

Graph Theory and Combinatorics MATH-42021/52021.

Home Work 7, due on Tuesday, August 2

Instructor: Prof. Artem Zvavitch

8 problems, 2pts each, YES 6 points extra!

Problem 1. *How many different sequences of numbers 1, 2, 3, 4, 5, 6 are possible if a dice is tossed n times?*

Problem 2. *How many ways there to pick a man and a woman who are not husband and wife from a group of n married couples?*

Problem 3. *How many different six digit numbers can be formed by various arrangements of the six digits 1, 1, 1, 2, 2, 0 (note: a number can not start with zero)?*

Problem 4. *How many n -digit binary sequences are there without any pair of consecutive digits being the same?*

Problem 5. *How many different numbers can be formed by the product of two or more of the numbers 3, 4, 4, 5, 5, 6, 7, 7, 7.*

Problem 6. *How many ways are there for a man to invite some (nonempty) subset of his 12 fiends for a dinner?*

Problem 7. *How many different 9-digit numbers have at least one repeated digit (note: a number can not start with zero)?*

Problem 8. *Prove that for all natural values of n :*

$$\sum_{k=0}^n \binom{n}{k} = 2^n.$$