

الف) $\frac{n^2-4n}{n^2-n} \geq 0 \Rightarrow \frac{n(n-4)}{n(n^2-1)}$
 $D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$

-1	*	1	4
-	+	+	-
+	+	+	+

 $D_f = \mathbb{R} - \{-1, 0, 1\}$

الف) $n+|n| > 0 \Rightarrow D_f = \mathbb{R}^+$

الف) $\sqrt{2-[x]} \geq 0$

2	3
+	+
0	0
+	+
+	+

 $D_f = \mathbb{R} - [2, +\infty) \subseteq D_f = (-\infty, 2)$

الف) $\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0 \Rightarrow \left[x - \frac{1}{x}\right] + \left[x - \frac{1}{x}\right] + 1 \geq 0$
 $2\left[x - \frac{1}{x}\right] \geq -1 \Rightarrow \left[x - \frac{1}{x}\right] \geq -\frac{1}{2}$
 $\Rightarrow D_f = \left[\frac{1}{2}, +\infty\right)$

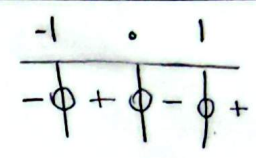
$\left[x - \frac{1}{x}\right] + \left[-x + \frac{1}{x}\right] \geq 0 \Rightarrow -x + \frac{1}{x} = -\left(x - \frac{1}{x}\right) = -a$
 $\Rightarrow [a] + [-a] \geq 0$
 $\left. \begin{array}{l} \text{if } a \in \mathbb{Z} \\ \text{if } a \notin \mathbb{Z} \end{array} \right\} \Rightarrow a \in \mathbb{Z}$
 $\Rightarrow [a] + [-a] = 0$
 $\Rightarrow [a] + [-a] = -1$
 $x - \frac{1}{x} = \mathbb{Z} \Rightarrow D_f = \left\{x + \frac{1}{x} \mid n \in \mathbb{Z}\right\}$

$\sin x - 1 \neq 0 \Rightarrow \sin x \neq 1$

$\Rightarrow D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$

$\sin^2 x \neq \frac{1}{4} \Rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \Rightarrow 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{3\pi}{4}$

$\Rightarrow D_f = \mathbb{R} - \left\{\frac{k\pi}{4} + \frac{\pi}{4}\right\}$

(الف) $r \sin \pi - 1 \geq 0 \Rightarrow \sin \pi \geq \frac{1}{r}$  $Df = \left[r\pi + \frac{\pi}{4}, r\pi + \frac{5\pi}{4} \right]$	$\cos \pi - 1 \geq 0 \Rightarrow \cos \pi \geq 1$  $\Rightarrow Df = \{ r\pi \}$	6		
(الف) $\cos y = [-1, 1] \Rightarrow -1 \leq n - r \leq 1 \Rightarrow r \leq n \leq r+1$ $\Rightarrow Df = [-r, -r] \cup [r, r]$	$(n^r, r_{n+1}) = [-1, 1] \Rightarrow -1 \leq n^r, r_{n+1} \leq 1$ $\Rightarrow n^r + r_{n+1} \leq 1 \Rightarrow n(n+r) \leq 0 \Rightarrow -r \leq n \leq 0$ $n^r + r_{n+1} \geq -1 \Rightarrow (n+1)(n+r) \geq 0 \Rightarrow \begin{cases} n \leq -r \\ n \geq 1 \end{cases}$ $\Rightarrow [-r, 0] \cap ((-\infty, -r] \cup [1, \infty))$ $\Rightarrow Df = [-r, -r] \cup [1, 0]$	7		
(الف) $\begin{cases} n-r > 0 \Rightarrow n > r \\ \log_r(n-r) \leq r \\ n-r \leq r^r \Rightarrow n \leq 11 \end{cases} \Rightarrow r < n \leq 11 \Rightarrow Df = (r, 11]$	$n(n^r-1) > 0$  $\Rightarrow Df = (-1, 0) \cup (1, +\infty)$	8		
(الف) $\begin{aligned} r^n + 1 &\neq 0 \\ r^n &> 0 \text{ always} \\ \Rightarrow r^n + 1 &> 0 \text{ always} \\ \Rightarrow Df &= \mathbb{R} \end{aligned}$	(ب) $\begin{aligned} r^n - 1 &\neq 0 \\ \Rightarrow r^n \neq 1, r^0 = 1 \\ \Rightarrow n &\neq 0 \\ \Rightarrow Df &= \mathbb{R} - \{0\} \end{aligned}$	(ج) $\begin{aligned} r^n - r &\neq 0 \\ \Rightarrow r^n &\neq r \\ \Rightarrow n &\neq \log_r r \\ \log_r r &= \frac{1}{r} \Rightarrow Df = \mathbb{R} - \left\{ \frac{1}{r} \right\} \end{aligned}$	(د) $\begin{aligned} r^n - r &\neq 0 \Rightarrow r^n \neq r \\ n &\neq \log_r r \\ \Rightarrow Df &= \mathbb{R} - \left\{ \log_r r \right\} \end{aligned}$	9
(الف) $\begin{aligned} r^n + 1 &\geq 0 \Rightarrow r^n \geq -1 \Rightarrow n \geq \frac{-1}{r} \\ \Rightarrow Df &= \left\{ \frac{n-1}{r} \mid n \in \mathbb{Z} \right\} \end{aligned}$	$\frac{r^n - r}{r^n - r} = n \geq 0 \Rightarrow r^n - r = r^{n-1} - r \Rightarrow (r^n - r) = r^{n-1} - r$ $\Rightarrow n = \frac{\Delta n - r}{r^{n-1}}$ $\Rightarrow Df = \left\{ \frac{\Delta n - r}{r^{n-1}} \mid n \in \mathbb{W} \right\}$	10		