Problem Set 2 Real Analysis 1 Due 9/6/2004

Each problem is worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor.

1. Does it work to define a *bounded* function by saying "A function $f:A \to B$ is *bounded* if and only if for every $a \in A$, there is some $M \in \mathbb{R}$ for which $|f(a)| < M$"?

2. Use mathematical induction to prove that $n^2 + n$ is even for all $n \in \mathbb{R}$.

3. Use mathematical induction to prove that $5 + 8 + 11 + ... + (3n+2) = \frac{1}{2}(3n^2 + 7n)$ for all $n \in \mathbb{R}$.

4. Prove that $\sqrt{5}$ is irrational.