

General Mathematics and Computational Science I

Exercise 21

November 29, 2007

1. Show that

$$\frac{1}{(1-x)^2} = 1 + 2x + 3x^2 + 4x^3 + \dots$$

Hint: Use the result of Exercise 11, Question 2.

2. Use the method of generating functions to solve the difference equation

$$a_{n+1} = 2a_n - a_{n-1}$$

with $a_0 = 1$ and $a_1 = 2$.

Hint: Use the result from Question 1 above.

3. Solve the difference equation from Question 2 using the theorem proved in class (Theorem 6 in the class notes).