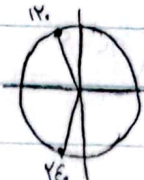


الف) $y = \frac{\sin x - 2}{2 \cos x + 1} \rightarrow 2 \cos x + 1 \neq 0 \rightarrow \cos x \neq -\frac{1}{2}$
 $D_f = \mathbb{R} - \left\{ 2k\pi + \frac{2\pi}{3}, 2k\pi - \frac{2\pi}{3} \right\}$



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

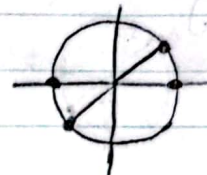


الف) $y = \frac{2 \sin x + 1}{\tan x + 1} \rightarrow \tan x + 1 \neq 0 \rightarrow \tan x \neq -1$
 $\tan x = \frac{\sin x}{\cos x} \Rightarrow \cos x \neq 0$



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

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



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

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

ب) $y = \arccos(\sqrt{x} - 2) \rightarrow -1 \leq \sqrt{x} - 2 \leq 1 \rightarrow 1 \leq \sqrt{x} \leq 3 \rightarrow 1 \leq x \leq 9$
 $D_f = [1, 9]$

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) $y = \arcsin(x^2 + 3x + 1) \rightarrow -1 \leq x^2 + 3x + 1 \leq 1$
 ① $x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x + 3) \leq 0 \rightarrow \frac{-3}{+} \frac{0}{-} \rightarrow [-3, 0]$

② $-1 \leq x^2 + 3x + 1 \rightarrow 0 \leq x^2 + 3x + 2 \rightarrow 0 \leq (x + 1)(x + 2) \rightarrow \frac{-2}{+} \frac{-1}{-} \rightarrow (-\infty, -2] \cup [-1, +\infty)$
 $D_f = [-3, -2] \cup [-1, 0]$

در این سوال باید

الف) $y = \log_{\frac{1}{2}} x^{2-4} \rightarrow x^2 - 4 > 0 \rightarrow (x-2)(x+2) > 0$ $\frac{-2}{+} \frac{2}{-}$

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

ب) $y = \log_2 x^{2-m} \rightarrow 0 < 2-m \rightarrow m < 2 \rightarrow -2 < x < 2$

$D_f = (-2, 2)$

الف) $\log_{x-3} 5-x \rightarrow 0 < 5-x \rightarrow x < 5$ $D_f = (2, 5) - \{4\}$

$0 < x-3 \rightarrow 3 < x$

$x-3 \neq 1 \rightarrow x \neq 4$

ب) $\log_{x+3} x^2-1 \rightarrow 0 < x^2-1 \rightarrow 0 < (x+1)(x-1) \rightarrow \frac{-1}{+} \frac{1}{-}$ $(-\infty, -1) \cup (1, +\infty)$

$0 < x+3 \rightarrow -3 < x$ $D_f = (-3, -1) - \{-2\} \cup (1, +\infty)$

$x+3 \neq 1 \rightarrow x \neq -2$

الف) $y = \log \frac{x^2-5x+3}{x-3} \rightarrow 0 < \frac{x^2-5x+3}{x-3} \rightarrow \frac{(x-1)(x-3)}{x-3}$ $\frac{1}{-} \frac{3}{+}$

$D_f = (1, +\infty) - \{3\}$ نباید 1 باشد زیرا با بسط صفر می شود

ب) $\log_{x+5} \frac{x+3}{x-2} \rightarrow 0 < \frac{x+3}{x-2} \rightarrow \frac{-3}{+} \frac{2}{-}$

$0 < x+5 \rightarrow -5 < x$

$x+5 \neq 1 \rightarrow x \neq -4$ $D_f = (-5, -4) - \{-4\} \cup (2, +\infty)$

الف) $y = \sqrt{3 - \log_2 x} \rightarrow 0 < 3 - \log_2 x \rightarrow \log_2 x < 3 \rightarrow x-2 < 1 \rightarrow x < 10$ $\textcircled{A}$

$D_f = (2, 10]$

ب) $y = \log (2 \log_3 x - 1) \rightarrow 2 \log_3 x - 1 > 0 \rightarrow 2 \log_3 x > 1 \rightarrow \log_3 x > \frac{1}{2} \rightarrow x > 3^{\frac{1}{2}}$

$x > 0$ $x > \sqrt{3}$

$D_f = (\sqrt{3}, +\infty)$

(4)

الف) $y = \frac{x^3}{x^2+1} \rightarrow x^2+1 \neq 0 \Rightarrow x^2 \neq -1$ $D_f = \mathbb{R}$

ب) $y = \frac{x^3}{x^2-1} \rightarrow x^2-1 \neq 0 \Rightarrow x^2 \neq 1$ $D_f = \mathbb{R} - \{0\}$

ج) $y = \frac{x^3}{x^2-2} \rightarrow x^2-2 \neq 0 \Rightarrow x^2 \neq 2 \rightarrow D_f = \mathbb{R} - \{\log_2 x\}$

د) $y = \frac{x^3}{x^2-3} \rightarrow x^2-3 \neq 0 \Rightarrow x^2 \neq 3 \rightarrow D_f = \mathbb{R} - \{\log_3 x\}$

هـ) $y = (x+1)! \Rightarrow x+1 \in \mathbb{N} \rightarrow x \in \mathbb{N}-1 \rightarrow x \in \frac{\mathbb{N}-1}{x}$ (10)
 $D_f = \{x | x = \frac{k-1}{x}, k \in \mathbb{N}\}$

و) $y = \frac{x^3-2}{x^2-5} \Rightarrow \frac{x^3-2}{x^2-5} \in \mathbb{N} \rightarrow x^2-5 \neq 0 \rightarrow x^2 \neq 5 \rightarrow x \neq \sqrt{5}$
 $x(x^2-5) = 5x-2 \rightarrow x = \frac{5x-2}{x^2-5}$
 $D_f = \{x | x = \frac{5k-2}{x^2-5}, k \in \mathbb{N}\}$