Math 477, Homework 1, due 1/26/06

Radoš Radoičić

January 18, 2006

You are required to hand in any 10 of the following problems.

At least two have to be theoretical exercises. At least one cannot be from the textbook.

The solutions should be clearly written explanations, not just numbers.

Problems 1 – 16 from the book:

Chapter 1 – Problems: $5, 8ad, 10, 16, 18, 19c, 22, 26, 27, 28, 32$.

Chapter 1 – Theoretical Exercises: $10, 11, 12b, 16, 20$.

Problem 17: Let $n \geq 2$. How many permutations of the set $\{1, 2, \ldots, n\}$ are there in which 2 comes after 1?

Problem 18: If one writes down all the numbers from 1 to 10^9, how many times was the zero digit written? (hint: do not try to write them all down!)

Problem 19: (two problems worth) At King Arthur's round table there are 12 knights, such that each knight does not like his neighbors. In how many ways can one choose 5 knights, so that any two of them like each other?

Problem 20: (two problems worth) One writes k zeroes between every two digits of the number 14641. What is the square root of the number obtained?