

الف) $y = \sqrt{\frac{x^2 - 4}{x^2 - x}} \geq 0 \Rightarrow \frac{x^2 - 4}{x^2 - x} \geq 0$
 $\frac{(x-2)(x+2)}{x(x-1)} \geq 0$
 Sign chart: $x \mid -1 \quad 0 \quad 1 \quad 2$
 $\quad \quad \quad - \quad + \quad - \quad +$
 $Df = (-1, 0) \cup (0, 1) \cup [2, +\infty)$

ب) $y = \sqrt{\frac{x^2 - x}{x^3 - x}} \geq 0 \Rightarrow \frac{x^2 - x}{x^3 - x} \geq 0$
 $\frac{x(x-1)}{x^2(x-1)} \geq 0 \Rightarrow \frac{1}{x} \geq 0$
 $x > 0$
 Sign chart: $x \mid -1 \quad 0 \quad 1$
 $\quad \quad \quad + \quad - \quad +$
 $Df = \mathbb{R} - \{-1, 0, 1\}$

الف) $y = \frac{n+1}{\sqrt{n+1|x|}} \Rightarrow n+1 > 0$
 $Df = (0, +\infty)$
 Sign chart: $\oplus \checkmark$
 $\ominus \times$

ب) $y = \frac{1}{\sqrt{n|m|}} \Rightarrow n|m| > 0$
 $Df = (0, +\infty)$
 Sign chart: $\oplus \checkmark$
 $\ominus \times$
 $\oplus \checkmark$

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

ب) $y = \frac{1}{\sqrt{2 - [x]}} \Rightarrow 2 - [x] > 0 \rightarrow 2 > [x] \rightarrow Df = (-\infty, 2)$

الف) $y = \sqrt{[n - \frac{1}{x}] + [n + \frac{1}{x}]} \Rightarrow [n - \frac{1}{x}] + [n + \frac{1}{x}] \geq 0 \rightarrow [n + \frac{1}{x}] \geq \frac{1}{x}$
 $\frac{1}{x} > 0 \rightarrow x > 0$
 $Df = (\frac{1}{x}, +\infty)$

ب) $y = \sqrt{[n - \frac{1}{x}] + [n + \frac{1}{x}]} \Rightarrow [n - \frac{1}{x}] + [n + \frac{1}{x}] \geq 0$
 $n - \frac{1}{x} \in \mathbb{Z} \Rightarrow Df = \{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\}$
 $x \in \mathbb{Z} + \frac{1}{x}$

الف) $y = \frac{x}{\sin x - 1} \neq 0 \rightarrow \sin x \neq 1 \rightarrow Df = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{x}{\sin x - 1} \neq 0 \rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \rightarrow Df = \mathbb{R} - \{k\pi \pm \frac{\pi}{4}\}$

الف) $y = \sqrt{2 \sin x - 1} \rightarrow 2 \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{2} \rightarrow Df = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

ب) $y = \sqrt{\cos x - 1} \rightarrow \cos x \geq 1 \rightarrow Df = \{2k\pi\}$

الف) $\cos y \leq |n| - 1 \rightarrow 1 \geq |n| - 1 \geq -1 \rightarrow 1 \geq |n| \geq 1$ (1)
 $\frac{1}{2}n \geq 1, -\frac{1}{2}n \geq -1$ $Df = [-1, -\frac{1}{2}] \cup [\frac{1}{2}, 1]$ $Df = [-1, -\frac{1}{2}] \cup [-\frac{1}{2}, 0]$

ب) $y \leq \arcsin(n^2 + 1) \rightarrow 1 \geq n^2 + 1 \geq -1$
 $1 \geq n^2 + 1 \rightarrow 0 \geq n^2 \rightarrow n = 0$ $Df = [-1, 0]$
 $n^2 + 1 \geq -1 \rightarrow n^2 + 1 \geq 0 \rightarrow (n+1)(n-1) \geq 0 \rightarrow n \leq -1 \text{ or } n \geq 1$ $Df = (-\infty, -1] \cup [1, \infty)$

الف) $y \leq \sqrt{x - \log_p(n-x)} \rightarrow x - \log_p(n-x) \geq 0 \rightarrow x \geq \log_p(n-x)$ (1)

$x \geq \log_p(n-x) \rightarrow x \geq n \rightarrow Df = [n, \infty)$ (1, 1)
 ب) $y \leq \log(n^2 - n) \geq 0 \rightarrow n^2 - n \geq 0 \rightarrow n(n-1) \geq 0$
 $Df = (-1, 0) \cup (1, \infty)$

ا) $y = \frac{x}{x^n + 1} \neq 0$ $x^n + 1 \neq 0$ $x^n \neq -1$ $Df = \mathbb{R}$ (4)

ب) $y = \frac{x}{x^n - 1} \neq 0$ $x^n - 1 \neq 0$ $x^n \neq 1$ $Df = \mathbb{R} - \{0\}$

ج) $y = \frac{x}{x^n - 1}$ $x^n - 1 \neq 0$ $x^n \neq 1$ $x \neq 1 \rightarrow Df = \mathbb{R} - \{1\}$

د) $y = \frac{x}{x^n - 1}$ $x^n - 1 \neq 0$ $x^n \neq 1$ $\log x \neq n \rightarrow Df = \mathbb{R} - \{\log x\}$

ا) $x(n+1)!$ $n+1 \in \mathbb{W}$ $n \in \mathbb{W} - 1$ (1)
 $Df = \{n \mid n = \frac{k-1}{r}, k \in \mathbb{W}\}$

ب) $y = \left(\frac{x^n - 1}{x^n - a}\right)!$ $\frac{x^n - 1}{x^n - a} \in \mathbb{W} \rightarrow x^n \mathbb{W} - a \mathbb{W} \leq x^n - 1$
 $Df = \{n \mid n = \frac{-1 + ak}{r}, k \in \mathbb{W}\}$ $n \leq \frac{-1 + a\mathbb{W}}{-r\mathbb{W} + r}$