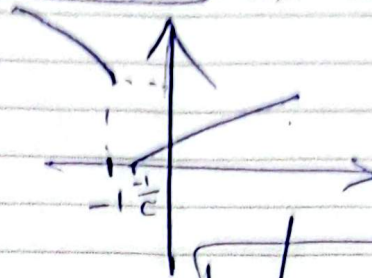


$$x = \begin{cases} 3y-1 & y \geq 0 \\ -y^2 & y < 0 \end{cases}$$



①

$$g(x) = \sqrt{x f(x-2)} \Rightarrow \sqrt{0, 0, 9-2}$$

②

$$\omega, 3, 9-2 \leftarrow f(x)$$

-2	-1	0	1	2	3	4	5
-1	0	1	2	3	4	5	6

$$\Rightarrow \text{Domain: } (-\infty, -2] \cup [0, 2) \cup [4, +\infty)$$

$$\text{الف) } 1) f(x^2-2n) \rightarrow x^2-2n \neq 0 \Rightarrow x(x^2-2)$$

③

$$\Rightarrow x(x+2)(x-2) \neq 0 \rightarrow x \neq 0, 2, -2 \rightarrow 1) f: \mathbb{R} \setminus \{-2, 0, 2\}$$

$$\boxed{1) f: \mathbb{R} \setminus \{-2, 0, 2\}}$$

$$\text{ب) } \frac{2x^2-4x+2}{x^2-2n} \geq 0 \xrightarrow{\text{تقسیم کنیم}} \frac{-2 \quad 0 \quad +2}{-1 \quad +1 \quad -1 \quad +1}$$

$$\Rightarrow 1) f: (-2, 0) \cup (2, +\infty)$$

(۴)

ا) $\frac{x-2}{x^2-2x-1} \geq 0$

$$x^2-2x-1 \xrightarrow{x^2-2x-1} (x-2)(x+1) = 0 \rightarrow \begin{cases} x=2 \Rightarrow x=2 \\ x=-1 \Rightarrow x=-1 \end{cases}$$

$x=2$

$$\Rightarrow \frac{-x}{-\frac{1}{2} + \frac{1}{2} +} \rightarrow D_f = (-1, +\infty) - \{2\}$$

ب) $[-2, x] \neq 0 \rightarrow [2, x] \rightarrow [x] \neq 2$

$[x] \neq 2$

$$\Rightarrow D_f = 1/2 - (-3/2, 2)$$

ا) $y = f(x) \Rightarrow \begin{cases} x(x^2-1) \geq 0 \rightarrow x(x-1)(x+1) \geq 0 \quad (I) \\ |x|+x \geq 0 \Rightarrow x \geq 0 \quad (II) \end{cases}$

$$\Rightarrow (I) \cap (II) = [1, +\infty)$$

ب) $y = f(x) \Rightarrow \begin{cases} |x-2| - x^2 \geq 0 \rightarrow \frac{x}{-x^2-x+2} \rightarrow \frac{x}{-x^2-x+2} \\ |x| \neq 1 \rightarrow x \neq \pm 1 \quad (I) \end{cases}$

$$\Rightarrow x^2+x-2 \leq 0 \rightarrow (x+2)(x-1) \leq 0 \rightarrow \frac{x+1}{+x-x+} \rightarrow [-2, 1]$$

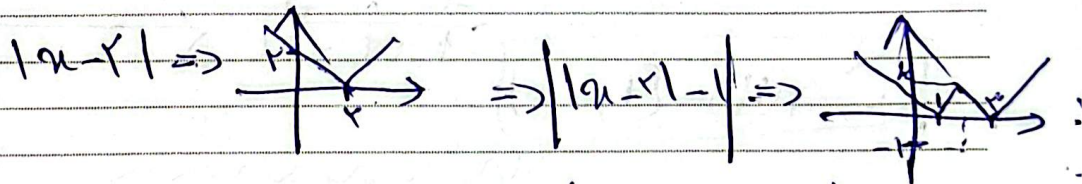
(II)

$$(I) \cap (II) = [-2, 1] - \{\pm 1\}$$

(الف) $(x-2)(x-3) \geq 0$ $\frac{2}{+} \frac{3}{+}$ $\rightarrow D_f = \mathbb{R}$

(ب) $|x-1| \{x-3\} \geq 0$ $\frac{1}{-} \frac{3}{+}$ $\rightarrow D_f = [3, +\infty) \cup \{1\}$
 $D_f = [3, +\infty) \cup \{1\}$

$||x-2|-1|-k \neq 0 \Rightarrow ||x-2|-1| \neq k$ (✓)



$\Rightarrow k=1 \leftarrow$ (ب) $k=1$ $\Rightarrow$ $|x-2|-1=1$ $\Rightarrow |x-2|=2$ $\Rightarrow x=0$ or $x=4$

$k=2-1=1$ $\Rightarrow$ $x=0$ or $x=4$

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

(I) $x^2 + 2x + 1 \neq 0 \rightarrow (x+1)(x+1) \neq 0$
 $\rightarrow x \neq -1$

(II) $x-1 \neq 0 \rightarrow x \neq 1$

(III) $\frac{x+1}{x-1} \neq 0 \rightarrow x \neq -1$

$\Rightarrow (I) \cap (II) \cap (III) = \mathbb{R} - \{-1, 1\} \rightarrow D_f = \mathbb{R} - \{-1, 1\}$

$\Rightarrow x^2 - 4x + 4 = 0 \rightarrow (x-2)^2 = 0 \rightarrow x=2$

$$\lim_{n \rightarrow \infty} \frac{1}{n}$$

$$\textcircled{I} \lim_{n \rightarrow \infty} \frac{1}{n} > 0 \rightarrow 0 < n < 1 \quad \textcircled{4}$$

$$\lim_{n \rightarrow \infty} \frac{1}{n+1} \rightarrow \textcircled{II} n+1 > 0 \rightarrow n > -1$$

$$\textcircled{III} n+1 \neq 1 \Rightarrow n \neq 0$$

$$\Rightarrow \textcircled{I} \cap \textcircled{II} \cap \textcircled{III} = (0, 1)$$

۱۰

$$-2 \leq 3n^2 - 1 \leq 2 \rightarrow 3n^2 + 2 \geq 0 \rightarrow \text{همواره برقرار است}$$

$$3n^2 - 2 \leq 0 \rightarrow 3n^2 \leq 2$$

$$\boxed{-\frac{\sqrt{6}}{3} \leq n \leq \frac{\sqrt{6}}{3}}$$

$$\Rightarrow D_f = \left[-\frac{\sqrt{6}}{3}, \frac{\sqrt{6}}{3} \right]$$

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