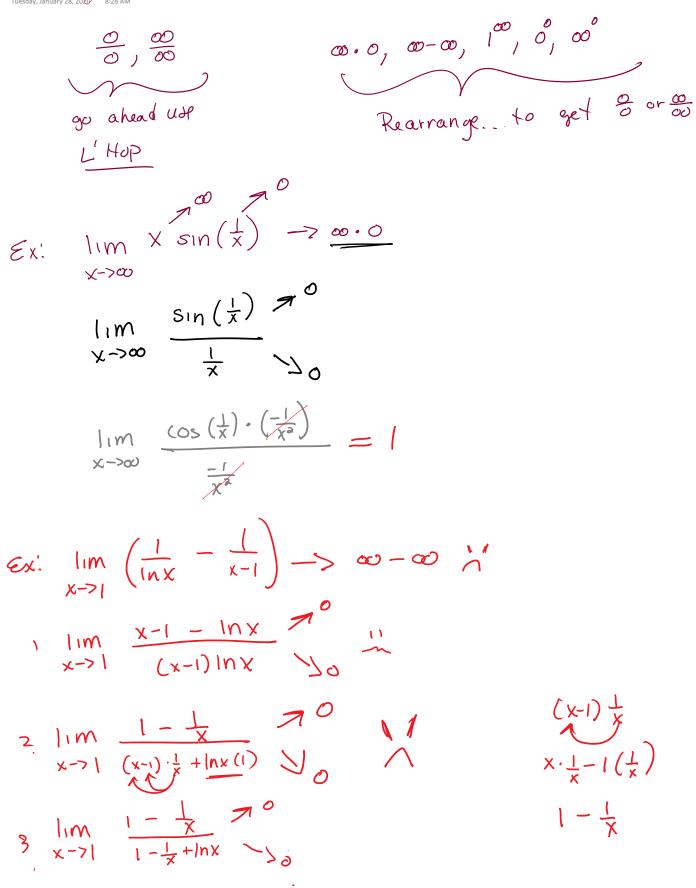
9. 2 Day 2 Tuesday, January 28, 2020 8:28 AM L'Hopital's Rule



$$4 \lim_{X \to 1} \frac{\frac{1}{X^2}}{\frac{1}{X^2} + \frac{1}{X}} = \frac{1}{\frac{1}{1 + \frac{1}{1}}} = \frac{1}{1 + 1} = \frac{1}{2}$$

Think...

$$e^{\ln f(x)} = f(x)$$
recall $b^{\log_b x} = x$

$$e^{\ln x} = x$$
So $\lim_{x \to a} \ln f(x) = L \Rightarrow \lim_{x \to a} f(x) = \lim_{x \to a} e^{\ln x} = e^{L}$
Ex' $\lim_{x \to \infty} (1 + \frac{L}{x})^x \longrightarrow 1^\infty$

$$f(x) = (1 + \frac{L}{x})^x$$

$$\ln f(x) = \ln (1 + \frac{L}{x})^x$$

$$\lim_{x \to \infty} x \ln (1 + \frac{L}{x}) \longrightarrow \infty \cdot 0$$

$$\lim_{x \to \infty} \frac{\ln (1 + \frac{L}{x})}{\frac{L}{x}} \Rightarrow \infty$$

 $\lim_{x \to \infty} \frac{1}{1+\frac{1}{x}} \cdot \frac{-1}{x^2} = 1$ e'