Math 300: Homework Set #2.

1. Find the expansion of $(x + y)^6$.

2. Find the coefficient of $x^6y^7$ in $(2x - 3y)^{13}$.

3. How many terms are there in the expansion of $(x + y)^{100}$ after like terms are collected?

4. Show that for all integers $n, k \geq 2$, $(\binom{n-2}{k-2}) + 2\binom{n-2}{k-1} + \binom{n-2}{k} = \binom{n}{k}$.

5. Show that for all non-negative integers $n, h, k$ with $n > h$ and $n > k$,
   \[
   \binom{n}{k} \binom{n-k}{h} = \binom{n}{h} \binom{n-k}{k}.
   \]

6. Also do exercises 1.8, 1.10, 1.12, 1.17, 1.18 from the textbook.