

$\frac{a(a-4)}{a(a-1)(a+1)} = \frac{a-4}{(a-1)(a+1)} \rightarrow D = (-1, 0) \cup (0, 1) \cup [4, \infty)$	۱
$\begin{aligned} & \rightarrow a \neq -1, 0, 1 \\ & a^2 \geq 0 \end{aligned} \quad \left\{ \mathbb{R} : \{-1, 0, 1\} \right.$	۲
$\begin{aligned} & a + a > 0 \rightarrow 2a > 0 \\ & a = a \rightarrow a \geq 0 \\ & a < 0 \rightarrow a = -a < 0 \\ & D = (0, \infty) \end{aligned} \quad \left(\text{الف} \right) \quad \left\{ \begin{aligned} & a a > 0 \\ & a > 0 \rightarrow a^2 > 0 \checkmark \\ & a < 0 \rightarrow -a^2 < 0 \times \\ & D = (0, \infty) \end{aligned} \right. \quad \left(\text{ب} \right)$	۳
$\begin{aligned} & 2 - [a] > 0 \rightarrow [a] < 2 \quad \left(\text{الف} \right) \quad \left\{ \begin{aligned} & 2 - [a] \geq 0 \rightarrow [a] \leq 2 \\ & \hookrightarrow a < 3 \\ & D = (-\infty, 3) \end{aligned} \right. \\ & a < 2 \\ & D = (-\infty, 2) \end{aligned}$	۴
$\begin{aligned} & n \leq a < n + \frac{1}{n} \\ & [a - \frac{1}{n}] = n - 1 \\ & [-a + \frac{1}{n}] = -n \quad \times \\ & n + \frac{1}{n} \leq a < n + 1 \quad \cup \quad [n + \frac{1}{n}, n + 1) \rightarrow n \in \mathbb{Z} \\ & [a - \frac{1}{n}] = n \quad / \quad [a + \frac{1}{n}] = -n \quad \checkmark \end{aligned}$	۵
$\begin{aligned} & 2 \sin^2 a - 1 \neq 0 \\ & \sin^2 a \neq \frac{1}{2} \\ & \sin a \neq \pm \frac{\sqrt{2}}{2} \\ & a \neq \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4} + 2K\pi \end{aligned} \quad \left(\text{الف} \right) \quad \left\{ \begin{aligned} & \sin a - 1 \neq 0 \\ & \sin a \neq 1 \\ & \sin a = 1 \\ & a = \frac{\pi}{2} + 2K\pi \\ & D \Rightarrow \mathbb{R} \setminus \left\{ \frac{\pi}{4} + 2K\pi \right\}, K \in \mathbb{Z} \end{aligned} \right.$	۶

$\cos x - 1 \geq 0$ $\cos x = 1$ $x = 2k\pi$ $D_f = \{2k\pi k \in \mathbb{Z}\}$	$\sqrt{2} \sin x - 1 \geq 0$ (الف) $\sin x \geq \frac{1}{\sqrt{2}}$ $x \in \left[\frac{\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi \right]$	6
$-1 \leq x^2 + 3x + 1 < 1$ $x^2 + 3x \geq 0 \rightarrow x(x+3) \geq 0$ $x \geq 0 \quad \vee \quad x \leq -3$ $x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0$	$\cos y = \sqrt{2} - 3$ (الف) $-1 \leq x - \sqrt{2} \leq 1$ $\sqrt{2} \leq x \leq 2$ $D_f = [-2, -\sqrt{2}] \cup [\sqrt{2}, 2]$	7
$x^2 - x > 0$ $x(x-1)(x+1) > 0$ $D_f = (-1, 0) \cup (1, +\infty)$	$x - 2 > 0 \rightarrow x > 2$ (الف) $2 - \log_2(x-2) \geq 0$ $\log_2(x-2) \leq 2$ $x-2 \leq 4 \rightarrow x \leq 6$ $D_f = (2, 6]$	8
الف) $x^2 + 1 > 0 \rightarrow x^2 > -1 \rightarrow D_f = \mathbb{R}$ ب) $x^2 - 1 \neq 0 \rightarrow x^2 \neq 1 \rightarrow x \neq \pm 1 \rightarrow D_f = \mathbb{R} - \{\pm 1\}$ ج) $x^2 \neq 2 \rightarrow x \neq \pm \sqrt{2} \rightarrow D_f = \mathbb{R} - \{\pm \sqrt{2}\}$ د) $x^2 - 2 \neq 0 \rightarrow x^2 \neq 2 \rightarrow x \neq \pm \sqrt{2} \rightarrow D_f = \mathbb{R} - \{\pm \sqrt{2}\}$		9
$\frac{x^2 - 2}{x^2 - 1} = n \rightarrow (n = 0, 1, 2, \dots)$ $n \neq \frac{1}{2} \rightarrow D_f = \mathbb{W}$	$x^2 + 1 = n \rightarrow (n = 0, 1, \dots)$ (الف) $x = \frac{n-1}{2} \rightarrow D_f = \left\{ -\frac{1}{2}, \frac{1}{2}, \frac{3}{2}, \frac{5}{2}, \dots \right\}$	