

الف) $y = \sqrt{4-x} \rightarrow 4-x \geq 0 \rightarrow x \leq 4$
 $\sqrt{4-x} \geq 0 \rightarrow \sqrt{4-x} \leq 4 \rightarrow 4-x \leq 16 \rightarrow -x \leq 12 \rightarrow x \geq -12$
 $D_f = [-12, 4]$

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

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

ب) $y = \sqrt{x^2-9} \rightarrow x^2-9 \geq 0 \rightarrow x^2 \geq 9 \rightarrow |x| \geq 3 \rightarrow x \geq 3$
 $x \leq -3$
 $D_f = (-\infty, -3] \cup [3, +\infty)$

الف) $y = \frac{\sqrt[3]{|x+1|}}{\sqrt{|x-3|}} \rightarrow |x|-3 \neq 0 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3$
 $D_f = \mathbb{R} - \{\pm 3\}$

ب) $y = \frac{\sqrt{x+1}}{\sqrt{x-3}} \rightarrow \begin{cases} x \geq 0 \\ \sqrt{x} \neq 3 \rightarrow x \neq 9 \end{cases}$

$D_f = [0, +\infty) - \{9\}$

الف) $y = \frac{\sqrt{3-|x|}}{|x|+1} \rightarrow \begin{cases} 3-|x| \geq 0 \rightarrow |x| \leq 3 \rightarrow -3 \leq x \leq 3 \\ |x|+1 \neq 0 \rightarrow |x| \neq -1 \end{cases}$
 $D_f = [-3, 3]$

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

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

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

الف) $y = \sqrt{2-x} \rightarrow 2-x \geq 0 \rightarrow [x] \leq 2 \rightarrow x \leq 2 \rightarrow D_f = (-\infty, 2]$
 $(-\infty, 2]$ ✓ (۲)

ب) $y = \frac{1}{\sqrt{2-x}} \rightarrow 2-x > 0 \rightarrow [x] < 2 \rightarrow x < 2 \rightarrow D_f = (-\infty, 2)$
 $(-\infty, 2)$ ✓

الف) $y = \frac{1}{x[x]}$ → چون x و $[x]$ همواره هم علامت اند و هر دو در صورتی که صفر باشند تعریف نشده است. $D_f = \mathbb{R} - \{0\}$
 $D_f = \mathbb{R} - \{0\}$ ✓ (۱)

ب) $y = \frac{1}{\sqrt{x[x]}}$ → $-x[x] > 0 \rightarrow [x] > x$ → $D_f = \emptyset$
 برای همیشه عدد را روی پایین گردی کمتر از نتیجه پس چون بیشتر از منفی داریم عدد را از صفر بزرگتر می شود. $D_f = \emptyset$ ✓ (۱۰۰)

الف) $y = \sqrt{[x - \frac{1}{x}] + [x + \frac{1}{x}]} \rightarrow [x - \frac{1}{x}] + [x + \frac{1}{x}] \geq 0 \rightarrow [x + \frac{1}{x} - 1] + [x + \frac{1}{x}] \geq 0$
 $\rightarrow [x + \frac{1}{x}] - 1 + [x + \frac{1}{x}] \geq 0 \rightarrow 2[x + \frac{1}{x}] \geq 1 \rightarrow [x + \frac{1}{x}] \geq \frac{1}{2} \rightarrow x + \frac{1}{x} \geq 1$
 $\rightarrow x \geq \frac{1}{x} \rightarrow D_f = [\frac{1}{x}, +\infty)$
 ب) $y = \sqrt{[x - \frac{1}{x}] + [-x + \frac{1}{x}]} \rightarrow \sqrt{[x - \frac{1}{x}] + [-x + \frac{1}{x}]} \rightarrow \begin{cases} a \in \mathbb{Z} [a] + [-a] \geq 0 \\ a \notin \mathbb{Z} [a] + [-a] = -1 \end{cases} \rightarrow x - \frac{1}{x} \in \mathbb{Z}$
 $D_f = \{x \mid x = k + \frac{1}{k}, k \in \mathbb{Z}\}$ ✓ (۲)

الف) $y = \frac{1}{\sqrt{2\sin^2 x - 1}} \rightarrow 2\sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{2} \rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}}$
 $D_f = \mathbb{R} - \{\frac{k\pi}{4} + \frac{\pi}{4}\}$ ✓ (۱)

ب) $y = \frac{\cot x + 1}{\tan x + 1} \rightarrow \begin{cases} \cot x \neq 1 \rightarrow \cot x \neq k\pi + \frac{\pi}{4} \\ \tan x \neq -1 \rightarrow \tan x \neq k\pi + \frac{3\pi}{4} \end{cases} D_f = \mathbb{R} - \{k\pi + \frac{\pi}{4}\}$
 $\tan x \neq -1 \quad \tan x \neq 0 \quad \cot x \neq 0$ $D_f = \mathbb{R} - \{\frac{k\pi}{4}, k\pi - \frac{\pi}{4}\}$ ✓

الف) $y = \sqrt{2\sin x - 1} \rightarrow 2\sin x - 1 \geq 0 \rightarrow 2\sin x \geq 1 \rightarrow \sin x \geq \frac{1}{2}$
 $2k\pi + \frac{\pi}{6} \leq x \leq 2k\pi + \frac{5\pi}{6} \rightarrow D_f = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$ ✓

ب) $y = \sqrt{1 - 2\cos x} \rightarrow 1 - 2\cos x \geq 0 \rightarrow 2\cos x \leq 1 \rightarrow \cos x \leq \frac{1}{2}$
 $D_f = [2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3}]$ ✓ (۲)

