

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

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

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

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$$f(n) + f(1) = n^2 - 2n + 4 \xrightarrow{n=0} \begin{cases} 2f(1) = 4 \\ f(1) = 2 \end{cases}$$

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

$$\boxed{f(n) = n^2 - 2n + 2}$$

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

$$\Delta \geq 0 \rightarrow (1-y)^2 - 4(2-y) \geq 0$$

$$y^2 - 2y + 1 - 8 + 4y \geq 0$$

$$y^2 - 4y - 7 \geq 0 \rightarrow (y-7)(y+1) \geq 0 \rightarrow y \in (-\infty, -1] \cup [7, +\infty)$$

$$\text{الف) } y = \frac{n^2 - 5n + 1}{n - 1} \rightarrow \frac{y}{n} = \frac{n^2 - 5n + 1}{n^2 - n} = y \rightarrow \frac{-\Delta}{2a} = \frac{-(25-4)}{2} = \frac{-21}{2}$$

$$\rightarrow R_F: \left[\frac{-21}{2}, +\infty \right)$$

$$\text{ب) } y = \frac{n^2 - 4n^2 + 5n + 2}{n} \rightarrow y = \frac{R_F}{R} \rightarrow R_F: \mathbb{R}$$

$$\text{الف) } y = \frac{n^2 + 1}{n - 2} \rightarrow R - \left\{ \frac{a}{c} \right\} = R_F = \left[R - \left\{ \frac{a}{c} \right\} \right)$$

$$\rightarrow y = \sqrt{\frac{n+1}{n-2}} \rightarrow \sqrt{R - \left\{ \frac{a}{c} \right\}}$$

$$\rightarrow R_F: \left[0, +\infty \right) - \left\{ \frac{a}{c} \right\}$$

$$\text{ب) } y = \frac{n^2 + 1}{\sqrt{n^2 + 2}} = \sqrt{n^2 + 2} + \frac{1}{\sqrt{n^2 + 2}} \Rightarrow \frac{y}{\sqrt{n^2 + 2}} = \sqrt{n^2 + 2} + \frac{1}{\sqrt{n^2 + 2}} = \frac{2\sqrt{n^2 + 2}}{\sqrt{n^2 + 2}}$$

$$\rightarrow R_F: \left[\frac{2\sqrt{2}}{3}, +\infty \right)$$

$$\text{ب) } y = \frac{n^2 + 1}{n^2 + 2} = \frac{1}{n^2 + 2} + \frac{n^2}{n^2 + 2} = \frac{1}{n^2 + 2} + \frac{n^2 + 2 - 2}{n^2 + 2} = \frac{1}{n^2 + 2} + 1 - \frac{2}{n^2 + 2} = 1 - \frac{1}{n^2 + 2}$$

$$\rightarrow R_F: \left[\frac{1}{2}, +\infty \right) \cap R: \left[\frac{1}{2}, +\infty \right)$$

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

مشتق

$$x^2 + c = yx^2 - y$$

$$(x-y)x^2 + y + c = 0 \rightarrow x = \frac{\sqrt{\Delta}}{x(x-y)}$$

$$y \neq 3$$

$$-f(x-y)(y+c) > f(y-c)(y+c) >$$

$$\frac{-c}{1} - \frac{c}{-1} + \rightarrow R_f:$$

$$(-\infty, -c] \cup (c, +\infty)$$

$$y = -c \rightarrow y = -c$$

$$y = c \rightarrow y = c$$

خرج صفر شود

$$(-\infty, -c] \cup (c, +\infty)$$

$$f(x) = \frac{2 \sin x + c}{\sin x - c}$$

$$\sin x = 1 \rightarrow y = \frac{2}{-1} = -2$$

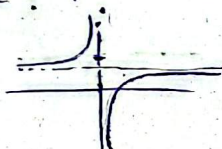
$$\sin x = -1 \rightarrow y = \frac{2}{-1} = -2$$

خرج صفر شود

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

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

$$\frac{x_{n-1}}{x_n}$$



$$\left| \frac{x_{n-1}}{x_n} \right|$$



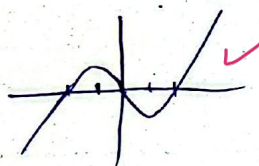
$$R_f: [0, +\infty)$$

$$y = \sqrt{\frac{9x-18}{x-1}} = \sqrt{\frac{9(x-2)}{x-1}}$$

$$\Rightarrow \sqrt{\frac{9}{x}} = \left[\frac{3}{\sqrt{x}} \right] = R_f$$

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

$$x^2 - 2x | n^2 - 2n$$



$$R_f: \mathbb{R}$$

