

**Reading assigned January 13, 2023***Prof. Marcia Groszek**Student: Amittai Siavava***Problem 1.**

Assume that we have a language with the following parameters:

- $\forall$ , intended to mean “for all things”;
- $N$ , intended to mean “is a number”;
- $I$ , intended to mean “is interesting”;
- $<$ , intended to mean “is less than”;
- and  $0$ , a constant symbol intended to denote zero.

Translate into this language the English sentences listed below.

*If the English sentence is ambiguous, you will need more than one translation.*

- (b) If any number is interesting, then zero is interesting.

$$\forall x (Nx \rightarrow Ix) \rightarrow I0$$

**Questions**

I am somewhat confused about free variables. I understand the example and recursive explanation of what free variables are — but I do not understand the context around free variables. Is it “free” because it is singular (i.e. not declared in some way before use, like in  $y$  in  $\forall x x \in xy$ )?