V1

1	2	3	4	5	6

Last Name:_____

First Name:_____

ID:_____ Section:____

Math 1271 Midterm #1. February 14, 2003

Attention! Please, note that this is the closed book test. You are not allowed to use graphing calculator. Simple calculators are allowed. Please, show all important steps in you solution but do not make your solution excessively long.

1. Consider one-sided limits at $x = 1$ to show that

$$\lim_{x \to 1} \frac{|x-1|}{x^2-1} \qquad \text{does not exist.}$$

2. Prove using ε–δ definition of the limit that

$$\lim_{x \to 3}(x^2 - 4) = 5.$$

3. Evaluate limit

$$\lim_{x\to 0} \frac{x}{\sqrt{1-x}-\sqrt{1+x}}.$$

4. Evaluate limit at infinity

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

5. It is known that the function $f(x)$ satisfies the following inequality

$$|f(x)| < x^2.$$

Use the Squeese Theorem to prove that

$$\lim_{x \to 0} f(x) = 0.$$

6. Use definition of the derivative to find the derivative at $x = 2$ of the function

$$f(x) = \frac{1}{x^2}.$$

(Comment: you are NOT allowed to use the Power Rule in this problem. Use one of the definitions for the derivative of a function at a point.)