

الف) $y = \frac{x+3}{x^3+x^2-1}$ $\frac{x^3+x^2-1}{x^3+x^2-1} \cdot \frac{x-1}{x-1} = \frac{x^3+x^2-1}{x^3+x^2-1} \cdot \frac{x-1}{x-1}$
 $\frac{x^3+x^2-1}{x^3+x^2-1} \cdot \frac{x-1}{x-1} = \frac{x^3+x^2-1}{x^3+x^2-1} \cdot \frac{x-1}{x-1}$
 $\frac{x^3+x^2-1}{x^3+x^2-1} \cdot \frac{x-1}{x-1} = \frac{x^3+x^2-1}{x^3+x^2-1} \cdot \frac{x-1}{x-1}$
 $D_f = R - \{-3, -1, 1\}$

ب) $y = \frac{x+3}{x^3+x^2+10x+3}$ $\frac{x^3+x^2+10x+3}{x^3+x^2+10x+3} \cdot \frac{x-1}{x-1} = \frac{x^3+x^2+10x+3}{x^3+x^2+10x+3} \cdot \frac{x-1}{x-1}$
 $\frac{x^3+x^2+10x+3}{x^3+x^2+10x+3} \cdot \frac{x-1}{x-1} = \frac{x^3+x^2+10x+3}{x^3+x^2+10x+3} \cdot \frac{x-1}{x-1}$
 $\frac{x^3+x^2+10x+3}{x^3+x^2+10x+3} \cdot \frac{x-1}{x-1} = \frac{x^3+x^2+10x+3}{x^3+x^2+10x+3} \cdot \frac{x-1}{x-1}$
 $D_f = R - \{-1, -3, -5\}$

ج) $y = \frac{x+3}{x^3-x^2+2x-1}$ $\frac{x^3-x^2+2x-1}{x^3-x^2+2x-1} \cdot \frac{x-1}{x-1} = \frac{x^3-x^2+2x-1}{x^3-x^2+2x-1} \cdot \frac{x-1}{x-1}$
 $\frac{x^3-x^2+2x-1}{x^3-x^2+2x-1} \cdot \frac{x-1}{x-1} = \frac{x^3-x^2+2x-1}{x^3-x^2+2x-1} \cdot \frac{x-1}{x-1}$
 $\frac{x^3-x^2+2x-1}{x^3-x^2+2x-1} \cdot \frac{x-1}{x-1} = \frac{x^3-x^2+2x-1}{x^3-x^2+2x-1} \cdot \frac{x-1}{x-1}$
 $D_f = R - \{1\}$

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

ه) $y = \frac{1}{x^2-\delta|x-1|-2x+\delta}$ $x^2-\delta|x-1|-2x+\delta \neq 0$
 $x^2-\delta|x-1|-2x+\delta \neq 0$
 $D_f = R - \{-3, 0, 2, \delta\}$

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

ز) $y = \frac{\delta x^2+4}{[x]^2-2[x]-3}$ $[x]^2-2[x]-3 \neq 0$ $([x]-3)([x]+1) \neq 0$ $[x] \neq 3$ $x \neq [3, 4)$ $[x] \neq -1$ $x \neq [-1, 0)$
 $D_f = (-\infty, -1) \cup (0, 3) \cup (4, \infty)$

ح) $y = \sqrt{[x-\frac{1}{2}]+[x+\frac{1}{2}]}$ $[x-\frac{1}{2}]+[x+\frac{1}{2}] \geq 0$ $x+\frac{1}{2} \geq 1$ $x \geq \frac{1}{2}$
 $D_f = [\frac{1}{2}, \infty)$

ط) $y = \sqrt{[x-\frac{1}{2}]+[\frac{1}{2}-x]}$ $[x-\frac{1}{2}]+[\frac{1}{2}-x] \geq 0$ $x-\frac{1}{2} \in \mathbb{Z}$ $x \in \mathbb{Z}+\frac{1}{2}$ $y = [x]+[-x]$
 $D_f = \{x | x = k+\frac{1}{2}, k \in \mathbb{Z}\}$

الف) $y = \frac{\cot x + 1}{\tan x + 1}$  $\tan x + 1 \neq 0$ $\tan x \neq -1$
 $D_f = \mathbb{R} - \left\{ \frac{k\pi}{\pi}, k\pi - \frac{\pi}{\pi} \right\}$

ب) $y = \sqrt{1 - \sqrt{\sin x}}$ $1 - \sqrt{\sin x} \geq 0$
 $\sqrt{\sin x} \leq 1$ $\sin x \leq \frac{1}{4}$ $-\frac{1}{2} \leq \sin x \leq \frac{1}{2}$

 $D_f = \left[-k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{6} \right]$

الف) $y = \sqrt{\sqrt{\sin x} - 1}$ $\sqrt{\sin x} - 1 \geq 0$
 $\sqrt{\sin x} \geq 1$ $\sin x \geq \frac{1}{4}$

 $D_f = \left[k\pi + \frac{\pi}{6}, k\pi + \frac{5\pi}{6} \right]$

ب) $y = \sqrt{1 - \sqrt{\cos x}}$ $1 - \sqrt{\cos x} \geq 0$
 $\sqrt{\cos x} \leq 1$ $\cos x \leq \frac{1}{4}$

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

الف) $y = \arcsin(x^2 + 2x + 1)$ $-1 \leq x^2 + 2x + 1 \leq 1 + \frac{\pi}{\pi}$
 $D_f = [-3, -1] \cup [-1, 0]$
 $\frac{1}{\pi} \leq (x + \frac{1}{\pi})^2 \leq \frac{9}{\pi} \Rightarrow \frac{1}{\pi} \leq x + \frac{1}{\pi} \leq \frac{3}{\pi} \Rightarrow -1 \leq x \leq 0$
 $-\frac{1}{\pi} \leq x + \frac{1}{\pi} \leq -\frac{1}{\pi} \Rightarrow -2 \leq x \leq -1$

ب) $y = \sqrt{\delta - \sqrt{x}}$ $-1 \leq \sqrt{\delta - \sqrt{x}} \leq 1 \Rightarrow \delta - \sqrt{x} \leq 1$
 $\delta - \sqrt{x} \geq 0$ $\sqrt{x} \leq \delta$ $x \leq \delta^2$
 $\sqrt{x} \geq \frac{\delta}{\pi}$ $x \geq \frac{\delta^2}{\pi^2}$
 $D_f = \left[\frac{\delta^2}{\pi^2}, \delta^2 \right]$

الف) $y = \log_r(1 - \log_r x)$ $1 - \log_r x > 0 \Rightarrow \log_r x < 1$ $x < r$
 $x > 0$ $D_f = (0, r)$

ب) $y = \log_r(1 - \log_r \frac{x}{r})$ $x > 0$
 $1 - \log_r \frac{x}{r} > 0 \Rightarrow \log_r \frac{x}{r} < 1 \Rightarrow x < \frac{1}{r}$
 $0 < \frac{x}{r} < 1$
 $D_f = (0, \frac{1}{r})$

الف) $y = \sqrt{r^x - x^r - 1}$ $r^x - x^r - 1 \geq 0$ $r^x - x^r \geq 1$
 $r^x - x^r \geq r$
 $x^r - r^x + r \leq 0 \Rightarrow \frac{1}{r} \leq x \leq r$
 $D_f = [1, r]$

ب) $y = \left(\frac{rx + \delta}{rx + r} \right)!$
 $\frac{rx + \delta}{rx + r} \in W \Rightarrow x = -\frac{rW - \delta}{rW - r} = \frac{\delta - rW}{rW - r}$
 $D_f = \left\{ x \mid x = \frac{\delta - rW}{rW - r}, r \in W \right\}$