

الف) $y = \frac{\sin x - 2}{\cos x + 1}$ $\cos x + 1 \neq 0 \Rightarrow \cos x \neq -1$



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

ب) $y = \frac{\sin x + 3}{\cos x - 1}$ $\cos x - 1 \neq 0 \Rightarrow \cos x \neq 1$



$D_f = \mathbb{R} - \{2k\pi\}$

الف) $y = \frac{2 \sin x + 1}{\tan x + 1}$ $\begin{cases} \tan x + 1 \neq 0 \Rightarrow \tan x \neq -1 \Rightarrow k\pi - \frac{\pi}{4} \\ \cos x \neq 0 \Rightarrow k\pi + \frac{\pi}{2} \end{cases}$



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

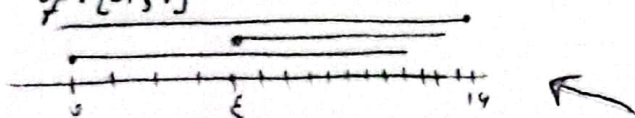
ب) $y = \frac{\cos x + 1}{\cot x - 1}$ $\begin{cases} \cot x - 1 \neq 0 \Rightarrow \cot x \neq 1 \Rightarrow k\pi + \frac{\pi}{4} \\ \sin x \neq 0 \Rightarrow k\pi \end{cases}$



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

الف) $\sin y = x^2 - 2$ $-1 \leq x^2 - 2 \leq 1$ $\begin{cases} x^2 - 2 \geq -1 \Rightarrow x^2 \geq 1 \Rightarrow x \leq -1 \text{ or } x \geq 1 \\ x^2 - 2 \leq 1 \Rightarrow x^2 \leq 3 \Rightarrow -\sqrt{3} \leq x \leq \sqrt{3} \end{cases}$

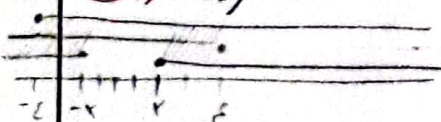
$D_f = [-1, 1]$



ب) $y = \arccos(\sqrt{x} - 3)$ $-1 \leq \sqrt{x} - 3 \leq 1$ $x \geq 0$ $D_f = [0, 14]$

$\begin{cases} \sqrt{x} - 3 \geq -1 \Rightarrow \sqrt{x} \geq 2 \Rightarrow x \geq 4 \\ \sqrt{x} - 3 \leq 1 \Rightarrow \sqrt{x} \leq 4 \Rightarrow x \leq 16 \end{cases}$

الف) $\cos y = |x| - 3$ $-1 \leq |x| - 3 \leq 1$ $\begin{cases} |x| - 3 \geq -1 \Rightarrow |x| \geq 2 \Rightarrow x \leq -2 \text{ or } x \geq 2 \\ |x| - 3 \leq 1 \Rightarrow |x| \leq 4 \Rightarrow -4 \leq x \leq 4 \end{cases}$



ب) $y = \arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1$ $\begin{cases} x^2 + 3x + 1 \geq -1 \Rightarrow x^2 + 3x + 2 \geq 0 \Rightarrow (x+1)(x+2) \geq 0 \\ x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0 \end{cases}$

الف) $y = \log_3(x^2 - 4)$ $x^2 - 4 > 0 \Rightarrow (x-2)(x+2) > 0$

$D_f = (-\infty, -2) \cup (2, \infty)$

ب) $y = \log_4(x-1)$ $x-1 > 0 \Rightarrow x > 1$

$D_f = (1, \infty)$

$D_f = (-2, 2)$

الف) $y = \log \frac{x^2 - 4x + 3}{x-3}$ $D_f = (1, +\infty) - \{3\}$	$\frac{x^2 - 4x + 3}{x-3} > 0$ $\frac{x+3}{x-4} > 0$ $x+3 > 0 \Rightarrow x > -3$ $x+3 \neq 0 \Rightarrow x \neq -3$ $D_f = (-\infty, -3) \cup (3, +\infty) - \{-3\}$	6
الف) $y = \log \frac{\omega - x}{x-3}$ $D_f = (3, \omega) - \{3\}$	$\omega - x > 0 \Rightarrow x < \omega$ $x - 3 > 0 \Rightarrow x > 3$ $x - 3 \neq 0 \Rightarrow x \neq 3$	7
الف) $y = \sqrt{3 - \log_r^{(n-2)}}$ $D_f = (2, 10]$	$n-2 > 0 \Rightarrow n > 2$ $3 - \log_r^{(n-2)} \geq 0 \Rightarrow \log_r^{(n-2)} \leq 3 \Rightarrow n-2 \leq 10 \Rightarrow n \leq 12$	8
الف) $y = \frac{3}{x^2 + 1}$ $D_f = \mathbb{R}$	$x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1$	9
الف) $y = \frac{3}{x^2 - 1}$ $D_f = \mathbb{R} - \{0\}$	$x^2 - 1 \neq 0 \Rightarrow x^2 \neq 1$	9
الف) $y = \frac{3}{x^2 - 2}$ $D_f = \mathbb{R} - \{\log_2^2\}$	$x^2 - 2 \neq 0 \Rightarrow x^2 \neq 2$	9
الف) $y = \frac{3}{x^2 - 3}$ $D_f = \mathbb{R} - \{\log_3^3\}$	$x^2 - 3 \neq 0 \Rightarrow x^2 \neq 3$	9
الف) $y = (x+1)!$ $D_f = \{x \mid x \in \frac{k-1}{e}, k \in \mathbb{W}\}$	$x+1 \in \mathbb{W} \Rightarrow \frac{x+1}{e} \in \mathbb{W} \Rightarrow x \in \frac{W-1}{e}$	10
الف) $y = \left(\frac{x-2}{x-5}\right)!$ $D_f = \{x \mid x \in \frac{2k-2}{2k-5}, k \in \mathbb{W}\}$	$\frac{x-2}{x-5} \in \mathbb{W} \Rightarrow x-2 \in (x-5)\mathbb{W} \Rightarrow x-2 \in x\mathbb{W} - 5\mathbb{W} \Rightarrow x-2 \in x\mathbb{W} - 5\mathbb{W}$ $x(1-5\mathbb{W}) \in x\mathbb{W} - 5\mathbb{W}$	10

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

$$x \in \frac{x-5\mathbb{W}}{1-5\mathbb{W}} \Rightarrow x \in \frac{5\mathbb{W}-2}{1-5\mathbb{W}}$$