

$$\left\{ \cos \left(\frac{1}{2} \tan^{-1} \left(-\frac{n}{2} \right)^n \right) \right\}$$

$$\Rightarrow \cos \left\{ \frac{1}{2} \left(\tan^{-1} \left(-\frac{n}{2} \right)^n \right) \right\}$$

$$\therefore \cos(-\theta) = \cos \theta$$

$\therefore \left(\frac{n}{2} \right)^n$ is a monotonic increasing sequence and $\tan^{-1} \left(\frac{n}{2} \right)^n$ is also monotonic increasing on interval $(0, \frac{\pi}{2})$

$\therefore \left(\cos \left(\frac{1}{2} \tan^{-1} \left(\frac{n}{2} \right)^n \right) \right)$ is also $\uparrow$ monotonic decreasing

