

الف) $y = \sqrt{\frac{x^2-4x}{x^3-x}} \rightarrow \sqrt{\frac{x(x-4)}{x(x+1)(x-1)}}$ $x \neq -1, 0, 1, 4$ $D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$	ب) $y = \sqrt{\frac{x^2-4x}{x^3-x}} \rightarrow \sqrt{\frac{x^2(x+1)(x-1)}{x(x+1)(x-1)}}$ $x \neq -1, 0, 1$ $D_f = \mathbb{R} - \{-1, 0, 1\}$	۱
الف) $y = \frac{x+1}{\sqrt{x+ x }}$ $x+ x > 0 \rightarrow x > -x$ $\rightarrow \oplus \checkmark \quad \ominus x \quad \ominus x$ $D_f = (0, +\infty)$	ب) $y = \frac{1}{\sqrt{x x }}$ $x x > 0 \quad \oplus \checkmark \quad \ominus x \quad \ominus x$ $D_f = (0, +\infty)$	۲
الف) $y = \sqrt{2-[x]}$ $2-[x] > 0 \rightarrow [x] < 2$ $D_f = (-\infty, 2)$	ب) $y = \frac{1}{\sqrt{2-[x]}}$ $2-[x] > 0 \rightarrow [x] < 2$ $D_f = (-\infty, 2)$	۳
الف) $y = \sqrt{[x-\frac{1}{3}]+[-x+\frac{1}{3}]}$ $[x-\frac{1}{3}]+[-(x-\frac{1}{3})] \geq 0$ $\begin{cases} a \in \mathbb{Z} & [a]+[-a]=0 \checkmark \\ a \notin \mathbb{Z} & [a]+[-a]=-1 \end{cases}$ $x-\frac{1}{3} \in \mathbb{Z} \quad D_f = \{x x = k + \frac{1}{3}, k \in \mathbb{Z}\}$	ب) $y = \sqrt{[x-\frac{1}{3}]+[x+\frac{2}{3}]}$ $[x-\frac{1}{3}]+[x+\frac{2}{3}] \geq 0$ $[x+\frac{2}{3}-1]+[x+\frac{2}{3}] \geq 0$ $2[x+\frac{2}{3}] \geq 1 \rightarrow [x+\frac{2}{3}] \geq \frac{1}{2}$ $x+\frac{2}{3} \geq 1 \rightarrow x \geq \frac{1}{3} \quad D_f = [\frac{1}{3}, +\infty)$	۴
الف) $y = \frac{r}{\sin^2 x - 1} \rightarrow \sin^2 x \neq 1$ $\sin^2 x \neq \frac{1}{r} \rightarrow \sin x \neq \pm \frac{\sqrt{r}}{r}$ $D_f = \mathbb{R} - \left\{ \frac{k\pi}{r} + \frac{\pi}{r}, \frac{k\pi}{r} - \frac{\pi}{r} \right\}$	ب) $y = \frac{r}{\sin^2 x - 1} \rightarrow \sin^2 x \neq 1$  $D_f = \mathbb{R} - \left\{ r k \pi + \frac{\pi}{r} \right\}$	۵

$y = \sqrt{\cos x - 1}$ $\rightarrow \cos x - 1 \geq 0 \rightarrow \cos x \geq 1$ $D_f = \{2k\pi\}$ 	$y = \sqrt{2 \sin x - 1}$ $2 \sin x - 1 \geq 0 \rightarrow 2 \sin x \geq 1$ $\rightarrow \sin x \geq \frac{1}{2}$  $D_f = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$
$y = \arcsin(x^2 + 3x + 1)$ $\rightarrow -1 \leq x^2 + 3x + 1 \leq 1$ ① $x^2 + 3x + 1 \leq 1 \rightarrow x(x+3) \leq 0$ ② $x^2 + 3x + 1 \geq -1 \rightarrow (x+1)(x+2) \geq 0$ $D_f = [-3, -1] \cup [-1, 0]$	$\cos y = x - 3$ $-1 \leq x - 3 \leq 1 \rightarrow 2 \leq x \leq 4$ $\rightarrow 2 \leq x \leq 4, -4 \leq x \leq -2$ $D_f = [-4, -2] \cup [2, 4]$
$y = \log(x^2 - x)$ $x^2 - x > 0 \rightarrow x(x-1) > 0$ $D_f = (-1, 0) \cup (1, +\infty)$	$y = \sqrt{2 - \log_3(x-2)}$ $\rightarrow x - 2 > 0 \rightarrow x > 2$ $\rightarrow 2 - \log_3(x-2) \geq 0 \rightarrow \log_3(x-2) \leq 2$ $x - 2 \leq 9 \rightarrow x \leq 11$ $D_f = (2, 11]$
$y = \frac{3}{k^x - 1} \rightarrow k^x \neq 1 \rightarrow x \neq 0$ $D_f = \mathbb{R} - \{0\}$	$y = \frac{3}{k^x + 1} \rightarrow k^x \neq -1$ (مستبعد) $D_f = \mathbb{R}$
$y = \frac{3}{k^x - 3} \rightarrow k^x \neq 3$ $x \neq \log_k 3$ $D_f = \mathbb{R} - \{\log_k 3\}$	$y = \frac{3}{k^x - 2} \rightarrow k^x \neq 2$ $\rightarrow x \neq \log_k 2$ $D_f = \mathbb{R} - \{\log_k 2\}$
$y = \left(\frac{3x-2}{2x-5}\right)!$ $\frac{3x-2}{2x-5} \in \mathbb{W} \rightarrow x = -\frac{-5w+2}{2w-3}$ $D_f = \{x \mid x = \frac{+5k-2}{2k-3}, k \in \mathbb{W}\}$	$y = (kx+1)!$ $kx+1 \in \mathbb{W} \rightarrow kx \in \mathbb{W} - 1$ $x \in \frac{\mathbb{W}-1}{k}$ $D_f = \{x \mid x = \frac{k-1}{k}, k \in \mathbb{W}\}$