Math 131
Homework 4

1) Suppose that S is a non-empty set of reals which is bounded below. Prove that S contains a sequence $\{x_n\}$ which converges to $\text{glb}(S)$.

2) Let (E, d) be a metric space containing a sequence $\{x_n\}$, which has subsequences $\{x_{n_k}\}$ and $\{x_{m_j}\}$ such that every term of $\{x_n\}$ is contained in one of these two subsequence. Suppose that $x_{n_k} \to a$ and $x_{m_j} \to a$. Prove that $x_n \to a$.

3) Prove that every sequence of reals has a monotonic subsequence.

Also, do problems 8, 9, 10, on pages 61-62 of Rosenlicht.