Math 171 - Quiz 2

September 2, 2010

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Use a table of values to estimate the following limit. Your table must show function values at six or more points.

$$\lim_{x\to 0} \frac{\tan 3x}{5x\cos x} \approx 0.6$$

x	y
±0.1	0.621779
±0.01	0.600210
±0.001	0.6000021

$\frac{\tan 3x}{5x\cos x}$ IS AN EVEN FUNCTION. I'LL SHOW ± VALUES SIMULTANEOUSLY

2. (2 points) Why can't the limit laws be used to evaluate the following limit? Use a graph or table (you need not show work) to estimate the limit.

$$\lim_{x\to 3} \frac{2x^2-18}{x-3} = 12$$

THE LIMIT OF THE DENOMINATOR IS $\lim_{x\to 3}(x-3) = 0$.

LIMIT LAWS DON'T APPLY.

3. (3 points) Evaluate each limit analytically. DO NOT USE A CALCULATOR.

(a) $\lim_{x\to 4}(5\sqrt{x} - \sin(\pi x) + x^2 - 1)$

$= 5\sqrt{4} - \sin 4\pi + 4^2 - 1 = 10 - 0 + 16 - 1 = \boxed{25}$

(b) $\lim_{x\to 1} \frac{x^5 - 7x}{2x^2 - x} = \frac{1^5 - 7(1)}{2(1)^2 - 1} = \frac{-6}{1} = \boxed{-6}$

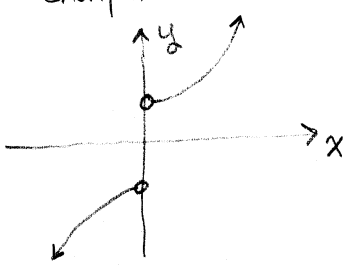
4. (2 points) In which of the four ways does the following limit fail to exist? Briefly explain your reasoning.

$$\lim_{x\to 0} \frac{(x^3+1)|x|}{x}$$

TABLE:

x	y
-0.1	-0.999
-0.01	-0.999999
0.1	1.001
0.01	1.000001

GRAPH:



LIMIT AT X=0 FROM THE LEFT IS NOT EQUAL TO THE LIMIT FROM THE RIGHT.