

الف) $y = \sqrt{\frac{x^2 - 4x}{x^3 - x}} = \sqrt{\frac{x(x-4)}{x(x+1)(x-1)}}$ $D_f = (-1, 0) \cup (0, 1) \cup (4, +\infty)$

ب) $y = \sqrt{\frac{x^3 - x^2}{x^3 - x}} = \sqrt{\frac{x^2(x-1)(x+1)}{x(x+1)(x-1)}}$ $D_f = \mathbb{R} - \{-1, 0, +1\}$

$x(x-4)$	-	+	-	-	+
$x(x+1)(x-1)$	-	+	-	+	+
	-	+	+	-	+

$x^2(x+1)(x-1)$	-	+	-	+
$x(x+1)(x-1)$	-	+	-	+
	+	+	+	+

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \rightarrow x+|x| > 0 \rightarrow \begin{cases} \oplus \rightarrow 2x \\ \ominus \rightarrow \text{صفر} \\ \odot \rightarrow \text{صفر} \end{cases} \Rightarrow D_f = \mathbb{R}^+ / (0, +\infty)$

ب) $y = \frac{1}{\sqrt{x|x|}} \rightarrow x|x| > 0 \rightarrow \begin{cases} \oplus \rightarrow x^2 \rightarrow \text{مثبت} \\ \ominus \rightarrow -x^2 \rightarrow \text{منفی} \\ \odot \rightarrow \text{صفر} \end{cases} \Rightarrow D_f = \mathbb{R}^+ / (0, +\infty)$

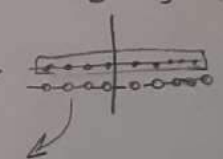
الف) $y = \sqrt{2 - [x]} \rightarrow 2 - [x] > 0 \Rightarrow 2 > [x] \Rightarrow D_f = (-\infty, 2)$

ب) $y = \frac{1}{\sqrt{2 - [x]}} \rightarrow 2 - [x] > 0 \Rightarrow 2 > [x] \Rightarrow D_f = (-\infty, 2)$

الف) $y = \sqrt{[x - \frac{1}{4}] + [x + \frac{2}{4}]} \rightarrow [x - \frac{1}{4}] + [x + \frac{2}{4}] \geq 0$ $x - \frac{1}{4} \geq -1$

$x + \frac{2}{4} \geq 0$ $[x - \frac{1}{4}] + [x + \frac{2}{4} - 1] \geq -1 \Rightarrow 2[x - \frac{1}{4}] \geq -1 \Rightarrow [x - \frac{1}{4}] \geq -\frac{1}{2}$

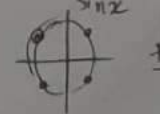
$[x + \frac{2}{4}] \geq \frac{1}{2} \Rightarrow D_f = [\frac{1}{4}, +\infty)$

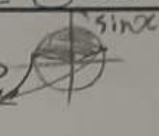
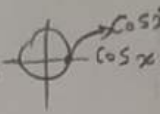
ب) $y = \sqrt{[x - \frac{1}{4}] + [-x + \frac{1}{4}]} \rightarrow [x - \frac{1}{4}] + [-x + \frac{1}{4}] \rightarrow [-x] + [x] \rightarrow$ 

$D_f = \{x = k + \frac{1}{4} \mid k \in \mathbb{Z}\}$

الف) $y = \frac{2}{\sin x - 1} \rightarrow \sin x - 1 \neq 0 \Rightarrow \sin x \neq 1 \Rightarrow \sin x \neq 1 \Rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

ب) $y = \frac{3}{2\sin^2 x - 1} \rightarrow 2\sin^2 x - 1 \neq 0 \Rightarrow 2\sin^2 x \neq 1 \Rightarrow \sin^2 x \neq \frac{1}{2} \Rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}} \Rightarrow \sin x \neq \pm \frac{\sqrt{2}}{2} \Rightarrow D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{4}\}$



الف) $y = \sqrt{2\sin x - 1} \rightarrow 2\sin x - 1 \geq 0 \rightarrow 2\sin x \geq 1 \rightarrow \sin x \geq \frac{1}{2} \rightarrow$  $D_f = \left[2k\pi + \frac{\pi}{6}, 2k + \frac{5\pi}{6} \right]$ ب) $y = \sqrt{\cos x - 1} \rightarrow \cos x - 1 \geq 0 \rightarrow \cos x \geq 1 \rightarrow$  $D_f = \{2k\pi\}$	6
الف) $\cos y = x - 2, -1 \leq \cos y \leq 1 \rightarrow -1 \leq x - 2 \leq 1 \rightarrow 2 \leq x \leq 4$ $D_f = [-4, -2] \cup [2, 4] \leftarrow \begin{cases} 2 \leq x \rightarrow D_f = (-\infty, 2] \cup [2, +\infty) \\ x \leq 4 \rightarrow D_f = [-4, 4] \end{cases}$ ب) $y = \arcsin(x^2 + 2x + 1), -1 \leq x^2 + 2x + 1 \leq 1 \rightarrow 0 \leq x^2 + 2x + 2 \leq 2$ $D_f = [-2, 0] \cup [0, 2] \leftarrow \begin{cases} D_f = (-\infty, -2] \cup [2, +\infty) \\ D_f = [-2, 0] \end{cases}$	7
الف) $y = \sqrt{2 - \log_2(x-2)} \rightarrow 2 - \log_2(x-2) \geq 0 \rightarrow 2 \geq \log_2(x-2) \rightarrow 2^2 \geq x-2 \rightarrow 4 \geq x-2 \rightarrow 6 \geq x$ $D_f = (2, 6]$ ب) $y = \log(x^2 - x) \rightarrow x^2 - x > 0$ $D_f = (-1, 0) \cup (1, +\infty)$	8
الف) $y = \frac{x}{x^2 + 1} \rightarrow x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1 \Rightarrow D_f = \mathbb{R}$ ب) $y = \frac{x}{x^2 - 1} \rightarrow x^2 - 1 \neq 0 \Rightarrow x^2 \neq 1 \Rightarrow x \neq \pm 1 \rightarrow D_f = \mathbb{R} - \{1, -1\}$ ج) $y = \frac{x}{x^2 - 2} \rightarrow x^2 - 2 \neq 0 \Rightarrow x^2 \neq 2 \rightarrow D_f = \mathbb{R} - \{\sqrt{2}, -\sqrt{2}\}$ د) $y = \frac{x}{x^2 - 3} \rightarrow x^2 - 3 \neq 0 \Rightarrow x^2 \neq 3 \rightarrow D_f = \mathbb{R} - \{\sqrt{3}, -\sqrt{3}\}$	9
الف) $y = (x+1)!$ $x+1 \in \mathbb{N} \Rightarrow x \in \mathbb{N} - 1 \Rightarrow x \in \frac{\mathbb{N}-1}{1} \Rightarrow D_f = \left\{ x = \frac{k-1}{1} \mid k \in \mathbb{N} \right\}$ ب) $y = \left(\frac{x-2}{x-5} \right)!$ $\frac{x-2}{x-5} \in \mathbb{N} \Rightarrow D_f = \left\{ x = \frac{\omega k - 2}{\omega k - 5} \mid k \in \mathbb{N} \right\}$	10