

الف) $\sqrt{\cos x + 1} \neq 0 \rightarrow \cos x \neq -\frac{1}{\sqrt{2}}$

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

1

ب) $\cos x - 1 \neq 0 \rightarrow \cos x \neq 1$ ✓

$D_f = \mathbb{R} - \{ \sqrt{2}k\pi \}$

الف) $\tan x \neq -1$

$\tan x \neq \frac{\sqrt{2}\pi}{\sqrt{2}} \text{ و } \frac{\sqrt{2}\pi}{\sqrt{2}} \text{ و } \cos x \neq 0 \rightarrow \cos x \neq 90^\circ \text{ و } 270^\circ$
 $135^\circ \quad 315^\circ$

✓

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

۲

ب) $\cot x \neq 1$

$\cot x \neq 45^\circ \text{ و } 225^\circ$ و $\sin x \neq 0 \rightarrow \sin x \neq 0^\circ, 180^\circ, 360^\circ$

$D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{4}, \sqrt{2}k\pi, \sqrt{2}k\pi + \pi \right\}$

الف) $\sin y \in [-1, 1]$

$-1 \leq x^2 - 2 \leq 1 \rightarrow 1 \leq x^2 \leq 3$

$x \in [\sqrt{3}, -1] \cup [1, \sqrt{3}]$

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

۳

ب) $-1 \leq \sqrt{x} - 3 \leq 1 \rightarrow 2 \leq \sqrt{x} \leq 4 \rightarrow 4 \leq x \leq 16$

$D_f = [4, 16]$

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

$D_f = [2, 4] \cup [-4, -2]$

۴

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

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

① $x \in [-1, \infty) \cup (-\infty, -2]$

② $x \in [-3, 0]$

① $\cap$ ② $\rightarrow D_f = [-3, -2] \cup [-1, 0]$

الف) $\log_{\sqrt{x-2}} \rightarrow 0 < x^2 - 4 \rightarrow 4 < x^2$ $x > 2$ $D_f = (-\infty, -2) \cup (2, \infty)$
 $x < -2$

۵

ب) $\log_{\sqrt{2-x}} \rightarrow 0 < 2 - |x| \rightarrow |x| > 2 \rightarrow D_f = (-2, 2)$

الف) $\begin{cases} \omega - x > 0 & \omega > x \\ x - 3 > 0 & x > 3 \\ x - 3 \neq 1 & x \neq 4 \end{cases} \quad D_f = (3, \omega) - \{4\}$

۶

ب) $\begin{cases} x^2 - 1 > 0 & x^2 > 1 \rightarrow x > 1 \text{ و } x < -1 \\ x + 3 > 0 & x > -3 \\ x + 3 \neq 1 & x \neq -2 \end{cases} \quad D_f = (-3, -1) \cup (1, \infty) - \{-2\}$

الف) $\frac{x^2 - 4x + 3}{x - 3} > 0 \rightarrow \frac{(x-1)(x-3)}{x-3} > 0$

$\frac{-1}{-1} + \frac{3}{3} +$

$D_f = (1, 3) \cup (3, \infty)$

۷

ب)
$$\begin{cases} \frac{x+3}{x-2} > 0 \rightarrow \frac{-3}{+} \mid \frac{2}{-} \mid + & x > 2 \\ x+5 > 0 \rightarrow x > -5 \\ x+5 \neq 1 \rightarrow x \neq -4 \end{cases} \quad D_f = (-5, -4) \cup (-4, -2) \cup (2, \infty)$$

الف)
$$x > 2 \leftarrow x-2 > 0 \leftarrow \text{دائري تقاربية ①}$$

$$0 \leq 3 - \log_2(x-2) \rightarrow -3 \leq -\log_2(x-2) \rightarrow 3 \geq \log_2(x-2) \leftarrow \text{رادكالي ②} \rightarrow 8 \geq x-2 \rightarrow x \leq 10$$

 $D_f = (2, 10]$

ب)
$$2 \log_3 x - 1 > 0 \rightarrow 2 \log_3 x > 1 \rightarrow \log_3 x > \frac{1}{2} \rightarrow x > \sqrt{3} \quad D_f = (\sqrt{3}, \infty)$$

الف)
$$x^x + 1 \neq 0 \rightarrow x^x \neq -1 \checkmark \rightarrow D_f = \mathbb{R}$$

ب)
$$x^x - 1 \neq 0 \rightarrow x^x \neq 1 \rightarrow D_f = \mathbb{R} - \{0\}$$

ج)
$$x^x - 2 \neq 0 \rightarrow x^x \neq 2 \rightarrow D_f = \mathbb{R} - \{\log_2 2\}$$

د)
$$x^x - 3 \neq 0 \rightarrow x^x \neq 3 \rightarrow D_f = \mathbb{R} - \{\log_3 3\}$$

الف)
$$Kx+1 \in W \rightarrow Kx \in W-1 \rightarrow x \in \frac{W-1}{K} \rightarrow D_f = \left\{ x \mid x = \frac{K-1}{K}, K \in W \right\}$$

ب)
$$\frac{Kx-1}{Kx-5} \in W \rightarrow Kx-1 \in Kwx-5W \rightarrow Kx-1 \in Kwx-5W \rightarrow x = \frac{K-5W}{K-1W}$$

$$D_f = \left\{ x \mid x = \frac{K-5K}{K-1K}, K \in W \right\}$$