Math 211 Spring 2007

Exam I S. Bolotin

Your Name: _____

Your TA: _____

Your Section Meeting time: _____

PROBLEM	POINTS	SCORE
I	20	
II	20	
III	20	
IV	20	
V	20	
TOTAL	100	

Show all your work. No work – no credit. Leave your answers in exact forms (using e, $\ln 2$, $\sqrt{2}$ and similar numbers). Circle your answer. You may use the last page as scratch paper, but it will not be checked. Hand in your exam to your TA.

I. (20 points) Find each limit, if it exists, or show that the limit does not exist.

(a) $\lim_{x \to 2} \dfrac{x-2}{x^2+x-6}$

(b) $\lim_{x \to -3} \dfrac{x-2}{x^2+x-6}$

(c) $\lim_{x \to 0} (1+2x)^{1/x}$.

II. (20 points) Let $f(x) = \dfrac{x^2}{x^2 - 5x + 6}$. Find vertical and horizontal asymptotes of the graph $y = f(x)$ and sketch the graph.

III. (20 points) Using the definition of the derivative as a limit

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

find $f'(x)$ for the function $f(x) = \dfrac{1}{x+1}$.

IV. (20 points) (a) Using appropriate rules, find $f'(x)$ for the function $f(x) = 2/x + 2\sqrt{x^5} - 3x^{1/3}$.

(b) Find an equation for the tangent line to the graph $y = 2/x + 2\sqrt{x^5} - 3x^{1/3}$ at the point $x = 1$, $y = 1$.

V. (20 points) Suppose you put \$1000 in a CD account paying an annual interest rate 8%. Find how long it will take for the amount of money to reach \$3000 if the interest is compounded:

(a) 8 times a year

(b) continuously