Supplementary problems (assigned 9/5/03)

1. Prove that every open interval $(a, b) \subset \mathbf{R}$ is uncountable.
2. Prove that a finite union of finite sets is finite.
3. Consider the set S of all subsets of $\mathbf{N}$. Show that S is uncountable. (Hint: there is a close relationship between S and the set $2^{\mathbf{N}}$ discussed in class.)
4. Consider the set S of all finite subsets of $\mathbf{N}$. Show that S is countable.