Math 336, Combinatorics, Winter 2017
Homework 5, due Tuesday 1/31

1. Do problems from chapter 5: 21, 30, 31, 35

2. Let \( S \) be a set of \( n \) elements and \( 0 \leq k \leq n \). Run through the details to show that the collection of all \( k \)-subsets of \( S \) forms an antichain.

3. Do problems from chapter 5: 37, 39, 40.

4. Problem 44 in the text asks you to prove that

\[
\sum_{n_1+n_2+n_3=n} \binom{n}{n_1 \ n_2 \ n_3} (-1)^{n_1-n_2+n_3} = 1.
\]

Demonstrate that this is, alas, False.

The grader will pay special attention to 30 and 35, so you should write these up more carefully. Don’t just give an answer, but explain.