Homework Assignment #8
Due: November 23, 2010

1. In class, we proved that CIRCUIT-VALUE is **P**-complete. Then we used a very similar proof to show that CIRCUIT-SAT is **NP**-complete. We also showed that CIRCUIT-VALUE remains **P**-complete if you consider only monotone circuits (which have AND and OR gates, but no NOT gates.

(a) Prove that CIRCUIT-SAT is not **NP**-complete. (Your answer should be *very* short.)

(b) Consider the proof that MONOTONE-CIRCUIT-VALUE is **P**-complete. What part of it does not work if you try to use the same approach to prove MONOTONE-CIRCUIT-SAT is **NP**-complete?

2. Define the MAX-4-COVERING problem as follows. The input is a finite set S, a collection C of 4-element subsets of S and a threshold $k \in \mathbb{N}$. The problem is to determine whether there are k pairwise disjoint sets in C. Show that this problem is **NP**-complete.