

الف) $y = \sqrt{\frac{x^2 - 4x}{x^2 - x}}$ $\rightarrow y = \sqrt{\frac{x(x-4)}{x(x-1)(x+1)}}$ $\rightarrow 0, -1, 1, 4$

ب) $y = \sqrt{\frac{x^2 - x}{x^2 - x}} = \sqrt{\frac{x(x+1)(x-1)}{x(x+1)(x-1)}}$ $\rightarrow 0, 1, -1$

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

$\Rightarrow Df = (-1, 0) \cup (0, 1) \cup [4, +\infty)$

$\Rightarrow Df = \mathbb{R} - \{-1, 0, 1\}$

الف) $y = \frac{x+1}{\sqrt{x+|x|}}$ $x+|x| \geq 0 \Rightarrow x+|x| \neq 0$

$\Rightarrow x+|x| \geq 0$

$\Rightarrow Df = (0, +\infty)$

ب) $y = \frac{1}{\sqrt{x|x|}}$ $x|x| \geq 0, x|x| \neq 0$

$\Rightarrow x|x| > 0$

$\Rightarrow Df = (0, +\infty)$

الف) $y = \sqrt{2-[x]}$ $2-[x] \geq 0 \Rightarrow [x] \leq 2$

$\Rightarrow x < 3$

$Df = (-\infty, 3)$

ب) $y = \frac{1}{\sqrt{2-[x]}}$ $2-[x] \geq 0, 2-[x] \neq 0$

$\Rightarrow 2-[x] > 0$

$\Rightarrow [x] < 2$

$\Rightarrow x < 2$

$\Rightarrow Df = (-\infty, 2)$

الف) $y = \sqrt{[x - \frac{1}{x}] + [x + \frac{1}{x}]}$

$= \sqrt{2[x + \frac{1}{x}]} - 1$

$\Rightarrow 2[x + \frac{1}{x}] - 1 \geq 0$

$\Rightarrow [x + \frac{1}{x}] \geq \frac{1}{2}$

$x + \frac{1}{x} \geq 1 \Rightarrow x \geq \frac{1}{x} \Rightarrow Df = [\frac{1}{x}, +\infty)$

ب) $y = \sqrt{[x - \frac{1}{x}] + [-x + \frac{1}{x}]}$ $\rightarrow z = x - \frac{1}{x}$

$\Rightarrow y = \sqrt{[z] + [-z]}$

$[z] + [-z] \geq 0 \quad |[-z]| \geq |[z]|$

$z \in \mathbb{Z} \Rightarrow x - \frac{1}{x} \in \mathbb{Z} \Rightarrow Df = \{k + \frac{1}{x} \mid k \in \mathbb{Z}\}$

الف) $y = \frac{2}{\sin x - 1}$ $\sin x - 1 \neq 0 \Rightarrow \sin x \neq 1$

$\Rightarrow Df = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{2}{\sin^2 x - 1}$ $\sin^2 x \neq 1$

$\Rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}} = \pm \frac{\sqrt{2}}{2}$

$\Rightarrow Df = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{4}, \frac{k\pi}{2} + \frac{3\pi}{4}\}$

الف) $y = \sqrt{r \sin x - 1}$ $\Rightarrow r \sin x - 1 \geq 0$ $\Rightarrow \sin x \geq \frac{1}{r}$ $Df = [rk\pi + \frac{\pi}{4}, rk\pi + \frac{3\pi}{4}]$	ب) $y = \sqrt{\cos x - 1}$ $\Rightarrow \cos x - 1 \geq 0$ $\Rightarrow \cos x \geq 1 \quad \text{max}(\cos x) = 1$ $\Rightarrow \cos x = 1$ $\Rightarrow Df = \{rk\pi\}$	6
الف) $\cos y = x - r$ $\Rightarrow -1 \leq x - r \leq 1$ ① $r \leq x$ $\Rightarrow x \geq r \text{ و } x \leq -r$ ② $x \leq r$ $\Rightarrow -r \leq x \leq r$ $\Rightarrow Df = [-r, -r] \cup [r, r]$	ب) $y = \arcsin(x^r + r(x+1))$ $-1 \leq x^r + r(x+1) \leq 1$ ① $x^r + r(x+1) \geq 0 \Rightarrow (x+1)(x+r) \geq 0$ $\frac{+}{+} \frac{-}{-} \frac{-}{+} \frac{+}{+}$ ② $x^r + r(x+1) \leq 1 \Rightarrow x(x+r) \leq 0$ $\frac{+}{+} \frac{-}{-} \frac{-}{+} \frac{+}{+}$ $Df = [-r, -r] \cup [-1, 0]$	7
الف) $y = \sqrt{r - \log_r(x-r)}$ $\Rightarrow r - \log_r(x-r) \geq 0 \quad x-r > 0$ $\Rightarrow \log_r(x-r) \leq r \Rightarrow x > r$ $\Rightarrow x-r \leq r$ $\Rightarrow x \leq 11$ $\Rightarrow Df = (r, 11]$	ب) $y = \log(x^r - x)$ $x^r - x > 0$ $\Rightarrow x^r > x$ $\Rightarrow Df = (1, +\infty) \cup (-1, 0)$	8
الف) $y = \frac{r}{r^x + 1}$ $r^x + 1 \neq 0$ $\Rightarrow r^x \neq -1$ $\Rightarrow x = \log_r^{-1} \cdot X \Rightarrow Df = \mathbb{R}$ ج) $y = \frac{r}{r^x - r}$ $r^x - r \neq 0$ $\Rightarrow r^x \neq r$ $\Rightarrow x \neq \log_r r \Rightarrow Df = \mathbb{R} - \{\log_r r\}$	ب) $y = \frac{r}{r^x - 1}$ $r^x - 1 \neq 0$ $\Rightarrow r^x \neq 1$ $\Rightarrow x \neq 0 \Rightarrow Df = \mathbb{R} - \{0\}$ د) $y = \frac{r}{r^x - r}$ $r^x \neq r$ $\Rightarrow x \neq \log_r r$ $\Rightarrow Df = \mathbb{R} - \{\log_r r\}$	9
الف) $y = (fx+1)!$ $fx+1 \in \mathbb{W}$ $\Rightarrow fx \in \mathbb{W}-1$ $\Rightarrow x \in \frac{\mathbb{W}-1}{f}$ $\Rightarrow Df = \left\{ \frac{k-1}{f} \mid k \in \mathbb{W} \right\}$	ب) $y = \left(\frac{rx-r}{rx-\infty} \right)!$ $\frac{rx-r}{rx-\infty} \in \mathbb{W} \Rightarrow rx-r \in rx\mathbb{W} - \infty\mathbb{W}$ $\Rightarrow rx - rx\mathbb{W} = -\infty\mathbb{W} + r$ $\Rightarrow x(r - r\mathbb{W}) = -\infty\mathbb{W} + r \Rightarrow x = \frac{-\infty\mathbb{W} + r}{r - r\mathbb{W}}$ $\Rightarrow Df = \left\{ \frac{-\infty k + r}{r - rk} \mid k \in \mathbb{W} \right\}$	10