

الف) $y = \sqrt{r \sin u - 1}$ $r \sin u - 1 \geq 0 \Rightarrow r \sin u \geq 1 \Rightarrow \sin u \geq \frac{1}{r}$ $\Rightarrow \left\{ 2\pi k + \frac{\pi}{r}, 2\pi k + \frac{3\pi}{r} \right\}$  <u>1, 5</u> ✓	ب) $y = \sqrt{\cos u - 1}$ $\cos u - 1 \geq 0 \Rightarrow \cos u \geq 1 \Rightarrow \{2\pi k\}$ 6		
الف) $\cos y = u - 2$ $-1 \leq u - 2 \leq 1 \Rightarrow 1 \leq u \leq 3 \Rightarrow 1 \leq u \leq 3$ $-3 \leq u \leq -1$ <u>1, 5</u>	ب) $y = \arcsin(u^2 + 3u + 1)$ $-1 \leq u^2 + 3u + 1 \leq 1 \Rightarrow [-2, -1] \cup [1, 0]$ $u^2 + 3u + 2 \geq 0 \Rightarrow (u+1)(u+2) \geq 0 \Rightarrow u \leq -2, u \geq -1$ $u^2 + 3u + 1 \leq 1 \Rightarrow -2 \leq u \leq 0$ $u^2 + 3u \leq 0 \Rightarrow u(u+3) \leq 0 \Rightarrow -3 \leq u \leq 0$ 7		
الف) $y = \sqrt{2 - \log_p(u-2)} \Rightarrow u-2 > 0 \Rightarrow u > 2$ $2 - \log_p(u-2) \geq 0 \Rightarrow \log_p(u-2) \leq 2 \Rightarrow u-2 \leq p^2$ $u \leq 11$ $D_y = (2, 11]$ <u>1, 5</u> ✓	ب) $y = \log(u^3 - u)$ $u^3 - u > 0 \Rightarrow u(u^2 - 1) > 0$ $u(u-1)(u+1) > 0$ $\frac{-1}{-1} \frac{0}{0} \frac{1}{1} \Rightarrow (-1, 0) \cup (1, \infty)$ 8		
الف) $y = \frac{r}{r^u + 1}$ $r^u \neq -1 \Rightarrow b_f = R$	ب) $y = \frac{r}{r^u - 1}$ $r^u - 1 \neq 0 \Rightarrow r^u \neq 1$ $D = R - \{0\}$ (2) ✓	ج) $\frac{r}{r^u - 2}$ $r^u - 2 \neq 0 \Rightarrow r^u \neq 2$ $\log_r 2 \Rightarrow D = R - \{\log_r 2\}$	د) $y = \frac{r}{r^u - r}$ $r^u - r \neq 0 \Rightarrow r^u \neq r$ $\log_r r \Rightarrow D = R - \{1\}$ 9
الف) $y = (k+1)! \Rightarrow k+1 \in \mathbb{N}$ $k \in \mathbb{N} - 1 \Rightarrow k \in \frac{\mathbb{N}-1}{r} \Rightarrow D = \{u/k = \frac{k-1}{r}, k \in \mathbb{N}\}$ (2) ✓	ب) $y = \left(\frac{r^u - r}{r^u - \omega} \right)!$ $\frac{r^u - r}{r^u - \omega} \in \mathbb{N} \Rightarrow r^u - r \in (r^u - \omega)\mathbb{N}$ $r^u - r = \omega \mathbb{N} \Rightarrow u = \frac{r - \omega \mathbb{N}}{r - r \mathbb{N}}$ $D = \{u/k = \frac{r - \omega k}{r - rk}, k \in \mathbb{N}\}$ 10		