

Taller Aut6nomo:
Actividad Aut6noma #2

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$$1) \lim_{x \rightarrow \infty} \left[\ln \left(\frac{3x+1}{3x-5} \right)^{2-x} \right]$$

$$\lim_{x \rightarrow \infty} (2-x) \ln \left(\frac{3x+1}{3x-5} \right)$$

$$\lim_{x \rightarrow \infty} (2-x) (\ln(3x+1) - \ln(3x-5))$$

$$\lim_{x \rightarrow \infty} 2 \ln(3x+1) - 2 \ln(3x-5) - x \ln(3x+1) + x \ln(3x-5)$$

$$\lim_{x \rightarrow \infty} +\infty$$

$$2) \lim_{x \rightarrow \infty} x [\ln(x+3) - \ln x]$$

$$\lim_{x \rightarrow \infty} x [\ln(x) + \ln(3) - \ln(x)]$$

$$\lim_{x \rightarrow \infty} x \ln 3 + x \ln 3 - x \ln x$$

$$\lim_{x \rightarrow \infty} x \ln 3$$

$$\lim_{x \rightarrow \infty} \infty \cdot k$$

$$\lim_{x \rightarrow \infty} +\infty$$

$$3) \lim_{x \rightarrow \infty} x [\ln x - \ln(x+2)]$$

$$\lim_{x \rightarrow \infty} x [\ln x - \ln x - \ln 2]$$

$$\lim_{x \rightarrow \infty} x \ln x - x \ln x - x \ln 2$$

$$\lim_{x \rightarrow \infty} -x \ln 2$$

$$\lim_{x \rightarrow \infty} -\infty$$

$$4) \lim_{x \rightarrow \infty} (x+1) [\ln(x+1) - \ln x]$$

$$\lim_{x \rightarrow \infty} (x+1) [\ln x + \ln 1 - \ln x]$$

$$\lim_{x \rightarrow \infty} x \ln 1 + \ln 1$$

$$\lim_{x \rightarrow \infty} \infty + K$$

$$\lim_{x \rightarrow \infty} \infty$$

$$5) \lim_{x \rightarrow 0} \left(\frac{\ln x}{\ln(\sin x)} \right)$$

$$\lim_{x \rightarrow 0} \frac{\frac{d}{dx} \ln x}{\frac{d}{dx} \ln(\sin x)}$$

$$\lim_{x \rightarrow 0} \frac{\frac{1}{x}}{\frac{1}{\sin x} \cdot \frac{d}{dx} \sin x}$$

$$\lim_{x \rightarrow 0} \frac{\frac{1}{x}}{\frac{1}{\sin x} \cdot \cos x}$$

$$\lim_{x \rightarrow 0} \frac{\frac{1}{x}}{\frac{\cos x}{\sin x}}$$

$$\lim_{x \rightarrow 0} \frac{1}{x \cdot \cos x \cdot \sin x}$$

$$\lim_{x \rightarrow 0} \frac{1}{\cos(0)}$$

$$\lim_{x \rightarrow 0} \frac{1}{1}$$

$$= 1$$

$$6) \lim_{x \rightarrow 0} \frac{\ln(\sin 2x)}{\ln(\sin x)} \rightarrow \text{L'Hopital}$$

$$\lim_{x \rightarrow 0} \frac{2 \cot(2x)}{\cot(x)}$$

$$\lim_{x \rightarrow 0} \frac{2 \cos 2x}{\sin 2x} \cdot \frac{\cos x}{\sin x}$$

$$\lim_{x \rightarrow 0} \frac{2 \cos 2x}{2 \sin x \cos x} \cdot \frac{\cos x}{\sin x}$$

$$\lim_{x \rightarrow 0} \frac{2 \cos 2x}{2 \sin x \cos^2 x}$$

$$\lim_{x \rightarrow 0} \frac{\cos 2x}{\cos^2 x}$$

$$\lim_{x \rightarrow 0} \frac{\cos 2(0)}{\cos^2(0)}$$

$$\lim_{x \rightarrow 0} = 1$$

$$\frac{d}{dx} \ln(\sin(2x))$$

$$\frac{d \ln(u)}{du} \cdot \frac{d \sin(2x)}{dx}$$

$$\frac{1}{u} \cdot \frac{d \sin(u)}{du} \cdot \frac{d 2x}{dx}$$

$$\frac{1}{\sin(2x)} \cdot \cos(u) \cdot 2$$

$$\frac{d \ln(u)}{du} \cdot \frac{d \sin x}{dx}$$

$$\frac{1}{u} \cdot \cos x$$

$$\frac{1}{\sin x} \cdot \cos x$$