21. If $2\sin^{-1}x + \{\cos^{-1}x\} > \frac{\pi}{2} + \{\sin^{-1}x\}$, then $x \in$: (where $\{\cdot\}$ denotes fractional part function)

(a) $(\cos 1, 1]$ (b) $[\sin 1, 1]$ (c) $(\sin 1, 1]$ (d) None of these

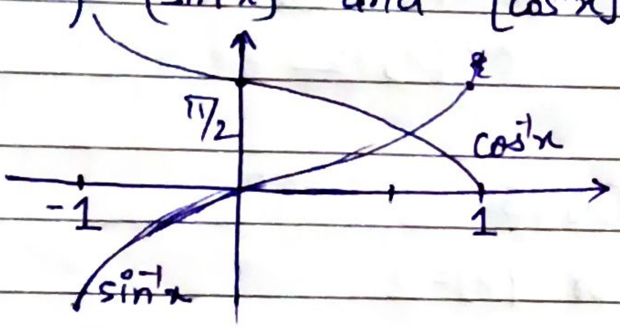
$$2\sin^{-1}x + \{\cos^{-1}x\} > \frac{\pi}{2} + \{\sin^{-1}x\}$$

$$\Rightarrow \sin^{-1}x + \sin^{-1}x + \cos^{-1}x - [\cos^{-1}x] > \frac{\pi}{2} + \sin^{-1}x - [\sin^{-1}x]$$

$$\Rightarrow \sin^{-1}x + \pi/2 - [\cos^{-1}x] > \pi/2 + \sin^{-1}x - [\sin^{-1}x]$$

$$\Rightarrow [\sin^{-1}x] > [\cos^{-1}x].$$

from the graphs of $\sin^{-1}x$ and $\cos^{-1}x$, plot the graphs of $[\sin^{-1}x]$ and $[\cos^{-1}x]$.

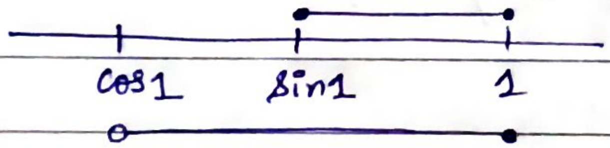


$$[\sin^{-1}x] = \begin{cases} -2 & -1 \leq x < -\sin 1 \\ -1 & -\sin 1 \leq x < 0 \\ 0 & 0 \leq x < \sin 1 \\ 1 & \sin 1 \leq x \leq 1 \end{cases}$$

$$[\cos^{-1}x] = \begin{cases} 3. & -1 \leq x \leq \cos 3 \\ 2 & \cos 3 < x \leq \cos 2 \\ 1 & \cos 2 < x \leq \cos 1 \\ 0 & \cos 1 < x \leq 1. \end{cases}$$

So, $[\sin^{-1}x) > [\cos^{-1}x)$ is only possible when $[\sin^{-1}x] = 1$ & $[\cos^{-1}x] = 0$

$\therefore\ x \in [\sin 1, 1]$ & $x \in (\cos 1, 1]$



$\therefore\ x \in [\sin 1, 1]$ is the answer.

Note: This is a kind of deeply analytical question. Try to observe and make conclusions.