

1. When is C_n odd/even?
2. Discuss the asymptotic behavior of Catalan numbers.
3. Combinatorically prove that C_n counts the number of:
 - (a) Dyck paths from $(0, 0)$ to $(2n, 0)$;
 - (b) rooted semi-full binary trees drawn in $\mathbb{R}^2$ with $n + 1$ leaves (and n inner vertices);
 - (c) correct placements of brackets in $x_0x_1 \dots x_n$;
 - (d) triangulations of a $(n + 2)$ -convex polygon in $\mathbb{R}^2$.