Math 101

Homework 10

Problems 8.1c), 8.3, 8.4 and 8.5.

Homework 11

Problems 8.6 (prove the assertions in 8.6b), 8.9, and 8.10, and the following

1) Prove or disprove the following statements.
a) Let $\{x_n\}$ and $\{y_n\}$ be convergent sequences such that for all $n \in \mathbb{N}$, $x_n < y_n$. Then $\lim x_n < \lim y_n$.
b) If $\{x_n\}$ diverges to ∞ then $\{x_n\}$ does not converge

Homework 12

1) Suppose that $x_n \to l$. Prove that for every $m \in \mathbb{N}$, $x_n^m \to l^m$.

2) Let S be a set of real numbers, and let $\{x_n\}$ be a sequence which converges to l. Suppose that for every $n \in \mathbb{N}$, x_n is an upper bound for S. Prove that l is an upper bound for S.

3) Let $\{x_n\}$ be a sequence in a set S. Suppose that $x_n \to l$ and l is an upperbound for S. Prove that $l = \text{lub}(S)$.

4) Prove that for all $a, b \in \mathbb{R}$, $||a| - |b|| \leq |a - b|$, and use this inequality to prove that if $x_n \to x$ then $|x_n| \to |x|$.