

الف) $y = \frac{\sin x - 2}{2 \cos x + 1}$ $2 \cos x + 1 \neq 0$ $2 \cos x \neq -1$ $\cos x \neq -\frac{1}{2}$ $D = R - \left\{ 2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3} \right\}$	ب) $y = \frac{\sin x + 3}{\cos x - 1}$ $\cos x - 1 \neq 0$ $\cos x \neq 1$ $D = R - \{2k\pi\}$	1
الف) $y = \frac{2 \sin x + 1}{\tan x + 1}$ $\tan x + 1 \neq 0$ $\tan x \neq -1$ $D = R - \left\{ k\pi + \frac{\pi}{4}, k\pi - \frac{\pi}{4} \right\}$	ب) $y = \frac{\cos x + 1}{\cot x - 1}$ $\cot x - 1 \neq 0$ $\cot x \neq 1$ $D = R - \left\{ k\pi, k\pi + \frac{\pi}{4} \right\}$	2
الف) $\sin y = x^2 - 2$ $-1 \leq x^2 - 2 \leq 1$ $1 \leq x^2 \leq 3$ $1 \leq x \leq \sqrt{3} \cup -\sqrt{3} \leq x \leq -1$ $D = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$	ب) $y = \arccos(\sqrt{x} - 3)$ $-1 \leq \sqrt{x} - 3 \leq 1$ $2 \leq \sqrt{x} \leq 4$ $4 \leq x \leq 16$ $D = [4, 16]$	3
الف) $\cos y = x - 3$ $-1 \leq x - 3 \leq 1$ $2 \leq x \leq 4$ $2 \leq x \leq 4 \cup -4 \leq x \leq -2$ $D = [-4, -2] \cup [2, 4]$	ب) $y = \arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1$ $0 \leq x^2 + 3x + 2 \leq 2$ $0 \leq (x+1)(x+2) \leq 2$ $\begin{array}{c} -3-2 \quad -1-0 \\ + \quad + \quad - \quad + \quad + \\ \hline x \end{array}$ $D = [-3, -2] \cup [-1, 0]$	4
الف) $y = \log_3 x^2 - 4$ $x^2 - 4 > 0$ $D = (-\infty, -2) \cup (2, +\infty)$ $(x-2)(x+2) > 0$ $\begin{array}{c} -2 \quad 2 \\ + \quad - \quad + \\ \hline x \end{array}$	ب) $y = \log_3 \sqrt{1-x}$ $1-x > 0$ $2 > x$ $-2 < x < 2$ $D = (-2, 2)$	5

الف) $y = \log_{x-r} \omega - x$ $x-r \neq 1 \quad x \neq r$ $x-r > 0 \quad x > r$ $\omega - x > 0 \quad \omega > x$ $D = (r, \omega) - \{r\}$	ب) $y = \log_{x+r} x^r - 1$ $x+r \neq 1 \quad x \neq -r \quad x+r > 0$ $x^r - 1 > 0 \quad x > -r$ $(x+1)(x-1) > 0 \quad x > 1, x < -1$ $D = (-\infty, -1) \cup (1, +\infty) - \{-r\}$	6
الف) $y = \log \frac{x^r - rx + r}{x-r}$ $\frac{x^r - rx + r}{x-r} > 0 \quad \frac{(x-1)(x-r)}{(x-r)} > 0$ $x-r \neq 0 \quad x \neq r$ $D = (1, r) \cup (r, +\infty)$	ب) $y = \log \frac{x+r}{x-r}$ $x+r > 0 \quad x > -r$ $x-r > 0 \quad x > r$ $D = (-\infty, -r) \cup (r, +\infty) - \{-r\}$	7
الف) $y = \sqrt{r - \log_r(x-r)}$ $x-r > 0 \quad x > r$ $r - \log_r(x-r) \geq 0 \quad r \geq \log_r(x-r)$ $x \leq 10 \Rightarrow r < x \leq 10$ $D = (r, 10]$	ب) $y = \log(r \log_r x - 1)$ $x > 0 \quad r \log_r x - 1 > 0$ $r \log_r x > 1 \quad \log_r x > \frac{1}{r}$ $x > \sqrt[r]{r}$ $D = (\sqrt[r]{r}, +\infty)$	8
الف) $y = \frac{r}{r^x + 1}$ $r^x + 1 \neq 0$ $D = \mathbb{R}$ ب) $y = \frac{r}{r^x - r}$ $r^x - r \neq 0 \quad r^x \neq r$ $D = \mathbb{R} - \log_r r$	ب) $y = \frac{r}{r^x - 1}$ $r^x - 1 \neq 0 \quad r^x \neq 1 \quad x \neq 0$ $D = \mathbb{R} - \{0\}$ 2) $y = \frac{r}{r^x - r}$ $r^x - r \neq 0 \quad r^x \neq r \quad D = \mathbb{R} - \log_r r$	9
الف) $y = (rx+1)!$ $rx+1 \in \mathbb{N}$ $rx \in \mathbb{N} - 1$ $x \in \frac{\mathbb{N}-1}{r}$ $D = \{x \mid x = \frac{k-1}{r}, k \in \mathbb{N}\}$	ب) $y = \left(\frac{rx-r}{rx-\omega} \right)!$ $x = -\frac{-\omega k + r}{rk - r} = \frac{\omega k - r}{rk - r}$ $D = \{x \mid x = \frac{\omega k - r}{rk - r}, k \in \mathbb{N}\}$	10