Spring 2026, Math 590: Week 3 Preliminary Problems
Due: Wednesdsay, February 11th, 2026
Generating Functions - Deep Cuts

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

(P1) Use the fact that

$$\sum_{n\geq 0}^{\infty} n^2 z^n = \frac{z+z^2}{(1-z)^3}$$

and formal differentiation to verify that

$$\sum_{n\geq 0}^{\infty} n^3 z^n = \frac{z+4z^2+z^3}{(1-z)^4}.$$