \Delta \geq 0 \rightarrow (1-y)^2 - 4(y+2) \geq 0 \rightarrow y^2 - 6y - 7 \geq 0$$

$$(y-7)(y+1) \geq 0$$



$$\rightarrow R = (-\infty, -1] \cup [7, +\infty)$$

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$$\text{الف) } x_{\text{محدود}} = \frac{\omega}{f} \rightarrow y = \frac{1}{n} \rightarrow R = [-\frac{1}{n}, +\infty)$$

$$\text{ب) } x_{\text{محدود}} = 3 \rightarrow y_{\text{محدود}} = \varepsilon \rightarrow R = \sqrt{(-\infty, \varepsilon]} = [0, 2]$$

$$\text{ج) } R = [0, +\infty)$$

$$\text{د) } R = (-\infty, +\infty)$$

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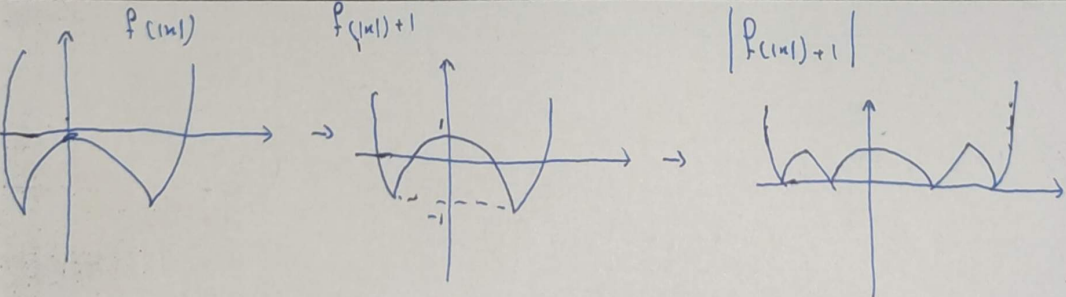
$$\text{الف) } R = \left\{ \frac{3}{2} \right\}$$

$$\text{ب) } \sqrt{R - \{ \varepsilon \}} \rightarrow [0, 2) \cup (2, +\infty)$$

$$\text{ج) } \sqrt{x^2 + 2} = t \rightarrow \frac{t^2 + 1}{t} = t + \frac{1}{t} \xrightarrow{t \geq 0} \min \rightarrow \sqrt{2} + \frac{1}{\sqrt{2}} = \frac{\varepsilon \sqrt{2}}{\sqrt{2}} \rightarrow \left[\frac{\varepsilon \sqrt{2}}{\sqrt{2}}, +\infty \right)$$

$$\text{د) } x^2 + \varepsilon + \frac{1}{x^2 + \varepsilon} - \varepsilon \Rightarrow \varepsilon + \frac{1}{\varepsilon} = \frac{1}{\varepsilon} \rightarrow R = \left[\frac{1}{\varepsilon}, +\infty \right) - \varepsilon \Rightarrow \left[\frac{1}{\varepsilon}, +\infty \right)$$

۵

$y(x^r-1) = 2x^0 + \varepsilon \Rightarrow x^r = \frac{y+\varepsilon}{y-2} \rightarrow \frac{y+\varepsilon}{y-2} \geq 0 \quad \frac{-\varepsilon}{+} \frac{2}{-} \frac{+}{+} \rightarrow R = [-\infty, -\varepsilon] \cup (2, +\infty)$	
$\begin{aligned} \text{رؤس ۳} \rightarrow x=0 \rightarrow y=\varepsilon, x \rightarrow +\infty \rightarrow y=2 \\ \text{چون متغیرها از ۱-۲ کمتر می شود اینجاست} \rightarrow (-\infty, -\varepsilon] \cup (2, +\infty) \\ \text{ببرون این دو نقطه است} \end{aligned}$	۶
$\begin{aligned} x=-1 \rightarrow \frac{2+\varepsilon}{-1-2} = \frac{2}{-\varepsilon} = -\frac{1}{\varepsilon} \\ x=1 \rightarrow \frac{2+\varepsilon}{1-2} = \frac{2}{-\varepsilon} = -\frac{1}{\varepsilon} \end{aligned} \quad \left. \begin{array}{l} \text{چون متغیرها از ۱-۲ کمتر می شود} \end{array} \right\} \rightarrow [-2, -\frac{1}{\varepsilon}]$	۷
$\text{الف) } \frac{x_n-1}{\varepsilon_n} = y \rightarrow x = \frac{1}{2-\varepsilon y} \rightarrow y \neq \frac{2}{\varepsilon}, \frac{x_n-1}{\varepsilon_n} = -y \rightarrow x = \frac{1}{2+\varepsilon y} \rightarrow y \geq 0 \rightarrow R = [0, +\infty)$	
$\text{ب) } \sqrt{\frac{q(x-2)}{\varepsilon(x-2)}} = \sqrt{\frac{q}{\varepsilon}} = \frac{2}{\varepsilon} x + 2 \rightarrow R = \left\{ \frac{2}{\varepsilon} \right\}$	۸
$\begin{cases} x^r - 2x, x < 0 \rightarrow R = (-\infty, 1] \\ x^r - 2x, x \geq 0 \rightarrow R = [-1, +\infty) \end{cases} \rightarrow R = \mathbb{R}$	۹
	۱۰