

Math 2001: Homework 11

Due: November 19, 2008

Give complete justifications for all your answers.

Problem 1

1. Prove that in any group of six people there are either 3 people who all know one-another, or three people who are strangers to one-another (or both). Hint: Think pigeon-hole principle.
2. How many ways can 6 men and 6 women be seated at a table with 12 place-settings in such a way that gender alternates as one looks around the table?
3. For each of the following sets, count the number of 4 letter words that one can make using letters from the set.
 - (a) The set $\{A, B, C, D, E, F, G, H, I\}$ ($ABCD$ is valid, but $AABC$ is not).
 - (b) The multi-set $\{T, E, L, E, P, H, O, N, E\}$ (ELE is valid, but $EEEE$ is not).
4. A classroom has 2 rows of 8 seats each. There are 14 students. In a given class, there are always at least five students in the first row and at least four students in the second row. How many ways can the students be seated?