

1. Prove that $c(n, k)$ equals the number of permutations in S_n with k left-to-right maximums. Hint: Foata transformation.
(a_i is a left-to-right maximum in a permutation $a_1 \cdots a_n$ if $a_i > a_j$ for all $j < i$.)
2. Prove that for a fixed k , $c(n, n - k)$ is a polynomial in n of degree $2k$.
3. Determine $c(n, n - 2)$ without using the recursion formula.