

## EXERCISES OF WEEK ONE

**Exercise 1.** Defining the set of the first 100,000 natural numbers as

$$A := \{1, 2, 3, \dots, 99999, 100000\}$$

is ambiguous. How could we define the set above with the Axiom of Unrestricted Comprehension Schema (find  $p(n)$ )?

**Exercise 2.** Draw a truth table for  $\neg(\neg P)$ .

**Exercise 3.** Can you show that the following sets are infinite?

- (a)  $\mathbb{Z} - \mathbb{N}$ : relative integers which are not natural numbers
- (b)  $\mathbb{Q} - \mathbb{Z}$ : rational numbers which are not relative integers
- (c)  $\mathbb{R} - \mathbb{Q}$ : real numbers which are not rational numbers

**Exercise 4.** We defined  $E := \{S \mid \#S = \infty\}$ . We know that  $E \in E$ . Starting from  $E$ , can you find another set  $E_*$  such that  $E_* \in E_*$ ?