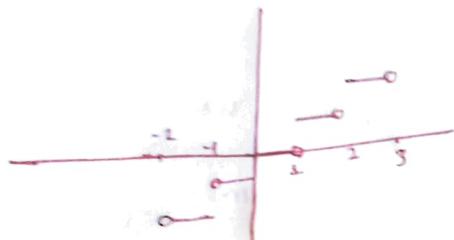


$$f(x) = \begin{cases} \frac{\sin[x]}{[x]+1} & \text{for } x > 0 \\ \frac{\cos\left(\frac{\pi}{2}[x]\right)}{[x]} & ; x < 0 \\ k & x = 0 \end{cases}$$

" Graph of greatest integer x



Left hand limit (LHL)

$$\text{LHL} = \lim_{h \rightarrow 0} f(0-h) = \lim_{h \rightarrow 0} \frac{\cos\left(\frac{\pi}{2}[0-h]\right)}{[0-h]}$$

$$\left\{ \begin{array}{l} \because \\ [0-h] = -1-h \end{array} \right.$$

$$= \lim_{h \rightarrow 0} \frac{\cos\left(\frac{\pi}{2}(-1+h)\right)}{(-1+h)}$$

$$= \frac{\cos\left(\frac{\pi}{2}(-1)\right)}{-1} = 0$$

$$\text{LHL} = 0$$

Right hand limit (RHL) $\text{RHL} = \lim_{h \rightarrow 0} f(0+h) = \lim_{h \rightarrow 0} \frac{\sin[0+h]}{[0+h]+1}$

$$= \lim_{h \rightarrow 0} \frac{\sin(0)}{0+1}$$

$$\text{RHL} = 0$$

f is continuous at $x=0$ so $\text{LHL} = \text{RHL} = f(0)$

$$\Rightarrow 0 = 0 = k$$

$$\Rightarrow \boxed{k=0}$$