Homework for Math 351-003
Team Homework: due Monday, January 29..

1. Prove that the sequence $(-1)^n$ does not converge.

2. Prove that every Cauchy sequence is bounded.

3. Prove that if (x_n) and (y_n) are convergent sequences, $\lim_{n\to\infty} x_n = x$ and $\lim_{n\to\infty} y_n = y$ and $x_n \leq y_n$ for all $n \in \mathbb{N}$, then $x \leq y$.

4. Suppose that (a_n), (b_n) and (s_n) are three sequences and that

$$a_n \leq s_n \leq b_n$$

for all $n \in \mathbb{N}$. Prove that if (a_n) and (b_n) both converge to s, then (s_n) also converges to s. (This is known as the Squeeze Lemma. Note that you are not assuming that (s_n) (necessarily) converges.)