

الف) $y = \sqrt{4 - \sqrt{2-x}}$ $\left. \begin{array}{l} 4-x \geq 0 \rightarrow x \leq 4 \\ 4-\sqrt{2-x} \geq 0 \rightarrow 4 \geq \sqrt{2-x} \rightarrow 4 \geq 2-x \rightarrow x \geq -2 \end{array} \right\} \Rightarrow D = [-2, 4]$

ب) $y = \sqrt{3 - \sqrt{x-2}}$ $\left. \begin{array}{l} x-2 \geq 0 \rightarrow x \geq 2 \\ 3-\sqrt{x-2} \geq 0 \rightarrow x-2 \leq 3 \rightarrow x \leq 5 \end{array} \right\} \Rightarrow D = [2, 5]$

الف) $y = \sqrt{4 - 2x^2}$ $\rightarrow \frac{2(2-x^2)}{\pm \sqrt{2}} \geq 0 \rightarrow 2-x^2 \geq 0 \rightarrow 2 \geq x^2 \rightarrow \sqrt{2} \geq x \rightarrow D = (-\infty, \sqrt{2}]$

ب) $y = \sqrt{3|x|-9}$ $\rightarrow 3|x|-9 \geq 0 \rightarrow \frac{3|x|}{3} \geq \frac{9}{3} \rightarrow |x| \geq 3 \rightarrow D = (-\infty, -3] \cup [3, +\infty)$
 $\downarrow$
 $x \geq 3$
 $x \leq -3$

الف) $y = \frac{\sqrt{|x|+1}}{|x|-3}$ $\rightarrow |x| \neq 3 \rightarrow x \neq \pm 3 \rightarrow D = \mathbb{R} - \{\pm 3\}$

ب) $y = \frac{\sqrt{x+1}}{\sqrt{x}-3}$ $\left. \begin{array}{l} x \geq 0 \\ \sqrt{x} \neq 3 \rightarrow x \neq 9 \end{array} \right\} \rightarrow D = [0, +\infty) - \{9\}$

الف) $y = \frac{\sqrt{3-2x}}{|x|+2}$ $\left. \begin{array}{l} 3-2x \geq 0 \rightarrow 3 \geq 2x \rightarrow -3 \leq x \leq 3 \\ |x|+2 \neq 0 \rightarrow |x| \neq -2 \end{array} \right\} \Rightarrow D = [-3, 3]$

ب) $y = \frac{\sqrt{4-x^2}}{|x|-1}$ $\left. \begin{array}{l} 4-x^2 \geq 0 \rightarrow 4 \geq x^2 \rightarrow 2 \geq |x| \\ |x|-1 \neq 0 \rightarrow |x| \neq 1 \end{array} \right\} \Rightarrow D = (-\infty, -1) \cup [1, 2]$

الف) $y = \frac{x+1}{\sqrt{x+|x|}}$ $\rightarrow -x+|x| > 0 \rightarrow D = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x|x|}}$ $\rightarrow x|x| > 0 \rightarrow D = \mathbb{R}^+$

$$\text{الف)} y = \sqrt{1-x} \rightarrow 1-x \geq 0 \rightarrow 1 \geq x \rightarrow x < \infty \rightarrow D = (-\infty, 1)$$

$$\text{ب)} y = \frac{1}{\sqrt{1-x}} \rightarrow 1-x > 0 \rightarrow 1 > x \rightarrow 1 > x \rightarrow D = (-\infty, 1)$$

$$\text{الف)} y = \frac{1}{x[x]} \rightarrow x[x] \neq 0 \rightarrow D = \mathbb{R} - \{0\}$$

$$\text{ب)} y = \frac{1}{\sqrt{-x[x]}} \rightarrow -x[x] > 0 \rightarrow D = \emptyset$$

$\oplus x$
 $\oplus x$
 $\ominus x$

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

$$D = \left[\frac{1}{2}, +\infty\right) \leftarrow \left[x + \frac{1}{x} - 1 + x + \frac{1}{x}\right] \geq 0 \rightarrow 2\left[x + \frac{1}{x}\right] \geq 1 \rightarrow \left[x + \frac{1}{x}\right] \geq \frac{1}{2} \rightarrow x + \frac{1}{x} \geq 1 \rightarrow x \geq \frac{1}{2}$$

$$\text{ب)} \sqrt{\left[x - \frac{1}{x}\right] + \left[-x + \frac{1}{x}\right]} \rightarrow \begin{cases} a \in \mathbb{Z} & [a] + [-a] = 0 \\ a \notin \mathbb{Z} & [a] + [-a] = -1 \end{cases} \rightarrow x - \frac{1}{x} \in \mathbb{Z} \rightarrow x \in \mathbb{Z} + \frac{1}{x}!$$

$$D = \left\{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\right\}$$

$$\text{الف)} y = \frac{1}{1 - \sin^2 x} \rightarrow 1 - \sin^2 x \neq 0 \rightarrow \sin^2 x \neq 1 \rightarrow \sin x \neq \pm 1 \rightarrow D = \mathbb{R} - \left\{\frac{k\pi}{2} + \frac{\pi}{2}, \frac{k\pi}{2} - \frac{\pi}{2}\right\}$$


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


$$\text{الف)} y = \sqrt{1 - \sin^2 x} \rightarrow 1 - \sin^2 x \geq 0 \rightarrow 1 - \sin^2 x \geq 0 \rightarrow \sin^2 x \leq 1 \rightarrow D = \left[k\pi + \frac{\pi}{2}, k\pi + \frac{3\pi}{2}\right]$$


$$\text{ب)} y = \sqrt{1 - \cos^2 x} \rightarrow 1 - \cos^2 x \geq 0 \rightarrow 1 - \cos^2 x \geq 0 \rightarrow \cos^2 x \leq 1 \rightarrow D = \left[k\pi + \frac{\pi}{2}, k\pi + \frac{3\pi}{2}\right]$$
