UNIVERSITEIT VAN AMSTERDAM
INSTITUTE FOR LOGIC, LANGUAGE AND COMPUTATION

Axiomatic Set Theory

(Axiomatische Verzamelingentheorie)

2003/2004; 2nd Trimester
dr Benedikt Löwe

Homework Set # 2 Deadline: Thursday, January 22nd, 2004

Exercise 2.1 (Different Sets)
Work in the theory $(\mathbf{I}) + (\mathbf{II})$. Prove that the sets

$$\varnothing, \{\varnothing\}, \{\{\varnothing\}\}, \{\varnothing, \{\varnothing\}\}$$

are pairwise different, *i.e.*, that

- $\varnothing \neq \{\varnothing\}$,
- $\varnothing \neq \{\{\varnothing\}\}$,
- $\varnothing \neq \{\varnothing, \{\varnothing\}\}$,
- $\{\varnothing\} \neq \{\{\varnothing\}\}$,
- $\{\varnothing\} \neq \{\varnothing, \{\varnothing\}\}$, and
- $\{\{\varnothing\}\} \neq \{\varnothing, \{\varnothing\}\}$.

Exercise 2.2 (Commutativity)
Work in the theory $(\mathbf{I}) + (\mathbf{II}) + (\mathbf{III})$. Prove that for all sets x and y,

- $\{x, y\} = \{y, x\}$, and
- $x \cap y = y \cap x$.