

MAT 2348 — assignment #4

Due: April 9th. Numeric answers need to be justified. Don't Panic.

A. We consider words made from the letters A, B, C, D give the exponential generating function for the number of n -letter words with the following constraints:

1. We use at least three A .
2. We use at most two B .
3. A and B are used an even number of times, C and D an odd number of times.

Then use it to compute the number of n -letter words that can be formed in each case.

B. Solve the following recurrences using the generating function method:

1. $a_0 = 1$ and $a_{n+1} = 5a_n - n$
2. $a_0 = 0, a_1 = 1$ and $2a_{n+2} = -a_{n+1} + a_n$

C. We consider the undirected graph G given formally as the pair (V, E) with

- $V = \{a, b, c, d, e, f\}$
- $E = \{[a, c], [a, f], [b, c], [b, e], [c, d], [d, e], [e, f]\}$

1. Draw the graph.
2. What are the degrees of the vertices?
3. We define G' by replacing $[c, d]$ by $[c, e]$. Are G and G' isomorphic?

D. We consider the directed graph G on the right

1. Give the formal description of G .
2. Give a walk (that is not a trail), a trail (that is not a path) and a path from b to d .
3. List the cycles of the graph.
4. What is the minimal number of edges we would need to remove to make the graph acyclic?

