Homework 12
Due Date: December 3

**Problem 1.** Use Euler’s Pentagonal Number Theorem to compute the number of integer partitions of 16, \( p(16) \).

**Problem 2.** Give a combinatorial proof (i.e., use the Involution Principle) to show that for \( 0 \leq m < n \),

\[
\sum_{k=0}^{n} (-1)^k \binom{n}{k} \binom{k}{m} = 0.
\]

(You did this problem already, so now you just need to write up a nice solution.)

**Problem 3.** Determine the value of \( \sum_{k=0}^{n} (-1)^k \binom{n}{k}^2 \), and give a combinatorial proof that your formula is correct.