Problem Set 4 Real Analysis 1 Due 9/20/2004

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.

For each of the following propositions, either prove or give a counterexample:

1. Proposition: If the sequence $\{a_n\}$ converges to 0, then the sequence $\{|a_n|\}$ converges to 0.
2. Proposition: If the sequence $\{|a_n|\}$ converges to 0, then the sequence $\{a_n\}$ converges to 0.
3. Proposition: If the sequence $\{a_n\}$ converges to A, then the sequence $\{|a_n|\}$ converges to $|A|$.
4. Proposition: If the sequence $\{|a_n|\}$ converges to $|A|$, then the sequence $\{a_n\}$ converges to A.
5. Proposition: If the sequence $\{a_n\}$ converges to 0, and the sequence b_n is bounded, then the sequence $\{a_n b_n\}$ converges to 0.
6. Proposition: If the sequence $\{a_n\}$ converges to 0, and $\{b_n\}$ is another sequence, then the sequence $\{a_n b_n\}$ converges to 0.