COMPUTER SCIENCE 20, SPRING 2012
DISCRETE MATHEMATICS FOR COMPUTER SCIENCE

Class #6 (Normal Forms)

Homework, due in hard copy Monday 2/6/2012 at 10:10am

Please write your TF's name on your homework, and list the names of any students with whom you collaborated.

1. Is the following formula a tautology, satisfiable, or unsatisfiable? Explain your answer.

   $(p \Leftrightarrow q) \wedge ([(\neg r \wedge p) \rightarrow \neg q] \vee [(r \wedge p) \rightarrow \neg p])$

2. Translate the following sentence from English to a logical formula and then to CNF and DNF.

   If *Octavian wins the Battle of Actium* then *Mark Anthony will rule Rome* only if *Cleopatra aids him in the war* and *Octavian's troops desert.*

3. Put the following into DNF: $\neg(p \vee \neg(q \vee \neg(r \vee \neg(q \vee p))))$

4. Prove that every formula is equivalent to a fromula in conjunctive normal form. (Recall, in class we proved the equivalence of any formula to a formula in disjunctive normal form).