LGIC 010 & PHIL 005
Problem Set 9
Spring Term, 2014

For each of the following pairs consisting of a set of schemata X and a schema S determine whether X implies S. If so, provide a deduction to establish the implication. If not, specify a structure which makes S false and all the schemata in X true.

1. $X : \{(\exists x)Fx \wedge (\forall x)(\forall y)((Fx \wedge Fy) \supset x = y)\}$
   $S : (\exists x)(\forall y)(Fy \equiv x = y)$

2. $X : \{(\exists x)(\forall y)(Fy \equiv x = y)\}$
   $S : (\exists x)Fx \wedge (\forall x)(\forall y)((Fx \wedge Fy) \supset x = y)$

3. $X : \{(\forall x)(\forall y)(\forall z)((Rxy \wedge Ryz) \supset Rxz), (\forall x)\neg Rxx, (\forall x)(\forall y)(x \neq y \supset (Rxy \vee Ryx)),$
   $(\exists x)(\forall y)\neg Ryx, (\exists x)(\forall y)\neg Rxy, (\forall x)((\exists y)Rxy \supset (\exists y)(Rxy \wedge (\forall z)\neg(Rxz \wedge Rzy))),$
   $(\forall x)((\exists y)Ryx \supset (\exists y)(Ryx \wedge (\forall z)\neg(Ryz \wedge Rzx)))\}$
   $S : ((\forall x)(\exists y)(\forall z)(Lxz \equiv y = z) \wedge (\forall y)(\exists x)Lxy) \supset (\forall x)(\forall y)(\forall z)((Lxz \wedge Lyz) \supset x = y)$

4. $X : \{(\forall x)(\exists y)(\forall z)(Lxz \equiv y = z)\}$
   $S : (\forall x)(\exists y)(\forall z)(Lzx \equiv y = z)$