CSE 725 - Problem Set 3
Due lecture on March 9th

Problem numbers are from the second edition of Sipser's book. If unsure about which problem to solve, ask. Collaboration is permitted; looking for solutions from external sources (books, the web, material from previous years, etc.) is prohibited.

1. 7.36
2. 7.24
3. * 7.27 (Optional hint: do not follow the hint in the book and show $\neq SAT \leq_P 3COLOR$, where $\neq SAT$ is from problem 2.)
4. Show that $2COLOR \in P$, where

   $2COLOR = \{\langle G \rangle$: the nodes of G can be colored with two colors such that no two nodes joined by an edge have the same color$\}$.

5. (extra credit) * Show that NP-complete languages are *large*, unless $P = NP$. More precisely, show that if there exists an NP-complete language $L \subseteq \{1\}^*$, then $P = NP$. (Hint: show first that determining the satisfiability of a boolean formula reduces efficiently to determining the satisfiability of two strictly smaller formulas).