20. Domain (D) and range (R) of $f(x) = \sin^{-1}(\cos^{-1}[x])$ where [ ] denotes the greatest integer function is

(a) $D \equiv [1, 2), R \equiv \{0\}$

(b) $D \equiv [0, 1), R \equiv \{-1, 0, 1\}$

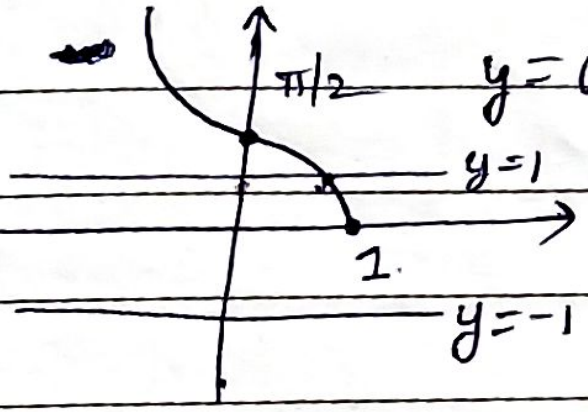
(c) $D \equiv [-1, 1), R \equiv \left\{0, \frac{\pi}{2}, \pi\right\}$

(d) $D \equiv [-1, 1), R \equiv \left\{-\frac{\pi}{2}, 0, \frac{\pi}{2}\right\}$

$\sin^{-1}(\cos^{-1}[x])$

for definition of function, $-1 \leq \cos^{-1}[x] \leq 1$

and $-1 \leq [x] \leq 1$.



from the graph, observe that

$\cos^{-1}[x] \in [-1, 1]$

when $[x] \in [\cos 1, 1]$.

$\therefore [x] = 1$ [$\because [x]$ is integer] — (1)

Also, $-1 \leq [x] \leq 1$.

$\Rightarrow -1 \leq x < 2$ — (2)

from (1) and (2), we have, $\boxed{1 \leq x < 2}$

Now, $[x] = 1$.

Range $= \sin^{-1}(\cos^{-1}(1)) = \sin^{-1}(0) = 0$

$\therefore$ Range is singleton.

$D = [1, 2)$ $R = \{0\}$.