PRINT NAME: _____
Student ID#: _____

Mathematics 2200 - Test One
Wednesday, June 20, 2001

Problem #	Points	Score
1	50	
2	10	
3	10	
4	10	
bonus	10	
Total	90	

Show all work or credit will not be given.
No aids are allowed. **NO Calculators!**
Do Not Tear Out Any Pages.

1. Evaluate the following limits

   (a) $\lim_{x \to 2} \dfrac{x^2 - 4}{x^3 - 8}$.

   (b) $\lim_{x \to 4} \dfrac{\sqrt{x+5} - 3}{x - 4}$

   (c) $\lim_{x \to 0^-} \dfrac{x}{x - |x|}$

(d) $\lim_{x \to 0} \dfrac{1 - \cos 3x}{x \sin x}$

(e) $\lim_{h \to 0} \dfrac{1}{h} \left(\dfrac{1}{\sqrt{4+h}} - \dfrac{1}{2} \right)$

2. Find the value of the constant c so that the function $f(x) = \begin{cases} 2x + c & \text{if } x \leq 3 \\ 2c - x & \text{if } x > 3 \end{cases}$ is continuous for all x. Explaine your answer.

3. State the intermediate value theorem and apply it to prove that the equation $x^3 - 4x^2 + 1 = 0$ has three different solutions on the interval $[-1, 4]$.

4. Find the tangent line of the circle $x^2 + (y-1)^2 = 5^2$ at point $(3, -3)$.

5. * **Bonus Problem** (**very difficult**) Evalute $\lim_{x \to 0} \dfrac{\sqrt[3]{1+cx} - 1}{x}$, where c is a constant.