Homework 2

1. Find a_n, if $a_n = -2a_{n-1} + 8a_{n-2} + (-2)^n$ and $a_1 = 0, \ a_2 = 1$

2. Find the asymptotic behavior of the number of non-negative integer solutions of the equation $\sum_{i=1}^{m} i \cdot x_i = n \ , n \to \infty$

3. Let us assume that $A(x), B(x)$ – polynomials with integer coefficients, $\deg B(x) = k$, $f(x) = \sum_{n=0}^{\infty} f_n x^n = \frac{A(x)}{B(x)}$. Show that starting with some n_0 coefficients f_n satisfy therecurrence relation $f_n = \sum_{i=1}^{k} c_k f_{n-k}$ with constantc_k.

4. Find the number of sequences of 0, 1, 2 and 3 with length n, in which each block of 1 has even length and the length of the blocks of 2 and 3 are multiples of three.

5. How many ways are there to fill a rectangle of height 1 and length n, using tilesof height 1 of the following types:

6. Find the number of n-digit decimal numbers in which there is no number 5 after number 2.