

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

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

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

$D_f = \mathbb{R} - \{ \sqrt{2}x \}$

الف)  $\tan x \neq -1$

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

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

ب)  $\cot x \neq 1$

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

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

الف)  $\sin y \in [-1, 1]$

$-1 \leq x^2 - 2 \leq 1 \rightarrow 1 \leq x^2 \leq 3 \quad x \in [\sqrt{3}, -1] \cup [1, \sqrt{3}]$

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

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

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

ب)  $-1 \leq x^2 + 3x + 1 \leq 1 \rightarrow \begin{cases} -1 \leq x^2 + 3x + 1 \rightarrow 0 \leq x^2 + 3x + 2 \rightarrow 0 \leq (x+2)(x+1) \\ x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0 \end{cases}$

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)  $\log_{\sqrt{x-2}} \rightarrow 0 < x^2 - 2 \rightarrow 2 < x^2 \quad \begin{matrix} x > 2 \\ x < -2 \end{matrix} \quad D_f = (-\infty, -2) \cup (2, \infty)$

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

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

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)  $\frac{x^2 - 4x + 3}{x - 3} > 0 \rightarrow \frac{(x-1)(x-3)}{x-3} > 0 \quad \begin{matrix} - & | & + & | & + \\ & 1 & & 3 & \end{matrix}$

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

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

الف) 
$$\begin{aligned} x > 2 &\leftarrow x-2 > 0 \leftarrow \text{دائري تقاربية ①} \\ 0 < 3 - \log_2(x-2) &\rightarrow -3 < -\log_2(x-2) \rightarrow 3 > \log_2(x-2) \leftarrow \text{رادكبال ②} \end{aligned}$$

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$\wedge \geq x-2 \rightarrow x \leq 10$

$D_f = (2, 10]$

ب) 
$$2 \log_2 x - 1 > 0 \rightarrow 2 \log_2 x > 1 \rightarrow \log_2 x > \frac{1}{2} \rightarrow x > \sqrt{2} \quad D_f = (\sqrt{2}, \infty)$$

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

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

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