MATH 113: DISCRETE STRUCTURES
HOMEWORK FOR MONDAY WEEK 4

Problem 1. Give a combinatorial proof that

$$\binom{2}{2}\binom{n}{2} + \binom{3}{2}\binom{n-1}{2} + \binom{4}{2}\binom{n-2}{2} + \cdots + \binom{n}{2}\binom{2}{2} = \binom{n+3}{5}$$

for $n \geq 3$.

Problem 2. Give a combinatorial proof that

$$\binom{2n}{2} = 2\binom{n}{2} + n^2$$

for $n \geq 0$.