

Homework 4

Lecturer: Sasha Boldyreva

Due: N/A

Problem 4.1 In the questions below find a recurrence relation with initial condition(s) satisfied by the sequence. Assume a_0 is the first term of the sequence.

(a) $a_n = 2^n + 1$

(b) $a_n = (-1)^n$

Problem 4.2 Suppose inflation continues at three percent annually. (That is, an item that costs \$1.00 now will cost \$1.03 next year.) Let a_n = the value (that is, the purchasing power) of one dollar after n years.

(a) Find a recurrence relation for a_n .

(b) What is the value of \$1.00 after 20 years?

(c) What is the value of \$1.00 after 80 years?

(d) If inflation were to continue at ten percent annually, find the value of \$1.00 after 20 years.

(e) If inflation were to continue at ten percent annually, find the value of \$1.00 after 80 years.

Problem 4.3 In the questions below solve the recurrence relation by discovering a pattern formed by the terms.

$$a_n = -10a_{n-1} - 21a_{n-2}, a_0 = 2, a_1 = 1$$

Problem 4.4, 10 points. Problems 28a, 28b, 28c, 28d from Section 7.3 of Rosens textbook.