

الف) $y = \frac{\sin x - 2}{2 \cos x + 1} \rightarrow 2 \cos x + 1 \neq 0 \rightarrow \cos x \neq -\frac{1}{2}$ $D_f = \mathbb{R} - \left\{ \frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi \right\}$

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

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

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

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

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

الف) $\sin y = x^2 - 2 \rightarrow -1 \leq x^2 - 2 \leq 1 \rightarrow 1 \leq x^2 \leq 3 \rightarrow 1 \leq x^2 \leq 3 \Rightarrow D_f$

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

ب) $y = \arccos(\sqrt{x} - 3) \rightarrow -1 \leq \sqrt{x} - 3 \leq 1 \rightarrow 2 \leq \sqrt{x} \leq 4 \rightarrow 4 \leq x \leq 16$ (II)
 $\sqrt{x} \rightarrow x \geq 0$ (I) $D_f = I \cap II \Rightarrow D_f = [4, 16]$

الف) $\cos y = |x| - 3 \rightarrow -1 \leq |x| - 3 \leq 1 \rightarrow 2 \leq |x| \leq 4$
 $D_f = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(x^2 + 3x + 1) \rightarrow -1 \leq x^2 + 3x + 1 \leq 1$
 $\Rightarrow 0 \leq (x+1)(x+2)$
 $x^2 + 3x \leq 0$
 $x(x+3) \leq 0$

(I) $\begin{array}{c} -2 \quad -1 \\ + \quad - \quad + \end{array}$ (II) $\begin{array}{c} -3 \quad 0 \\ + \quad - \quad + \end{array}$

$D_f = I \cap II \Rightarrow D_f = [-3, -2] \cup [-1, 0]$

$$\text{الف) } y = \log_{\mu} \frac{x^2-4}{x^2-1} \quad \left\{ \begin{array}{l} x^2-4 > 0 \rightarrow x^2 > 4 \\ x^2-1 \neq 0 \rightarrow x \neq \pm 1 \end{array} \right. \rightarrow DF = (-\infty, -2) \cup (2, +\infty) \quad (8)$$

$$\text{ب) } y = \log_{\mu} \frac{2-|x|}{x} \rightarrow 2-|x| > 0 \rightarrow 2 > |x| \Rightarrow -2 < |x| < 2 \quad DF = (-2, 2)$$

$$\text{الف) } y = \log_{x-3} \frac{\Delta-x}{x-3} \rightarrow \begin{array}{l} \Delta-x > 0 \rightarrow \Delta > x \text{ (I)} \\ x-3 > 0 \rightarrow x > 3 \text{ (II)} \\ x-3 \neq 1 \rightarrow x \neq 4 \text{ (III)} \end{array} \Rightarrow DF = (3, \Delta) - \{4\} \quad (9)$$

$$\text{ب) } \log_{x+3} \frac{x^2-1}{x+3} \rightarrow \begin{array}{l} x^2-1 > 0 \rightarrow x^2 > 1 \Rightarrow \begin{cases} x > 1 \\ x < -1 \end{cases} \rightarrow (-\infty, -1) \cup (1, +\infty) \text{ (I)} \\ x+3 > 0 \rightarrow x > -3 \\ x+3 \neq 1 \rightarrow x \neq -4 \rightarrow (-3, +\infty) - \{-4\} \text{ (II)} \end{array}$$

$$DF = (I) \cap (II) \Rightarrow DF = (-3, -1) - \{-4\} \cup (1, +\infty)$$

$$\text{الف) } y = \log \frac{(x-3)(x-1)}{x-3} \rightarrow \frac{(x-3)(x-1)}{x-3} > 0 \quad x-3 \neq 0 \quad x \neq 3$$

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

$$\text{ب) } y = \log \frac{\frac{x+3}{x-2}}{x+2} \rightarrow \begin{array}{l} \frac{x+3}{x-2} > 0 \rightarrow \begin{array}{l} x-2 \neq 0 \rightarrow x \neq 2 \\ x+3 > 0 \rightarrow x > -3 \end{array} \\ x+2 > 0 \rightarrow x > -2 \\ x+2 \neq 1 \rightarrow x \neq -1 \end{array}$$

$$DF = 1 \cap 2 \cap 3 \rightarrow DF = (-2, -1) - \{-1\} \cup (2, +\infty)$$

$$\text{الف) } y = \sqrt{\mu - \log_{\mu} \frac{(x-2)}{x-2}} \rightarrow \mu - \log_{\mu} \frac{(x-2)}{x-2} > 0 \rightarrow \mu > \log_{\mu} \frac{(x-2)}{x-2} \rightarrow \begin{array}{l} x-2 < \mu \\ x < \mu+2 \end{array}$$

$$\rightarrow \log_{\mu} \frac{(x-2)}{x-2} \rightarrow x-2 > 0 \rightarrow x > 2 \rightarrow DF = (2, \mu+2]$$

$$\text{ب) } y = \log \left(\mu^{\log_{\mu-1} x} \right) \rightarrow \mu^{\log_{\mu-1} x} > 0 \rightarrow \mu^{\log_{\mu-1} x} > 1 \rightarrow \log_{\mu} \mu^{\log_{\mu-1} x} > \frac{1}{\mu} \rightarrow x > \sqrt{\mu}$$

$$DF = (\sqrt{\mu}, +\infty)$$

$$\text{الف) } \frac{w}{r^{x+1}} \rightarrow r^x \neq -1 \text{ على } \mathbb{R} \quad DF = \mathbb{R}$$

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$$\text{ب) } \frac{w}{r^{x-1}} \rightarrow r^x \neq 1 \rightarrow x \neq 0 \rightarrow DF = \mathbb{R} - \{0\}$$

$$\text{ج) } y = \frac{w}{r^{x-1}} \rightarrow r^x \neq r \Rightarrow \log_r r \neq x \quad x \neq \frac{1}{r} \rightarrow DF = \mathbb{R} - \left\{ \frac{1}{r} \right\}$$

$$\text{د) } y = \frac{w}{r^{x-1}} \rightarrow r^x \neq w \rightarrow \log_r w \neq x \rightarrow DF = \mathbb{R} - \left\{ \log_r w \right\}$$

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$$\text{الف) } y = (rx+1)! \rightarrow rx+1 \in \mathbb{W} \rightarrow rx \in \mathbb{W}-1 \rightarrow x \in \frac{\mathbb{W}-1}{r}$$

$$DF = \left\{ x \mid x = \frac{K-1}{r}, K \in \mathbb{W} \right\}$$

$$\text{ب) } y = \left(\frac{rx-1}{rx-2} \right)! \rightarrow \frac{rx-1}{rx-2} \in \mathbb{W} \rightarrow rx-2 \in \mathbb{W} \rightarrow rx-1 \in \mathbb{W} \rightarrow rx-2 \in \mathbb{W} \rightarrow rx-1 \in \mathbb{W} \rightarrow rx-2 \in \mathbb{W}$$

$$x = \frac{r-2\mathbb{W}}{r-1\mathbb{W}} \rightarrow DF = \left\{ x \mid x = \frac{2K-1}{rK-1}, K \in \mathbb{W} \right\}$$