

الف $y = \frac{\sin x - 2}{2\cos x + 1}$ $2\cos x + 1 \neq 0 \rightarrow \cos x \neq -\frac{1}{2} \rightarrow \cos x \neq -\frac{1}{2} \rightarrow$ $x \neq 2k\pi + \frac{2\pi}{3}, 2k\pi - \frac{2\pi}{3}$ $D_f = \mathbb{R} - \{2k\pi + \frac{2\pi}{3}, 2k\pi - \frac{2\pi}{3}\}$	ب $y = \frac{\sin x + 3}{\cos x - 1}$ $\cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow$ $x \neq 2k\pi$ $D_f = \mathbb{R} - \{2k\pi\}$	۱
الف $y = \frac{2\sin x + 1}{\tan x + 1}$ $\begin{cases} \tan x = \frac{\sin x}{\cos x} \rightarrow \cos x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2} \\ \tan x + 1 \neq 0 \rightarrow \tan x \neq -1 \rightarrow x \neq k\pi - \frac{\pi}{4} \end{cases}$ $D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{4}\}$	ب $y = \frac{\cos x + 1}{\cot x - 1}$ $\begin{cases} \cot x = \frac{\cos x}{\sin x} \rightarrow \sin x \neq 0 \rightarrow x \neq k\pi \\ \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow x \neq k\pi + \frac{\pi}{4} \end{cases}$ $D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{4}\}$	۲
الف $\sin y = x^2 - 2$ $-1 \leq x^2 - 2 \leq 1 \rightarrow 1 \leq x^2 \leq 3 \rightarrow$ $-\sqrt{3} \leq x \leq -1 \cup 1 \leq x \leq \sqrt{3}$ $D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$	ب $y = \arccos(\sqrt{x} - 3)$ $-1 \leq \sqrt{x} - 3 \leq 1 \rightarrow 2 \leq \sqrt{x} \leq 4 \rightarrow$ $4 \leq x \leq 16$ $D_f = [4, 16]$	۳
الف $\cos y = x - 3$ $-1 \leq x - 3 \leq 1 \rightarrow 2 \leq x \leq 4 \rightarrow$ $-4 \leq x \leq -2 \cup 2 \leq x \leq 4$ $D_f = [-4, -2] \cup [2, 4]$	ب $y = \arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1 \rightarrow \begin{cases} x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow \\ x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0 \end{cases}$ $x(x+3) \leq 0 \rightarrow x=0, x=-3$: ریشه ها $(x+1)(x+2) \geq 0 \rightarrow x=-1, x=-2$: ریشه ها $-3 \leq x \leq 0 \cap (x \leq -2 \cup x \geq -1)$ $D_f = [-3, -2] \cup [-1, 0]$	۴
الف $y = \log_{\frac{1}{2}}(x^2 - 4)$ $x^2 - 4 > 0 \rightarrow x^2 > 4 \rightarrow$ $x < -2 \cup x > 2$ $D_f = (-\infty, -2) \cup (2, +\infty)$	ب $y = \log_{\frac{1}{2}}(2 - x)$ $2 - x > 0 \rightarrow x < 2 \rightarrow$ $-2 < x < 2$ $D_f = (-2, 2)$	۵

الف $y = \log_{x-3} \omega - x$ $\begin{cases} \omega - x > 0 \rightarrow x < \omega \\ x - 3 > 0 \rightarrow x > 3 \\ x - 3 \neq 1 \rightarrow x \neq 4 \\ x < \omega \cap x > 3 \cap x \neq 4 \end{cases}$ $D_f = (3, \omega) - \{4\}$	ب $y = \log_{x+3} \frac{x^2-1}{x-3}$ $\begin{cases} x^2-1 > 0 \rightarrow x^2 > 1 \rightarrow x < -1 \cup x > 1 \\ x+3 > 0 \rightarrow x > -3 \\ x+3 \neq 1 \rightarrow x \neq -2 \end{cases}$ $(x < -1 \cup x > 1) \cap x > -3 \cap x \neq -2$ $D_f = (-3, -1) \cup (1, +\infty) - \{-2\}$	٦		
الف $y = \log_{x-3} \frac{x^2-fx+3}{x-3}$ $\frac{x^2-fx+3}{x-3} > 0 \rightarrow \frac{(x-1)(x-3)}{x-3} > 0$ $\frac{1}{-} \frac{3}{+} \frac{+}{+}$ $x=1, x=3$: ریشه ها $D_f = (1, +\infty) - \{3\}$	ب $y = \log_{x+\omega} \frac{x+w}{x-3}$ $\frac{x+w}{x-3} > 0 \rightarrow \frac{-3}{+} \frac{+}{-} \frac{+}{+} \rightarrow x < -3 \cup x > 3$ $x=3, x=2$: ریشه ها $\begin{cases} x+\omega > 0 \rightarrow x > -\omega \\ x+\omega \neq 1 \rightarrow x \neq -\omega-1 \end{cases}$ $(x < -3 \cup x > 3) \cap x > -\omega \cap x \neq -\omega-1$ $D_f = (-\omega, -3) \cup (3, +\infty) - \{-\omega-1\}$	٧		
الف $y = \sqrt{3 - \log_2(x-2)}$ $\begin{cases} x-2 > 0 \rightarrow x > 2 \\ 3 - \log_2(x-2) \geq 0 \rightarrow \log_2(x-2) \leq 3 \rightarrow x-2 \leq 8 \end{cases}$ $\rightarrow x \leq 10$ $x > 2 \cap x \leq 10$ $D_f = (2, 10]$	ب $y = \log(\sqrt[3]{\log_3^n - 1})$ $\begin{cases} x > 0 \\ \sqrt[3]{\log_3^n - 1} > 0 \rightarrow \sqrt[3]{\log_3^n} > 1 \rightarrow \log_3^n > 1 \end{cases}$ $\rightarrow x > \sqrt[3]{3}$ $x > 0 \cap x > \sqrt[3]{3}$ $D_f = (\sqrt[3]{3}, +\infty)$			
الف $y = \frac{3}{f^x+1}$ $\begin{cases} f^x+1 \neq 0 \rightarrow f^x \neq -1 \end{cases}$ همواره برقرار است. $D_f = \mathbb{R}$	ب $y = \frac{3}{f^x-1}$ $\begin{cases} f^x-1 \neq 0 \rightarrow f^x \neq 1 \rightarrow x \neq 0 \end{cases}$ $D_f = \mathbb{R} - \{0\}$	ج $y = \frac{3}{f^x-2}$ $\begin{cases} f^x-2 \neq 0 \rightarrow f^x \neq 2 \rightarrow x \neq \log_f 2 \end{cases}$ $D_f = \mathbb{R} - \{\log_f 2\}$	د $y = \frac{3}{f^x-3}$ $\begin{cases} f^x-3 \neq 0 \rightarrow f^x \neq 3 \rightarrow x \neq \log_f 3 \end{cases}$ $D_f = \mathbb{R} - \{\log_f 3\}$	٩
الف $y = (fx+1)!$ $fx+1 \in \mathbb{W} \rightarrow fx \in \mathbb{W}-1 \rightarrow x \in \frac{\mathbb{W}-1}{f}$ $D_f = \{x \mid x = \frac{k-1}{f}, k \in \mathbb{W}\}$	ب $y = \left(\frac{3x-2}{2x-\omega}\right)!$ $\frac{3x-2}{2x-\omega} \in \mathbb{W} \rightarrow 3x-2 \in \mathbb{W} \cap 2x-\omega \in \mathbb{W}$ $\rightarrow 3x-2 \in \mathbb{W} \cap 2x-\omega \in \mathbb{W} \rightarrow x \in \frac{\mathbb{W}-2}{2} \cap x \in \frac{\mathbb{W}+\omega}{2}$ $\rightarrow x \in \frac{\mathbb{W}-2}{2} \cap \frac{\mathbb{W}+\omega}{2} \rightarrow x \in \frac{\mathbb{W}-2}{2} \cap \frac{\mathbb{W}+\omega}{2}$ $D_f = \{x \mid x = \frac{\omega k - 2}{2k - 2}, k \in \mathbb{W}\}$	١٠		