

Practice Final Problems

The final exam will have 5 problems. One of the problems will be true and false questions and one will be a homework problem. The final is comprehensive and will cover the following chapters in Biggs “Discrete Mathematics”:

Chapters 11.3, 11.6, 11.7, 13.4, 13.5, 22 (all), 23 (all except 23.9), 24 (all), 25.1, 25.3, 26.1, 26.3, 26.4, Rogers-Ramanujan identities.

Here are some practice problems for the second part of the class:

- (1) Write down the codewords of the cyclic code corresponding to the ideal $\langle 1 + x \rangle$ in $V^3[x]$ and find the parity-check matrix for this code.
- (2) Let C_1 and C_2 be cyclic codes of the same length n . Show that $C_1 + C_2 = \{x \in V^n \mid x = c_1 + c_2 \text{ for } c_1 \in C_1, c_2 \in C_2\}$ is a cyclic code. Prove that the generator of this code is the gcd of the generators of C_1 and C_2 .
- (3) Show that the generating function of partitions with distinct parts is

$$D(x) = \prod_{i=1}^{\infty} (1 + x^i).$$