

الف)  $\frac{\sin x - 1}{\cos x + 1} \Rightarrow \cos x \neq -1 \Rightarrow D_f = \mathbb{R} - \{k\pi \pm \pi\}$

$D_f = \mathbb{R} - \{2k\pi \pm \frac{2\pi}{3}\}$

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

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الف)  $y = \frac{2\sin x + 1}{\tan x + 1} \Rightarrow \begin{cases} \tan x \neq -1 \Rightarrow x \neq k\pi - \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \\ \tan x \in \mathbb{R} \Rightarrow x \neq k\pi \pm \frac{\pi}{2} \end{cases} \Rightarrow D_f = \mathbb{R} - \{k\pi - \frac{\pi}{4}, k\pi + \frac{3\pi}{4}, k\pi \pm \frac{\pi}{2}\}$

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ب)  $y = \frac{\cos x + 1}{\cot x - 1} \Rightarrow \begin{cases} \cot x \neq 1 \Rightarrow x \neq k\pi + \frac{\pi}{4}, k\pi - \frac{3\pi}{4} \\ \cot x \in \mathbb{R} \Rightarrow x \neq k\pi \end{cases} \Rightarrow D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{4}, k\pi - \frac{3\pi}{4}\}$

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

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

$\Rightarrow x \geq 0$  (محدودیت دام)  $D_f = [4, 14]$

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

$\frac{-2-1}{+1-1+}$

$D_f = [-3, -2] \cup [-1, 0]$

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

$\frac{-3}{+1-1+}$

$x^2 + 3x + 1 = 0 \Rightarrow x = -3, 0$   
 $x^2 + 3x + 1 = -2 \Rightarrow x = -1, -2$

$\Rightarrow D_f = [-3, 0]$

الف)  $y = \log x^2 \Rightarrow x^2 - 4 > 0 \Rightarrow x^2 > 4 \Rightarrow x > 2 \vee x < -2 \Rightarrow D_f = (2, \infty) \cup (-\infty, -2)$

$D_f = (-\infty, -2) \cup (2, \infty)$

$\begin{cases} x > 2 \\ x < -2 \end{cases}$

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ب)  $y = \log \frac{2-|x|}{x} \Rightarrow 2-|x| > 0 \Rightarrow 2 > |x| \Rightarrow -2 < x < 2$   
 $x > 0 \Rightarrow x < 2$   
 $x < 0 \Rightarrow x > -2$

$\Rightarrow D_f = (-2, 2)$

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$$\text{الف) } y = \log_{x-2}^{5-x}$$

$$\Rightarrow \begin{cases} 5-x > 0 \Rightarrow x < 5 \\ x-2 > 0 \Rightarrow x > 2, x-2 \neq 1 \Rightarrow x \neq 3 \end{cases} \Rightarrow D_f = (2, 5) - \{3\}$$

②

$$\text{ب) } \log_{x+2}^{x^2-1}$$

$$x^2-1 > 0 \Rightarrow x > 1$$

$$x+2 > 0 \Rightarrow x > -2$$

$$x+2 \neq 1 \Rightarrow x \neq -1$$

$$\Rightarrow D_f = (-2, -1) \cup (-1, 1) \cup (1, \infty)$$

$$\text{الف) } y = \log_{x-2} \frac{x^2-1}{x-2} \Rightarrow \frac{(x-1)(x+1)}{x-2} > 0 \Rightarrow \frac{1}{x-2} > 0 \Rightarrow D_f = (2, \infty)$$

$$\text{ب) } y = \log_{x+2} \frac{x^2}{x-2} \Rightarrow \frac{x^2}{x-2} > 0 \Rightarrow \frac{x^2}{x-2} > 0 \Rightarrow \frac{x^2}{x-2} > 0 \Rightarrow D_f = (-\infty, -2) \cup (-2, 0) \cup (0, \infty)$$

$$\text{الف) } y = \sqrt{2 - \log_{\frac{1}{2}}(x-1)} \Rightarrow \begin{cases} x-1 > 0 \Rightarrow x > 1 \\ 2 - \log_{\frac{1}{2}}(x-1) \geq 0 \Rightarrow 2 \geq \log_{\frac{1}{2}}(x-1) \Rightarrow x \leq 10 \end{cases} \Rightarrow D_f = (1, 10]$$

$$\text{ب) } y = \log(\log_{\frac{1}{2}} x - 1) \Rightarrow \log_{\frac{1}{2}} x - 1 > 0 \Rightarrow \log_{\frac{1}{2}} x > 1 \Rightarrow x > \frac{1}{2} \Rightarrow D_f = (\frac{1}{2}, \infty)$$

$$\text{الف) } y = \frac{2}{x^2+1} \Rightarrow x^2+1 \neq 0 \Rightarrow x^2 \neq -1 \Rightarrow D_f = \mathbb{R}$$

$$\text{ب) } y = \frac{2}{x^2-1} \Rightarrow x^2-1 \neq 0 \Rightarrow x^2 \neq 1 \Rightarrow D_f = \mathbb{R} - \{1, -1\}$$

$$\text{ج) } y = \frac{2}{x^2-2} \Rightarrow x^2-2 \neq 0 \Rightarrow x^2 \neq 2 \Rightarrow D_f = \mathbb{R} - \{\sqrt{2}, -\sqrt{2}\}$$

$$\text{د) } y = \frac{2}{x^2-2} \Rightarrow x^2-2 \neq 0 \Rightarrow x^2 \neq 2 \Rightarrow D_f = \mathbb{R} - \{\sqrt{2}, -\sqrt{2}\}$$

$$\text{الف) } y = (2x+1)! \Rightarrow 2x+1 \in \mathbb{N} \Rightarrow x \in \frac{\mathbb{N}-1}{2} \Rightarrow D_f = \{x \mid x = \frac{k-1}{2}, k \in \mathbb{N}\}$$

$$\text{ب) } y = \left(\frac{2x-1}{2x+1}\right)! \Rightarrow \frac{2x-1}{2x+1} \in \mathbb{N} \Rightarrow \frac{2x-1}{2x+1} = k \Rightarrow 2x-1 = k(2x+1) \Rightarrow 2x-1 = 2kx+k \Rightarrow x = \frac{k+1}{2-k} \Rightarrow D_f = \{x \mid x = \frac{k+1}{2-k}, k \in \mathbb{N}\}$$