$D_f = \mathbb{R} - \left\{2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3}\right\}$

۱- الف) $y = \frac{\sin x - 2}{2\cos x + 1} \rightarrow 2\cos x + 1 \neq 0 \rightarrow 2\cos x \neq -1 \rightarrow \cos x \neq \frac{-1}{2} \rightarrow 2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3}$

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

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

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

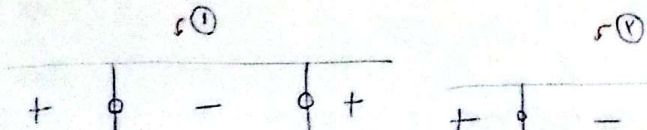
۳- الف) $\sin y = x^2 - 2 \rightarrow -1 \leq x^2 - 2 \leq 1 \rightarrow 1 \leq x^2 \leq 3 \xrightarrow{\text{جذر}} \begin{matrix} 1 \leq x \leq \sqrt{3} \\ -1 \geq x \geq -\sqrt{3} \end{matrix} \rightarrow D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $y = \arccos(\sqrt{x} - 2) \rightarrow \begin{cases} -1 \leq \sqrt{x} - 2 \leq 1 \rightarrow 1 \leq \sqrt{x} \leq 3 \xrightarrow{\text{جذر}} 1 \leq x \leq 9 \\ x \geq 0 \end{cases} \xrightarrow[\text{n}]{\text{شرط}} D_f = [1, 9]$

۴- الف) $\cos y = |x| - 2 \rightarrow -1 \leq |x| - 2 \leq 1 \rightarrow 1 \leq |x| \leq 3 \rightarrow \begin{matrix} 1 \leq x \leq 3 \\ -1 \geq x \geq -3 \end{matrix} \rightarrow$

$D_f = [-3, -1] \cup [1, 3]$

ب) $y = \arcsin(x^2 + 2x + 1) \rightarrow -1 \leq x^2 + 2x + 1 \leq 1 \begin{cases} x^2 + 2x + 1 \geq -1 \rightarrow x^2 + 2x + 2 \geq 0 \rightarrow (x+1)(x+1) \geq 0 \quad ① \\ x^2 + 2x + 1 \leq 1 \rightarrow x^2 + 2x \leq 0 \rightarrow x(x+2) \leq 0 \quad ② \end{cases}$



$\rightarrow D_f = ① \cap ② \rightarrow D_f = [-2, -1] \cup [-1, 0]$

۵- الف) $y = \log_3^{x^2 - 4} \rightarrow x^2 - 4 > 0 \rightarrow x^2 > 4 \rightarrow \begin{cases} x > 2 \\ x < -2 \end{cases} \rightarrow D_f = (-\infty, -2) \cup (2, +\infty)$

ب) $y = \log_2^{2 - |x|} \rightarrow 2 - |x| > 0 \rightarrow |x| < 2 \rightarrow -2 < x < 2 \rightarrow D_f = (-2, 2)$

۶- الف) $y = \log_{x-2}^{5-x} \rightarrow \begin{cases} 5 - x > 0 \rightarrow x < 5 \\ x - 2 > 0 \rightarrow x > 2 \\ x - 2 \neq 1 \rightarrow x \neq 3 \end{cases} \xrightarrow[\text{n}]{\text{شرط}} D_f = (2, 5) - \{3\}$

ب) $y = \log_{x+2}^{x^2-1}$ $\Rightarrow \begin{cases} x^2-1>0 \rightarrow x^2>1 \rightarrow \begin{cases} x>1 \\ x<-1 \end{cases} \\ x+2>0 \rightarrow x>-2 \\ x+2\neq 1 \rightarrow x\neq -1 \end{cases} \Rightarrow D_f =$

-۷

الف) $y = \log \frac{x^2-4x+3}{x-3} \rightarrow \frac{x^2-4x+3}{x-3} = \frac{(x-1)(x-3)}{x-3} > 0$ ~

	1		3	
	− ϕ	+	∞ 0	+

$\Rightarrow D_f = (1, +\infty) - \{3\}$

ب) $y = \log_{x+5}^{\frac{x+2}{x-2}} \rightarrow \begin{cases} \frac{x+2}{x-2} > 0 \rightarrow \overset{+}{\underset{-2}{\phi}} \quad \overset{-}{\underset{2}{\text{ok}}} \quad \overset{+}{} \rightarrow (-\infty,-2) \cup (2,+\infty) \\ x+5>0 \rightarrow x>-5 \\ x+5\neq 1 \rightarrow x\neq -4 \end{cases} \Rightarrow D_f =$

-۸

الف) $y = \sqrt{3 - \log_2^{(x-2)}} \rightarrow \begin{cases} x-2>0 \rightarrow x>2 \Rightarrow D_f = (2, 10] \\ 3 - \log_2^{x-2} \geq 0 \rightarrow \log_2^{x-2} \leq 3 \rightarrow x-2 \leq 2^3 \rightarrow x \leq 10 \end{cases}$

ب) $y = \log(2\log_3^x - 1) \rightarrow \begin{cases} x>0 \Rightarrow D_f = (\sqrt{3}, +\infty) \\ 2\log_3^x - 1 > 0 \rightarrow 2\log_3^x > 1 \rightarrow \log_3^x > \frac{1}{2} \rightarrow x > 3^{\frac{1}{2}} \\ x > \sqrt{3} \end{cases}$

-۹

الف) $y = \frac{3}{4^x+1} \rightarrow 4^x+1 \neq 0 \rightarrow 4^x \neq -1 \xrightarrow[\text{برقرار}]{\text{همواره}} D_f = \mathbb{R}$

ب) $y = \frac{3}{4^x-1} \rightarrow 4^x-1 \neq 0 \rightarrow 4^x \neq 1 \rightarrow x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$

ج) $y = \frac{3}{4^x-2} \rightarrow 4^x-2 \neq 0 \rightarrow 4^x \neq 2 \rightarrow \log_4^2 \neq x \rightarrow D_f = \mathbb{R} - \{\log_4^2\}$

د) $y = \frac{3}{4^x-3} \rightarrow 4^x-3 \neq 0 \rightarrow 4^x \neq 3 \rightarrow \log_4^3 \neq x \rightarrow D_f = \mathbb{R} - \{\log_4^3\}$

الف) $y = (4x+1)! \rightarrow 4x+1 \in \mathbb{W} \rightarrow 4x \in \mathbb{W}-1 \rightarrow x \in \frac{\mathbb{W}-1}{4} \rightarrow D_f = \{x \mid x = \frac{k-1}{4}, k \in \mathbb{W}\}$ ۱۰

ب) $y = \left(\frac{3x-2}{2x-5}\right)! \rightarrow \frac{3x-2}{2x-5} \in \mathbb{W} \rightarrow 3x-2 = 3\times\mathbb{W} - 5\mathbb{W} \rightarrow 3x-2x\mathbb{W} = 2-5\mathbb{W}$

$x(3-2\mathbb{W}) = 2-5\mathbb{W}$

$D_f = \left\{x \mid x = \frac{2-5k}{3-2k}, k \in \mathbb{W}\right\} \leftarrow x = \frac{2-5\mathbb{W}}{3-2\mathbb{W}}$