

الف) $y = \sqrt{x^2 - 9x} \rightarrow x(x-9) \geq 0 \rightarrow -\frac{1}{x} + \frac{1}{x-9} \geq 0$ $D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$ ب) $y = \sqrt{x^3 - x^2} \rightarrow x^2(x-1) \geq 0 \rightarrow \frac{-1}{x} + \frac{1}{x-1} \geq 0$ $D_f = (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, +\infty)$	۱
الف) $y = \frac{x+1}{\sqrt{x+ x }} \rightarrow x+ x > 0 \rightarrow x > 0 \rightarrow x = x \rightarrow x+x > 0 \rightarrow x > 0 \rightarrow (0, +\infty)$ $x < 0 \rightarrow x = -x \rightarrow x+(-x) > 0 \rightarrow 0 > 0 \times \rightarrow D_f = (0, +\infty)$ ب) $y = \frac{1}{\sqrt{x x }} \rightarrow x x > 0 \rightarrow x > 0 \rightarrow x = x \rightarrow x \cdot x > 0 \rightarrow (0, +\infty)$ $x < 0 \rightarrow x = -x \rightarrow x(-x) > 0 \rightarrow -x^2 > 0 \rightarrow x^2 < 0 \times$ $x = 0 \rightarrow \text{مخرج صفر شود} \rightarrow D_f = (0, +\infty)$	۲
الف) $y = \sqrt{1-x} \rightarrow 1-x \geq 0 \rightarrow x \leq 1 \rightarrow D_f = (-\infty, 1]$ ب) $y = \frac{1}{\sqrt{1-x}} \rightarrow 1-x > 0 \rightarrow x < 1 \rightarrow D_f = (-\infty, 1)$	۳
الف) $y = \sqrt{x - \frac{1}{x}} + [x + \frac{1}{x}] \rightarrow [x - \frac{1}{x}] + [x + \frac{1}{x}] \geq 0 \rightarrow [x - \frac{1}{x}] + ([x - \frac{1}{x}] + 1) \geq 0$ $2[x - \frac{1}{x}] + 1 \geq 0 \rightarrow 2[x - \frac{1}{x}] \geq -1 \rightarrow [x - \frac{1}{x}] \geq -\frac{1}{2}$ $x > \frac{1}{x} \rightarrow D_f = [\frac{1}{x}, +\infty)$ ب) $y = \sqrt{x - \frac{1}{x}} + [-x + \frac{1}{x}] \rightarrow \sqrt{[a] + [-a]} \rightarrow 0 \leftarrow a \in \mathbb{Z}'$ $x - \frac{1}{x} \in \mathbb{Z}' \rightarrow x \in \mathbb{Z}' + \frac{1}{x} \rightarrow D_f = \{n + \frac{1}{n} n \in \mathbb{Z}'\}$	۴
الف) $y = \frac{1}{\sin x - 1} \rightarrow \sin x - 1 \neq 0 \rightarrow \sin x \neq 1 \rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$ ب) $y = \frac{1}{1 - \sin^2 x} \rightarrow 1 - \sin^2 x \neq 0 \rightarrow \sin^2 x \neq 1 \rightarrow \sin x \neq \pm 1$ $D_f = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{2}\}$	۵

الف) $y = \sqrt{1 - \sin x} \rightarrow 1 - \sin x \geq 0 \rightarrow \sin x \leq 1$ $D_f = [2k\pi + \frac{\pi}{4}, 2k\pi + \frac{5\pi}{4}] (k \in \mathbb{Z})$ ب) $y = \sqrt{\cos x} \rightarrow \cos x \geq 0 \rightarrow \cos x \geq 0$ $\cos \rightarrow \cos = 1 \rightarrow D_f = \{2k\pi k \in \mathbb{Z}\}$	6
الف) $y = \cos y = x - 3 \rightarrow -1 \leq x - 3 \leq 1 \rightarrow -1 \leq x - 3 \rightarrow 2 \leq x$ $x - 3 \leq 1 \rightarrow x \leq 4 \rightarrow -4 \leq x \leq 4 \rightarrow D_f = [-4, -2] \cup [2, 4]$ ب) $y = \arcsin(x^2 + 3x + 1) \rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x + 2 \geq 0 \rightarrow (x+2)(x+1) \geq 0$ $x \in (-\infty, -2] \cup [-1, +\infty) / D_f = [-2, -1] \cup [0, 1]$	7
الف) $y = \sqrt{1 - \log_3(x+1)} \rightarrow x+1 \geq 0 \rightarrow x \geq -1 / 1 - \log_3(x+1) \geq 0 \rightarrow 1 \geq \log_3(x+1)$ $3^1 \geq x+1 \rightarrow 2 \geq x \rightarrow x \leq 2 \rightarrow D_f = (-1, 2]$ ب) $y = \log(x^3 - x) \rightarrow x^3 - x > 0 \rightarrow x(x^2 - 1) > 0 \rightarrow x(x-1)(x+1) > 0$ $D_f = (-1, 0) \cup (1, +\infty)$	8
الف) $y = \frac{3}{x+1}$ $\rightarrow D_f = \mathbb{R}$ ب) $y = \frac{3}{x-1} \rightarrow x-1 \neq 0 \rightarrow x \neq 1 \rightarrow D_f = \mathbb{R} - \{1\}$ ج) $y = \frac{3}{x^2-1} \rightarrow x^2-1 \neq 0 \rightarrow x^2 \neq 1 \rightarrow (x-1)(x+1) \neq 0 \rightarrow x \neq \pm 1 \rightarrow D_f = \mathbb{R} - \{\pm 1\}$ د) $y = \frac{3}{x-3} \rightarrow x-3 \neq 0 \rightarrow x \neq 3 \rightarrow \log_3 \rightarrow D_f = \mathbb{R} - \{\log_3 3\}$	9
الف) $y = (\frac{1}{x} + 1)!$ $\rightarrow \frac{1}{x} + 1 \in \mathbb{N} \rightarrow \frac{1}{x} \in \mathbb{N} - 1 \rightarrow x \in \frac{1}{\mathbb{N} - 1}$ $D_f = \{x x = \frac{1}{K-1}, K \in \mathbb{N}\}$ ب) $y = (\frac{x^2-2}{x^2-1})!$ $\rightarrow \frac{x^2-2}{x^2-1} \in \mathbb{N} \rightarrow x^2-2 = (x^2-1)w \rightarrow x^2-2 = x^2w - w \rightarrow x^2-2 = -w+2$ $x = \frac{-w+2}{x^2-2} \rightarrow D_f = \{x x = \frac{2-w}{2-w}, K \in \mathbb{N}\}$	10