Límite por L'Hopital

ByteMarket

$$\lim_{x\to 0} \frac{\ln(x)}{\cot(x)} = \frac{\ln(0)}{\cot(0)} = \frac{\infty}{\infty}$$

$$\overset{L'}{=} \lim_{x\to 0} \frac{\frac{1}{x}}{-\csc^2(x)} = \frac{\frac{1}{0}}{-\csc^2(0)} = \frac{\infty}{\infty}$$

* $\frac{d}{dx}\ln(x) = \frac{1}{x}$
* $\frac{d}{dx}\cot(x) = -\csc^2(x)$

$$\overset{L'}{=} \lim_{x\to 0} \frac{1}{-x\csc^2(x)}$$

$$\overset{L'}{=} \lim_{x\to 0} -\frac{1}{x}\cdot\frac{1}{\csc^2(x)}$$

* $\operatorname{sen}^2 x = \frac{1}{\csc^2 x}$

$$\overset{L'}{=} \lim_{x\to 0} -\frac{1}{x}\cdot \operatorname{sen}^2(x)$$

* $\frac{\operatorname{sen}(x)}{x} = 1$

$$\overset{L'}{=} \lim_{x\to 0} -\frac{\operatorname{sen}(x)}{x}\cdot \operatorname{sen}(x)$$

$$\lim_{x\to 0}\left\{-1\cdot \operatorname{sen}(0)\right\} = -1\,(0) = \underline{0}$$