Assignment 8 MA1124 March 14.

1. Prove that if $a_n \to 0$ and $\{b_n\}$ is a bounded sequence then $\{a_n b_n\} \to 0$.

2. Prove that $\overline{A}$ is the smallest closed set of which A is a subset, and hence prove that $\overline{A}$ is the intersection of all closed sets that contain A.

3. Prove that if f(x) is continuous at x = a, and $f(a) \geq 0$, then for some interval about x = a, f(x) is positive.

4. Prove the corresponding fact about $f(a) \leq 0$ as economically as possible. A nod to the TSM's?

5. Prove that f(x) is continuous at x = a if and only if for every sequence $\{a_n\} \to a$ then $f(x_n) \to f(a)$.