CSE 725 - Problem Set 3
Due lecture on March 10th

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, etc.) is prohibited. As a warmup, solve but do not turn in 7.21.

1. 7.17
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 if $P = NP$, then $EXP = NEXP$, where

$$EXP = \bigcup_{k \geq 1} TIME(2^{n^k}),$$
$$NEXP = \bigcup_{k \geq 1} NTIME(2^{n^k}).$$