

## MATH/CSCI 2113

### Assignment 4

Due Friday, February 8, at the beginning of class.

*For each of the following problems, show your work.*

1. Give a formula for the coefficients  $a_n$  if the sequence  $\{a_n\}$  has the given generating function  $a(x)$ :

(a)  $a(x) = \frac{5}{x-3}$

(b)  $a(x) = \frac{3-7x}{1-5x+6x^2}$  (use partial fractions)

(c)  $a(x) = \frac{x+1}{(1-2x)^2}$

For the following problems, let  $a(x)$  be the generating function of the recursively defined sequence  $\{a_n\}$ . Find an equation satisfied by  $a(x)$ , and solve for  $a(x)$ . (You do not have to find a direct formula for  $a_n$ .)

2.  $a_0 = 3$ , and  $a_n = -a_{n-1} + 2$  for  $n \geq 1$ .
3.  $a_0 = 2$ ,  $a_1 = 1$ , and  $a_n = a_{n-1} - 3a_{n-2}$  for  $n \geq 2$ .
4. For this problem, do the same as in the previous two, but also find a direct formula for  $a_n$ :  $a_0 = -1$ ,  $a_1 = 0$ , and  $a_n = -a_{n-1} + 2a_{n-2}$
5. Do Exercise 11.1.2, page 483 of the text book.
6. Do Exercise 11.1.6, page 483 of the text book.
7. Do Exercise 11.1.10, page 483 of the text book.
8. Do Exercise 11.1.10, page 483 of the text book.