

الف) $\frac{\sin x - 2}{y \cos x + 1} \geq 0$ $y \cos x + 1 \neq 0$ $y \cos x \neq -1$ $\cos x \neq \frac{-1}{y}$ $x \neq \pi, 2\pi$

$\partial_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{y}, 2k\pi + \frac{3\pi}{y} \right\}$

ب) $\frac{\sin x + 3}{\cos x - 1} \geq 0$ $\cos x - 1 \neq 0$ $\cos x \neq 1 \rightarrow \{2k\pi\} \rightarrow \partial_f = \mathbb{R} - \{2k\pi\}$

الف) $\frac{y \sin x + 1}{\tan x + 1} \geq 0$ $\tan x + 1 \neq 0$ $\frac{\sin x}{\cos x} + 1 \neq 0$ $\frac{\sin x}{\cos x} \neq -1$

$\partial_f = \mathbb{R} - \left\{ k\pi \pm \frac{\pi}{y} \right\}$ $\cot x - 1 \neq 0$ $\cot x \neq 1 \rightarrow x \neq k\pi + \frac{\pi}{4}$

ب) $\frac{\cos x + 1}{\cot x - 1} \geq 0$ $\sin x \neq 0$ $x \neq k\pi$ $\partial_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{y}, k\pi \right\}$

الف) $\sin y = x^2 - 2$

$-1 \leq x^2 - 2 \leq 1$ $\rightarrow -1 \leq x^2 - 2 \leq 1$ $\rightarrow -1 \leq x^2 \leq 3$ $\rightarrow x \in [-\sqrt{3}, \sqrt{3}]$

$\partial_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $y = \arccos(\sqrt{x} - 3)$

$-1 \leq \sqrt{x} - 3 \leq 1$ $\rightarrow -1 \leq \sqrt{x} - 3 \leq 1$ $\rightarrow 2 \leq \sqrt{x} \leq 4$ $\rightarrow x \in [4, 16]$

ج) $\cos y = |x| - 3$ $-1 \leq |x| - 3 \leq 1$ $\rightarrow -1 \leq |x| - 3 \leq 1$ $\rightarrow 2 \leq |x| \leq 4$ $\rightarrow x \in [-4, -2] \cup [2, 4]$

د) $y = \arcsin(x^2 + 3x + 1)$

$-1 \leq x^2 + 3x + 1 \leq 1$ $\rightarrow x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0 \rightarrow (x+1)(x+2) \geq 0$

$x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0$

$\partial_f = [-2, -1] \cup [0, 1]$

$\log_3 x^2 - 4$ $\rightarrow \log_3 (x+2)(x-2)$ $\rightarrow \frac{(x+2)(x-2)}{3} > 0$ $x \neq \pm 2$

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

$\log_3 2 - |x|$ $\rightarrow 2 - |x| > 0$ $2 > |x|$ $-2 < x < 2$

$\partial_f = (-2, 2)$

