

الف) $y = \frac{\sin x - 2}{2 \cos x + 1} \Rightarrow 2 \cos x + 1 \neq 0 \Rightarrow \cos x \neq -\frac{1}{2}$
 $\Rightarrow D = \mathbb{R} - \left\{ k\pi + \frac{2\pi}{3}, k\pi + \frac{4\pi}{3} \right\}$

ب) $y = \frac{\sin x + 2}{\cos x - 1} \Rightarrow \cos x - 1 \neq 0 \Rightarrow \cos x \neq 1$
 $\Rightarrow D = \mathbb{R} - \{ 2k\pi \}$

الف) $y = \frac{2 \sin x + 1}{\tan x + 1} \rightarrow \frac{\sin x}{\cos x} + 1 \rightarrow \begin{cases} \cos x \neq 0 \\ \tan x \neq -1 \end{cases} \Rightarrow D = \mathbb{R} - \left\{ k\pi + \frac{\pi}{2}, k\pi + \frac{3\pi}{4} \right\}$

ب) $y = \frac{\cos x + 1}{\cot x - 1} \rightarrow \frac{\cos x}{\sin x} - 1 \rightarrow \begin{cases} \sin x \neq 0 \\ \cot x \neq 1 \end{cases} \Rightarrow D = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{4} \right\}$

الف) $\sin y = x^2 - 2 \Rightarrow -1 \leq x^2 - 2 \leq 1 \Rightarrow 1 \leq x^2 \leq 3 \Rightarrow 1 \leq |x| \leq \sqrt{3}$
 $\Rightarrow D = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $\arccos(\sqrt{x} - 3) \Rightarrow \begin{cases} x > 0 \\ -1 \leq \sqrt{x} - 3 \leq 1 \\ 2 \leq \sqrt{x} \leq 4 \Rightarrow 4 \leq x \leq 16 \end{cases} \Rightarrow D = [4, 16]$

الف) $\cos y = |x| - 3 \Rightarrow -1 \leq |x| - 3 \leq 1 \Rightarrow 2 \leq |x| \leq 4$
 $\Rightarrow D = [-4, -2] \cup [2, 4]$

الف) $\arcsin(x^2 + 3x + 1) \Rightarrow \begin{cases} -1 \leq x^2 + 3x + 1 \leq 1 \\ -2 \leq x(x+3) \leq 0 \end{cases} \Rightarrow D = [-2, 0]$

الف) $y = \log_2 x^2 - 4 \Rightarrow x^2 - 4 > 0 \Rightarrow x^2 > 4 \Rightarrow |x| > 2 \Rightarrow D = \mathbb{R} - [-2, 2]$

ب) $y = \log_2 2 - |x| \Rightarrow 2 - |x| > 0 \Rightarrow 2 > |x| \Rightarrow D = (-2, 2)$

الف) $y = \log_{x-2} \frac{x-2}{x-3}$ $\left\{ \begin{array}{l} x-2 > 0 \\ x-3 > 0 \\ x-2 \neq 1 \end{array} \right\} \Rightarrow \left\{ \begin{array}{l} x > 2 \\ x > 3 \\ x \neq 3 \end{array} \right\} \Rightarrow D = (2, 3) \cup (3, \infty)$

ب) $y = \log_{x+2} x^2 - 1$ $\left\{ \begin{array}{l} x^2 - 1 > 0 \\ x+2 > 0 \\ x+2 \neq 1 \end{array} \right\} \Rightarrow \left\{ \begin{array}{l} x^2 > 1 \Rightarrow |x| > 1 \\ x > -2 \\ x \neq -3 \end{array} \right\} \Rightarrow D = (-\infty, -3) \cup (-1, \infty) \cup \{1\}$

الف) $y = \log_{x-2} \frac{x^2 - 4x + 3}{x-2} \Rightarrow \frac{(x-2)(x-1)}{x-2} > 0$
 $\Rightarrow \frac{1}{-2} + \frac{3}{2} + \frac{1}{2} \Rightarrow D = [1, 2) \cup (2, \infty)$

ب) $y = \log_{x+2} \frac{x+2}{x-2}$ $\left\{ \begin{array}{l} \frac{x+2}{x-2} > 0 \Rightarrow \frac{-2}{x-2} - \frac{1}{x-2} + \frac{1}{x-2} \\ x+2 > 0 \Rightarrow x > -2 \\ x+2 \neq 1 \Rightarrow x \neq -3 \end{array} \right\} \Rightarrow D = ((-2, -3) \cup (-3, \infty)) \cup \{-1\}$

الف) $y = \sqrt{3 - \log_2(x-2)}$ $\left\{ \begin{array}{l} x-2 > 0 \Rightarrow x > 2 \\ 3 - \log_2(x-2) \geq 0 \Rightarrow \log_2(x-2) \leq 3 \\ \Rightarrow x-2 \leq 8 \Rightarrow x \leq 10 \end{array} \right\} \Rightarrow D = (2, 10]$

ب) $y = \log_2(2 \log_2 x - 1)$ $\left\{ \begin{array}{l} 2 \log_2 x > 1 \Rightarrow \log_2 x > \frac{1}{2} \Rightarrow x > \sqrt{2} \end{array} \right\}$
 $\Rightarrow D = (\sqrt{2}, \infty)$

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

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

ج) $y = \frac{2}{e^x - 2} \rightarrow e^x \neq 2 \Rightarrow x \neq \log_2 2 \Rightarrow D = \mathbb{R} - \{1\}$

د) $y = \frac{2}{e^x - 3} \rightarrow e^x \neq 3 \Rightarrow x \neq \log_2 3 \Rightarrow D = \mathbb{R} - \{\log_2 3\}$

الف) $y = (x+1)!$ $\rightarrow (x+1) \in \mathbb{W} \Rightarrow x \in \mathbb{W} - 1$
 $\Rightarrow D = \left\{ x \mid x = \frac{k-1}{1}, k \in \mathbb{W} \right\}$

ب) $y = \left(\frac{2x-2}{2x-3} \right)!$ $\rightarrow \frac{2x-2}{2x-3} \in \mathbb{W} \Rightarrow \frac{-2\mathbb{W}+2}{2\mathbb{W}-3}$

$\Rightarrow D = \left\{ x \mid x = \frac{2k-2}{-2k+3}, k \in \mathbb{W} \right\}$