CMSC 250 (0101 & 0102) Homework 1 Spring 2006

Due Wed Feb 1 at the beginning of your discussion section.

You must write the solutions to the problems single-sided on your own lined paper, with all sheets stapled together, and with all answers written in sequential order or you will lose points.

1. Convert the following sentences to logical expressions assuming that "j", "k" and "l" represent the propositions below. You may also assume that Jane, Kyle and Lauren are the only people we are discussing.

   - j = "Jane likes to swim."
   - k = "Kyle likes to swim."
   - l = "Lauren likes to swim."

   (a) Somebody likes to swim.

   (b) Everybody except Lauren likes to swim.

   (c) Somebody besides Lauren likes to swim.

2. Determine which of the following are statements and which are not.

   (a) This homework is hard.

   (b) I'm done with this homework already.

   (c) This statement is both true and false at the same time.

   (d) This statement is false.

   (e) This statement is true.

3. If the first column is known to be true, what else would need to be true in order to ensure that the second column is true?

(a) p	$p \wedge q$
(b) p	$p \vee q$
(c) p	$\sim (p \wedge q)$
(d) p	$\sim p \vee \sim q$

4. Let a and b be statements. Construct the complete truth table for the following statement: $(a \vee b) \wedge (\sim a \vee \sim (a \vee b))$

5. Let p, q, and r be statements. Construct the complete truth table for the following statement: $(\sim p \wedge q) \vee \sim r) \wedge p$

6. Let x and y be statements. Construct the complete truth table for the following statement: $x \wedge ((y \vee \sim x) \vee (\sim x \wedge \sim y))$