Quiz 9
October 30, 2013

Name: **Key**

Section: 005 / 006 (circle one)

1. (6 points) Find the limit. Indicate each time l'Hôpital's Rule is applied.

(a) $\lim\limits_{x\to 1} \dfrac{1 - x + \ln(x)}{1 + \cos\left(\frac{\pi x}{2}\right)}$ $= \dfrac{1-1+0}{1+0} = \dfrac{0}{1} = 0$

$\smile$ not an indeterminate form!

$\ln(1) = 0$

$\cos\left(\frac{\pi}{2}\right) = 0$

(b) $\lim\limits_{x\to 0} \dfrac{x}{\arctan(4x)}$ $\overset{\frac{0}{0}}{=} \lim\limits_{x\to 0} \dfrac{1}{\frac{4}{1+(4x)^2}}$

$\arctan(0) = 0$

$= \dfrac{1}{\frac{4}{1+0^2}} = \dfrac{1}{4}$

(c) $\lim\limits_{x\to\infty} x\sin\left(\dfrac{\pi}{x}\right) = \lim\limits_{x\to\infty} \dfrac{\sin\left(\pi/x\right)}{1/x} \overset{\frac{0}{0}}{=} \lim\limits_{x\to\infty} \dfrac{\cos\left(\pi/x\right)\cdot -\pi/x^2}{-1/x^2}$

$\sin(0) = 0$

$\cos(0) = 1$

$= \lim\limits_{x\to\infty} \dfrac{+\pi\cos\left(\pi/x\right)}{1} = \pi.$

2. (4 points) List the eight specific Guidelines that we use to draw a sketch of the graph of a function that shows the most important aspects of the function.

A. Domain

B. Intercepts

C. Symmetry

D. Asymptotes

E. Intervals of Increasing/Decreasing

F. Local Max/Min.

G. Concavity & Inflection Pts.

H. Sketch the graph