CMSC 250 Fall 2004 — Homework 1

Due Wed., Sept. 8 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.
   - j = "Jane likes to swim."
   - k = "Kyle likes to swim."
   - l = "Lauren likes to swim."

   (a) Nobody likes to swim.
   (b) Nobody except Lauren likes to swim.
   (c) Somebody in addition to Lauren likes to swim.

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

   (a) How high is that?
   (b) "What" is a word that is used to start a question.
   (c) This sentence refers to itself.
   (d) This sentence does not refer to itself.

3. For each of the following, translate the logical expression to an English statement and then give the set of values that make the statement true. Assume that we restrict ourselves only to the set of integers $A = \{-3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, and that we are using the following propositions:
   - a = "n is even."
   - b = "n is at most 7."
   - c = "n is an exact multiple of 3."

   (a) $a \wedge \sim c$
   (b) $c \wedge \sim (b \wedge a)$.
   (c) $\sim b \vee c$

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

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

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