

Homework 7, pp.71-3#5,6

Answers

(5) The hotelkeeper tells each guest to move into the room that is twice the number of his present room. That leaves all the odd rooms empty, so each football player can double the number on his shirt and subtract one to find his room number.

(6) (a) The turtles can be numbered as follows:

0
1 2
3 4 5
etc.

Since the turtles can be effectively listed, so can the corresponding monotheistic sects, and the cardinality of the set of such sets is therefore \aleph_0 .

(b) Taking the preceding enumeration, it is clear that each sect corresponds to a subset of the set of all natural numbers: the atheistic sets corresponds to \emptyset , the monotheistic sects to singletons. The set of all sects can therefore be put in one-to-one correspondence with $\wp(\mathbb{N})$ and therefore has cardinality 2^{\aleph_0} .