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

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

$\sin x - 1 \neq 0 \Rightarrow \sin x \neq 1$
 $\Rightarrow D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{2}\right\}$ ✓

$\sin^2 x \neq \frac{1}{4} \Rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \Rightarrow 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{3\pi}{4}$
 $\Rightarrow D_f = \mathbb{R} - \left\{\frac{k\pi}{4} + \frac{\pi}{4}\right\}$

(الف) $r \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{r}$  $D_f = \left[r k\pi + \frac{\pi}{4}, r k\pi + \frac{3\pi}{4} \right]$ (ب) ✓	(الف) $\cos x - 1 \geq 0 \Rightarrow \cos x \geq 1$  $\Rightarrow D_f = \{ r k\pi \}$ 6														
(الف) $\cos y = [-1, 1] \Rightarrow -1 \leq x - r \leq 1 \Rightarrow r \leq x \leq r+1$ $\Rightarrow D_f = [-r-1, -r] \cup [r, r+1]$ جدول تبين علامت <table border="1" style="margin: auto;"><tr><td>-r-1</td><td>-r</td><td>-1</td><td>0</td><td>1</td><td>r</td><td>r+1</td></tr><tr><td>+</td><td>-</td><td>-</td><td>+</td><td>+</td><td>-</td><td>-</td></tr></table> 1, 1, 1, 1, 1, 1, 1	-r-1	-r	-1	0	1	r	r+1	+	-	-	+	+	-	-	(الف) $(x^2 + r x + 1) = [-1, 1] \Rightarrow -1 \leq x^2 + r x + 1 \leq 1$ $\Rightarrow x^2 + r x + 1 \leq 1 \Rightarrow x(x+r) \leq 0 \Rightarrow -r \leq x \leq 0$ $x^2 + r x + 1 \geq -1 \Rightarrow (x+1)(x+r) \geq 0 \Rightarrow \begin{cases} x \leq -1 \\ x \geq -r \end{cases}$ $\Rightarrow D_f = [-r-1, -r] \cup [-1, 0]$ 7
-r-1	-r	-1	0	1	r	r+1									
+	-	-	+	+	-	-									
(الف) $\begin{cases} x - r > 0 \Rightarrow x > r \\ \log_r(x - r) \leq r \\ x - r \leq r^r \Rightarrow x \leq r + r^r \end{cases} \Rightarrow r < x \leq r + r^r \Rightarrow D_f = (r, r + r^r]$ (ب) ✓	(الف) $x(x^2 - 1) > 0$ <table border="1" style="margin: auto;"><tr><td>-1</td><td>0</td><td>1</td></tr><tr><td>-</td><td>+</td><td>-</td></tr></table> $\Rightarrow D_f = (-1, 0) \cup (1, +\infty)$ 8	-1	0	1	-	+	-								
-1	0	1													
-	+	-													
(الف) $f^x + 1 \neq 0$ $f^x > 0$ $\Rightarrow f^x + 1 > 0$ $\Rightarrow D_f = \mathbb{R}$	(ب) $f^x - 1 \neq 0$ $\Rightarrow f^x \neq 1 \Rightarrow f \neq 1$ $\Rightarrow x \neq 0$ $\Rightarrow D_f = \mathbb{R} - \{0\}$	(ج) $f^x - r \neq 0$ $\Rightarrow f^x \neq r$ $\Rightarrow x \neq \log_r r$ $\log_r r = \frac{1}{r} \Rightarrow D_f = \mathbb{R} - \left\{ \frac{1}{r} \right\}$ (ب) ✓	(د) $f^x - r \neq 0 \Rightarrow f^x \neq r$ $x \neq \log_r r$ $\Rightarrow D_f = \mathbb{R} - \left\{ \log_r r \right\}$ 9												
(الف) $f^x + 1 \geq 0 \Rightarrow f^x \geq -1 \Rightarrow x \geq \frac{-1}{f}$ $\Rightarrow D_f = \left\{ \frac{n-1}{f} \mid n \in \mathbb{Z} \right\}$ (ب) ✓	(الف) $\frac{f^x - r}{f^{n-1}} = n \geq 0 \Rightarrow f^x - r = f^{n-1} n \Rightarrow (f^x - r) n = f^{n-1} n$ $\Rightarrow n = \frac{\Delta n - r}{f^{n-1}}$ $\Rightarrow D_f = \left\{ \frac{\Delta n - r}{f^{n-1}} \mid n \in \mathbb{W} \right\}$ 10														