

Graph Theory and Combinatorics MATH-42021/52021.
Home Work 10, due on Sunday, July 21 BEFORE 4 p.m.
Instructor: Prof. Artem Zvavitch
5 problems, 3pts each, YES 5 points extra!

Problem 1. Find a compact form for generating function of the sequence $4, 4, 4, 4, 1, 0, 1, 0, 1, 0, 1, 0, \dots$

Problem 2. Find a compact form for generating function of the sequence $1, 8, 27, \dots, k^3, \dots$

Problem 3. Find the coefficient of x^{25} in $(1 + x + x^8)^{10}$

Problem 4. Find the coefficient of x^{12} in

$$(1 - x^2)^{-5},$$

what can you set about the coefficient of x^{17}

Problem 5. Build a generating function for a_r , the number of integer solutions to the equation

$$e_1 + e_2 + e_3 + e_4 = r; \quad 2 \leq e_i \leq 8, \quad e_1 \text{ is even, } e_2 \text{ is odd.}$$