

الف) $\begin{cases} 2-x \geq 0 \rightarrow x \leq 2 \\ 4-\sqrt{2-x} \geq 0 \rightarrow 4 \geq \sqrt{2-x} \rightarrow 16 \geq 2-x \rightarrow x \geq -14 \end{cases} \Rightarrow D_f = [-14, 2]$

ب) $\begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ 3-\sqrt{x-2} \geq 0 \rightarrow 3 \geq \sqrt{x-2} \rightarrow 9 \geq x-2 \rightarrow x \leq 11 \end{cases} \Rightarrow D_f = [2, 11]$

الف) $4-x^2 \geq 0 \rightarrow 4 \geq x^2 \rightarrow x^2 \leq 4 \rightarrow \sqrt{4} \geq \pm x \rightarrow -\sqrt{4} \leq x \leq \sqrt{4}$
 $\Rightarrow D_f = [-2, 2]$

ب) $3|x|-9 \geq 0 \rightarrow 3|x| \geq 9 \rightarrow |x| \geq 3 \Rightarrow \begin{cases} x \geq 3 \\ x \leq -3 \end{cases} \Rightarrow D_f = (-\infty, -3] \cup [3, +\infty)$

الف) $|x|-3 \neq 0 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3 \rightarrow D_f = \mathbb{R} - \{3, -3\}$

ب) $\begin{cases} x \geq 0 \\ \sqrt{x}-3 \neq 0 \rightarrow \sqrt{x} \neq 3 \rightarrow x \neq 9 \end{cases} \Rightarrow D_f = [0, +\infty) - \{9\}$

الف) $\begin{cases} |x|+2 \neq 0 \rightarrow |x| \neq -2 \\ 3-|x| \geq 0 \rightarrow 3 \geq |x| \rightarrow -3 \leq x \leq 3 \end{cases} \Rightarrow D_f = [-3, 3]$

ب) $\begin{cases} |x|-1 \neq 0 \rightarrow |x| \neq 1 \rightarrow x \neq \pm 1 \\ 4-x^2 \geq 0 \rightarrow 4 \geq x^2 \rightarrow -2 \leq x \leq 2 \end{cases} \Rightarrow D_f = [-2, 2] - \{\pm 1\}$

الف) $\begin{cases} x+|x| \geq 0 \rightarrow |x| \geq -x \\ \sqrt{x+|x|} \neq 0 \rightarrow x+|x| \neq 0 \rightarrow |x| \neq -x \end{cases} \Rightarrow |x| > -x \Rightarrow D_f = \mathbb{R}^+$

ب) $x|x| > 0 \rightarrow x > 0 \Rightarrow D_f = \mathbb{R}^+$

$$\text{الف)} x - [x] \geq 0 \rightarrow x \geq [x] \Rightarrow x < 1 \rightarrow D_f = (-\infty, 1)$$

$$\text{ب)} x - [x] > 0 \rightarrow x > [x] \rightarrow x < 1 \Rightarrow D_f = (-\infty, 1)$$

$$\text{الف)} x[x] \neq 0 \Rightarrow D_f = \mathbb{R} - [0, 1)$$

$$\text{ب)} \rightarrow D_f = \emptyset$$

$$\text{الف)} [x - \frac{1}{\sqrt{x}}] + [x + \frac{\sqrt{x}}{x}] \geq 0 \rightarrow [x + \frac{\sqrt{x}}{x}] - 1 + [x + \frac{\sqrt{x}}{x}] \geq 0 \rightarrow [x + \frac{\sqrt{x}}{x}] \geq 1$$

$$\rightarrow [x + \frac{\sqrt{x}}{x}] \geq \frac{1}{\sqrt{x}} \rightarrow x + \frac{\sqrt{x}}{x} \geq 1 \rightarrow x \geq \frac{1}{\sqrt{x}} \Rightarrow D_f = [\frac{1}{\sqrt{x}}, +\infty)$$

$$\text{ب)} [x - \frac{1}{\sqrt{x}}] + [-(x - \frac{1}{\sqrt{x}})] \geq 0 \rightarrow \begin{cases} a \in \mathbb{Z} \rightarrow [a] + [-a] = 0 \\ a \notin \mathbb{Z} \rightarrow [a] + [-a] = -1 \end{cases} \Rightarrow x - \frac{1}{\sqrt{x}} \in \mathbb{Z}$$

$$\rightarrow D_f = \{x \mid x = k + \frac{\sqrt{x}}{x}, k \in \mathbb{Z}\}$$

$$\text{الف)} x \sin^2 x - 1 \neq 0 \rightarrow x \sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{x} \rightarrow \sin x \neq \pm \sqrt{\frac{1}{x}}$$

$$\Rightarrow D_f = \{ \frac{k\pi}{\sqrt{x}} + \frac{\pi}{\sqrt{x}} \}$$

$$\text{ب)} \left. \begin{array}{l} \cot x \rightarrow x \neq k\pi + \frac{\pi}{2} \\ \tan x \rightarrow x \neq k\pi \\ \tan x \neq -1 \rightarrow x \neq k\pi - \frac{\pi}{4} \end{array} \right\} \Rightarrow D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{4}\}$$

$$\text{الف)} x \sin x - 1 \geq 0 \rightarrow x \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{x} \Rightarrow D_f = [k\pi + \frac{1}{x}, k\pi + \frac{5\pi}{2}]$$

$$\text{ب)} 1 - x \cos x \geq 0 \rightarrow x \cos x \leq 1 \rightarrow \cos x \leq \frac{1}{x} \Rightarrow D_f = [k\pi + \frac{\pi}{x}, k\pi - \frac{\pi}{x}]$$