Math 23b **Homework 3** **Spring, 2007**

Due Thursday, February 12.

Be sure to write clearly, using complete sentences. Do not use abbreviations like s.t., w/, w/o, b/c, c/o, etc. In all problems you must prove that your answer is correct, even if the problem does not explicitly ask you to do so.

1. Problem 2.4 Page 44.

2. Problem 2.19 Page 46.

3. Problem 2.28 Page 47.

4. Problem 2.36 Page 48. Recall that $|x-1|<1$ also means $-1<x-1<1$.

5. Problem 2.37 Page 48. Use the truth table for "$P \Longrightarrow Q$."

6. Problem 2.52 Page 49.

7. *Power set.* Let n be a positive integer. Prove that there are exactly 2^n distinct n-tuples of 0 and 1. Let B_n be the set of all such n-tuples. As defined in class, let $C(\{1,..,n\})$ be the set of binary functions on the set $\{1,..,n\}$. Use the Bijectivity Test to prove that the function
$$\psi : C(\{(1,..,n\}) \to B_n, \quad f \mapsto (f(1),..,f(n))$$
is a bijection. (You should write down the inverse of ψ first.) Finally, use the bijection $\phi : P(\{1,...,n\}) \to C(\{1,...,n\})$, introduced in class to conclude that the power set $P(\{1,...,n\})$ has exactly 2^n members.