

الف) $\frac{x^2 - 4x}{x^3 - x} \geq 0$ $\frac{x(x-4)}{x(x-1)(x+1)} \geq 0$ $D_f = (-\infty, 0) \cup (0, 1) \cup [4, +\infty)$	ب) $\frac{x^3 - x^2}{x^3 - x} \geq 0 \Rightarrow \frac{x^2(x-1)(x+1)}{x(x-1)(x+1)} \geq 0$ $D_f = \mathbb{R} - \{-1, 0, 1\}$	1
الف) $x + x > 0$ $\begin{matrix} (+) \checkmark \\ (0) \times \\ (-) \times \end{matrix}$ $D_f = \mathbb{R}^+$	ب) $x x > 0$ $\begin{matrix} (+) \checkmark \\ (0) \times \\ (-) \times \end{matrix}$ $D_f = \mathbb{R}^+$	2
الف) $2 - [x] \geq 0 \rightarrow [x] \leq 2$ $D_f = (-\infty, 3)$	ب) $2 - [x] > 0 \rightarrow [x] < 2$ $D_f = (-\infty, 2)$	3
الف) $[x - \frac{1}{x}] + [x + \frac{1}{x}] \geq 0 \rightarrow [x + \frac{1}{x}] + [x + \frac{1}{x}] \geq 1 \rightarrow 2[x + \frac{1}{x}] \geq 1 \rightarrow [x + \frac{1}{x}] \geq \frac{1}{2}$ $x + \frac{1}{x} \geq 1 \rightarrow x \geq \frac{1}{x} \rightarrow D_f = [\frac{1}{x} + \infty)$ ب) $[x - \frac{1}{x}] + [-x + \frac{1}{x}] \geq 0 \rightarrow -[x - \frac{1}{x}] + [-(x - \frac{1}{x})] \geq 0 \rightarrow x - \frac{1}{x} \in \mathbb{Z}$ $D_f = \{x \mid x = k + \frac{1}{x}, x \in \mathbb{Z}\}$ $x \in \mathbb{Z} + \frac{1}{x}$	الف) $\sin x - 1 \neq 0$ $\sin x \neq 1$ $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$	4
الف) $\sin x - 1 \neq 0$ $\sin x \neq 1$ $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$	ب) $2 \sin^2 x - 1 \neq 0 \rightarrow 2 \sin^2 x \neq 1$ $\sin^2 x \neq \frac{1}{2}$ $\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ $\sin x \neq \pm \frac{\sqrt{2}}{2}$ $D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{4}\}$	5

الف) $\sqrt{\sin n - 1} \geq 0$ $\sqrt{\sin n} \geq 1 \rightarrow \sin n \geq 1$ $\oplus$ $D_f = \{ \sqrt{k\pi + \frac{\pi}{4}} > \sqrt{k\pi + \frac{5\pi}{4}} \}$	ب) $\sqrt{\cos n - 1} \geq 0$ $\cos n \geq 1$ $\oplus$ $D_f = \{ \sqrt{k\pi} \}$	6
الف) $-1 \leq n - 2 \leq 1$ $1 \leq n \leq 3 \rightarrow 1 \leq n \leq 3 \text{ و } -3 \leq n \leq -1$ $D_f = [1, 3] \cup [-3, -1]$	ب) $-1 \leq n^2 + \sqrt{n} + 1 \leq 1$ $-1 \leq n^2 + \sqrt{n} + 1$ $-2 \leq n^2 + \sqrt{n}$ $0 \leq (n+1)(\sqrt{n}+1)$ $\frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm \sqrt{-3}}{2}$ $(-\infty, -2] \cup [-1, +\infty)$ $[-1, 0]$ $\textcircled{1} \cap \textcircled{2} \Rightarrow D_f = [-1, -2] \cup [-1, 0]$	7
الف) $\sqrt[n]{\log_p(n-2)} \geq 0$ $\log_p(n-2) \leq 2 \rightarrow n-2 \leq p$ $\boxed{n \leq 11}$ $n-2 > 0$ $\boxed{n > 2}$ $D_f = (2, 11]$	ب) $\log_{n^2-n} n^2 - n_1 > 0$ $n(n^2 - 1) > 0$ $n(n-1)(n+1) > 0$ $\frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm \sqrt{-3}}{2}$ $D_f = (-1, 0) \cup (1, +\infty)$	8
الف) $\frac{n}{\varepsilon} + 1 \neq 0$ $\frac{n}{\varepsilon} \neq -1$ $D_f = \mathbb{R}$ ب) $\frac{n}{\varepsilon} - 1 \neq 0$ $\frac{n}{\varepsilon} \neq 1$ $n \neq \varepsilon$ $D_f = \mathbb{R} - \{\varepsilon\}$ ج) $\frac{n}{\varepsilon} - 2 \neq 0$ $\frac{n}{\varepsilon} \neq 2 \rightarrow n \neq 2\varepsilon$ $D_f = \mathbb{R} - \{2\varepsilon\}$ د) $\frac{n}{\varepsilon} - 3 \neq 0 \rightarrow \frac{n}{\varepsilon} \neq 3 \rightarrow n \neq 3\varepsilon$ $D_f = \mathbb{R} - \{3\varepsilon\}$		9
الف) $\{n+1\} \in W \rightarrow \{n\} \in W-1$ $n \in \frac{W-1}{\varepsilon}$ $D_f = \{n n = \frac{k-1}{\varepsilon}, n \in W\}$	ب) $\frac{\sqrt[n]{n} - 2}{\sqrt[n]{n} - 2} \in W \rightarrow \sqrt[n]{n} - 2 \in \sqrt[n]{n} - 2W$ $\sqrt[n]{n} - \sqrt[n]{n} \in \sqrt[n]{n} - 2W$ $n = \frac{\sqrt[n]{n} - 2W}{\sqrt[n]{n} - \sqrt[n]{n}} = \frac{\sqrt[n]{n} - 2}{\sqrt[n]{n} - \sqrt[n]{n}}$ $D_f = \{n n = \frac{\partial k - 2}{\sqrt[n]{n} - \sqrt[n]{n}}, n \in k\}$	10