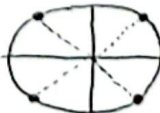
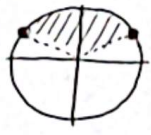


الف) $\frac{x^2-4x}{x^3-x} \geq 0$ $\Rightarrow \frac{x(x-4)}{x(x^2-1)} = \frac{x(x-4)}{x(x-1)(x+1)}$ ریشه های صورت = ۰ و ۴ ریشه های مخرج = ۰ و ۱ و -۱ نقطه ها: $\frac{-1}{0} \quad \frac{0}{0} \quad \frac{+1}{0} \quad \frac{4}{+}$ $D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$	ب) $\frac{x^3-x^2}{x^3-x} \geq 0$ ریشه های صورت = ۰ و ۱ ریشه های مخرج = ۰ و ۱ $\frac{x^2(x-1)}{x(x^2-1)} = \frac{x^2(x-1)(x+1)}{x(x-1)(x+1)}$ $D_f = R - \{-1, 0, 1\}$	۱
الف) $x + x > 0$ $\oplus \ominus \odot$ $\checkmark \times \times$ $\Rightarrow D_f = R^+ \cup (0, +\infty)$	ب) $x x > 0$ $\oplus \ominus \odot$ $\checkmark \times \times$ $\Rightarrow D_f = R^+ \cup (0, +\infty)$	۲
الف) $2 - [x] \geq 0$ $\Rightarrow [x] \leq 2$ $\Rightarrow x < 3$ $\Rightarrow D_f = (-\infty, 3)$	ب) $2 - [x] > 0$ $\Rightarrow [x] < 2$ $\Rightarrow x < 2$ $\Rightarrow D_f = (-\infty, 2)$	۳
الف) $[x - \frac{1}{x}] + [x + \frac{1}{x}] \geq 0$ $\Rightarrow [x + \frac{1}{x} - 1] + [x + \frac{1}{x}] \geq 0$ $\Rightarrow [x + \frac{1}{x}] - 1 + [x + \frac{1}{x}] \geq 0$ $\Rightarrow 2[x + \frac{1}{x}] \geq 1$ $\Rightarrow [x + \frac{1}{x}] \geq \frac{1}{2}$ $\Rightarrow x + \frac{1}{x} \geq \frac{1}{2} \Rightarrow x \geq \frac{1}{x} \Rightarrow D_f = [\frac{1}{2}, +\infty)$	ب) $[x - \frac{1}{x}] + [-x + \frac{1}{x}] \geq 0$ $\Rightarrow [x - \frac{1}{x}] + [-(x - \frac{1}{x})] \geq 0$ $\Rightarrow x - \frac{1}{x} \in \mathbb{Z}$ $\Rightarrow D_f = \{x x = k + \frac{1}{x}, k \in \mathbb{Z}\}$	۴
الف) $\sin x - 1 \neq 0$ $\Rightarrow \sin x \neq 1$  $\Rightarrow D_f = R - \{2k\pi + \frac{\pi}{2}\}$	ب) $2 \sin^2 x - 1 \neq 0$ $\Rightarrow 2 \sin^2 x \neq 1$ $\Rightarrow \sin^2 x \neq \frac{1}{2}$ $\Rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2}$ $\Rightarrow D_f = R - \{k\pi \pm \frac{\pi}{4}\}$ 	۵

الف) $2 \sin x - 1 > 0$ $\Rightarrow 2 \sin x > 1$ $\Rightarrow \sin x > \frac{1}{2}$ $\Rightarrow D_f = \left[2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right]$ 	ب) $\cos x - 1 > 0$ $\Rightarrow \cos x > 1$ $\Rightarrow D_f = \{2k\pi\}$ 	6
الف) $-1 < a - 3 < 1$ $\Rightarrow 2 < a < 4$ $\Rightarrow 2 < a < 4, -4 < a < -2$ $\Rightarrow D_f = [-4, -2] \cup [2, 4]$	ب) $-1 < x^2 + 3x + 1 < 1$ $\Rightarrow x^2 + 3x + 1 < 1 \Rightarrow x^2 + 3x < 0 \Rightarrow x(x+3) < 0$ $\Rightarrow x \in (-3, 0)$ $\Rightarrow x^2 + 3x + 1 > -1 \Rightarrow x^2 + 3x + 2 > 0 \Rightarrow (x+1)(x+2) > 0$ $\Rightarrow x \in (-\infty, -2) \cup (-1, \infty)$ ریشه ها: $0, -3$ و $-1, -2$ $\frac{-3}{+} \frac{0}{-} \frac{-1}{+} \frac{-2}{-}$ $\frac{-3}{+} \frac{0}{-} \frac{-1}{+} \frac{-2}{-}$ $(I) \cap (II) \Rightarrow D_f = [-3, -2] \cup [-1, 0]$	7
الف) $x - 2 > 0$ $\Rightarrow x > 2$ $2 - \log_3^{(x-2)} > 0$ $\Rightarrow \log_3^{(x-2)} < 2$ $\Rightarrow x - 2 < 9 \Rightarrow x < 11$ $\Rightarrow D_f = (2, 11]$	ب) $x^3 - x > 0$ $\Rightarrow x(x^2 - 1) > 0$ $\Rightarrow x(x-1)(x+1) > 0$ ریشه ها: $0, 1, -1$ $\frac{-1}{-} \frac{0}{+} \frac{1}{-}$ $\Rightarrow D_f = (-1, 0) \cup (1, \infty)$	8
الف) $\varepsilon^x + 1 \neq 0$ $\Rightarrow \varepsilon^x \neq -1 \Rightarrow D_f = \mathbb{R}$ ب) $\varepsilon^x - 1 \neq 0$ $\Rightarrow \varepsilon^x \neq 1 \Rightarrow x \neq 0$ $\Rightarrow D_f = \mathbb{R} - \{0\}$	ج) $\varepsilon^x - 2 \neq 0$ $\Rightarrow \varepsilon^x \neq 2 \Rightarrow x \neq \log_2 \varepsilon$ $\Rightarrow D_f = \mathbb{R} - \{\log_2 \varepsilon\}$ د) $\varepsilon^x - 3 \neq 0$ $\Rightarrow \varepsilon^x \neq 3 \Rightarrow x \neq \log_3 \varepsilon$ $\Rightarrow D_f = \mathbb{R} - \{\log_3 \varepsilon\}$	9
الف) $\varepsilon x + 1 \in \mathbb{W}$ $\Rightarrow \varepsilon x \in \mathbb{W} - 1$ $\Rightarrow x \in \frac{\mathbb{W} - 1}{\varepsilon}$ $\Rightarrow D_f = \left\{ x \mid x = \frac{k-1}{\varepsilon}, k \in \mathbb{W} \right\}$	ب) $\frac{\varepsilon x - 2}{\varepsilon x - \omega} \in \mathbb{W}$ $\Rightarrow \varepsilon x - 2 \in (\varepsilon x - \omega) \mathbb{W}$ $\Rightarrow \varepsilon x - 2 \in \varepsilon \mathbb{W} - \omega \mathbb{W}$ $\Rightarrow x = \frac{\varepsilon - \omega \mathbb{W}}{\varepsilon - \varepsilon \mathbb{W}} = \frac{\omega \mathbb{W} - 2}{\varepsilon \mathbb{W} - \varepsilon}$ $\Rightarrow D_f = \left\{ x \mid x = \frac{\omega k - 2}{\varepsilon k - \varepsilon}, k \in \mathbb{W} \right\}$	10