

Reading assigned February 10, 2023*Prof. Marcia Groszek**Student: Amittai Siavava***Problem 1.**

Is it possible to have a finite set of sentences Σ in a first-order language with the property that every model of Σ is infinite?

Yes. If we define a two-place predicate symbol \leq to mean “less than or equal to”, The set

$$\Sigma = \{ \forall x \exists y ((x \leq y) \wedge \neg(x = y)) \}$$

may not have a finite model although the set itself contains a finite number of sentences.