BY GIMUSI 21/05/2015

(1^{∞})

$$\lim_{x\to 0} \cos x^{\left(\frac{1}{\operatorname{sen} x}\right)} = 1$$

INFATTI:

$$\cos x^{\left(\frac{1}{\operatorname{sen} x}\right)} = e^{\log \cos x^{\left(\frac{1}{\operatorname{sen} x}\right)}} = e^{\frac{\log \cos x}{\operatorname{sen} x}}$$

$$\lim_{x\to 0} \cos x^{\left(\frac{1}{\operatorname{sen} x}\right)} = \lim_{x\to 0} e^{\frac{\log \cos x}{\operatorname{sen} x}} = e^{0} = 1$$

INFATTI:

$$\left(\frac{0}{0}\right)$$

$$\lim_{x\to 0} \frac{\log \cos x}{\operatorname{sen} x} \overset{(H)}{=} \lim_{x\to 0} \frac{-\operatorname{tg} x}{\cos x} = 0$$

CON LIMITI NOTEVOLI:

$$\frac{\log \cos x}{\operatorname{sen} x} = \frac{1}{2}\frac{\log \cos^2 x}{\operatorname{sen} x} = \frac{1}{2}\frac{\log(1-\operatorname{sen}^2 x)}{\operatorname{sen}^2 x}\cdot \operatorname{sen} x$$

$$\rightarrow \lim_{x\to 0} \frac{\log \cos x}{\operatorname{sen} x} = \lim_{\sigma\to 0} \frac{1}{2}\underbrace{\frac{\log(1-\sigma^2)}{\sigma^2}}_{\to -1}\cdot \underbrace{\sigma}_{\to 0} = 0$$