LGIC 010 & PHIL 005
Problem Set 9
Spring Term, 2010

For each of the problems 1 – 3 below, determine whether or not the premises imply the conclusion. If so, present a deduction of the conclusion from the premises; if not, specify a structure in which the premises are true and the conclusion is not true.

1. (20 points)
   Premises: $(\forall x)\neg Rxx, (\forall x)(\forall y)(\forall z)(Rxy \supset (Ryz \supset Rxz))$
   Conclusion: $(\forall x)(\forall y)(Rxy \supset \neg Ryx)$

2. (20 points)
   Premise: $(\forall x)(\forall y)(Rxy \supset \neg Ryx)$
   Conclusion: $(\forall x)\neg Rxx$

3. (20 points)
   Premises: $(\forall x)(\forall y)(\forall z)(\neg Rxy \supset (\neg Ryz \supset \neg Rxz)), (\forall x)(\forall y)(Rxy \supset \neg Ryx)$
   Conclusion: $(\forall x)(\forall y)(\forall z)(Rxy \supset (Ryz \supset Rxz))$

4. Give deductions to show that:

   (a) (20 points) $(\forall x)(p \vee Fx)$ is equivalent to $p \vee (\forall x)Fx$;

   (b) (20 points) $(\exists x)(Fx \supset p)$ is equivalent to $(\forall x)Fx \supset p$.