

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

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

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

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

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

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

الف) $\sin y = x^2 - 2 \rightarrow -1 \leq x^2 - 2 \leq 1 \xrightarrow{+1} 1 \leq x^2 \leq 3 \rightarrow \begin{cases} 1 \leq x \leq \sqrt{3} \\ -1 \geq x \geq -\sqrt{3} \end{cases}$

$D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $y = \arccos(\sqrt{x} - 2) \rightarrow \begin{cases} x \geq 0 \\ -1 \leq \sqrt{x} - 2 \leq 1 \end{cases} \rightarrow 2 \leq \sqrt{x} \leq 3 \rightarrow 4 \leq x \leq 9$

$[0, \infty) \cap [4, 9] \rightarrow D_f = [4, 9]$

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

$D_f = [-3, -2] \cup [2, 3]$

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

$\{ (-\infty, -1] \cup [-1, +\infty) \} \cap [-1, 0] \rightarrow D_f = [-1, 0] \cup [0, 1]$

$y = \log_{10} x^2 - 2 \rightarrow x^2 - 2 > 0 \rightarrow x^2 > 2 \rightarrow \begin{cases} x > \sqrt{2} \\ -\sqrt{2} > x \end{cases}$

$D_f = (-\infty, -\sqrt{2}) \cup (\sqrt{2}, +\infty)$

$y = \log_2 |x| \rightarrow 2 - |x| > 0 \rightarrow 2 > |x| \rightarrow -2 < x < 2$

$D_f = (-2, 2)$

$$الف) y = \log_{n-c}^{d-n} \rightarrow \begin{cases} d-n > 0 \rightarrow d > n \\ n-c > 0 \rightarrow n > c \\ n-c \neq 1 \rightarrow n \neq c \end{cases} \Rightarrow D_f = (c, d) - \{c\}$$

$$ب) y = \log_{n+c}^{n^r-1} \rightarrow \begin{cases} n^r-1 > 0 \rightarrow n^r > 1 \rightarrow n > 1 \text{ و } n < -1 \\ n+c > 0 \rightarrow n > -c \\ n+c \neq 1 \rightarrow n \neq -c-1 \end{cases} \Rightarrow D_f = (-c, -1) \cup (1, +\infty) - \{-c-1\}$$

$$الف) y = \log_{n-c} \frac{n^r - \varepsilon n + c}{n-c} \rightarrow \begin{cases} n-c \neq 0 \rightarrow n \neq c \\ \frac{n^r - \varepsilon n + c}{n-c} > 0 \rightarrow \frac{(n-1)(n-c)}{n-c} > 0 \rightarrow n > 1 \end{cases}$$

$D_f = (1, c) \cup (c, \infty)$

$$ب) y = \log_{n+d} \frac{n+c}{n-r} \rightarrow \begin{cases} n-r \neq 0 \rightarrow n \neq r \\ n+d \neq 1 \rightarrow n \neq -d-1 \\ n+d > 0 \rightarrow n > -d \\ \frac{n+c}{n-r} > 0 \rightarrow \frac{c}{r} > 0 \rightarrow r > 0 \end{cases} \Rightarrow D_f = (-d, -c) \cup (r, \infty) - \{-d-1\}$$

$$الف) y = \sqrt{c - \log_r(n-r)} \rightarrow \begin{cases} n-r > 0 \rightarrow n > r \\ c - \log_r(n-r) \geq 0 \rightarrow c \geq \log_r(n-r) \rightarrow r^c \geq n-r \rightarrow 1 \geq n-r \rightarrow n \leq r+1 \end{cases}$$

$D_f = (r, r+1]$

$$ب) y = \log_c(r \log_c^n - 1) \rightarrow \begin{cases} n > 0 \\ r \log_c^n - 1 > 0 \rightarrow \log_c^n > \frac{1}{r} \rightarrow n > c^{\frac{1}{r}} \rightarrow n > \sqrt{c} \end{cases}$$

$D_f = (\sqrt{c}, +\infty)$

$$الف) y = \frac{c}{\varepsilon^{n+1}} \rightarrow D_f = \mathbb{R}$$

$$ب) y = \frac{c}{\varepsilon^n - 1} \rightarrow \varepsilon^n - 1 \neq 0 \rightarrow \varepsilon^n \neq 1 \rightarrow n \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$$

$$ج) y = \frac{r}{\varepsilon^n - r} \rightarrow \varepsilon^n - r \neq 0 \rightarrow \varepsilon^n \neq r \rightarrow n \neq \frac{1}{r} \rightarrow D_f = \mathbb{R} - \{\frac{1}{r}\}$$

$$د) y = \frac{c}{\varepsilon^n - c} \rightarrow \varepsilon^n - c \neq 0 \rightarrow \varepsilon^n \neq c \rightarrow n \neq \log_r c \rightarrow D_f = \mathbb{R} - \{\log_r c\}$$

$$الف) y = (\varepsilon n + 1)! \rightarrow \varepsilon n + 1 \in \mathbb{W} \rightarrow \varepsilon n = w - 1 \rightarrow n = \frac{w-1}{\varepsilon}$$

$$D_f = \left\{ n \mid n = \frac{k-1}{\varepsilon}, k \in \mathbb{W} \right\}$$

$$ب) y = \left(\frac{c^{n-r}}{r^{n-d}} \right)! \rightarrow \frac{c^{n-r}}{r^{n-d}} = w \Rightarrow c^{n-r} = r^{n-d} w \rightarrow c^{n-r} w = r^{n-d} w \rightarrow n(c-rw) = r-dw \rightarrow n = \frac{-dw+r}{-rw+c}$$

$$D_f = \left\{ n \mid n = \frac{-\Delta K + r}{-rK + c}, K \in \mathbb{W} \right\}$$