Logic II — Richard Zach

Phil 379 L01 — Winter 2016

Problem Set #3

This assignment is due on **Thursday, February 25, at 12:30 pm**. You can turn it in in class or in the dropbox labelled "Logic II (379 L01)—Richard Zach" in the Philosophy Department. The dropbox is cleared at 4 pm daily.

1. Our definition says that a set X is countable iff there is a surjective function $f : \mathbb{N} \to X$. An alternative definition some of you have used for problem set 2 is this: A set is countable iff there is an *injective* function $g : X \to \mathbb{N}$. Prove that these definitions are equivalent, i.e., if X is countable according to one it is also countable according to the other.
2. Show that there cannot be an injective function $g : \wp(X) \to X$, for any set X. (Hint: Suppose there were. Use g to construct a set $Y \subseteq X$ for which g cannot be defined.)
3. Complete Problem 5.5 (p. 198)
4. Complete the proof of Proposition 5.35 (p. 60) by carrying out the two remaining cases.
5. Complete Problem 5.9 (p. 198).

Remember: this is not a test. You are allowed—indeed, encouraged—to work together, and to ask questions on the website and in office hours.