PMAT 4340 – Combinatorial Analysis — Assignment #11
Fall 2002

Instructions

- Answer each question completely; justify your answers.
- This assignment is due at 2:00 pm on Tuesday, December 3rd, 2002.

1. Exercise 7.1.34.
2. Assuming that n is a power of 2, solve the following recurrence relations:
   (a) $a_n = a_{\frac{n}{2}} + 9$, $a_1 = 3$.
   (b) $a_n = 3a_{\frac{n}{2}} - 4n$, $a_1 = 1$.
   (c) $a_n = 2a_{\frac{n}{2}} + 6n$, $a_1 = 3$.
3. Solve the following linear recurrence relations:
   (a) $a_n = 3a_{n-1} + 4a_{n-2} - 12a_{n-3}$, $a_0 = 7, a_1 = 27, a_2 = 53$.
   (b) $a_n = -4a_{n-1} - 6a_{n-2} - 4a_{n-3} - a_{n-4}$, $a_0 = 1, a_1 = -6, a_2 = 57, a_3 = -196$.
4. Solve the following inhomogeneous recurrence relations:
   (a) $a_n = 2a_{n-1} + n$, $a_0 = 0$.
   (b) $a_n = 3a_{n-1} + 5^n$, $a_0 = 2$.
5. Use generating functions to solve the following recurrence relations:
   (a) $a_n = a_{n-1} + 3n$, $a_0 = 1$.
   (b) $a_n = 3a_{n-1} - 2a_{n-2}$, $a_0 = 2, a_1 = 1$.
   (c) $a_n = 4a_{n-1} + 2^n$, $a_0 = 2$.
   (d) $a_n = 4a_{n-1} - 3a_{n-2} + n$, $a_0 = 1, a_1 = 5$.
6. Exercise 7.5.8.
7. Exercise 9.1.2.
8. Exercise 9.1.10.
9. Exercise 9.1.18.
10. Exercise 9.1.20.a.