

۲- آفرین

الف) $\frac{x^2 - 4x}{x^3 - x} \geq 0$ $\frac{x^2(x-4)}{x^2(x-1)(x+1)} \geq 0$ $D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$ Ⓟ ✓	ب) $\frac{x^3 - x^2}{x^3 - x} \geq 0$ $\frac{x^2(x-1)}{x^2(x-1)(x+1)} \geq 0$ $D_f = \mathbb{R} - \{-1, 0, 1\}$ ۱
الف) $x + x > 0$ Ⓟ ✓ Ⓢ ✗ Ⓣ ✗ $D_f = \mathbb{R}^+$ Ⓟ ✓	ب) $x x > 0$ Ⓟ ✓ Ⓢ ✗ Ⓣ ✗ $D_f = \mathbb{R}^+$ ۲
الف) $2 - [x] \geq 0 \rightarrow [x] \leq 2$ $D_f = (-\infty, 3)$ Ⓟ ✓	ب) $2 - [x] > 0 \rightarrow [x] < 2$ $D_f = (-\infty, 2)$ ۳
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) $[x - \frac{1}{x}] + [-x + \frac{1}{x}] \geq 0 \rightarrow -[x - \frac{1}{x}] + [-(x - \frac{1}{x})] \geq 0 \rightarrow x - \frac{1}{x} \in \mathbb{Z}$ $D_f = \{x \mid x = k + \frac{1}{x}, x \in \mathbb{Z}\}$ Ⓟ ✓	$x \in \mathbb{Z} + \frac{1}{x}$ ۴
الف) $\sin x - 1 \neq 0$ $\sin x \neq 1$ $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$ Ⓟ ✓	ب) $2 \sin^2 x - 1 \neq 0 \rightarrow 2 \sin^2 x \neq 1$ $\sin^2 x \neq \frac{1}{2}$ $\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ $\sin x \neq \pm \frac{\sqrt{2}}{2}$ $D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{4}\}$ Ⓟ ✓ ۵

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