

$$\begin{aligned}
 & \lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos(x+\cos x)}{\sin x} = |\text{the limit of quotient}| = \\
 &= \frac{\lim_{x \rightarrow \frac{\pi}{2}} \cos(x+\cos x)}{\lim_{x \rightarrow \frac{\pi}{2}} \sin x} \\
 &= \left| \begin{array}{l} \text{functions } \sin x \text{ and } \cos x \text{ are continuous,} \\ \text{we also use the limit of the sum of functions} \end{array} \right| = \\
 &= \frac{\cos\left(\frac{\pi}{2}+0\right)}{\sin\left(\frac{\pi}{2}\right)} = \frac{0}{1} = 0
 \end{aligned}$$