

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

$$f(x) = ?$$

(۱۷۵)

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

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

صفحه آفرین

$$f(x) + f(0) = x^2 - 3x + 6 \quad (1)$$

$$f(x^2) = ?$$

(۲)

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

$$x^2 \rightarrow f(x^2) + 3 = (x^2)^2 - 3(x^2) + 6 \rightarrow f(x^2) = x^4 - 3x^2 + 3$$

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

دوره اولی

(۲)

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

$$\Delta = (1-y)^2 - 4(y+1) = 1 + y^2 - 2y - 4y - 4 = y^2 - 6y - 3 = 0 \rightarrow (y-3)(y+1) = 0$$

$$y = 3 \text{ or } y = -1 \rightarrow R = (-\infty, -1] \cup [3, \infty)$$

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

$$y \in [0, 1]$$

$$R = [0, 1] \checkmark$$

$$b) y = \sqrt{\frac{x+1}{x}}$$

$$y \in [1, \infty)$$

$$R = [1, \infty) \checkmark$$

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

$$y \in [1, \infty)$$

$$R = [1, \infty) \checkmark$$

$$d) y = \log(x^2 + 1)$$

$$y \in (-\infty, \infty)$$

$$R = \mathbb{R} \checkmark$$

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

$$y \in (-\infty, \infty)$$

$$R = \mathbb{R} \checkmark$$

$$f) y = \sqrt{\frac{x+1}{x}}$$

$$y \in [1, \infty)$$

$$R = [1, \infty) \checkmark$$

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

$$y \in (-\infty, \infty)$$

$$R = \mathbb{R} \checkmark$$

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

$$y \in (-\infty, \infty)$$

$$R = \mathbb{R} \checkmark$$

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

$$x_{\max} = \infty \rightarrow y = 3$$

$$x_{\min} = 0 \rightarrow y = -3$$

$$R = (-\infty, -3] \cup [3, \infty)$$

$$\frac{3x^2 + \varepsilon}{x^2 - 1}, y$$

$$x = \pm \sqrt{\frac{y+1}{y-3}}$$

$$+ \frac{-1}{-3} +$$

$$R = (-\infty, -3] \cup (3, \infty)$$

$$f(x) = \frac{x \sin x + 1}{\sin x - 3}$$

$$\begin{aligned} \text{Max} \rightarrow \sin x = 1 &\sim \frac{1}{-2} = -\frac{1}{2} \\ \text{Min} \rightarrow \sin x = -1 &\sim \frac{-1+1}{-1-3} = \frac{0}{-4} = 0 \end{aligned}$$

$$R = [-\frac{1}{2}, 0]$$

$$\text{الف) } y = \left| \frac{3x-1}{\varepsilon x} \right|$$

$$R = [0, \infty)$$

$$\text{ب) } y = \sqrt{\frac{7x-11}{-8+x}}$$

تابع ثابت

$$\frac{7x-11}{-8+x} \cdot y \sim \frac{\varepsilon y + 11}{-8y - 9} \cdot x \sim 0$$

$$R = [0, \infty)$$

$$y = x|x| - 2x$$

$$x^2 - 2x \quad x > 0$$

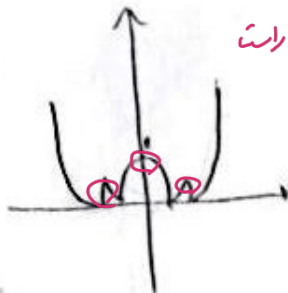
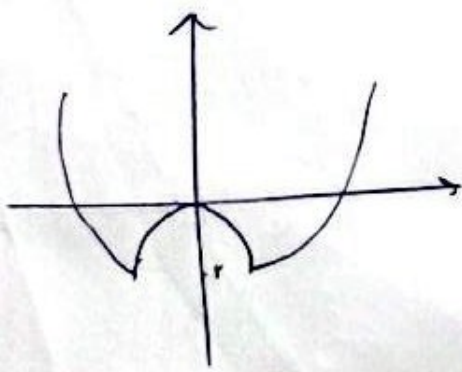
$$x > 0$$

$$R = \mathbb{R}$$

$$-x^2 - 2x \quad x < 0$$

$$x < 0$$

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



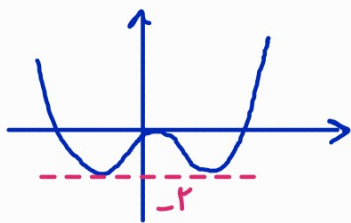
باید در یک راستا باشند

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

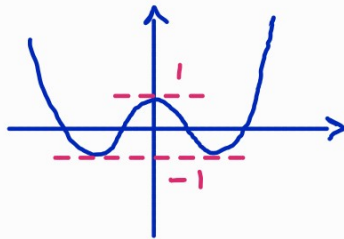
$$\begin{aligned} f(-n) - n^r f(n) &= 2|n| + 1 \xrightarrow{\times n} \begin{cases} n f(-n) - n^r f(n) = 2n|n| + n & (I) \\ f(n) + n^r f(-n) = 2|n| + 1 & (II) \end{cases} \\ f(n) + n^r f(-n) &= 2|n| + 1 \end{aligned}$$

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

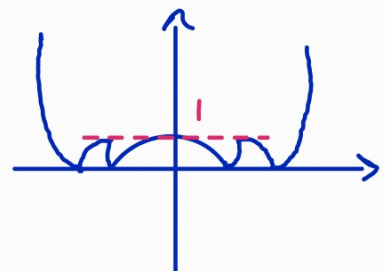
۸- ب) $y = \sqrt{\frac{4(n-r)}{r(n-r)}} = \sqrt{\frac{4}{r}} = \frac{r}{r} \Rightarrow R_y = \left\{ \frac{r}{r} \right\}$



$$y = f(1-n)$$



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



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

-۱۰