

University of South Carolina
Math 574: Discrete Mathematics I
Section 001
Summer I 2012

Homework Set 7

Pre-Class Homework Due: 6-6
Post-Class Homework Due: 6-11

Section 5.6 - Defining Sequences Recursively

Before Class

- Read Example 5.6.5 (about the Tower of Hanoi).
- # 17c

After Class

- # 19c, 20, 21c, 22a, 23a
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Section 5.7 - Solving Recurrence Relations by Iteration

Before Class

- Read from the beginning of the section through Example 5.7.1.
- Guess (but do not prove) an explicit formula for a_n given the recurrence $a_k = a_{k-1} + 3$ for all $k \geq 1$ with initial condition $a_0 = 4$.

After Class

- For each of the following recurrence relations, find an explicit form and prove its correctness by induction.

1.

$$b_n = \frac{b_{n-1}}{1 + b_{n-1}} \text{ for } n \geq 1, b_0 = 1$$

2.

$$d_n = 2d_{n-1} + 3 \text{ for } n \geq 2, d_1 = 2$$

3.

$$p_n = p_{n-1} + 2 \cdot 3^n \text{ for } n \geq 2, p_1 = 2$$

4.

$$s_n = 2s_{n-2} \text{ for } n \geq 2, s_0 = 1, s_1 = 2$$