

Quiz #8a: Sections 8.1 & 8.2

CALCULATE THE FOLLOWING LIMITS

If the limit does not exist, explain/show why.
Show all work to get full credit. Simplify all answers.

5 pts. 1. $\lim_{x \rightarrow 0} \frac{4x}{\tan x} = \frac{0}{0}$

$\stackrel{\textcircled{L}}{=} \lim_{x \rightarrow 0} \frac{4}{\sec^2 x} = \frac{4}{1} = 4$

5 pts. 2. $\lim_{x \rightarrow 0} \frac{\cos x}{x^2} = \frac{1}{0} = \infty$

Don't forget the back! \Rightarrow

5 pts. 3. $\lim_{x \rightarrow \infty} \frac{\ln x}{x^2} = \frac{\infty}{\infty}$

~~$\stackrel{\textcircled{L}}{=} \lim_{x \rightarrow \infty} \frac{\frac{1}{x}}{2x} = \lim_{x \rightarrow \infty} \frac{1}{2x^2} = -\infty$~~

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

5 pts. 4. $\lim_{x \rightarrow \infty} x^{1/x} = \infty^0$

Let $y = x^{1/x}$

$\ln y = \frac{1}{x} \ln x$

$\lim_{x \rightarrow \infty} \frac{\ln x}{x} = \frac{\infty}{\infty}$

$\stackrel{\textcircled{L}}{=} \lim_{x \rightarrow \infty} \frac{\frac{1}{x}}{1} = 0$

$\Rightarrow \lim_{x \rightarrow \infty} x^{1/x} = \lim_{x \rightarrow \infty} e^{\ln x / x} = e^0 = 1$

Points earned: _____ out of a possible 20 points