

الف) $y = \sqrt{\frac{x^2 - 4x}{x^2 - x}}$ $\frac{1}{x-1} +$ $\frac{x^2 - 4x}{x^2 - x} \geq 0 \rightarrow \frac{x(x-4)}{x(x^2-1)} \geq 0$ $D_f = (-\infty, -1) \cup (0, 1) \cup (4, +\infty)$	ب) $y = \sqrt{\frac{x^3 - x^2}{x^2 - x}}$ $\frac{-1}{+} \frac{x}{+} \frac{1}{+}$ $\frac{x^3 - x^2}{x^2 - x} \geq 0 \rightarrow \frac{x^2(x-1)}{x(x^2-1)} \geq 0$ $x \neq -1, 0, 1$ $D_f = \mathbb{R} - [-1, 0, 1]$	۱
الف) $y = \frac{x+1}{\sqrt{x+ x }}$ $x+ x \geq 0 \rightarrow x = -x \quad x \leq 0, \quad x = x \quad x \geq 0$ $x+ x = 2x \quad x \geq 0$ $x+ x = x-x = 0 \quad x \leq 0$ $D_f = (0, +\infty)$	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) $y = \sqrt{r-[x]}$ $r-[x] \geq 0 \rightarrow [x] \leq r \rightarrow x < r$ $D_f = (-\infty, r)$	ب) $y = \frac{1}{\sqrt{r-[x]}}$ $r-[x] > 0 \rightarrow [x] < r \rightarrow x < r$ $D_f = (-\infty, r)$	۳
الف) $y = \sqrt{[x-\frac{1}{r}] + [x+\frac{r}{r}]}$ $[x-\frac{1}{r}] + [x+\frac{r}{r}] \geq 0$ $x < \frac{1}{r}$ $x \geq \frac{1}{r}$ $D_f = [\frac{1}{r}, +\infty)$	ب) $y = \sqrt{[x-\frac{1}{r}] + [-x+\frac{r}{r}]}$ $[x-\frac{1}{r}] + [-x+\frac{r}{r}] \xrightarrow{\text{if}} \begin{cases} \alpha \in \mathbb{Z} & [\alpha] + [-\frac{\alpha}{r}] = 0 \\ \alpha \notin \mathbb{Z} & [\alpha] + [-\alpha] = -1 \end{cases}$ $\Rightarrow x - \frac{1}{r} \in \mathbb{Z} \quad D_f = \{x x = k + \frac{1}{r}, k \in \mathbb{Z}, k \geq \frac{r}{r}\}$	
الف) $y = \frac{r}{\sin x - 1}$ $\sin x - 1 \neq 0 \rightarrow$ $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{r}\}$	ب) $y = \frac{r}{r \sin^2 x - 1}$ $r \sin^2 x \neq 1 \Rightarrow \sin^2 x \neq \frac{1}{r} \Rightarrow \sin x \neq \pm \frac{\sqrt{r}}{r}$ $D_f = \mathbb{R} - \{ \frac{2k\pi}{r} + \frac{\pi}{r}, k \in \mathbb{Z} \}$	

الف) $y = \sqrt{r \sin n - 1}$ $r \sin n - 1 \geq 0 \Rightarrow r \sin n \geq 1$ $\sin n \geq \frac{1}{r}$ $D_f = \mathbb{R} - \left[r k \pi + \frac{\pi}{r} \right]$	ب) $y = \sqrt{\cos n - 1}$ $\cos n - 1 \geq 0 \Rightarrow \cos n \geq 1$ $D_f = \mathbb{R} - \{ r k \pi \}$	6
الف) $\cos y = n - r$ $-1 \leq n - r \leq 1 \Rightarrow r_0 n \leq \varepsilon$ $D_f = [r, \varepsilon] \cup [-\varepsilon, -r]$	ب) $y = \arcsin(n^r + r n + 1)$ $-1 \leq n^r + r n + 1 \leq 1$ $n^r + r n + 1 \geq -1 \rightarrow n^r + r n + 2 \geq 0 \rightarrow (n+r)(n+1) \geq 0$ $n^r + r n + 1 \leq 1 \rightarrow n^r + r n \leq 0 \rightarrow n(n+r) \leq 0 \rightarrow -r \leq n \leq 0$ $D_f = (-\infty, -r] \cup [-r, 0)$	
الف) $y = \sqrt{r - \log_n(n-r)}$ $r - \log_n(n-r) \geq 0$ $\log_n(n-r) \leq r$ $n-r \leq n^r$ $n \leq 11$ $D_f = (r, 11]$	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) $y = \frac{r}{\varepsilon^{n+1}}$ $\varepsilon^{n+1} \neq 0$ $\varepsilon^n \neq -1$ $D_f = \mathbb{R}$	ب) $y = \frac{r}{\varepsilon^n - 1}$ $\varepsilon^n - 1 \neq 0$ $\varepsilon^n \neq 1$ $D_f = \mathbb{R} - \{0\}$	9
ج) $y = \frac{r}{\varepsilon^{n-2}}$ $\varepsilon^{n-2} \neq 0$ $\varepsilon^n \neq 2$ $n \neq 1, 2$ $D_f = \mathbb{R} - \{ \log \frac{1}{\varepsilon} \}$	د) $y = \frac{r}{\varepsilon^n - r}$ $\varepsilon^n - r \neq 0$ $\varepsilon^n \neq r$ $n \neq 1, 2$ $D_f = \mathbb{R} - \{ \log \frac{1}{\varepsilon} \}$	
الف) $y = (n+1)!$ $n+1 \in \mathbb{W} \rightarrow n \in \mathbb{W} - 1 \rightarrow n = \frac{w-1}{\varepsilon}$ $D_f = \left\{ n \mid n = \frac{k-1}{\varepsilon}, k \in \mathbb{W} \right\}$	ب) $\left(\frac{r_n - r}{r_n - \alpha} \right)!$ $\frac{r_n - r}{r_n - \alpha} \in \mathbb{W} \rightarrow r_n - r \in r_n \mathbb{W} - \alpha \mathbb{W}$ $\rightarrow r + \alpha \mathbb{W} \in r_n \mathbb{W} - r_n \Rightarrow -r + \alpha \mathbb{W} \in \mathbb{N}(r_n - r)$ $n = \frac{-r + \alpha \mathbb{W}}{r_n - r}$ $D_f = \left\{ n \mid n = \frac{-r + \alpha k}{r_n - r}, k \in \mathbb{W} \right\}$	10