

1A, 2A

دالة فردية و زوجية

1

(I) $f(-n) = -n f(n) = r|n| + 1$

(II) $n \rightarrow -n$
 $f(n) + n f(-n) = r|-n| + 1 = r|n| + 1$

II, $\rightarrow f(-n) - n f(-n) = n f(n) - f(n) = 0$

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

$$f(-n) = \frac{n+1}{1-n} f(n)$$

$$\left(\frac{n+1}{1-n} - n \right) f(n) = r|n| + 1$$

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

~~Example~~ $f(2) + f(1) = 2^2 - 3 \cdot 2 + 4$

$n=1$ $\hookrightarrow r f(1) = 4 \rightarrow f(1) = \frac{4}{r}$

$$f(2) = 2^2 - 3 \cdot 2 + 4 - f(1) = 2^2 - 3 \cdot 2 + \frac{4}{r}$$

$$f(2^2) = 2^4 - 3 \cdot 2^2 + \frac{4}{r}$$

~~Example~~

$$y = \frac{2^x + x + r}{n-1}$$

$$\mathbb{R}_f = (-\infty, -1] \cup [0, +\infty)$$

$$+ \quad - \quad - \quad +$$

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

$$y^2 - 0y - 0 \geq 0$$

$$\Delta \geq 0$$

$$y^n - y = 2^x + x + r$$

$$2^x + x(1-y) + r + y = 0$$

$$x = \frac{(y-1) \pm \sqrt{y^2 + 1 - ry - 1 - ry}}{r}$$

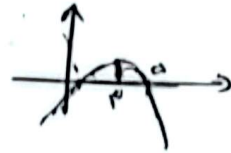
$$y = \sqrt{x^2 - 4x + 1} \rightarrow \begin{cases} \text{min} \\ \frac{1}{15} \end{cases} \quad R_f = \left[-\frac{14}{15}, +\infty \right) \quad \textcircled{P} \quad \textcircled{2}$$

~~XXXXXXXXXXXXXXXXXXXX~~

$$y\left(\frac{10}{15}\right) = \frac{350}{15} + 1 = \frac{210 + 15}{15} = \frac{225}{15} = 15$$

$$y = \sqrt{-x^2 + 4x - 8} = \sqrt{-(x^2 - 4x + 8)} = \sqrt{-(x-2)(x-1)}$$

$$\frac{-1}{1} + \frac{1}{0} = -$$



$$-9 \pm 11 - 8 = 4$$

$$R_f = [0, 2]$$

$$y = \sqrt{x^4 - 12x^2 + 11x + 1}$$

$$\hookrightarrow R_f = \mathbb{R} \quad \sqrt{1\mathbb{R}} = [0, +\infty)$$

$$y = \log |2x^2 - 9x + 11x + 1| \quad \textcircled{1\mathbb{R}}$$

$$\log 1\mathbb{R} = \mathbb{R}$$

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

~~XXXXXXXXXXXXXXXXXXXX~~

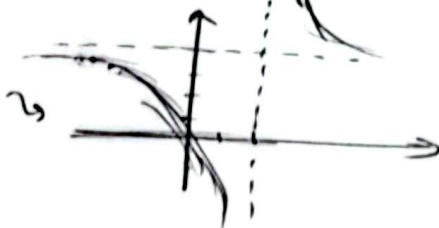
~~XXXXXXXXXXXXXXXXXXXX~~ $\textcircled{1\mathbb{R}}$ $\textcircled{5}$

~~XXXXXXXXXXXXXXXXXXXX~~



$$R_f = \mathbb{R} - \left\{ \frac{1}{4} \right\}$$

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



$$\sqrt{1\mathbb{R} - \left\{ \frac{1}{4} \right\}}$$

$$[0, +\infty) - \left\{ \frac{1}{2} \right\}$$

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

$$\left[\sqrt{3} + \frac{1}{\sqrt{3}}, +\infty \right)$$

$$y = n^r + \frac{1}{n^r + \epsilon} + \epsilon - r$$

$$\left(n^r + \epsilon + \frac{1}{n^r + \epsilon} \right) r$$

$$R_f = \left[r, \infty, +\infty \right) - \epsilon = \left[\cdot, \infty, +\infty \right)$$

$$y = \frac{n^r + r}{n^r - 1} \quad n^r: [\cdot, +\infty)$$

$$R_f = (-\infty, -r] \cup (r, +\infty)$$

$$y n^r - y = n^r + r$$

$$n^r (y - r) = y + \epsilon$$

$$n^r = \frac{y + \epsilon}{y - r} \gg \cdot$$

$$\begin{array}{c} -r \quad r \\ + \quad - \quad - \quad + \\ \hline -\epsilon \quad \cdot \quad \cdot \quad \cdot \end{array}$$

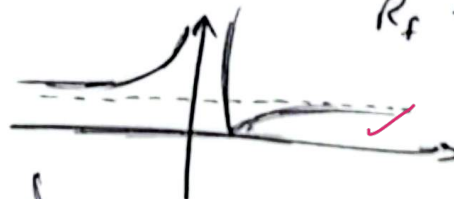
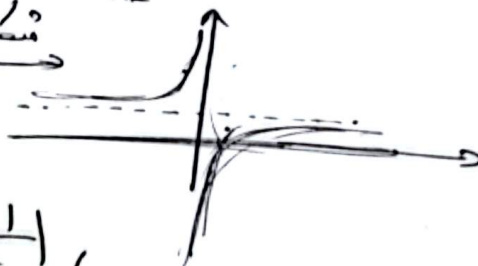
$$f(n) = \frac{r \delta_{n-1} + r}{\delta_{n-1} - r} \quad \delta_{n-1}: [-1, +1]$$

$$\frac{r}{-r} = -\frac{1}{r}$$

$$R_f = \left[-r, \frac{1}{\epsilon} \right]$$

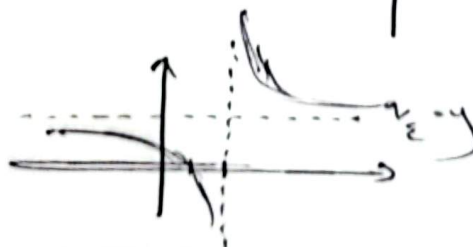
$$y = \left| \frac{n-1}{n} \right|$$

$$y = \left| \frac{n-1}{n} \right|$$



$$R_f = [\cdot, +\infty)$$

$$y = \sqrt{\frac{n-1}{n-1}}$$



$$R_f = [\cdot, +\infty) \setminus \left\{ \frac{1}{\epsilon} \right\}$$

تابع ثابت!

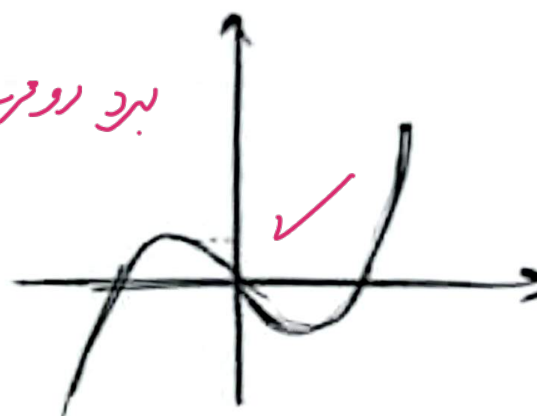
$$y = \sqrt{\frac{n-1}{n-1}} = \sqrt{\frac{1}{1}} = 1 \rightarrow R_y = \left\{ \frac{1}{r} \right\}$$

$$x|x| = x^2$$

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

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

برو رو مر خواهم:



$$R_f = \mathbb{R}$$

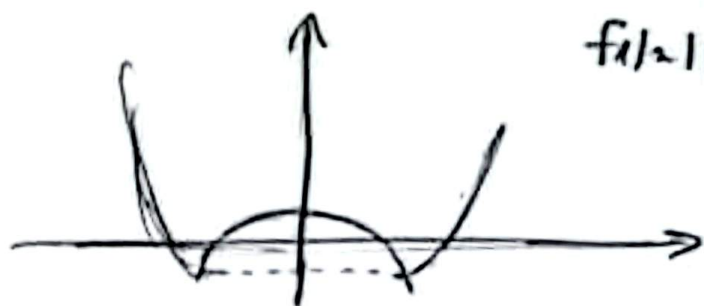
چون تابع نسبت به محور y متناظر است

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

۹) ۵۱

۱۰)

۲)



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

