V1

1	2	3	4	5	6

Last Name:_____

First Name:_____

ID:_____ Section:____

Math 150A Midterm #1. February 17, 2006

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. a) (4pt) Find the domain of the function

$$f(x) = \sqrt{1-x}.$$

b) (4pt) Find the domain of the function

$$g(x) = \frac{1}{x^2-4}.$$

c) (7pt) Find the domain of the composite function $(g \circ f)(x)$.

2. (20pt) Prove by ε–δ argument that

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

3. Evaluate the following limits

a) (5pt)

$$\lim_{x\to 2} \frac{x^5 - 1}{3x + 4};$$

b) (5pt)

$$\lim_{x\to -1} \frac{x^2 - 1}{x^2 - 4x - 5};$$

c) (5pt)

$$\lim_{x\to 2} \frac{\sqrt{6 - x} - \sqrt{2 + x}}{2 - x}.$$

4. Find trigonometric limits or indicate why the limit does not exist.

a) (5pt)

$$\lim_{x\to\pi} \frac{\cos x - 1}{\sqrt{\sin x + 9}};$$

b) (7pt)

$$\lim_{x\to 0} \frac{1 - \cos 2x}{\tan^2 x};$$

c) (8pt)

$$\lim_{x\to 0} \frac{x}{x + \sin x}.$$

5. Find infinite limits (include support in your answer)

a) (5pt)

$$\lim_{x\to -1} \frac{1}{x^2+2x+1};$$

b) (5pt)

$$\lim_{x\to 4^-} \frac{1}{x^2-3x-4};$$

c) (5pt)

$$\lim_{x\to 3^+} \frac{\sqrt{x-3}}{2-\sqrt{x+1}}.$$

6. a) (5pt) Determine whether the function is odd, even, or neither.

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

b) (5pt) Determine whether the function is odd, even, or neither.

$$g(x) = x^3 + \frac{1}{x}.$$

c) (5pt) Determine whether the function is odd, even, or neither.

$$h(x) = x^2 - 1.$$