A **Derangements:** n people leave their hats in the coatroom. On the way out the person in charge of the coatroom hands their hats back to them in an arbitrary order. Use inclusion-exclusion to count the total number of ways the hats can be handed back to them so that no person gets their own hat back.

B Use generating functions to compute $\sum_{i=0}^{n} i(i-1)(i-2)$.