

Math 131
Homework 1

Read Chapter 1 of Rosenlicht

1. Do problems 7 and 8 on page 12 of Rosenlicht
2. Let X_1, \dots, X_n be sets. We define the Cartesian product of these sets as $X_1 \times X_2 \times \dots \times X_n = \{(x_1, x_2, \dots, x_n) | x_i \in X_i\}$. Prove that if each of the sets X_1, \dots, X_n is countable, then $X_1 \times \dots \times X_n$ is countable.
3. Prove that the set of all subsets of the naturals is uncountable.
4. Prove that there is a bijection between the sets $[0, 1]$ and $(0, 1)$.