MATH 13150: Freshman Seminar
Homework #3 Due *Wed. Feb. 5, 2014*
Instructions: Clearly explain the answers to the following questions

1. Write $\binom{15}{7} + \binom{15}{8}$ as a binomial coefficient.
2. Write $\binom{42}{9} + \binom{42}{10}$ as a binomial coefficient.
3. Write $\binom{40}{17} + \binom{40}{18} + \binom{41}{19}$ as a binomial coefficient.
4. Write $\binom{162}{36} + \binom{162}{37} + \binom{163}{38}$ as a binomial coefficient.
5. Compute $1 + 8 + 28 + 56 + 70 + 56 + 28 + 8 + 1$ and compute

   $1 - 8 + 28 - 56 + 70 - 56 + 28 - 8 + 1$. With a little thought, you should be able to do this with essentially no computation.
6. Compute $1 + 7 + 21 + 35 + 35 + 21 + 7$ (hint: compare this to the sum of terms in the 7-row of Pascal's triangle, but be careful).
7. **Reading Assignment**: Read Chapter 2 from "The Code Book", which is about *Le Chiffre Indéchiffrable* a.k.a. the Vigenére cipher. When you've done this, use the Vigenére Square on page 48 and the code word: E DGAR to encode the following message:

   `NOW IS THE TIME FOR ALL GOOD MEN TO COME TO THE AID OF THEIR COUNTRY`