Homework 1 - Math 431
Due Jan 15th

Instructor	Mauro Maggioni
Office	319 Gross Hall
Office hours	This week at 11:30am on Monday 13th, instead of 1:30-2:30pm.
Web page	www.math.duke.edu/~mauro/teaching.html

Studying: from Reed's textbook: Chapter 1, Section 1 + notes from first lecture.
Problems: §1.1: #3, 4, 7

Additional Problems:

1. Let P, Q and R be statements. Construct truth tables for the compound statements:

$$P \text{ or } (Q \text{ and } R) \quad \text{and} \quad (P \text{ or } Q) \text{ and } (P \text{ or } R)$$

2. Show that the two compound statements in 1. are equivalent: either both are true or both are false.

3. Choose statements P, Q and R and write the two corresponding (grammatically correct) English sentences.

4. Use truth tables to determine whether or not the following argument is correct:

"If the tax rate and the unemployment rate both go up, then there will be a recession. If the GNP goes up, then there will not be a recession. The GNP and taxes are both going up. Therefore, the unemployment rate is not going up."

In other words, decide whether the concluding statement must be true, given that the preceding compound statements are true.

5. Do 4. without truth tables.

6. Let F be a field. Using only the axioms (for a field), prove that $-ab = (-a)b$ for all a, $b \in F$.