Graph Theory and Combinatorics MATH-42021/52021.
Home Work 10, due on MONDAY, August 20
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*

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