

نام و نام خانوادگی: ... شماره دانشجویی: ...

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

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

علاقت هارو اشتباه ندری!
صغیر افزودن

$$x=0 \rightarrow 2f(0) = 1 \rightarrow f(0) = \frac{1}{2} \Rightarrow x^2 = x \rightarrow f(x^2) + 3 = x^2 - 3x^2 + 2$$

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

$f(x) = x^2 - 3x + 3$
جای x و x^2 مبادی

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

$$1+y^2-4y-1-4y \geq 0 \rightarrow y^2-8y-4 \geq 0 \rightarrow (y-4)^2 \geq 20 \rightarrow y \leq 4-\sqrt{20} \text{ or } y \geq 4+\sqrt{20}$$

$R =]R - (-1, 4)]$

الف) $-\frac{b}{ra} = \frac{c}{r} \rightarrow y = \frac{r \times \frac{c}{r}}{\frac{r \times r}{r}} - \frac{c}{r} + 1 = -\frac{14}{1} \rightarrow R = [-\frac{14}{1}, 4)$

ب) $-\frac{b}{ra} = \frac{-y}{-r} = 2 \rightarrow y = -9 + 18 - 2 = 7 \Rightarrow R = [0, 7]$

ج) $R =]R - \{3\}] \rightarrow R = [0, 400)$

د) $R =]R - \{1\}] \rightarrow R =]R$

الف) $R =]R - \{3\}]$ ب) $R = [0, 400) - \{1\}$ راه حل!!

ج) $\frac{x^2+3}{\sqrt{x^2+3}} + \frac{1}{\sqrt{x^2+3}} \rightarrow \sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}} \xrightarrow{x=0} \sqrt{3} + \frac{1}{\sqrt{3}} = \frac{4\sqrt{3}}{3} \rightarrow R = [\frac{4\sqrt{3}}{3}, +\infty)$

د) $x^2+3 + \frac{1}{x^2+3} - 4 \xrightarrow{x=0} 3 + \frac{1}{3} - 4 = \frac{1}{3} \rightarrow R = [\frac{1}{3}, +\infty)$

$$\frac{r x^r + \varepsilon}{x^r - 1} = y \rightarrow x^r = \frac{y + 1}{y - 1} \rightarrow \frac{y + 1}{y - 1} > 0 \Rightarrow \frac{-1}{1 - \frac{1}{y}} > 0 \quad R =]R[\quad \checkmark \quad (-1, 1]$$

$$\begin{cases} x^r = 0 \rightarrow -1 \\ x^r = +\infty \rightarrow y = 1 \end{cases} \Rightarrow R = (-\infty, -1] \cup (1, +\infty)$$

$$f(x) = \frac{1 \sin x + r}{\sin x - r} \begin{cases} \sin x = -1 \rightarrow \frac{-r + \varepsilon}{-1 - \varepsilon} = -\frac{1}{r} \\ \sin x = 1 \rightarrow \frac{r + \varepsilon}{1 - \varepsilon} = -r \end{cases} \Rightarrow R = [-\infty, -\frac{1}{r}]$$

الف) $y = \left| \frac{r x - 1}{x} \right| \rightarrow \begin{cases} \text{مجاذبة} = \frac{r}{2} \\ \text{مجاذبة} = 0 \end{cases} \Rightarrow \text{قصر محض} \Rightarrow R = [0, +\infty)$

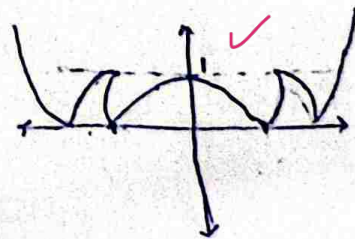
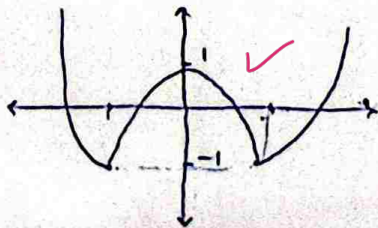
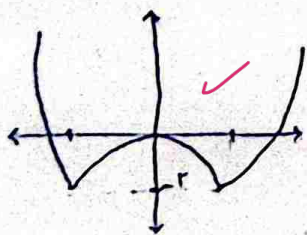
ب) $y = \sqrt{\frac{9(x-r)}{x(-r+x)}} = \frac{r}{r} \Rightarrow R = \left\{ \frac{r}{r} \right\}$

$$y = x|x| - r x \begin{cases} x > 0 \rightarrow x^2 - r x \\ x < 0 \rightarrow -x^2 - r x \end{cases} \Rightarrow R =]R[\quad \checkmark$$

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

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

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۱- جای n ، $-n$ قرار می دهیم و یک دستگاه می سازیم:

$$\begin{aligned} f(-n) - n f(n) &= 2|n| + 1 \xrightarrow{\times n} \begin{cases} n f(-n) - n^2 f(n) = 2n|n| + n & (I) \\ f(n) + n f(-n) = 2|n| + 1 & (II) \end{cases} \\ f(n) + n f(-n) &= 2|n| + 1 \end{aligned}$$

$$\underline{II - I} \rightarrow (1 + n^2) f(n) = 2(1-n)|n| + 1 - n \Rightarrow f(n) = \frac{(1-n)(2|n|+1)}{1+n^2}$$

الف $R_f = \mathbb{R} - \left\{ \frac{1}{2} \right\}$

۵- برد توابع محو نیز می باشد $\mathbb{R} - \left\{ \frac{\infty}{2} \right\}$ است

ب $R_g = \sqrt{\mathbb{R} - \{4\}} = [0, +\infty) - \{2\}$