

-1

$$\text{الف) } y = \frac{\sin x - 2}{2 \cos x + 1} \Rightarrow 2 \cos x + 1 \neq 0 \Rightarrow \cos x \neq -\frac{1}{2} \Rightarrow D_f = \mathbb{R} - \left\{ 2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3} \right\}$$

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

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$$\text{الف) } y = \frac{2 \sin x + 1}{\tan x + 1} \Rightarrow \begin{cases} \tan x + 1 \neq 0 \\ \cos x \neq 0 \end{cases} \Rightarrow \tan x \neq -1 \Rightarrow D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{4}, k\pi + \frac{5\pi}{4}, k\pi - \frac{\pi}{4} \right\}$$

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

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

$$\text{ب) } y = \arccos(\sqrt{x} - 3) \Rightarrow -1 \leq \sqrt{x} - 3 \leq 1 \Rightarrow 2 \leq \sqrt{x} \leq 4 \Rightarrow 4 \leq x \leq 16 \Rightarrow D_f = [4, 16]$$

-4

$$\text{الف) } \cos y = |x| - 3 \Rightarrow -1 \leq |x| - 3 \leq 1 \Rightarrow 2 \leq |x| \leq 4 \Rightarrow \begin{cases} 2 \leq x \leq 4 \\ -4 \leq x \leq -2 \end{cases} \Rightarrow D_f = [-4, -2] \cup [2, 4]$$

$$\text{ب) } y = \arcsin(x^2 + 3x + 1) \Rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow \begin{cases} x^2 + 3x + 1 \leq 1 \\ x^2 + 3x + 1 \geq -1 \end{cases} \Rightarrow \begin{cases} x^2 + 3x \leq 0 \\ x^2 + 3x + 2 \geq 0 \end{cases} \Rightarrow \begin{cases} x(x+3) \leq 0 \\ (x+1)(x+2) \geq 0 \end{cases} \Rightarrow D_f = [-3, -2] \cup [-1, 0]$$

-5

$$\text{الف) } y = \log_3 \frac{x^2 - 4}{x} \Rightarrow \begin{cases} x^2 - 4 > 0 \\ x > 0 \end{cases} \Rightarrow \begin{cases} x > 2 \\ x > 0 \end{cases} \Rightarrow D_f = (2, +\infty)$$

$$\text{ب) } y = \log_2 \frac{2 - |x|}{x} \Rightarrow \begin{cases} 2 - |x| > 0 \\ x > 0 \end{cases} \Rightarrow \begin{cases} |x| < 2 \\ x > 0 \end{cases} \Rightarrow D_f = (0, 2)$$

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$$\text{الف) } y = \log_{x-3} \frac{\omega - x}{x - 3} \Rightarrow \begin{cases} \omega - x > 0 \\ x - 3 > 0 \\ x - 3 \neq 1 \end{cases} \Rightarrow \begin{cases} x < \omega \\ x > 3 \\ x \neq 4 \end{cases} \Rightarrow D_f = (3, \omega) - \{4\}$$

$$\text{ب) } y = \log_{x+3} \frac{x^2 - 1}{x + 3} \Rightarrow \begin{cases} x^2 - 1 > 0 \\ x + 3 > 0 \\ x + 3 \neq 1 \end{cases} \Rightarrow \begin{cases} x > 1 \\ x > -3 \\ x \neq -2 \end{cases} \Rightarrow D_f = (-3, -2) \cup (1, +\infty) - \{-2\}$$

-V

الف) $y = \log \frac{x^2 - 5x + 3}{x - 2} = \log \frac{x^2 - 5x + 3}{x - 2} > 0 \Rightarrow \frac{(x-1)(x-3)}{x-2} > 0 \Rightarrow \frac{1}{-} \frac{3}{+} \frac{2}{+} \Rightarrow D_f = (1, +\infty) - \{2\}$

ب) $y = \log \frac{x+3}{x-2} = \log \frac{x+3}{x-2} > 0 \Rightarrow \frac{x+3}{x-2} > 1 \Rightarrow x > -5$
 $x+3 \neq 0 \Rightarrow x \neq -3$
 $D_f = (-5, -3) \cup (-3, +\infty) - \{-5\}$

-A

الف) $y = \sqrt{1 - \log_2(x-2)} = \sqrt{1 - \log_2(x-2)} \geq 0 \Rightarrow \log_2(x-2) \leq 1 \Rightarrow x-2 \leq 2 \Rightarrow x \leq 4$
 $D_f = (2, 4]$

ب) $y = \log(2 \log_3 x - 1) = \log(2 \log_3 x - 1) > 0 \Rightarrow \log_3 x > \frac{1}{2} \Rightarrow x > \sqrt{3}$
 $D_f = (\sqrt{3}, +\infty)$

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

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

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

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

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

ب) $y = \left(\frac{3x-2}{2x-5}\right)! = \frac{3x-2}{2x-5} \in \mathbb{W} \Rightarrow 3x-2 = 2x-5 \Rightarrow x = -3$
 $D_f = \{x \mid x = \frac{k+5}{-2+2k}, k \in \mathbb{W}\}$