Fall 2007 **CMSC 652: Homework 7** William Gasarch

Due Oct 29

COURSE WEBSITE: "http://www.cs.umd.edu/~gasarch/652/652.html"

1. (40 points) Show that if there exists a sparse set S such that $SAT \leq_m \overline{S}$ then $SAT \in P$.
2. (40 points) Show that if there exists a sparse set S such that $SAT_{17} \leq_m \overline{S}$ then $SAT_{17} \in P$.
3. (20 points) Assume that $SAT \in R$. Devise a "good" randomized algorithm for the following PROMISE PROBLEM:

   PROMISE: The input is satisfiable.

   REQUIREMENT ON OUTPUT: Output a satisfying assignment.

   (Note- if the input is NOT satisfiable then we make NO demands on what the algorithm does.)

   You get to define "good" but be reasonable. You NEED NOT include an analysis, but make sure that your definition of "good" is rigorous.