

Name: SOLUTIONS

Quiz #5 - February 9, 2007

1. Find the limit, using l'Hospital's rule only if appropriate:

$$\lim_{x \rightarrow \infty} \frac{x}{\ln(1 + 2e^x)}$$

$$\begin{aligned} \underline{\text{L.H.R.}} \quad \lim_{x \rightarrow \infty} \frac{1}{\frac{2e^x}{1+2e^x}} &= \lim_{x \rightarrow \infty} \frac{1+2e^x}{2e^x} \stackrel{\text{L.H.R.}}{=} \lim_{x \rightarrow \infty} \frac{2e^x}{2e^x} \\ &= 1 \end{aligned}$$

2. Find the limit, using l'Hospital's rule only if appropriate:

$$\lim_{x \rightarrow \infty} (xe^{1/x} - x)$$

$$\begin{aligned} &= \lim_{x \rightarrow \infty} x(e^{1/x} - 1) = \lim_{x \rightarrow \infty} \frac{e^{1/x} - 1}{1/x} = \lim_{x \rightarrow \infty} \frac{-\frac{1}{x^2} e^{1/x}}{-1/x^2} \\ &= \lim_{x \rightarrow \infty} e^{1/x} = 1 \end{aligned}$$

3. Find the limit, using l'Hospital's rule only if appropriate:

$$\lim_{x \rightarrow \pi/2^+} \frac{\cos x}{1 - \sin x}$$

$$\underline{\text{L.H.R.}} \quad \lim_{x \rightarrow \pi/2^+} \frac{-\sin x}{-\cos x} = \lim_{x \rightarrow \pi/2^+} \tan x = -\infty$$

↑  
L.H.R. does not apply, this is not type  $\frac{0}{0}$  or  $\frac{\infty}{\infty}$