

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

$$n^2 f(n) + f(n) = 2|m| + 1 - 2|m|n - n \Rightarrow f(n) (n^2 + 1) = (2|m|+1)(1-n)$$

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

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

$$n=n^2 \rightarrow f(n^2) = n^4 - 2n^2 + \frac{1}{2}$$

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

$$n = \frac{-(1-y) \pm \sqrt{(1-y)^2 - 4(2+y)}}{2} \rightarrow \Delta \geq 0 \rightarrow (1-y)^2 - 4(2+y) \geq 0$$

$$y^2 - 6y - 7 \geq 0 \Rightarrow (y-7)(y+1) \geq 0 \rightarrow \frac{-1}{+} \frac{7}{+} \rightarrow R_f: (-\infty, -1] \cup [7, +\infty)$$

$$الف) y = 2n^2 - 3n + 1$$

$$\left| \frac{-b}{2a} = \frac{3}{4} \right| R_f: [-\frac{1}{4}, +\infty)$$

$$ب) y = \sqrt{-n^2+4n-4} \rightarrow \sqrt{(-\infty, 4]} \rightarrow$$

$$\left| \frac{-b}{2a} = \frac{-4}{-2} = 2 \right| R_f: [0, 2]$$

$$ج) y = \sqrt{n^2-4n^2+4n+1} \rightarrow \sqrt{1R} \rightarrow$$

$$R_f: [0, +\infty)$$

$$د) y = \log(n^2-4n^2+4n+1)$$

$$R_f: (-\infty, +\infty)$$

$$هـ) \frac{3n+1}{2n-4} \rightarrow R_f: \mathbb{R} - \left\{ \frac{3}{2} \right\}$$

$$و) \sqrt{\frac{5n+1}{n-1}} \Rightarrow R_f: \mathbb{R} - \left\{ \frac{1}{5} \right\}$$

$$ز) \frac{n^2+2}{\sqrt{n^2+2}} + \frac{1}{\sqrt{n^2+2}} \Rightarrow \sqrt{n^2+2} + \frac{1}{\sqrt{n^2+2}}$$

$$R_f: [2, +\infty)$$

$$ح) n^2+2 + \frac{1}{n^2+2} - 2 \rightarrow R_f: \left[ \frac{1}{2}, +\infty \right)$$

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

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

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

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

$$n = \frac{\pm \sqrt{\frac{y+r}{y-r}}}{\frac{-r}{+4} - \frac{r}{-4}} \rightarrow R_f: (-\infty, -r] \cup (r, +\infty)$$

$$r^n = 0 \rightarrow \frac{r}{-1} \rightarrow -r$$

$$\lim_{r^n \rightarrow +\infty} \frac{r^n r + r}{r^n - 1} = \frac{+\infty}{+\infty} \text{ h.o.p}$$

$$\frac{y}{r^n} = r$$

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

$$\sin n \begin{matrix} n=1 \rightarrow \frac{y}{-r} = -r \\ n=-1 \rightarrow \frac{y}{-r} = -\frac{1}{r} \end{matrix}$$

چون مثلث قائمه  
مستطیل

$$R_f: [-r, -\frac{1}{r}]$$

با توجه به تدکیر

$$\text{الف) } \left| \frac{r^n - 1}{r^n} \right|$$

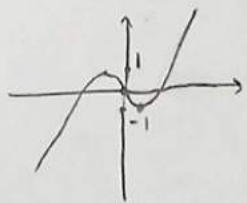
$$R_f = \mathbb{R} - \left\{ \frac{r}{r} \right\}$$

$$\text{ب) } y = \frac{\sqrt{9n-18}}{-1+r^n}$$

$$R_f: \mathbb{R} - \left\{ \frac{r}{r} \right\}$$

$$y = n|n| - r^n$$

$$y = \begin{cases} n^2 - r^n & n \geq 0 \\ -n^2 - r^n & n < 0 \end{cases}$$



$$R_f = \mathbb{R}$$

