

$$2\cos x + 1 \neq 0 \Rightarrow \cos x \neq -\frac{1}{2} \rightarrow D_{(f)} = \mathbb{R} - \left\{ k\pi + \frac{2\pi}{3}, k\pi + \frac{4\pi}{3} \right\} \quad (\text{الف})$$

$$\cos x - 1 \neq 0 \Rightarrow \cos x \neq 1 \rightarrow D_{(f)} = \mathbb{R} - \{ k\pi \} \quad (\text{ب})$$

$$\begin{cases} \tan x + 1 \neq 0 \Rightarrow \tan x \neq -1 \rightarrow D_{(f)} = \mathbb{R} - \left\{ \frac{3\pi}{4} + k\pi \right\} \\ \tan x \xrightarrow{\text{تعریف سه}} D_{(f)} = \mathbb{R} - \left\{ \frac{\pi}{4} + k\pi \right\} \end{cases} \rightarrow D_{(f)} = \mathbb{R} - \left\{ \frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi \right\} \quad (\text{الف})$$

$$\begin{cases} \cot x - 1 \neq 0 \Rightarrow \cot x \neq 1 \rightarrow \mathbb{R} - \left\{ \frac{\pi}{4} + k\pi \right\} \\ \cot x \xrightarrow{\text{تعریف سه}} \mathbb{R} - \{ k\pi \} \end{cases} \rightarrow D_{(f)} = \mathbb{R} - \left\{ k\pi, \frac{\pi}{4} + k\pi \right\} \quad (\text{ب})$$

$$\begin{aligned} -1 \leq x^2 - 2 \leq 1 &\rightarrow -1 \leq x^2 \leq 3 \rightarrow \begin{cases} -1 \leq x \leq \sqrt{3} \\ -1 \leq x \leq -\sqrt{3} \end{cases} \rightarrow D_{(f)} = [-\sqrt{3}, -1] \cup [1, \sqrt{3}] \quad (\text{الف}) \\ x \geq 0 \quad (1) & \\ -1 \leq \sqrt{x} - 2 \leq 1 &\rightarrow 1 \leq \sqrt{x} \leq 3 \rightarrow 4 \leq x \leq 16 \quad (2) \end{aligned}$$

(ب) ① A ② ②

$$D_{(f)} = [4, 16]$$

$$-1 \leq |x| - 3 \leq 1 \Rightarrow 2 \leq |x| \leq 4 \rightarrow \underbrace{-2 \geq x \geq -4 \text{ و } 2 \leq x \leq 4}_{(\text{الف})}$$

$$\begin{aligned} -1 \leq x^2 + 3x + 1 \leq 1 &\rightarrow (x+1)(x+2) \geq 0 \rightarrow \frac{-2}{+} \frac{-1}{-} \rightarrow (-\infty, -2] \cup [-1, +\infty) \quad (1) \\ x(x+3) < 0 &\rightarrow \frac{-3}{+} \frac{0}{-} \rightarrow (-3, 0) \cup [0, +\infty) \quad (2) \end{aligned}$$

(ب) ① A ② ②

$$D_{(f)} = (-\infty, -2] \cup [-1, 0) \cup [0, +\infty)$$

$$x^2 - 4 > 0 \Rightarrow x^2 > 4 \rightarrow x > 2 \text{ و } x < -2 \quad (\text{الف})$$

$$D_{(f)} = \mathbb{R} - [-2, 2]$$

$$2 - |x| > 0 \rightarrow |x| < 2 \rightarrow -2 < x < 2 \rightarrow D_{(f)} = (-2, 2) \quad (\text{ب})$$