

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

ب) $y = \frac{\sin x + r}{\cos x - 1} \rightarrow \cos x - 1 \neq 0 \rightarrow \cos x \neq 1$  $D_f = \mathbb{R} - \{ r k\pi \}$

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

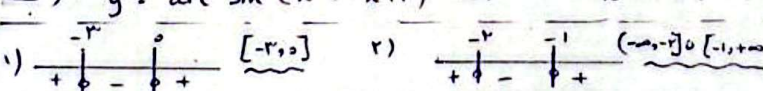
ب) $y = \frac{\cos x + 1}{\cot x - 1} \rightarrow \begin{cases} \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \\ \sin x \neq 0 \rightarrow x \neq k\pi \end{cases}$  $D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{4} \right\}$

الف) $\sin y = x^r - r \rightarrow -1 \leq x^r - r \leq 1 \rightarrow 1 \leq x^r \leq r+1 \rightarrow \sqrt[r]{1} \leq |x| \leq \sqrt[r]{r+1}$
 $\begin{cases} -\sqrt[r]{r+1} \leq x \leq \sqrt[r]{r+1} \\ x \geq 1, x \leq -1 \end{cases} \rightarrow D_f = [-\sqrt[r]{r+1}, -1] \cup [1, \sqrt[r]{r+1}]$

ب) $y = \arccos(\sqrt{x} - r) \rightarrow -1 \leq \sqrt{x} - r \leq 1 \rightarrow r \leq \sqrt{x} \leq r+1 \rightarrow r^2 \leq x \leq (r+1)^2$ $D_f = [r^2, (r+1)^2]$

الف) $\cos y = |x| - r \rightarrow -1 \leq |x| - r \leq 1 \rightarrow r \leq |x| \leq r+1 \rightarrow \begin{cases} -r \leq x \leq r \\ x \geq r, x \leq -r \end{cases}$

$D_f = [-r, -r] \cup [r, r]$

ب) $y = \arcsin(x^r + rx + 1) \rightarrow -1 \leq x^r + rx + 1 \leq 1$  $D_f = [-r, -r] \cup [-1, 0]$

الف) $y = \log_r(x^r - r) \rightarrow \begin{cases} x^r - r > 0 \\ x^r > r \rightarrow |x| > \sqrt[r]{r} \end{cases} \rightarrow D_f = (-\infty, -\sqrt[r]{r}) \cup (\sqrt[r]{r}, \infty)$

ب) $y = \log_r(r - |x|) \rightarrow r - |x| > 0 \rightarrow r > |x| \rightarrow -r < x < r$ $D_f = (-r, r)$

ا) $y = \log_{x-r} (a-x)$ $\rightarrow a-x > 0 \rightarrow a > x$
 $x-r > 0 \rightarrow x > r$, $x-r \neq 1 \rightarrow x \neq r+1$
 $1, r < x < a$

$$D_f = (r, a) - \{r+1\}$$

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ب) $y = \log_{x+r} (x^r - 1)$ $\rightarrow x^r - 1 > 0 \rightarrow x^r > 1 \rightarrow |x| > 1$ $\begin{cases} x > 1 & (1, +\infty) \\ x < -1 & (-\infty, -1) \end{cases}$
 $x+r > 0 \rightarrow x > -r$, $x+r \neq 1 \rightarrow x \neq 1-r$
 $(-r, +\infty) \cap x > -r$

$$D_f = (-r, -1) \cup (1, +\infty) - \{1-r\}$$

ا) $y = \log_{\frac{x-r}{x+r}} (\frac{x^r - rx + r}{x-r})$

$\frac{x^r - rx + r}{x-r} > 0$ $\rightarrow \frac{(x-1)(x-r)}{x-r} > 0$ $\rightarrow x \neq r$, $x \neq 1$
 $x > r$, $x < 1$

نقطة: $\frac{1}{x-r} + \frac{r}{x+r} > 0$
 $(1, r) \cup (r, +\infty)$

$$D_f = (1, r) \cup (r, +\infty)$$

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ب) $y = \log_{\frac{x+r}{x-r}} (x+r)$ $\rightarrow \frac{x+r}{x-r} > 0$ (موجب) $\rightarrow x > -r$, $x+r \neq 1 \rightarrow x \neq 1-r$
 $(-\infty, +\infty) \cap x > -r$ $\rightarrow x > -r$, $x \neq 1-r$

$\frac{-r}{x-r} + \frac{r}{x+r} > 0$
 $x < -r$, $x > r$

$$D_f = (-\infty, -r) \cup (r, +\infty)$$

ا) $y = r - \log_r (x-r)$ $\rightarrow x-r > 0 \rightarrow x > r$ $\rightarrow x-r \leq 1 \rightarrow x \leq r+1$
 $D_f = (r, r+1]$

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ب) $y = \log (r \log_r^x - 1)$ $\rightarrow r \log_r^x - 1 > 0 \rightarrow \log_r^x > \frac{1}{r} \rightarrow x > r^{\frac{1}{r}} \rightarrow x > \sqrt[r]{r}$
 $D_f = (\sqrt[r]{r}, +\infty)$

ا) $y = \frac{r}{r^x + 1}$ $\rightarrow r^x + 1 \neq 0 \rightarrow r^x \neq -1$ $\rightarrow x \in \mathbb{R}$

ب) $y = \frac{r}{r^x - 1}$ $\rightarrow r^x - 1 \neq 0 \rightarrow r^x \neq 1 \rightarrow x \neq 0$ $D_f = \mathbb{R} - \{0\}$

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

د) $y = \frac{r}{r^x - r}$ $\rightarrow r^x - r \neq 0 \rightarrow r^x \neq r \rightarrow x \neq \log_r r$ $D_f = \mathbb{R} - \{\log_r r\}$

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ا) $y = (fx+1)!$ $fx+1 \in \mathbb{N} \rightarrow fx \in \mathbb{N}-1 \rightarrow x \in \frac{\mathbb{N}-1}{f}$
 $D_f = \{x \mid x = \frac{k-1}{f}, k \in \mathbb{N}\}$

ب) $y = (\frac{rx-r}{rx-a})!$ $\rightarrow \frac{rx-r}{rx-a} \in \mathbb{N} \rightarrow rx-r \in \mathbb{N} \rightarrow rx \in \mathbb{N} \rightarrow x \in \frac{\mathbb{N}}{r}$

ج) $y = \frac{rx-r}{rx-a} \in \mathbb{N} \rightarrow rx-r \in \mathbb{N} \rightarrow rx \in \mathbb{N} \rightarrow x \in \frac{\mathbb{N}}{r}$ $D_f = \{x \mid x = \frac{ak-r}{rk-r}, k \in \mathbb{N}\}$

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