

## Homework 6, Number Systems

Due Tuesday November 11th, 2008

You can reference anything we did in class. However, if you use something we didn't do in class, then you need to justify it.

1. Prove that any non-empty subset of  $\mathbb{R}$  which is bounded below has a greatest lower bound.
2. Prove that if  $(x_k)$  converges to  $L$  and  $L'$ , then  $L = L'$ .
3. Prove the following: For all  $x, y \in \mathbb{R}$ ,  $|x - y| \geq ||x| - |y||$ .
4. Prove the following:  $\lim_{n \rightarrow \infty} \frac{5n}{3n - 1} = \frac{5}{3}$ .
5. Prove the following: If  $L = \lim_{n \rightarrow \infty} x_n$ , then for any  $c \in \mathbb{R}$ ,  $\lim_{n \rightarrow \infty} (cx_n) = cL$ .