

۲۰ آفرین :

ستایش معروف نژاد طلاس دار شهر A تکلیف ۴

$$n \rightarrow \begin{aligned} f(-x) - x f(n) &= x|n| + 1 \quad f(n) = ? \\ n \rightarrow n \quad x f(-n) - n^2 f(n) &= x|n| + n \end{aligned} \quad (۲)$$

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

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

$$f(n) = \begin{cases} \frac{-2x^2 + n + 1}{1+n^2} & ; n \geq 0 \\ \frac{2x^2 - n + 1}{x^2 + 1} & ; n < 0 \end{cases}$$

$$\begin{aligned} f(n) + f(n) &= x^2 - 2n + 1 \xrightarrow{n=0} x f(n) = 1 \rightarrow f(n) = \frac{1}{x} \rightarrow f(n) = x^2 - 2n + 1 \\ f(n^2) &= x^2 - 2n^2 + 1 \end{aligned} \quad (۲)$$

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

$$x = \frac{-y+1 \pm \sqrt{y^2 - 4y + 1}}{-2} \quad \Delta \geq 0 \rightarrow y^2 - 4y + 1 \geq 0 \rightarrow R = (-\infty, -1] \cup [1, +\infty)$$

$$\begin{aligned} \text{الف) } y &= 2x^2 - \alpha n + 1 \rightarrow A_{\min} \Big|_{\frac{0}{x}} \\ 2, \frac{2\alpha}{19} - \alpha\left(\frac{0}{x}\right) + 1 &= \frac{2\alpha}{\alpha} - \frac{2\alpha}{x^2} + 1 = \frac{-14}{\alpha} \end{aligned} \quad (۲)$$

$$\rightarrow R = \left[-\frac{14}{\alpha}, +\infty\right)$$

$$\begin{aligned} \text{ب) } y &= \sqrt{-n^2 + 4n - 8} \rightarrow A_{\max} \Big|_{\frac{0}{x}} \\ -9 + 1n - \alpha &= x \rightarrow R_{y'} = (-\infty, x] \\ R_y &= [0, x] \\ R_y &= \sqrt{R_{y'}} \end{aligned}$$

$$ج) y = \sqrt{x^2 - 3x^2 + 4x + 1}$$

$$R_{y'} = \mathbb{R} \rightarrow R_y = \sqrt{R_{y'}} = [0, \sqrt{1}]$$

-1

$$د) y = \lg(x^2 - 4x^2 + 6x + 4) \rightarrow R = \mathbb{R} \rightarrow \text{دستگاه معادلات} (0, +\infty) \rightarrow R_y = \mathbb{R}$$

$$الف) y = \frac{x^2 + 1}{x^2 - 4} \rightarrow R = \mathbb{R} - \left\{ \frac{1}{4} \right\}$$

(2)

$$ب) y = \sqrt{\frac{x^2 + 1}{x^2 - 4}} \rightarrow R_{y'} = \mathbb{R} - \{4\} \rightarrow R_y = [0, +\infty) - \{2\}$$

$$ج) y = \frac{x^2 + 4}{\sqrt{x^2 + 4}} = \frac{x^2 + 4}{\sqrt{x^2 + 4}} + \frac{1}{\sqrt{x^2 + 4}} = a + \frac{1}{a} \rightarrow y_{\min} = \frac{4}{\sqrt{4}} + \frac{1}{\sqrt{4}} = \frac{5}{2}$$

$$R_y = \left[\frac{5}{2}, +\infty \right)$$

$$د) y = x^2 + \frac{1}{x^2 + 4} \xrightarrow{x^2 \text{ متغیر}} 0 + \frac{1}{4} = \frac{1}{4}$$

$$\xrightarrow{x^2 \text{ max}} +\infty + \frac{1}{+\infty + 4} = +\infty$$

$$\rightarrow R_y = \left[\frac{1}{4}, +\infty \right)$$

$$y = \frac{3x^2 + 4}{x^2 - 1}$$

(2) (14)

$$\text{دستگاه معادلات} \quad x^2 = \frac{y + 4}{y - 3} \rightarrow x = \pm \sqrt{\frac{y + 4}{y - 3}} \quad \frac{-4}{+} \quad \frac{3}{-} \quad \frac{+}{+}$$

$$\rightarrow R_y = (-\infty, -4] \cup (3, +\infty)$$

$$\text{تکثر} \rightarrow x^2_{\min} = 0 \rightarrow y = -4$$

$$x^2_{\max} = +\infty \rightarrow y = 3$$

$$\xrightarrow{\text{دستگاه معادلات}} R = (-\infty, -4] \cup (3, +\infty)$$

(۲) - ۷

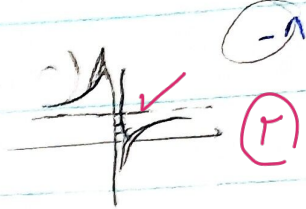
$$f(x) = \frac{x \sin x + \frac{4}{x}}{\sin x - x} \xrightarrow{\max \sin x} \sin x = 1 \rightarrow y = \frac{4}{-1} = -4$$

و نیز
 $\sin x = 0$

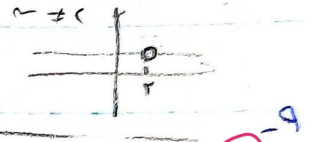
$$\xrightarrow{\min \sin x} \sin x = -1 \rightarrow y = \frac{4}{-1} = -4$$

$$\rightarrow R = [-4, -4]$$

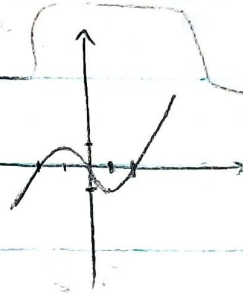
الف) $y = \left| \frac{x-1}{x} \right| \rightarrow R_{y'} = |R| \rightarrow R_y = [0, +\infty)$



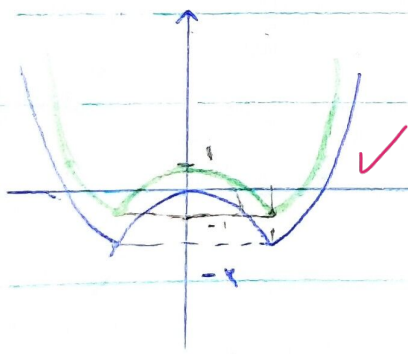
ب) $y = \sqrt{\frac{4x-1}{-x+4x}} \rightarrow y = \sqrt{\frac{4(x-1/4)}{x(4-x)}} = \sqrt{\frac{4}{x(4-x)}} = \frac{2}{\sqrt{x(4-x)}} \rightarrow R_y = \{ \frac{1}{4}, 4 \}$



$y = a|x| - x^2 \xrightarrow{x \geq 0} y = x^2 - x^2$
 $\xrightarrow{x < 0} y = -x^2 - x^2$

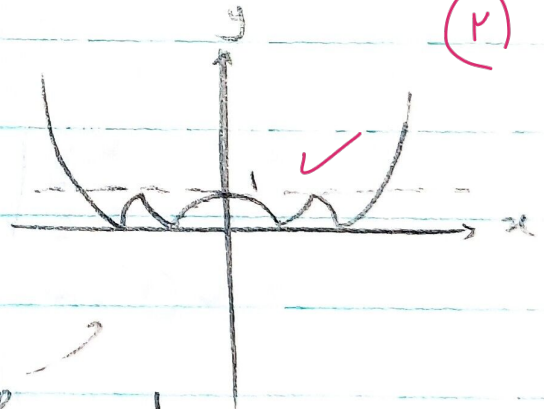


$$R_y = \mathbb{R}$$



$$y = f(x)$$

$$y = f(x) + 1$$



$$y = |f(x)| + 1$$

Somehow we can find the range of the function

$$\frac{4x-1}{x(4-x)} = 0 \text{ is}$$

$$\left| \frac{4x-1}{x(4-x)} \right| = 0 \text{ is}$$