

الف) $y = \frac{x+3}{2x^3+3x^2-11x+3} = \frac{x+3}{(x-1)(x+3)(2x-1)} \Rightarrow (x-1)(x+3)(2x-1) \neq 0$

ب) $y = \frac{x+3}{2x^3+9x^2+10x+3} \Rightarrow 2x^3+9x^2+10x+3 \neq 0 \Rightarrow (x+1)(x+3)(2x+1) \neq 0 \Rightarrow x \neq -1, -3, -\frac{1}{2}$

الف) $y = \frac{x+3}{x^3-2x^2+2x-1} \Rightarrow x^3-2x^2+2x-1 \neq 0 \Rightarrow (x-1)(x^2-x+1) \neq 0 \Rightarrow x \neq 1$ $D_f = \mathbb{R} - \{1\}$

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} \Rightarrow \frac{x+3}{(x-1)(x^2-x+1)} \geq 0$ $D_f = (-\infty, -3] \cup (1, +\infty)$

$y = \frac{2}{x^2-5|x-1|-2x+5} \Rightarrow x^2-5|x-1|-2x+5 \neq 0 \Rightarrow x \geq 1 \Rightarrow x^2-6x+10 \neq 0 \Rightarrow (x-2)(x-5) \neq 0 \Rightarrow x \neq 2, 5$

$\Rightarrow D_f = \mathbb{R} - \{-3, 0, 2, 5\}$ $x \leq 1 \Rightarrow x^2+3x+5 \neq 0 \Rightarrow x(x+3) \neq 0 \Rightarrow x \neq 0, -3$

الف) $y = \sqrt{[x]-2} \Rightarrow [x]-2 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow -x \geq 2 \Rightarrow x \leq -2 \Rightarrow D_f = (-\infty, -2]$

ب) $y = \frac{5x^2+9}{[x]^2-2[x]-3} \Rightarrow [x]^2-2[x]-3 \neq 0 \Rightarrow ([x]-3)([x]+1) \neq 0 \Rightarrow [x] \neq -1, 3$

$D_f = (-\infty, -1) \cup [0, 3) \cup [4, +\infty)$

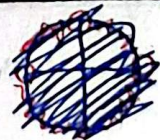
الف) $y = \sqrt{[x-\frac{1}{3}]+[x+\frac{2}{3}]} \Rightarrow [x-\frac{1}{3}]+[x+\frac{2}{3}] \geq 0 \Rightarrow [x+\frac{2}{3}-1]+[x+\frac{2}{3}] \geq 0$

$\Rightarrow 2[x+\frac{2}{3}]-1 \geq 0 \Rightarrow [x+\frac{2}{3}] \geq \frac{1}{2} \Rightarrow x+\frac{2}{3} \geq 1 \Rightarrow x \geq \frac{1}{3} \Rightarrow D_f = [\frac{1}{3}, +\infty)$

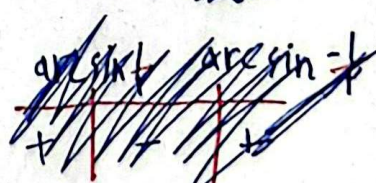
ب) $y = \sqrt{[x-\frac{1}{3}]+[\frac{1}{3}-x]} = \sqrt{[x-\frac{1}{3}]+[-(x-\frac{1}{3})]} \rightarrow \begin{cases} a \in \mathbb{Z} \Rightarrow [a]+[-a] = 0 \\ a \in \mathbb{Z} \Rightarrow [a]+[-a] = -1 \end{cases}$

$\Rightarrow x-\frac{1}{3} \in \mathbb{Z} \Rightarrow D_f = \{x/x = k+\frac{1}{3}, k \in \mathbb{Z}\}$

الف) $y = \frac{\cot x + 1}{\tan x + 1} \rightarrow D_f = \mathbb{R} - \{\frac{k\pi}{2}\} \rightarrow$

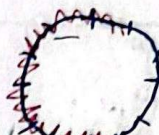


ب) $y = \sqrt{1-4\sin^2 x} \Rightarrow (1-4\sin x)(1+4\sin x) \geq 0$



$D_f = [\frac{2k\pi+\frac{3\pi}{2}}{2}, \frac{2k\pi+\frac{\pi}{2}}{2}] \cup [\frac{2k\pi+\frac{\pi}{2}}{2}, \frac{2k\pi+\frac{3\pi}{2}}{2}]$

الف) $y = \sqrt{1 - \sin x} \Rightarrow 1 - \sin x \geq 0 \Rightarrow \sin x \leq 1$ $D_f = [2k\pi + \frac{3\pi}{2}, 2k\pi + \frac{5\pi}{2}]$ 

ب) $y = \sqrt{1 - \cos x} \Rightarrow \cos x \leq 1$ $D_f = [2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}]$ 

الف) $y = \arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1$ $\Rightarrow -1 \leq x^2 + 3x + 1 \Rightarrow x^2 + 3x + 2 \geq 0$ $\Rightarrow (x+1)(x+2) \geq 0$ $\Rightarrow x \leq -2$ or $x \geq -1$

$x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0 \Rightarrow -3 \leq x \leq 0$

$D_f = (-\infty, -2] \cup [-1, +\infty)$

ب) $\cos y = \sqrt{\omega - 2x} \Rightarrow -1 \leq \sqrt{\omega - 2x} \leq 1 \Rightarrow 0 \leq \omega - 2x \leq 1 \Rightarrow \omega - 2x \geq 0 \Rightarrow 2x \leq \omega \Rightarrow x \leq \frac{\omega}{2}$ $\omega - 2x \leq 1 \Rightarrow 2x \geq \omega - 1 \Rightarrow x \geq \frac{\omega - 1}{2}$

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

الف) $y = \log_p(1 - \log_p x)$ $\rightarrow x > 0$ I / $1 - \log_p x > 0 \Rightarrow \log_p x < 1 \Rightarrow x < p$ II

$D_f = I \cap II = (0, p)$

ب) $y = \log_p(1 - \log_p \frac{x}{p})$ $\rightarrow x > 0$ I / $1 - \log_p \frac{x}{p} > 0 \Rightarrow \log_p \frac{x}{p} < 1 \Rightarrow \frac{x}{p} < p \Rightarrow x < p^2$

$D_f = I \cap II = (0, \frac{1}{p})$

الف) $y = \sqrt{p^2 x - x^2} \Rightarrow p^2 x - x^2 \geq 0 \Rightarrow x(p^2 - x) \geq 0 \Rightarrow x \geq 0$ and $p^2 - x \geq 0 \Rightarrow x \leq p^2$

$D_f = [0, p^2]$

ب) $y = \left(\frac{p^2 x + \omega}{p^2 x + p} \right)!$ $\frac{p^2 x + \omega}{p^2 x + p} \in \mathbb{N} \Rightarrow p^2 x + \omega \in p^2 x + p + \mathbb{N} \Rightarrow p^2 x - p^2 x + \omega - p \in \mathbb{N} \Rightarrow \omega - p \in \mathbb{N}$

$\Rightarrow x \in \frac{\mathbb{N} - \omega}{p^2 - p}$ $\Rightarrow \{x \mid x = \frac{pk - \omega}{p^2 - p}, k \in \mathbb{N}\} - \{p\}$