Philosophy 303
Symbolic Logic
Fall, 2007

Homework Assignment 10

1. Say that we add to our rules of inference the rule of Resolution:

j	$P \vee \neg Q$	
	$\vdots$	
k	$Q \vee R$	
	$\vdots$	
l	$P \vee R$	j, k *Resolution*

   Prove that the new system is sound. (You only need to prove that the rule of resolution is sound.)

2. Say that we add to our rules of inference the rules of Axiom1 and Axiom2. Axiom1 says that on any line of a derivation, you may write down the axiom $(P \rightarrow (Q \rightarrow P))$, subject to all and only only the hypotheses that governed the previous line. Axiom2 says that on any line of a derivation, you may write down the axiom $(P \rightarrow (Q \rightarrow R)) \rightarrow ((P \rightarrow Q) \rightarrow (P \rightarrow R))$, subject to all and only only the hypotheses that governed the previous line.

   Prove that the new system is sound. (You only need to prove that the rules of Axiom1 and Axiom2 are sound.)

3. Say that Γ is $\mathbf{V}$-saturated, and A and B are formulas of $\mathbf{V}$. Show that:

   $(\neg A \wedge \neg B) \in \Gamma$ if and only if $A \notin \Gamma$ and $B \notin \Gamma$

   $(\neg A \rightarrow B) \in \Gamma$ if and only if $A \in \Gamma$ or $B \in \Gamma$