

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

ب) $y = \frac{\sin x + 1}{\cos x - 1} \rightarrow \cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow \bigoplus \Rightarrow D_f = \mathbb{R} - \{ 2k\pi \}$

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الف) $y = \frac{\tan x + 1}{\tan x - 1} \rightarrow \tan x - 1 \neq 0 \rightarrow \tan x \neq 1 \Rightarrow \bigoplus \Rightarrow D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{4}, k\pi + \frac{5\pi}{4} \right\}$

ب) $y = \frac{\cot x + 1}{\cot x - 1} \rightarrow \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \Rightarrow \bigoplus \Rightarrow D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{2} \right\}$

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الف) $\sin y = x^2 - 2 \rightarrow -1 \leq x^2 - 2 \leq 1 \xrightarrow{+2} -1 \leq x^2 \leq 3 \rightarrow 1 \leq x^2 \rightarrow x \geq 1, x \leq -1$
 $\hookrightarrow x^2 \leq 3 \rightarrow -\sqrt{3} \leq x \leq \sqrt{3} \Rightarrow D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $y = \arccos(\sqrt{x} - 3) \rightarrow -1 \leq \sqrt{x} - 3 \leq 1 \xrightarrow{+3} 2 \leq \sqrt{x} \leq 4 \rightarrow \sqrt{x} \leq 4 \rightarrow x \leq 16$
 $\hookrightarrow 2 \leq \sqrt{x} \rightarrow 4 \leq x$
 $D_f = [4, 16]$

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الف) $\cos y = |x| - 3 \rightarrow -1 \leq |x| - 3 \leq 1 \xrightarrow{+3} 2 \leq |x| \leq 4 \rightarrow 2 \leq |x| \rightarrow x \geq 2 \text{ یا } x \leq -2$
 $\hookrightarrow |x| \leq 4 \rightarrow -4 \leq x \leq 4$
 $D_f = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(x^2 + 3x + 1) \rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0 \rightarrow (x+1)(x+2) \geq 0$
 $\hookrightarrow x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0$
 $\Rightarrow \frac{-2}{-1} \leq x \leq \frac{0}{0} \cap \frac{-3}{-2} \leq x \leq \frac{0}{0} \Rightarrow D_f = [-3, -2] \cup [0, 0]$

الف) $y = \log_3 x^{2-4} \rightarrow x^{2-4} > 0 \rightarrow x^2 > 4 \rightarrow |x| > 2 \rightarrow x > 2 \text{ یا } x < -2 \Rightarrow D_f = (-\infty, -2) \cup (2, +\infty)$
 $\hookrightarrow x < -2$

ب) $y = \log_3 x^{2-1} \rightarrow x^{2-1} > 0 \rightarrow |x| < 2 \rightarrow -2 < x < 2 \Rightarrow D_f = (-2, 2)$

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الف) $y = \log_{n-3}^{a-n} \rightarrow a-n > 0 \rightarrow n < a$
 $\rightarrow n-3 > 0 \rightarrow n > 3$ $D_f = (3, a) - \{4\}$
 $\rightarrow n-3 \neq 1 \rightarrow n \neq 4$

ب) $y = \log_{n+3}^{n^2-1} \rightarrow n^2-1 > 0 \rightarrow n^2 > 1 \rightarrow n > 1, n < -1$
 $\rightarrow n+3 > 0 \rightarrow n > -3$ $D_f = (-3, -1) \cup (1, +\infty) - \{-2\}$
 $\rightarrow n+3 \neq 1 \rightarrow n \neq -2$

الف) $y = \log_{n-3} \frac{n^2-5n+6}{n-3} \rightarrow \frac{(n-2)(n-3)}{n-3} > 0$ $D_f = (1, +\infty) - \{3\}$
 $\rightarrow n-2 > 0 \rightarrow n > 2$

ب) $y = \log_{n+3} \frac{n+3}{n+3} \rightarrow \frac{n+3}{n+3} > 0 \rightarrow \frac{-3}{+3-3} +$ $D_f = (-\infty, -3) \cup (3, +\infty) - \{-2\}$
 $\rightarrow n+3 > 0 \rightarrow n > -3$
 $\rightarrow n+3 \neq 1 \rightarrow n \neq -2$

الف) $y = \sqrt{3 - \log_r(n-2)} \rightarrow n-2 > 0 \rightarrow n > 2$ $D_f = (2, 10]$
 $\rightarrow 3 - \log_r(n-2) \geq 0 \rightarrow \log_r(n-2) \leq 3 \rightarrow n-2 \leq 10 \rightarrow n \leq 12$

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

الف) $y = \frac{r}{e^{n+1}} \rightarrow e^{n+1} \neq 0 \rightarrow e^n \neq -1 \rightarrow D_f = \mathbb{R}$

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

ج) $y = \frac{r}{e^{n-2}} \rightarrow e^{n-2} \neq 0 \rightarrow e^n \neq 2 \rightarrow r^n \neq r^2 \rightarrow r^n \neq 1 \rightarrow n \neq \frac{1}{r} \rightarrow D_f = \mathbb{R} - \{\frac{1}{r}\}$

د) $y = \frac{r}{e^{n-3}} \rightarrow e^{n-3} \neq 0 \rightarrow e^n \neq 3 \rightarrow n \neq \log_r 3 \rightarrow D_f = \mathbb{R} - \{\log_r 3\}$

الف) $y = (k+n+1)! \rightarrow k+n+1 \in \mathbb{N} \rightarrow k+n \in \mathbb{N} - 1 \rightarrow n \in \frac{k-1}{e} \rightarrow D_f = \{n | n = \frac{k-1}{e}, k \in \mathbb{N}\}$

ب) $y = (\frac{r(n-2)}{r(n-2)})! \rightarrow \frac{r(n-2)}{r(n-2)} \in \mathbb{N} \rightarrow n = -\frac{-2r+2}{r(n-2)} \rightarrow n = \frac{2(r-1)}{r(n-2)}$

$D_f = \{n | n = \frac{2k-2}{rk-2}, k \in \mathbb{N}\}$