MATH 211 (LECTURE 1)

EXAM 1

Instructions: Show all work. Partial work may lead to partial credit; an answer (even correct) without work will receive no credit. No references allowed.

(1) (10 pts) What is the slope of the line passing through the points $(2,3)$ and $(3,2)$? Write its equation in the form $y = mx + b$.

(2) (15 pts) Find the natural domain of the function $f(x) = \frac{\sqrt{x}}{x-2}$.

(3) (15 pts) Let $f(x) = x^2 + x - 2$.

(a) For what values of x do we have $f(x) = 0$?

(b) For what values of x do we have $f(x) < 0$?

(4) (20 pts) Find the following limits:

(a) $\lim_{x\to 2^+} \frac{x-1}{x-2}$.

(b) $\lim_{x\to 2^-} \frac{x-1}{x-2}$.

(c) $\lim_{x\to -1} \frac{x^2-1}{x+1}$.

(d) $\lim_{x\to \infty} \frac{x-1}{x^2-3x+2}$.

(5) (15 pts) Find the vertical and horizontal asymptotes, if there are any, of the following function. If there are none, say so.

$$f(x) = \frac{5x^3 + 4x^2 - 7x + 3}{x^3 - 1}.$$

(6) (10 pts) Two functions $f(x)$ and $g(x)$ are known to be continuous on the interval $[0,3]$. The following table gives their values at several points:

x	0	1	2	3
$f(x)$	2	5	-8	-9
$g(x)$	-7	-9	-13	-0.5

Which of these functions is certain to have a root in $[0,3]$? Explain.

Date: February 1st 2006.

(7) (15 pts) A police survey of speeding violations on highway Z-47 shows that when the fine for speeding is 150$ there are 50 violations a day on average, and when the fine is 200$ the number of daily violations is 30.

Assuming the number of violations is a linear function of the fine:

(a) Write the number of daily violations V as a function of the fine F.

(b) How many violations a day would there be if there were no fine?

(c) How high should the fine be to get the number of violations to 10 per day?