

LGIC 010 & PHIL 005
Problem Set 8
Spring Term, 2013

If X is a finite set, we write $|X|$ to denote the the number of members of X . Let A be a structure. Recall that $\mathbf{Aut}(A)$ is the set of automorphisms of A and that $\mathbf{Def}(A)$ is the set of sets which are definable over A .

Let S be the conjunction of the following schemata.

$$(\forall x)Rxx$$

$$(\forall x)(\forall y)(Rxy \supset Ryx)$$

$$(\forall x)(\forall y)(\forall z)((Rxy \wedge Ryz) \supset Rxz)$$

1. (25 points) How long a list of structures A with universe of discourse $\{1, 2, 3, 4, 5\}$ satisfy the schema S ?

2. (25 points) How long a list of pairwise non-isomorphic structures with universe of discourse $\{1, 2, 3, 4, 5\}$ satisfy the schema S ?

3. (25 points) How long a list of structures A with universe of discourse $\{1, 2, 3, 4, 5\}$ satisfy the condition: $A \models S$ and $|\mathbf{Aut}(A)| = 6$.

4. (25 points) How long a list of structures A with universe of discourse $\{1, 2, 3, 4, 5\}$ satisfy the condition: $A \models S$ and $|\mathbf{Def}(A)| = 4$.