Matematiska Institutionen
KTH

Homework number 3 to SF2736, fall 2014.

Please, deliver this homework at latest on Monday, December 1, 2014. Provide both your name and your e-mail address with your solutions.

The homework must be delivered individually, and, in general, just hand-written notes are accepted. You are allowed to discuss the problems with your classmates, but you are not allowed to deliver a copy of the solution of another student.

1. (0.1p) Find the integer that is equal to

$$\sum_{i=1}^{7} 2^i \binom{7}{i}.$$

2. (0.2p) How many "words" can you form with the letters in the word MISSISSIPPI such that no four S are adjacent, no for I are adjacent and no two P are adjacent. For instance the word PIPISSISSIM is an allowed word while the words MIIIISSPSSP and MIII are not accepted.

3. (0.3p) Find all integers n and k such that

$$\binom{n}{k} = 517.$$

4. (0.4p) A class has 7 boys and 8 girls. Find the number of ways to partition the class into four (mutually disjoint) unlabeled subgroups such that each subgroup contains at least one girl and such that the girls A and B will not belong to the same group. Answer with an integer (and motivations).