

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