
Math 218: Combinatorics

HOMEWORK 12 : DUE NOVEMBER 5

1. Morris Exercise 7.3.5 # 1. Prove Proposition 7.3.3 by induction on k .
2. Let h_n denote the number of non-negative integer solutions of the equation $3e_1 + 4e_2 + 2e_3 + 5e_4 = n$. Find the generating function $g(x)$ for the sequence $\{h_n\}_{n=0}^{\infty}$. Your final answer should be a rational function.
3. Write down a generating function in the form of a rational function for the number of ways to make k cents using pennies, nickels, dimes, quarters, Kennedy half-dollars, and Sacagawea dollars. Wikipedia is a good source for relevant numismatics information.
4. Let n be even. Find the generating function $g_n(x)$ for choosing k numbers (not necessarily distinct) from the set $[n]$ such that each odd number is chosen an odd number of times and each even number is chosen an even number of times. Write your answer as rational function.