

When do
you use

L'Hospitals Rule?

How do you use it?

You use L'Hospitals Rule when
you have an indeterminate
form of a limit.

Examples:

$$\frac{0}{0}, \frac{\infty}{\infty}, \infty - \infty, 0^0, \infty^0$$

To use: You must have a fraction or
"force" a fraction.

Then you take a derivative of the
top/bottom separately & retry limit
You might have to do this process several
times.

Find

$$\lim_{x \rightarrow \infty} \frac{\ln(x^4 + 1)}{x}$$

$$\lim_{x \rightarrow \infty} \frac{\ln(x^4 + 1)}{x} \frac{\infty}{\infty} = \lim_{x \rightarrow \infty} \frac{[\ln(x^4 + 1)] \frac{d}{dx}}{[x] \frac{d}{dx}}$$

$$\lim_{x \rightarrow \infty} \frac{1 \cdot (4x^3)}{x^4 + 1} = \lim_{x \rightarrow \infty} \frac{4x^3}{x^4 + 1} \frac{\infty}{\infty}$$

$$\lim_{x \rightarrow \infty} \frac{[4x^3] \frac{d}{dx}}{[x^4 + 1] \frac{d}{dx}} = \lim_{x \rightarrow \infty} \frac{12x^2}{4x^3} = \lim_{x \rightarrow \infty} \frac{3}{x}$$

$$= \boxed{0}$$