CSci 1302 Assignment 1

Due Wedn., February 1 in class

Problem 1 (10 points). Rewrite the following sentences as logical statements. Show the simple (atomic) propositions used to construct the compound ones. In some cases it may not be obvious whether English "or" is used inclusively or exclusively. Explain which one is meant and why. Use symbols $^\sim$, $\wedge$, $\vee$.

Example: the sentence "Today it will rain or snow" can be written as $p \vee q$, where $p =$"today it will rain", $q =$"today it will snow".

1. I live and study in Morris.

2. I go to the library to read or relax.

3. Either it doesn't rain, or the party will be indoors.

4. The bookstore is not open today.

5. The bookstore is closed today.

6. Mary and Jane are on the swimming team.

7. Jim is taking Math and either Computer Science or Biology.

8. Jane either is a Math major or she isn't.

9. I may not be on the soccer team this year, but if I am, I'll be a goal keeper.

10. Either Mary goes to UMM and her sister doesn't, or the other way around.

Problem 2 (4 points). Exercises 15, 17 on p. 16.

Problem 3 (6 points). Exercises Exercises 20, 22, 24 on p. 16.

Problem 4 (3 points). Exercises 30, 36, 38 on p. 16.

Problem 5 (12 points). Exercises 46, 49, 51 on p. 16.

Problem 6 (9 points). Prove the following:

1. $(q \wedge p) \vee^\sim (^\sim p \vee^\sim q) \equiv p \wedge q$

2. $p \vee (q \wedge r \wedge s) \equiv (p \vee q) \wedge (p \vee r) \wedge (p \vee s)$

3. $(p \wedge q \wedge r) \vee s \equiv (p \vee s) \wedge (q \vee s) \wedge (r \vee s)$