**Generating Functions and Number theory:**

1. A sequence is defined as S(0) = 1, and S(k) = S(k – 1) + k, for k >= 1. Find the generating function for S(k), and give the kth term.

2. What is the sequence for the generating function 1(1−𝑥)^2.

3. Let p > 2 be a prime. Prove that p divides the sum of any consecutive p integers.