MA651 Topology. Homework 2

Homework due February 7, 2006

1. Find the mistakes in the lecture notes (I have intentionally made several mistakes, and you might find even more).

2. Consider the questions given as a homework in the lecture notes:

    - Show that every infinite set is equipotent to one of its proper subsets. Proposition (17.17)
    - Prove Corollary (18.1)

3. Let us define the relation $\leq$ on R^2 by

$$(x_1, x_2) \leq (y_1, y_2)$$

    if and only if

$$x_1 \leq y_1 \text{ and } x_2 \leq y_2$$

    Show that $\leq$ is a partial order relation on R^2 , but not a total order.

4. Show that for any set X

$$\text{card } \mathscr{P}(X) = 2^{cardX}$$

5. Show that the set P of all polynomials with integer coefficients

$$p(x) = a_0 + a_1 x + a_2 x^2 + \ldots + a_n x^n$$

    is equipotent to the set of all positive integers N