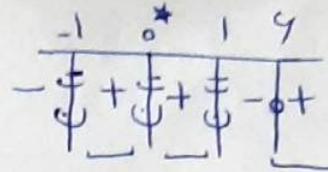


الف) $y = \sqrt{\frac{x^2 - 4x}{x^2 - x}} \Rightarrow \frac{x^2 - 4x}{x^2 - x} \geq 0 \Rightarrow \frac{x(x-4)}{x(x-1)} \geq 0$
 $D_f = (0, 1) \cup (-1, 0) \cup [4, +\infty)$



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

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \Rightarrow x+|x| > 0 \Rightarrow x > 0 \Rightarrow D_f = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x|x|}} \Rightarrow x|x| > 0 \Rightarrow x > 0 \Rightarrow D_f = \mathbb{R}^+ \cup \{0\}$

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

ب) $y = \frac{1}{\sqrt{2-x}} \Rightarrow 2-x > 0 \Rightarrow x < 2 \Rightarrow D_f = (-\infty, 2)$

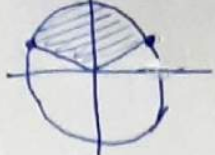
الف) $y = \sqrt{\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right]} \Rightarrow \left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0 \Rightarrow \left[x - \frac{1}{x} + x + \frac{1}{x}\right] \geq 0 \Rightarrow 2x \geq 0 \Rightarrow x \geq 0$
 $D_f = \left[\frac{1}{2}, +\infty\right)$
 ب) $y = \sqrt{\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right]}$ if $\begin{cases} a \in \mathbb{Z} \rightarrow a + [a] = 0 \\ a \notin \mathbb{Z} \rightarrow a + [a] = -1 \end{cases} \Rightarrow \left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0$
 $D_f = \{x \mid x = k + \frac{1}{k}, k \in \mathbb{Z}\}$
 $y = [x] + \left[x + \frac{1}{x}\right]$

الف) $y = \frac{1}{\sin x - 1} \Rightarrow \sin x - 1 \neq 0 \Rightarrow \sin x \neq 1 \Rightarrow D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$

ب) $y = \frac{1}{\sin^2 x - 1} \Rightarrow \sin^2 x - 1 \neq 0 \Rightarrow \sin^2 x \neq 1 \Rightarrow \sin x \neq \pm 1 \Rightarrow D_f = \mathbb{R} - \left\{k\pi + \frac{\pi}{2}\right\}$

الف) $y = \sqrt{y \sin x - 1}$

$y \sin x - 1 \geq 0$
 $y \sin x \geq 1$
 $\sin x \geq \frac{1}{y}$



$D_f = \left[\frac{\pi}{y} + 2K\pi, \frac{\pi}{y} + 2K\pi \right]$

9

ب) $y = \sqrt{\cos x - 1}$

$\cos x - 1 \geq 0$
 $\cos x \geq 1$
 $\cos x = 1$



$D_f = \{2K\pi\}$

الف) $\cos y = |x| - 3$

$-1 \leq \cos y \leq 1 \rightarrow -1 \leq |x| - 3 \leq 1$
 $|x| \leq 5 \rightarrow -5 \leq x \leq 5$

$D_f = [-5, 5] \cup [5, 5]$

ب) $y = \arcsin(x^2 + 3x + 1)$

$-1 \leq x^2 + 3x + 1 \leq 1$

$D_f = [-1, 1] \cup [1, 1]$

$-1 \leq x^2 + 3x + 1 \leq 1$

$(-\infty, -1] \cup [1, \infty)$

$x^2 + 3x + 1 \leq 1$

$x^2 + 3x \leq 0$

$x(x+3) \leq 0$

الف) $y = \sqrt{2 - \log_3(x-2)}$

$2 - \log_3(x-2) \geq 0 \rightarrow \log_3(x-2) \leq 2 \rightarrow x-2 \leq 9 \rightarrow x \leq 11$

$\log_3(x-2) \rightarrow x-2 > 0 \rightarrow x > 2$

$\Rightarrow D_f = (2, 11]$

ب) $y = \log(x^2 - x)$

$x^2 - x > 0$

$x(x-1) > 0 \rightarrow D_f = (-1, 0) \cup (1, \infty)$

$x \neq \pm 1$

الف) $y = \frac{x}{x^2 + 1}$

$x^2 + 1 \neq 0 \rightarrow x^2 \neq -1 \rightarrow D_f = \mathbb{R}$

ب) $y = \frac{x}{x^2 - 1}$

$x^2 - 1 \neq 0 \rightarrow x^2 \neq 1 \rightarrow x \neq \pm 1$

$\rightarrow D_f = \mathbb{R} - \{1, -1\}$

ج) $y = \frac{x}{x^2 - 2}$

$x^2 - 2 \neq 0 \rightarrow x^2 \neq 2 \rightarrow x \neq \pm \sqrt{2} \rightarrow D_f = \mathbb{R} - \{\pm \sqrt{2}\}$

الف) $y = (x+1)!$

$x+1 \in \mathbb{W}$

$x \in \mathbb{W} - 1$

$x \in \frac{\mathbb{W}-1}{1}$

$\rightarrow D_f = \left\{ x \mid x = \frac{k-1}{1}, k \in \mathbb{W} \right\}$

ب) $y = \left(\frac{x^2 - 2}{x^2 - 5} \right)!$

$\frac{x^2 - 2}{x^2 - 5} \in \mathbb{W} \rightarrow x^2 - 2 = k(x^2 - 5)$

$\frac{x^2 - 2}{x^2 - 5} = \frac{kx^2 - 5k}{x^2 - 5}$

$D_f = \left\{ x \mid x = \frac{5k-2}{1-5k}, k \in \mathbb{W} \right\} \leftarrow x = \frac{5\mathbb{W}-2}{1-5\mathbb{W}}$

✓

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9

10