UNIVERSITEIT VAN AMSTERDAM
INSTITUTE FOR LOGIC, LANGUAGE AND COMPUTATION

Axiomatische Verzamelingentheorie

2005/2006; 2nd Semester
dr Benedikt Löwe

Homework Set # 9 *Deadline:* April 20th, 2006

Since several students are a bit behind schedule with the exercises, we would like to allow them to catch up by extending the deadlines: Homework Set # 8 is now due **April 20, 2006** together with Exercise 25 (see below).

Exercise 23 (see HW Set # 8).

Exercise 24 (see HW Set # 8).

Exercise 25 (total of ten points).

(1) Let $\alpha := \omega \cdot \omega$ and $\beta < \alpha$. Prove that $\beta + \alpha = \alpha$ (4 points).
(2) For $\alpha < \beta$ there are unique $\lambda \leq \beta$ and $\varrho < \alpha$ such that $\beta = \alpha \cdot \lambda + \varrho$. We call this **division with remainder**. Let $\beta_0 := (\omega + 2) \cdot (\omega \cdot \omega)$, $\beta_1 := \omega \cdot \omega \cdot (\omega + 3)$, $\alpha_0 := \omega \cdot \omega + \omega \cdot 7 + 12$, and $\alpha_1 := \omega + 5$. Divide β_0 by α_0 (3 points) and β_1 by α_1 (3 points).