

Math 2001: Homework P6

Due: October 14, 2009

1. From the book do problems:
 - (a) 3.3.6, 3.3.15
 - (b) 4.1.2, 4.1.4
2. In terms of choose notation, how many different 5 card flushes (poker) are there in a standard deck of 52 cards (you do not need to give the actual value)?
3. 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.
4. 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

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

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

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).