Name:_____

Test 1
Spring 2007
MTH121 Section 02
February 2, 2002

Directions : You have 50 minutes to complete all 5 problems on this exam. There are a possible 100 points to be earned. You may not use your book, notes, or any graphing/programmable calculator. Please be sure to show all pertinent work. *An incorrect answer with no work will receive no credit!* If any portion of the exam is unclear please come to me and I will elaborate provided I can do so without giving away the problem.

1. (20 points)
   Sketch the graph of an example of a function f that satisfies all of the given conditions.

   $$\lim_{x\to 3^+} f(x) = 4,\ \lim_{x\to 3^-} f(x) = 2,\ \lim_{x\to -2} f(x) = 2,\ f(3) = 3,\ \text{and} f(-2) = 1.$$

2. (20 points)
Evaluate the limit, if it exists

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

b) $\lim_{x \to 7} \dfrac{\sqrt{x+2} - 3}{x - 7}$

3. (20 points)
Use the graph of $f(x) = \sqrt{x}$ to find a number δ such that $|\sqrt{x} - 2| < 0.4$ whenever $|x - 4| < \delta$.

4. (20 points)
   If $f(x) = x^3 - x^2 + x$, show that there is a number c such that $f(c) = 10$.

5. (20 points)
Find the slope of the tangent to the curve $y = 2/(x+3)$ at the point where $x = a$ using the limit definition. You must use the limit definition if you wish to receive any credit.