Math 2001: Homework P7

Due: October 23, 2013

1. From the book do problems:

   (a) 4.1.2, 4.1.4, 4.1.7

2. Color all the odd numbers in Pascals 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).