Math 2001: PHW5

Due: February 17, 2016

1. From the book do:

   - 3.1: 2, 6, 10
   - 8: 2, 6, 14

2. Color all the odd numbers in Pascal's triangle red and all the even numbers blue. What pattern do you get? Describe it as precisely as you can.

3. Let $k, l, m, n \in \mathbb{Z}_{\geq 0}$ be such that $n = k + l + m$. The *trinomial coefficient* $\binom{n}{k,l,m}$ is given by the rules

   (1) for $k + l = n$, $\binom{n}{k,l,0} = \binom{n}{k,0,l} = \binom{n}{0,k,l} = \binom{n}{k}$,

   (2) $\binom{n}{k,l,m} = \binom{n-1}{k-1,l,m} + \binom{n-1}{k,l-1,m} + \binom{n-1}{k,l,m-1}$.

   The following questions use this definition.

   (a) What are all the trinomial coefficients for $n = 1, 2, 3$?

   (b) Describe the "triangle" of trinomial coefficients (Hint: Think three dimensional Pascal's triangle).