

Last name _____

First name _____

LARSON—MATH 550—CLASSROOM WORKSHEET 21
Pascal's Triangle & Binomial Coefficients.

Concepts & Notation

- Sec. 5.1. Binomial coefficients, Pascal's triangle.

We let $\binom{n}{m}$ be the number of m -subsets of an n -set.

1. Find $\binom{n}{1}$.
2. Find $\binom{n}{n-1}$.
3. Find $\binom{n}{0}$?
4. Find a formula for $\binom{n}{m}$ ($0 \leq m \leq n$, $m, n \in \mathbb{Z}$).
5. Draw 5 levels of a Pascal-style triangle where the 0^{th} (top) level is the single number $\binom{0}{0}$, and where the n^{th} level is the $(n+1)$ numbers $\binom{n}{0}, \binom{n}{1}, \dots, \binom{n}{n}$.

6. What would you need to show in order to *prove* that this triangle is the same as Pascal's triangle?

7. Argue the *symmetry identity* $\binom{n}{k} = \binom{n}{n-k}$.

8. Argue the *absorbtion identity* $\binom{r}{k} = \frac{r}{k} \binom{r-1}{k-1}$.