

الف) $y = \sqrt{\frac{x^2-4x}{x^3-x}} \rightarrow \frac{x^2-4x}{x^3-x} \geq 0 \rightarrow \frac{x(x-4)}{x(x-1)(x+1)} \geq 0$
 $\rightarrow x = -1, 0, 4 \rightarrow \frac{-}{+} + \frac{+}{-} + \frac{+}{+} = -$
 $D = (-1, 0) \cup (0, 4) \cup (4, +\infty)$ 19, V.D

ب) $y = \sqrt{\frac{x^3-x^2}{x^3-x}} \rightarrow \frac{x^2(x-1)(x+1)}{x(x-1)(x+1)} \geq 0 \rightarrow \frac{x^2}{x} \geq 0 \rightarrow x \geq 0$
 $\rightarrow x = 0, 1, -1$
 $D = \mathbb{R} - \{0, -1, 1\}$ 1, V.D

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \rightarrow x+|x| > 0 \rightarrow \frac{+}{-} \frac{+}{+} \rightarrow D = (0, +\infty)$ 2

ب) $y = \frac{1}{\sqrt{x|x|}} \rightarrow x|x| > 0 \rightarrow \frac{+}{-} \frac{+}{+} \rightarrow D = (0, +\infty)$ 2

الف) $y = \sqrt{2-[x]} \rightarrow 2-[x] \geq 0 \rightarrow [x] \leq 2 \rightarrow x < 3$
 $D = (-\infty, 3)$ 2

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

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

ب) $y = \sqrt{[x-\frac{1}{x}] + [-x+\frac{1}{x}]} \rightarrow [-(x-\frac{1}{x})] \rightarrow x-\frac{1}{x} \in \mathbb{Z}$
 $\rightarrow x \in \mathbb{Z} + \frac{1}{x}$

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

ب) $y = \frac{r}{r \sin^2 x - 1} \rightarrow r \sin^2 x \neq \frac{1}{r} \rightarrow \sin x \neq \pm \sqrt{\frac{1}{r}} \rightarrow x \neq k\pi \pm \frac{\pi}{r}$
 $D = \mathbb{R} - \{k\pi \pm \frac{\pi}{r}\}$ 2

ا) $y = \sqrt{x \sin x - 1} \rightarrow x \sin x - 1 \geq 0 \rightarrow x \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{x}$
 $D = [2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}]$

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

ج) $\cos y = |x| - 2 \rightarrow -1 \leq |x| - 2 \leq 1 \rightarrow 1 \leq |x| \leq 3$
 $\rightarrow \begin{cases} 1 \leq x \leq 3 \\ -3 \leq x \leq -1 \end{cases} \cap D = [-3, -1] \cup [1, 3]$

د) $y = \arcsin(x^2 + 3x + 1) \rightarrow \begin{cases} x^2 + 3x + 1 \leq 1 \rightarrow x(x+3) \leq 0 \\ x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0 \end{cases}$
 $\rightarrow \begin{cases} x \in [-3, 0] \\ x \in (-\infty, -2] \cup [1, \infty) \end{cases} \rightarrow D = [-3, -2] \cup [1, 0]$

هـ) $y = \sqrt{2 - \log_2(x-1)} \rightarrow \begin{cases} x-1 > 0 \rightarrow x > 1 \\ 2 - \log_2(x-1) \geq 0 \rightarrow \log_2(x-1) \leq 2 \rightarrow (x-1) \leq 2^2 \end{cases}$
 $\rightarrow D = (1, 5]$

و) $y = \log(x^2 - x) \rightarrow x^2 - x > 0 \rightarrow x(x-1) > 0 \rightarrow x(x-1)(x+1) > 0$
 $D = (-1, 0) \cup (1, \infty)$

ز) $y = \frac{2}{e^x + 1} \rightarrow e^x \neq -1 \checkmark \rightarrow D = \mathbb{R}$

ح) $y = \frac{2}{e^x - 1} \rightarrow e^x \neq 1 \rightarrow x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

ط) $y = \frac{2}{e^x - 2} \rightarrow e^x \neq 2 \rightarrow 2^x \neq 2 \rightarrow 2^x \neq 1 \rightarrow x \neq 0 \rightarrow D = \mathbb{R} - \{0\}$

ي) $y = \frac{2}{e^x - e} \rightarrow e^x \neq e \rightarrow x \neq \log_e e \rightarrow D = \mathbb{R} - \{1\}$

ك) $y = (x+1)! \rightarrow x+1 \in \mathbb{N} \rightarrow x \in \frac{\mathbb{N}-1}{1}$

ل) $y = \left(\frac{x-2}{x-5}\right)! \rightarrow \frac{x-2}{x-5} \in \mathbb{N} \rightarrow x-2 = k(x-5) \rightarrow x - kx + 5k = 2 \rightarrow x(1-k) = 2 - 5k$
 $D = \{x/x = \frac{2-5k}{1-k}, k \in \mathbb{N}\}$