Last name _____

First name _____

LARSON—MATH 550—CLASSROOM WORKSHEET 19
Pascal's Triangle.

Concepts & Notation

- Sec. 3.4. mod notation.
- Sec. 4.4. Analyzing the size of $n!$
- Sec. 5.1. Binomial coefficients!

Estimating the size of $n!$

1. Check: $(n!)^2 = (1 \cdot 2 \dots n)(1 \cdot 2 \dots n) = \prod_{k=1}^{n} k(n+1-k)$

2. Check: $k(n+1-k) = \frac{1}{4}(n+1)^2 - (k - \frac{1}{2}(n+1))^2$

3. What is the smallest value of $k(n+1-k)$ (for $k, n \in \mathbb{Z}^+$, $k \leq n$)?

4. What is the largest value of $k(n+1-k)$ (for $k, n \in \mathbb{Z}^+$, $k \leq n$)?

5. What can we conclude?

6. Draw several level's of Pascal's Triangle.

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

7. Find $\binom{3}{1}$.

8. Find $\binom{3}{2}$.

9. Find $\binom{n}{1}$.

10. Find $\binom{n}{n-1}$.