CMSC 250 (0201 & 0202) Homework 1 Fall 2005

Due Wed September 6 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. Translate the following to logical expressions assuming "a", "b", and "c" are used to represent the propositions given below. (You may also assume that Abe, Bob and Carl are the only people who could possibly like or not like me.):

   - a = "Abe likes me."
   - b = "Bob likes me."
   - c = "Carl likes me."

   (a) Abe likes me, but Bob does not.
   (b) Somebody likes me.
   (c) Everybody likes me.
   (d) Nobody likes me.

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

   (a) What time is it?
   (b) This is my homework paper.
   (c) $2 * 5 > 10$
   (d) This is a true statement.
   (e) This is not a true statement.

3. For each of the following, translate the logical expression to an English statement and then give the set of values which would make the statement true. Assuming the following variables:

   - p = "n is at least -3."
   - q = "n is not equal to 0."
   - r = "n is less than 4."

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

4. Write the complete truth table for the following statement: $(x \wedge y) \vee (\sim x \vee \sim z)$.

5. Write the complete truth table for the following statement: $(y \vee \sim x) \wedge (x \vee y)$.

6. Use a truth table to determine if the statements "y" and "$(x \wedge y) \vee (\sim (z \wedge x) \wedge y)$" have the same truth value in all possible worlds – in other words, under every possible interpretation of the propositions "x", "y" and "z".