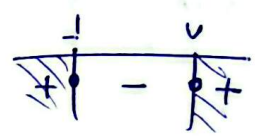


$f(-n) - 2f(n) = 2/n + 1 \xrightarrow{n \rightarrow -n} f(-(-n)) - (-n)f(-n) = 2/ -n + 1 \xrightarrow{1-2 \cdot 1/n} f(n) + n f(-n) = 2/n + 1$ $\Downarrow \textcircled{1}$ $f(n) + n [2f(n) + 2/n + 1] = 2/n + 1$ $\Downarrow$ $2^n f(n) + 2n/n + n + f(n) = 2/n + 1$ $f(n) = \frac{2/n(1-2) + (1-n)}{2^n + 1} \leftarrow f(n)(2^n + 1) = 2/n + 1 - 2n/n \cdot n \leftarrow$ $f(n) = \frac{(1-n)(2/n + 1)}{2^n + 1}$	۲
$f(x) + \frac{f(x)}{x} = x^2 - 2x + 4 \xrightarrow{x \rightarrow 1/x} x f(1/x) + (1/x) f(1/x) = (1/x)^2 - 2(1/x) + 4 \Rightarrow f(1/x) = x^2 - 2x + 4$ $\xrightarrow{x \rightarrow 2/x} f(2/x) = (2/x)^2 - 2(2/x) + 4 = 4/x^2 - 4/x + 4$	۲
$y = \frac{x^2 + n + 2}{n-1} \Rightarrow y(n-1) = x^2 + n + 2 \Rightarrow x^2 + (1-y)n + (y+2) = 0 \Rightarrow \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(1-y) \pm \sqrt{(1-y)^2 - 4(1)(y+2)}}{2}$ $\Delta \geq 0 \Rightarrow (1-y)^2 - 4(1)(y+2) \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0 \Rightarrow (y-7)(y+1) \geq 0$ $\Rightarrow R_f = (-\infty, -1] \cup [7, +\infty)$ 	۲
$1) y = \frac{y_n^2 - 2n + 1}{n} \Rightarrow \left \frac{y_n^2 - 2n + 1}{n} \right \leq \frac{1}{n} \Rightarrow R_f = [-1/n, 1/n]$ $\Rightarrow y = \sqrt{\frac{y_n^2 + 4n - 4}{n}} \Rightarrow \left \frac{y_n^2 + 4n - 4}{n} \right \leq \frac{1}{n} \Rightarrow [-1/n, 1/n] \Rightarrow [0, 1/n] : R_f$ $2) y = \sqrt{n^2 - 2n^2 + 4n + 1} \Rightarrow \sqrt{R} \Rightarrow R_f = [0, +\infty)$ $3) y = \log(n^2 - 4n^2 + 4n + 2) \Rightarrow \log(1/R) = \log(-\infty, +\infty) \Rightarrow \log(0, +\infty) \Rightarrow R_f = (-\infty, +\infty)$	۲
$1) y = \frac{y_n + 1}{y_n - 4} \Rightarrow IR - \{4\} \Rightarrow IR - \{4\} : R_f$ $\Rightarrow y = \sqrt{\frac{y_n + 1}{n-4}} \Rightarrow \sqrt{IR - \{4\}} \Rightarrow R_f = [0, 4) \cup (4, +\infty)$ $2) y = \frac{2^2 + 1}{\sqrt{2^2 + 3}} = \frac{5}{\sqrt{7}} + \frac{1}{\sqrt{2^2 + 3}} = \frac{1}{\sqrt{2^2 + 3}} + \sqrt{\frac{2^2 + 1}{2^2 + 3}}$ $\xrightarrow{\min \sqrt{2^2 + 3}} R_f = \left[\frac{5}{\sqrt{7}}, +\infty \right) = \left[\frac{\sqrt{7}}{7}, +\infty \right)$	۲
$3) y = \frac{1}{n^2 + 4} \xrightarrow{x^2} (n^2 + 4) \left(\frac{1}{n^2 + 4} \right) = 1 \xrightarrow{\min(n^2 + 4) = 4} R_f = \left[\frac{1}{4}, +\infty \right)$	۵

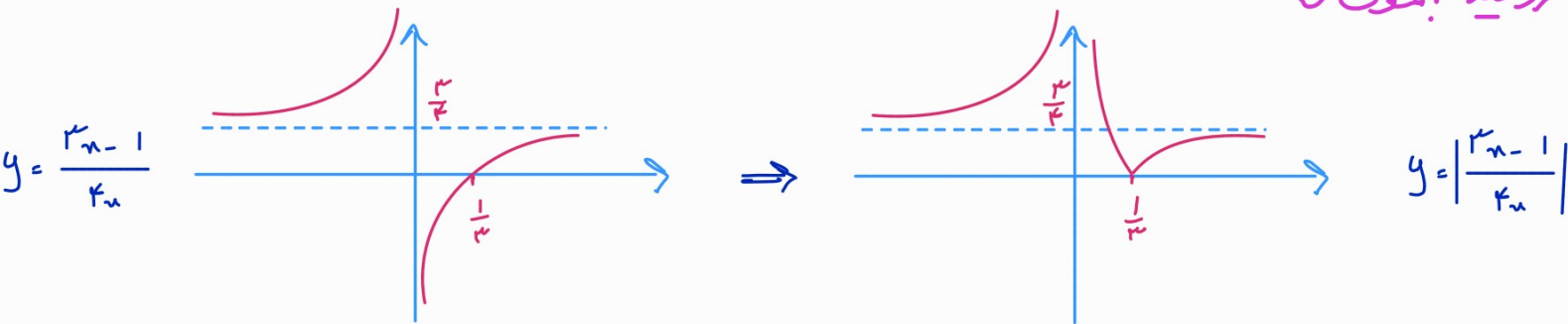
$y = \frac{x^2 + x}{x^2 - 1} \Rightarrow yx^2 - y = x^2 + x \Rightarrow (x-y)x^2 + (y-x) = 0$ $R_f: (-\infty, -1] \cup (1, +\infty)$ $y = \frac{x^2 + x}{x^2 - 1} \xrightarrow{x \rightarrow \pm\infty} \frac{x^2}{x^2} = 1$ $\xrightarrow{x \rightarrow -1} \frac{-1}{-2} = \frac{1}{2}$ $\xrightarrow{x \rightarrow 1} \frac{2}{0} = +\infty$ $R_f = (-\infty, -1] \cup (1, +\infty)$	2 6
$f(x) = \frac{x \sin x + x}{\sin x - 1}$ $\xrightarrow{\sin x = 1} \frac{x+1}{0} = +\infty$ $\xrightarrow{\sin x = -1} \frac{-x-1}{0} = -\infty$ $R_f = [-1, 1]$	2 7
$y = \left \frac{x-1}{x+1} \right \Rightarrow R_f = \left[\frac{1}{2}, 1 \right]$ $\Rightarrow y = \sqrt{\frac{x-1}{x+1}} \Rightarrow R_f = \left[0, \frac{1}{\sqrt{2}} \right]$	2 8
$y = x x - x_n \rightarrow \begin{cases} x > 0; y = x(x) - x_n = x^2 - x_n \Rightarrow y = x^2 - x_n \\ x < 0; y = x(-x) - x_n = -x^2 - x_n \Rightarrow y = -x^2 - x_n \end{cases}$ $R_f = (-\infty, 1] \cup [-1, +\infty) \Rightarrow R_f = \mathbb{R}$	2 9
$f(x) = \frac{1}{x} \Rightarrow f(x) = \frac{1}{ x } \Rightarrow f(x) + 1 = \frac{1}{ x } + 1$ $ f(x) + 1 \Rightarrow y = f(x) + 1 $	2 10

۸- اول برد عبارت داخل قدر مطلق
رو حساب می کنیم بعد قدر مطلق می گیریم

فقط خواست باشد که $y = \frac{3}{4}$ هم هست داخل برد

$y = -\frac{3}{4}$ عضو برد عبارت داخل قدر مطلق هست و وقتی قدر مطلق بگیریم $y = \frac{3}{4}$

روید به نمودار:



$$۸-ب) y = \sqrt{\frac{4(n-2)}{4(n-2)}} = \sqrt{\frac{4}{4}} = \frac{3}{2} \Rightarrow R_y = \left\{ \frac{3}{2} \right\}$$