

$$f(-n) - n f(n) = 2|n| + 1$$

$$\begin{cases} f(n) + n f(n) = 2|n| + 1 \\ n f(-n) - n^2 f(n) = 2n^2 + n \end{cases}$$

ن و نبر داخل قدر مطلق!

(۱، ۷۵)

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

زیادتر!

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

$$f(n) + f(0) = n^2 - 2n + 4 \Rightarrow f(n) = n^2 - 2n + 2$$

$$2f(0) = 4 \Rightarrow f(0) = 2$$

$$f(n^2) = n^2 - 2n^2 + 2$$

$$y = \frac{n^2 + n + 2}{n-1} \Rightarrow yn - y = n^2 + n + 2 \Rightarrow n^2 + n(1-y) + 2+y = 0 \Rightarrow \frac{-(1-y) \pm \sqrt{(1-y)^2 - 4(y+2)}}{2}$$

$$(1-y)^2 - 4(y+2) \geq 0 \Rightarrow y^2 - 2y + 1 - 4y - 8 \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0$$

$$(y-7)(y+1) \geq 0 \Rightarrow \frac{-1}{+} \frac{7}{-} \Rightarrow R_y = (-\infty, -1] \cup [7, +\infty)$$

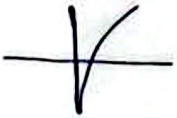
$$الف) y = 2n^2 - 2n + 1 \Rightarrow \frac{-\Delta}{2a} = -\frac{(4-1)}{4} = -\frac{3}{4} \Rightarrow \left[-\frac{3}{4}, +\infty\right)$$

$$ب) y = \sqrt{n^2 + 4n - 5} \Rightarrow \frac{-\Delta}{2a} = -\frac{(4-2)}{-2} = 1 \Rightarrow \sqrt{(-\infty, 1]} = [0, 1]$$

$$ج) y = \sqrt{2n^2 - 2n + 1} \Rightarrow R_y = \sqrt{R} = [0, +\infty)$$

$$د) \log(n^2 - 4n^2 + 6n + 4) \Rightarrow R_y = (-\infty, +\infty) \rightarrow R_y = \mathbb{R}$$

$\log -\infty = -\infty$
 $\log +\infty = +\infty$



$$الف) y = \frac{2n+1}{2n-4} \Rightarrow n = -\frac{-4y-1}{2y-2} = \frac{4y+1}{2y-2} \Rightarrow R_y = \mathbb{R} - \left\{\frac{1}{2}\right\}$$

$$ب) y = \sqrt{\frac{2n+1}{n-2}} \Rightarrow n = -\frac{-2y-1}{y-1} = \frac{2y+1}{y-1} \Rightarrow R_y = \sqrt{R - \{1\}} = [0, +\infty) - \{1\}$$

$$ج) y = \frac{n^2 + 1}{\sqrt{n^2 + 1}} = \sqrt{n^2 + 1} + \frac{1}{\sqrt{n^2 + 1}} = \sqrt{n^2 + 1} + \frac{1}{\sqrt{n^2 + 1}} = \frac{n^2 + 1}{\sqrt{n^2 + 1}} = \sqrt{n^2 + 1}$$

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

$$د) y = n^2 + \frac{1}{n^2 + 1} + 1 - 1 \Rightarrow n^2 + 1 + \frac{1}{n^2 + 1} - 1 \rightarrow 1 + \frac{1}{1} = \frac{2}{1} \Rightarrow \left[\frac{2}{1}, +\infty\right) = [2, +\infty)$$

$$y = \frac{ru^r + r}{u^r - 1} \xrightarrow{\text{محدود کردن}} u^r = -\frac{y-r}{y+r} = \frac{y+r}{y-r} \rightarrow u = \pm \sqrt{\frac{y+r}{y-r}} \quad \left\{ \begin{array}{l} -r < r \\ +r < -r \end{array} \right\} R_y = (-\infty, -r] \cup (r, +\infty)$$

$$\lim_{u \rightarrow +\infty} \frac{ru^r + r}{u^r - 1} = \frac{ru}{ru} = r \quad \left\{ \begin{array}{l} \text{محدود کردن} \\ \text{محدود کردن} \end{array} \right\} (-\infty, -r] \cup (r, +\infty)$$

به این روش می توان از حدی استفاده کرد.

$$f(u) = \frac{r \sin u + r}{\sin u - r} \quad \sin u \begin{cases} \text{محدود کردن} \\ \text{محدود کردن} \end{cases} \begin{cases} 1 \rightarrow \frac{r+r}{1-r} = \frac{2r}{1-r} \\ -1 \rightarrow \frac{-r+r}{-1-r} = -\frac{r}{1+r} \end{cases} \left\{ \begin{array}{l} \text{محدود کردن} \\ \text{محدود کردن} \end{array} \right\} [-r, -\frac{1}{r}]$$

$$\text{الف) } y = \left| \frac{ru-1}{ru} \right|$$

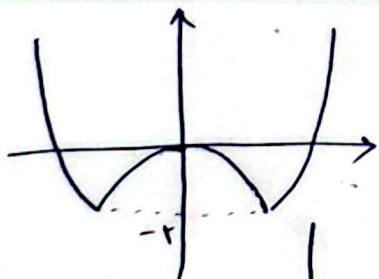
$$R_y = [0, +\infty)$$

$$\text{ب) } y = \sqrt{\frac{9u-18}{-1+ru}} = \sqrt{\frac{9(u-r)}{r(u-r)}} = \frac{3}{r} \quad R_y = \left\{ \frac{3}{r} \right\}$$

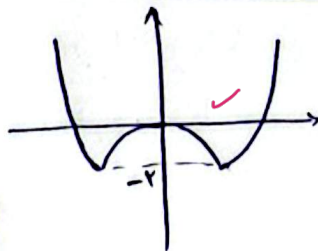
$$y = \frac{u|u| - ru}{-u^2 - ru / u^2 - ru}$$



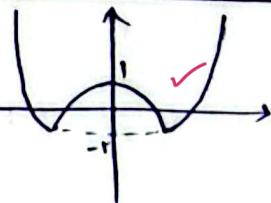
$$R_y = \mathbb{R}$$



$$f(mu)$$



$$f(mu+1)$$



$$|f(mu+1)|$$

