Spring 2026, Math 590: Week 2 Preliminary Problems
Due: Wednesday, February 4th, 2026
Introduction to Generating Functions

Preliminary problems. These problems should be completed before discussion on Wednesday.

(P1) Consider the formal power series

$$A(z) = \sum_{n=1}^{\infty} z^n = z + z^2 + z^3 + z^4 + \cdots;$$

note the first term!

(a) Write out the first 4 nonzero terms of $(A(z))^2 = (z + z^2 + z^3 + \cdots)(z + z^2 + z^3 + \cdots)$.

(b) Write out the first 4 nonzero terms in the composition $A(A(z))$. Show enough work to easily recall where each term comes from.