

Unit 13

$$\lim_{x \rightarrow 0} \frac{\tan x}{x} = \lim_{x \rightarrow 0} \frac{\sec^2 x}{1} = 1$$

$$\lim_{x \rightarrow 0} x \log x = \lim_{x \rightarrow 0} \frac{\log x}{\frac{1}{x}} = \lim_{x \rightarrow 0} \frac{1/x}{-1/x^2} = \lim_{x \rightarrow 0} -x = 0$$

$$\lim_{x \rightarrow \infty} \frac{\log(x)}{x} = \lim_{x \rightarrow \infty} \frac{1/x}{x^2} = \lim_{x \rightarrow \infty} \frac{1}{x^3} = 0$$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{e^{3x} - 1} = \lim_{x \rightarrow 0} \frac{e^x}{3e^{3x}} = \frac{1}{3}$$

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} = \lim_{x \rightarrow 0} \frac{-\sin x}{2x} = -\frac{1}{2}$$

$$\lim_{x \rightarrow 0} \frac{e^{x^2} - 1}{e^x - 1} = \lim_{x \rightarrow 0} \frac{2x e^{x^2}}{e^x} = 0$$

Jam:

First always check when we need to use l'Hospital at all!

