MATH 410 Dr. Wolfe ASSIGNMENT #3 Due September 27, 2006

1.For each of the following statements, determine whether it is true or false and justify your answer:
(a) A subsequence of a bounded sequence is bounded.
(b) A subsequence of a monotone sequence is monotone.
(c) A subsequence of a convergent subsequence is convergent.
(d) A sequence converges if it has a convergent subsequence.

2. Ex. 1, 2, 5, 7, Sec. 2.2, *Cooper.*

3. Ex. 1, Sec. 2.3, *Cooper.*

4. Prove that a sequence $\{a_n\}$ does not converge to the number a if and only if there is some $\epsilon > 0$ and a subsequence $\{a_{n_k}\}$ such that

$$|a_{n_k} - a| \geq \epsilon \quad \text{for every index } k.$$