

$$y = \frac{x^2 + 2}{x-1} \Rightarrow yx - y = x^2 + 2 \Rightarrow x^2 + (1-y)x + 2-y = 0 \Rightarrow \Delta = (y-1)^2 - 4(2-y) \geq 0 \Rightarrow y^2 - 4y - 7 \geq 0 \Rightarrow (y-7)(y+1) \geq 0$$

$$D_f = (-\infty, -1] \cup [7, +\infty)$$

الف) $x_0 = 0 \Rightarrow y_0 = \frac{0^2 + 2}{0-1} = -2 \Rightarrow D_f = [-2, +\infty)$

ب) $D_f = [0, 2] \Rightarrow D_f = (-\infty, 2] \cup (-\infty, 0] = (-\infty, 2]$

ج) $D_f = [0, +\infty)$

د) $D_f = \mathbb{R}$

الف) $D_f = \mathbb{R} - \{1\}$

ب) $D_f = \mathbb{R} - \{1\} \Rightarrow D_f = [0, +\infty) - \{1\}$

ج) $\frac{x^2 + 2}{\sqrt{x^2 + 2}} \Rightarrow \frac{x^2 + 2}{\sqrt{x^2 + 2}} \geq 0 \Rightarrow D_f = [0, +\infty)$

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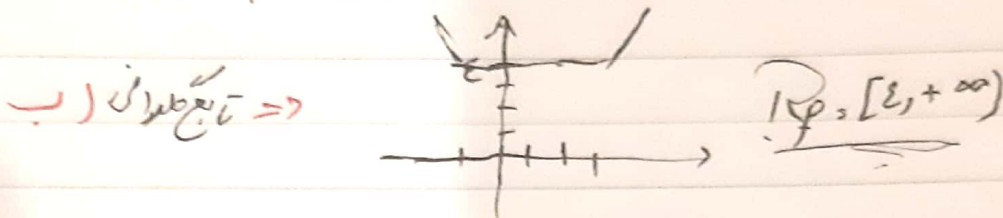
د) $D_f = [-\frac{1}{2}, +\frac{1}{2}]$

الف) $D_f = [-\frac{1}{2}, +\frac{1}{2}]$

دسته ۱ - $\lim_{n \rightarrow \infty} x_n = 1 \Rightarrow f_{\lim} = 1 \Rightarrow R_f = [-1, 1]$
 $\lim_{n \rightarrow \infty} x_n = 1 \Rightarrow f_{\lim} = 1/2$ (بعضی موارد)

$n^2 - n + 1 > 0 \Rightarrow n > 0 \Rightarrow \frac{1}{n} \rightarrow 0 \Rightarrow R_f = [0, 1]$
 $-1/2 < x_n < 1 + \infty \Rightarrow \lim_{n \rightarrow \infty} \frac{1}{n} = 0 \Rightarrow [0, 1] \subset R_f$

الف) $x < 1 \Rightarrow 1 - n + n - 1 < -n - 1 \Rightarrow R = [-1, +\infty)$
 $x < 0 \Rightarrow 1 - n - 1 + n - 1 < 1 - n - 1 \Rightarrow R = (-1, 1)$
 $x < n \Rightarrow 1 - n - 1 + n + 1 < n + 1 \Rightarrow R = (1, +\infty)$

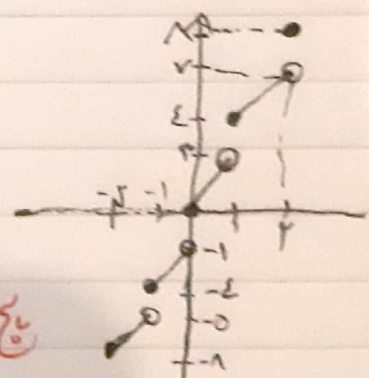


$x < -1 \Rightarrow 1 - n + n + 1 < x + 1 \Rightarrow x < 1 \checkmark$
 $-1 < x < 1 \Rightarrow 1 - n - 1 + n - 1 < 1 \Rightarrow -1 < x < 1 \Rightarrow x \in (-1, 1)$
 $1 < x \Rightarrow 1 - n - 1 + n - 1 < x - 1 \Rightarrow x > 1 \Rightarrow x \in (1, +\infty)$
 $R_f = (-\infty, -1] \cup (-1, 1) \cup [1, +\infty) = R = (-\infty, +\infty)$

الف) $[n] + [-n] + 1$

$R = \{0, 1\}$

ب) $\lim_{n \rightarrow \infty} [n] = 1 \Rightarrow \lim_{n \rightarrow \infty} [-n] = -1 \Rightarrow R_f = [-1, 1]$
 $-1 < x < 0 \Rightarrow \lim_{n \rightarrow \infty} [-n] = -1$
 $0 < x < 1 \Rightarrow \lim_{n \rightarrow \infty} [n] = 1$
 $R_f = [-1, +\infty) \cup (-\infty, 1] = [-1, 1]$



الف) $-1/2 < x_n < 1/2 \Rightarrow f_{\lim} = 1/2 = \min \Rightarrow R = [1/2, 1]$
 $\min x_n = 0 \Rightarrow y = 1$
 $-1/2 < x_n < 1/2 \Rightarrow \max x_n = 1 \Rightarrow y = 1 \Rightarrow R = [1, 1]$