

(ب) $\cos x - 1 \neq 0$ $\cos x \neq 1$ $x \neq 2k\pi, 0$ $D_f = \mathbb{R} - \{2k\pi\}$ ✓	(الف) $\sqrt{2}\cos x + 1 \neq 0$ $\sqrt{2}\cos x \neq -1$ $\cos x \neq -\frac{1}{\sqrt{2}}$ $x = 11\pi/4, 13\pi/4$ $D_f = \mathbb{R} - \{2k\pi\}$ $D_f = \mathbb{R} - \{2k\pi + \frac{3\pi}{4}, 2k\pi + \frac{5\pi}{4}\}$ ✓
(ب) $\frac{\cos x}{\sin x} - 1 \neq 0$ $\frac{\cos x}{\sin x} \neq 1 \rightarrow \sin x \neq 0 \quad x \neq \{k\pi + \frac{\pi}{2}\}$ $x \neq \pi/2, 3\pi/2$ $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}\}$ ✓	(الف) $\frac{\sin x}{\cos x} + 1 \neq 0 \rightarrow \frac{\sin x}{\cos x} \neq -1$ $\tan x \neq -1$ $x \neq 3\pi/4, 5\pi/4$ $D_f = \mathbb{R} - \{2k\pi + \frac{3\pi}{4}, 2k\pi + \frac{5\pi}{4}\}$ ✓ $x \neq \{k\pi\}$
(ب) $x \geq 0$ $-1 \leq \sqrt{x} - 3 \leq 1 \Rightarrow 2 \leq \sqrt{x} \leq 4 \Rightarrow 4 \leq x \leq 16$ $D_f = [4, 16]$ ✓	(الف) $-1 \leq x^2 - 2 \leq 1$ $1 \leq x^2 \leq 3 \Rightarrow 1 \leq x \leq \sqrt{3}$ $D_f = [1, \sqrt{3}]$ $x^2 \leq 3 \Rightarrow -\sqrt{3} \leq x \leq \sqrt{3}$ $D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$
(ب) $-1 \leq x^2 + 3x + 1 \leq 1$ $-2 \leq x^2 + 3x \leq 0 \Rightarrow -2 \leq x(x+3) \leq 0$ $\frac{-2}{+} \frac{0}{-} \frac{0}{+} \frac{-2}{-}$ $D_f = (-\infty, -3] \cup [0, +\infty)$ $D_f = [-3, -2] \cup [0, 1]$	(الف) $-1 \leq x - 3 \leq 1$ $2 \leq x \leq 4$ $\begin{cases} 2 \leq x \leq 4 \\ -4 \leq x \leq -2 \end{cases}$ $D_f = [2, 4] \cup [-4, -2]$ ✓
(ب) $x < 2 \quad -2 < x < 2$ $D_f = [-2, 2]$ ✓	(الف) $x^2 - 2 > 0 \quad x^2 > 2 \quad x > \sqrt{2} \quad x < -\sqrt{2}$ $D_f = (-\infty, -\sqrt{2}) \cup (\sqrt{2}, +\infty)$ ✓

$x^2 - 1 > 0 \Rightarrow x^2 > 1 \Rightarrow -1 < x < 1$ (ب) <u>1.5</u> $x + 3 > 0 \Rightarrow x > -3$ $x + 3 \neq 0 \Rightarrow x \neq -3 \quad x + 3 \neq 1 \Rightarrow x \neq -2$ $D_f = -1 < x < 1 \Rightarrow]-1, 1[$ $D_f = (-3, -1) \cup (1, +\infty) - \{-2\}$	$\Delta - x > 0 \Rightarrow \Delta > x$ $x - 3 > 0 \Rightarrow x > 3$ $x + 3 \neq 0 \Rightarrow x \neq -3$ $\omega - x \neq 0 \Rightarrow x \neq \omega$ $D_f = (3, \Delta) - \{3\}$ (الف) <u>1.5</u>	1.5
$\frac{x+3}{x-2} > 0$ (ب) <u>1.5</u> $x + \omega > 0 \Rightarrow x > -\omega$ $x + \omega \neq 1 \Rightarrow x \neq -\omega - 1$ $D_f = (-\omega, -\omega - 1) \cup (\omega + \infty) - \{-\omega - 1\}$	$\frac{(x-1)(x-3)}{x-2} > 0$ (الف) <u>1</u> $D_f = (1, +\infty) - \{3\}$ <u>1.5</u>	1.5
$x > 0$ (ب) $\forall \log_r^x - 1 > 0 \Rightarrow \log_r^x > \frac{1}{r}$ $x > r \Rightarrow D_f = (r^{\frac{1}{r}}, +\infty)$ <u>1.5</u>	$x - 2 > 0 \Rightarrow x > 2$ (الف) $r - \log_r^{x-2} \geq 0 \Rightarrow r \geq \log_r^{x-2} \Rightarrow x - 2 \leq 1 \Rightarrow x \leq 3$ $D_f = (2, 3]$	3
$\varepsilon^x - 1 \neq 0 \Rightarrow \varepsilon^x \neq 1 \Rightarrow x \neq 0 \Rightarrow D_f = (-\infty, +\infty) - \{0\}$ (ب) <u>1.5</u>	$\varepsilon^x + 1 \neq 0 \Rightarrow \varepsilon^x \neq -1 \Rightarrow D_f = \mathbb{R} = (-\infty, +\infty)$ (الف) <u>1.5</u>	1.5
$\varepsilon^x - 2 \neq 0 \Rightarrow \varepsilon^x \neq 2$ (ب) $x = 2 \Rightarrow x = \log_\varepsilon 2$ $D_f = \mathbb{R} - \{\log_\varepsilon 2\}$	$\varepsilon^x - 2 \neq 0 \Rightarrow \varepsilon^x \neq 2 \Rightarrow x \neq \frac{1}{r}$ (ج) <u>1.5</u> $D_f = (-\infty, +\infty) - \{\frac{1}{r}\}$	1.5
$\frac{3x-2}{x-\Delta} \in \omega \Rightarrow \begin{cases} 3x-2 \in \omega(x-\Delta) \\ 3x-2 \in \omega(x-\Delta) \end{cases}$ (ب) $x(3-2\omega) \in \omega(x-\Delta) \Rightarrow x \in \frac{\omega(x-\Delta)}{3-2\omega}$ $D_f = \{x \mid x = \frac{\omega(x-\Delta)}{3-2\omega}, k \in \omega\}$	$\varepsilon^{x+1} \in \omega \Rightarrow x \in \frac{\omega-1}{\varepsilon}$ (الف) $D_f = \{x \mid x = \frac{k-1}{\varepsilon}, k \in \omega\}$	1.5