

۱۷, ۵

الف) $y = \sqrt{\frac{x^2 - 4x}{x^2 - x}}$ $\frac{x^2 - 4x}{x^2 - x} \geq 0 \rightarrow \frac{x(x-4)}{x(x^2-1)} \geq 0$ ۱, ۵ $D_f = (-\infty, 1) \cup (0, 1) \cup (4, +\infty)$ -1 0 1 4 - 1 0 1 4	ب) $y = \sqrt{\frac{x^3 - x^2}{x^2 - x}}$ -1 0 1 4 - 1 0 1 4 $\frac{x^3 - x^2}{x^2 - x} \geq 0 \rightarrow \frac{x^2(x-1)}{x(x^2-1)} \geq 0$ -1 0 1 $D_f = \mathbb{R} - [-1, 0, 1]$	۱
الف) $y = \frac{x+1}{\sqrt{x+ x }}$ $x+ x \geq 0 \rightarrow x = -x \quad x \leq 0$ $x+ x = 2x \quad x \geq 0$ $x+ x = x \cdot x = x^2$ $D_f = (0, +\infty)$ ۲ ✓	ب) $y = \frac{1}{\sqrt{x x }}$ $x x > 0$ if $x > 0 \rightarrow x x = x^2 > 0$ if $x < 0 \rightarrow x x = x(-x) = -x^2 < 0$ $D_f = (0, +\infty)$	۲
الف) $y = \sqrt{r-[x]}$ $r-[x] \geq 0 \rightarrow [x] \leq r \rightarrow x < r$ $D_f = (-\infty, r)$ ۳ ✓	ب) $y = \frac{1}{\sqrt{r-[x]}}$ $r-[x] > 0 \rightarrow [x] < r \rightarrow x < r$ $D_f = (-\infty, r)$	۳
الف) $y = \sqrt{[x - \frac{1}{r}] + [x + \frac{r}{r}]}$ ۴ $[x - \frac{1}{r}] + [x + \frac{r}{r}] \geq 0$ ۱, ۵ $x < \frac{1}{r}$ $x \geq \frac{1}{r}$ $D_f = [\frac{1}{r}, +\infty)$ [x - 1/r] + [x - 1/r] + 2 ≥ 0 2[x - 1/r] ≥ -1 x - 1/r ≥ 0 x ≥ 1/r	ب) $y = \sqrt{[x - \frac{1}{r}] + [-x + \frac{r}{r}]}$ $[x - \frac{1}{r}] + [-x + \frac{r}{r}] \geq 0 \rightarrow [x - \frac{1}{r}] \geq 0$ if $\alpha \in \mathbb{Z} \quad [\alpha] + [-\alpha] = 0$ $\alpha \notin \mathbb{Z} \quad [\alpha] + [-\alpha] = -1$ $\Rightarrow x - \frac{1}{r} \in \mathbb{Z} \quad D_f = \{x x = k + \frac{1}{r}, k \in \mathbb{Z}\}$	
الف) $y = \frac{r}{\sin x - 1}$ $\sin x - 1 \neq 0 \rightarrow$ $D_f = \mathbb{R} - [2k\pi + \frac{\pi}{2}]$ ۲ ✓	ب) $y = \frac{r}{r \sin^2 x - 1}$ $r \sin^2 x \neq 1 \Rightarrow \sin^2 x \neq \frac{1}{r} \Rightarrow \sin x \neq \pm \frac{1}{\sqrt{r}}$ $D_f = \mathbb{R} - [\frac{k\pi}{r} + \frac{\pi}{2}, \frac{k\pi}{r} + \frac{3\pi}{2}] \quad k \in \mathbb{Z}$	

الف) $y = \sqrt{r \sin n - 1}$  $r \sin n - 1 \geq 0 \Rightarrow r \sin n \geq 1$ $\sin n \geq \frac{1}{r} \quad [rkn + \frac{\pi}{2}, rkn + \frac{3\pi}{2}]$ $D_f = \mathbb{R} - \{rkn + \frac{\pi}{2}\}$ (1)	ب) $y = \sqrt{\cos n - 1}$ $\cos n - 1 \geq 0 \Rightarrow \cos n \geq 1$ $D_f = \mathbb{R} - \{rkn\}$	6
الف) $\cos y = n - r$ $-1 \leq n - r \leq 1 \Rightarrow r_2 n \leq \varepsilon$ $D_f = [r, \varepsilon] \cup [-\varepsilon, -r]$ 1, 6	ب) $y = \arcsin(n^r + r_n + 1)$ $-1 \leq n^r + r_n + 1 \leq 1$ $n^r + r_n + 1 \geq -1 \Rightarrow n^r + r_n + 2 \geq 0 \Rightarrow (n+r)(n+r+1) \geq 0$ $n^r + r_n + 1 \leq 1 \Rightarrow n^r + r_n \leq 0 \Rightarrow n(n+r) \leq 0 \Rightarrow -r \leq n \leq 0$ $D_f = (-\infty, -r] \cup [-r, 0]$ $[-r, -r] \cup [-r, 0]$	7
الف) $y = \sqrt{r - \log_n(n-r)}$ $r - \log_n(n-r) \geq 0$ $\log_n(n-r) \leq r$ $n-r \leq n^r$ $n \leq 11$ $D_f = (r, 11]$ (2)	ب) $y = \log(n^r - n)$ $n^r - n > 0 \Rightarrow n(n^{r-1} - 1) > 0$ $n(n-1)(n+1) > 0$ $D_f = [-1, 0) \cup [1, +\infty)$	8
الف) $y = \frac{r}{\varepsilon^n + 1}$ $\varepsilon^n + 1 \neq 0$ $\varepsilon^n \neq -1$ $D_f = \mathbb{R}$ (2)	ب) $y = \frac{r}{\varepsilon^n - 1}$ $\varepsilon^n - 1 \neq 0$ $\varepsilon^n \neq 1$ $D_f = \mathbb{R} - \{0\}$	9
الف) $y = (f_n + 1)!$ $f_n + 1 \in \mathbb{N} \Rightarrow f_n \in \mathbb{N} - 1 \Rightarrow n = \frac{w-1}{\varepsilon}$ $D_f = \{n n = \frac{k-1}{\varepsilon}, k \in \mathbb{N}\}$ (2)	ب) $(\frac{r_n - r}{r_n - a})!$ $\frac{r_n - r}{r_n - a} \in \mathbb{N} \Rightarrow r_n - r \in r_n \mathbb{N} - a \mathbb{N}$ $\rightarrow r + a \mathbb{N} \in r \mathbb{N} - r \mathbb{N} \Rightarrow -r + a \mathbb{N} \in \mathbb{N}(r \mathbb{N} - r)$ $n = \frac{-r + a \mathbb{N}}{r \mathbb{N} - r}$	10

$$D_f = \{n | n = \frac{-r + ak}{rkn - r}, k \in \mathbb{N}\}$$