

الف) $y = \sqrt{2 \sinh x - 1} \Rightarrow 2 \sinh x \geq 1 \Rightarrow \sinh x \geq \frac{1}{2} \Rightarrow D_f = \left[2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2} \right]$	5
ب) $\sqrt{\cos x - 1} \Rightarrow \cos x \geq 1 \Rightarrow x = \{2k\pi\} \Rightarrow D_f = \{2k\pi\}$	6
الف) $\cos y = x - 3 \Rightarrow -1 \leq x - 3 \leq 1 \Rightarrow 2 \leq x \leq 4$ $\Rightarrow \begin{cases} 2 \leq x \leq 4 \\ -2 \geq x \geq -4 \end{cases} \quad D_f = [-4, -2] \cup [2, 4]$	
ب) $y = \arcsin(\sinh(x^2 + x + 1)) \Rightarrow -1 \leq \sinh(x^2 + x + 1) \leq 1 \Rightarrow \begin{cases} x^2 + x + 1 \leq 1 \\ x^2 + x + 1 \geq -1 \end{cases}$ $\Rightarrow \begin{cases} x^2 + x \leq 0 \Rightarrow x(x+1) \leq 0 \\ x^2 + x + 2 \geq 0 \Rightarrow (x+1)^2 + 1 > 0 \end{cases} \Rightarrow \frac{-1}{-1-1} \leq x \leq \frac{0}{-1-1} \Rightarrow D_f = [-\frac{1}{2}, 0]$	7
الف) $y = \sqrt{2 - \log_3^{x-2}} \Rightarrow 2 - \log_3^{x-2} \geq 0 \Rightarrow \log_3^{x-2} \leq 2 \Rightarrow x - 2 \leq 9$ $\Rightarrow x \leq 11, x > 2 \Rightarrow D_f = (2, 11]$	
ب) $y = \log_3^{x^2 - x} \Rightarrow x^2 - x > 0 \Rightarrow x(x-1) > 0 \Rightarrow \frac{-1}{-1+1} < x < \frac{0}{-1+1}$ $D_f = (-1, 0) \cup (1, \infty)$	8
الف) $y = \frac{x}{x^2 + 1} \Rightarrow D_f = \mathbb{R}$	
ب) $y = \frac{x}{x^2 - 1} \Rightarrow D_f = \mathbb{R} - \{0\}$	
ج) $y = \frac{x}{x^2 - 2} \Rightarrow D_f = \mathbb{R} - \{\log_3^2\}$	9
د) $y = \frac{x}{x^2 - 3} \Rightarrow D_f = \mathbb{R} - \{\log_3^3\}$	
الف) $y = (x^{k+1})! \Rightarrow x^{k+1} = k \Rightarrow x^k = k - 1 \Rightarrow x = \frac{k-1}{k}$ $D_f = \left\{ x \mid x = \frac{k-1}{k}, k \in \mathbb{N} \right\}$	
ب) $y = \left(\frac{x^2 - 2}{x^2 - \omega} \right)! \Rightarrow \frac{x^2 - 2}{x^2 - \omega} = k \Rightarrow x^2 - 2 = kx^2 - \omega k \Rightarrow x^2 - \frac{2}{k} = -\omega + \frac{\omega k}{k}$ $\Rightarrow (x^2 - 2)k = \omega k - 2 \Rightarrow x^2 = \frac{\omega k - 2}{k}$ $D_f = \left\{ x \mid x = \frac{\omega k - 2}{k}, k \in \mathbb{N} \right\}$	10

الف) $y = \sqrt{\frac{x^2 - x}{x^3 - x}} \Rightarrow \sqrt{\frac{x(x-1)}{x(x^2-1)}} \Rightarrow \frac{-1}{-1} + \frac{0}{0} + \frac{1}{1} + \frac{1}{1} + \frac{1}{1}$ $D_f = (-1, 0) \cup (0, 1) \cup [1, +\infty) \cup (-1, 1) \cup [1, +\infty) - \{0\}$ ب) $y = \sqrt{\frac{x^2 - x^3}{x^3 - x}} = \sqrt{\frac{x^2(x-1)(x-1)}{x(x^2-1)(x-1)}} \Rightarrow \frac{-1}{-1} + \frac{0}{0} + \frac{1}{1} + \frac{1}{1} + \frac{1}{1} \Rightarrow D_f = \mathbb{R} - \{1, 0, -1\}$	1
الف) $y = \frac{x+1}{\sqrt{x+1x}} \Rightarrow \frac{-1}{-1} + \frac{0}{0} + \frac{1}{1} \Rightarrow D_f = (0, +\infty)$ ب) $y = \frac{1}{\sqrt{x+1x}} \Rightarrow \sqrt{x+1x} \Rightarrow x > 0 \Rightarrow D_f = (0, +\infty)$	2
الف) $y = \sqrt{2-x} \Rightarrow 2-x \geq 0 \Rightarrow [x] \leq 2 \Rightarrow x \leq 2$ $D_f = (-\infty, 2]$ ب) $y = \frac{1}{\sqrt{2-x}} \Rightarrow 2-x > 0 \Rightarrow [x] < 2 \Rightarrow x < 2 \Rightarrow D_f = (-\infty, 2)$	3
الف) $y = \sqrt{[x-\frac{1}{p}] + [x+\frac{p}{p}]} \Rightarrow [x+\frac{p}{p}] = [x-\frac{1}{p}] + 1$ $2[x-\frac{1}{p}] + 1 \geq 0 \Rightarrow [x-\frac{1}{p}] \geq -\frac{1}{p} \Rightarrow x-\frac{1}{p} \geq 0 \Rightarrow x \geq \frac{1}{p}$ $D_f = [\frac{1}{p}, +\infty)$ ب) $y = \sqrt{[x-\frac{1}{p}] + [x+\frac{p}{p}]} = \sqrt{[a] + [a]} \Rightarrow [a] + [a] \geq 0 \Rightarrow \begin{cases} a \in \mathbb{Z} \Rightarrow [a] + [-a] = 0 \\ a \notin \mathbb{Z} \Rightarrow [a] + [-a] = -1 \end{cases}$ $x-\frac{1}{p} \in \mathbb{Z} \Rightarrow x-\frac{1}{p} = k \Rightarrow D_f = \{x \mid x = k + \frac{1}{p}, k \in \mathbb{Z}\}$	4
الف) $y = \frac{p}{\sin x - 1} \Rightarrow \sin x \neq 1 \Rightarrow x \neq 2k\pi + \frac{\pi}{2} \Rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2} \mid k \in \mathbb{Z}\}$ ب) $y = \frac{p}{2\sin x - 1} \Rightarrow 2\sin x \neq 1 \Rightarrow \sin x \neq \frac{1}{2} \Rightarrow \sin x \neq \pm \frac{\sqrt{3}}{2} \Rightarrow x = \frac{k\pi}{2} + \frac{\pi}{6}$ $D_f = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{6} \mid k \in \mathbb{Z}\}$	5