

$$۱) \cos x \neq 0 \Rightarrow \cos x \neq \frac{1}{2} \Rightarrow D_f = R - \left\{ 2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3} \right\}$$

$$۲) \cos x \neq 1 \Rightarrow \cos x \neq 1 \Rightarrow$$

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

$$۳) \begin{cases} \tan x \neq 0 \Rightarrow \tan x \neq -1 \Rightarrow x \neq k\pi - \frac{\pi}{4} \\ \cos x \neq 0 \Rightarrow x \neq k\pi + \frac{\pi}{2} \end{cases} \Rightarrow D_f = R - \left\{ k\pi + \frac{\pi}{4}, k\pi - \frac{\pi}{4} \right\}$$

$$۴) \begin{cases} \cot x \neq 1 \Rightarrow \cot x \neq 1 \Rightarrow x \neq k\pi + \frac{\pi}{4} \\ \sin x \neq 0 \Rightarrow x \neq k\pi \end{cases} \Rightarrow$$

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

$$۵) -1 < x^2 - 2 < 1 \Rightarrow \begin{cases} x^2 - 2 > -1 \Rightarrow x^2 > 1 \Rightarrow x < -1 \text{ or } x > 1 \\ x^2 - 2 < 1 \Rightarrow x^2 < 3 \Rightarrow -\sqrt{3} < x < \sqrt{3} \end{cases} \Rightarrow$$

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

$$۶) \begin{cases} x > 0 \\ -1 < \sqrt{x} - 2 < 1 \Rightarrow 2 < \sqrt{x} < 3 \Rightarrow 4 < x < 9 \end{cases} \Rightarrow D_f = (4, 9)$$

$$۷) -1 < |x - 2| < 3 \Rightarrow \begin{cases} |x - 2| < 3 \Rightarrow -1 < x - 2 < 1 \Rightarrow 1 < x < 3 \\ |x - 2| < 3 \Rightarrow -3 < x - 2 < 3 \Rightarrow -1 < x < 5 \end{cases} \Rightarrow$$

$$D_f = [1, 3) \cup (1, 5)$$

$$۸) -1 < x^2 + 2x + 1 < 1 \Rightarrow \begin{cases} x^2 + 2x + 1 > -1 \Rightarrow x^2 + 2x + 2 > 0 \Rightarrow (x+1)(x+2) > 0 \Rightarrow x < -2 \text{ or } x > -1 \\ x^2 + 2x + 1 < 1 \Rightarrow x^2 + 2x < 0 \Rightarrow x(x+2) < 0 \Rightarrow -2 < x < 0 \end{cases} \Rightarrow$$

$$D_f = [-2, -1) \cup (-1, 0]$$

$$۹) x^2 - 4 > 0 \Rightarrow (x-2)(x+2) > 0 \Rightarrow \begin{cases} x > 2 \\ x < -2 \end{cases} \Rightarrow D_f = (-\infty, -2) \cup (2, +\infty)$$

$$۱۰) 2 - |x| > 0 \Rightarrow |x| < 2 \Rightarrow -2 < x < 2 \Rightarrow D_f = (-2, 2)$$

$$\text{الف) } \left. \begin{aligned} (x-2) &= 0 \Rightarrow x=2 \\ (x-2) &= 0 \Rightarrow x=2 \\ (x-2) &= 0 \Rightarrow x=2 \end{aligned} \right\} \Rightarrow D_f = (2, \infty) - [2]$$

$$\text{ب) } \left. \begin{aligned} (x+2) &= 0 \Rightarrow x=-2 \\ (x+2) &= 0 \Rightarrow x=-2 \\ (x-1) &= 0 \Rightarrow x=1 \end{aligned} \right\} \Rightarrow D_f = (-\infty, -1) \cup (1, +\infty) - [2]$$

$$\text{الف) } \left. \begin{aligned} (x-2) &= 0 \Rightarrow x=2 \\ \frac{x^2-4x+3}{x-2} &= 0 \Rightarrow \frac{(x-1)(x-3)}{x-2} = 0 \Rightarrow (x-1) = 0 \Rightarrow x=1 \end{aligned} \right\} \Rightarrow D_f = (1, +\infty) - [2]$$

$$\text{ب) } \left. \begin{aligned} (x+2) &= 0 \Rightarrow x=-2 \\ (x-2) &= 0 \Rightarrow x=2 \\ (x-1) &= 0 \Rightarrow x=1 \end{aligned} \right\} \Rightarrow D_f = (-\infty, -1) \cup (-1, 1) \cup (1, +\infty)$$

$$\text{الف) } \left. \begin{aligned} (x-2) &= 0 \Rightarrow x=2 \\ (x-1) &= 0 \Rightarrow x=1 \end{aligned} \right\} \Rightarrow D_f = (2, 1] = \emptyset$$

$$\text{ب) } \left. \begin{aligned} (x) &= 0 \Rightarrow x=0 \\ (x-1) &= 0 \Rightarrow x=1 \end{aligned} \right\} \Rightarrow D_f = (1, +\infty)$$

$$\text{الف) } (x+1) \neq 0 \Rightarrow x \neq -1 \Rightarrow D_f = \mathbb{R}$$

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

$$\text{ج) } (x-2) \neq 0 \Rightarrow x \neq 2 \Rightarrow x = \log_2^x \Rightarrow D_f = \mathbb{R} - [\log_2^2] \Rightarrow D_f = \mathbb{R} - [\frac{1}{2}]$$

$$\text{د) } (x-3) \neq 0 \Rightarrow x \neq 3 \Rightarrow x = \log_3^x \Rightarrow D_f = \mathbb{R} - [\log_3^3] \Rightarrow D_f = \mathbb{R} - [1]$$

$$\text{الف) } (x+1) \in W \Rightarrow x \in \frac{W-1}{x} \Rightarrow D_f = \left\{ x/x = \frac{k-1}{x}, k \in W \right\}$$

$$\text{ب) } \frac{x^2-1}{x-1} \in W \Rightarrow x^2-1 \in W(x-1) \Rightarrow x^2-1 = (x-1)W \Rightarrow x = \frac{x-1W}{x-1} \Rightarrow D_f = \left\{ x/x = \frac{x-1W}{x-1}, k \in W \right\}$$