Last name _____

First name _____

LARSON—MATH 350—CLASSROOM WORKSHEET 07
Permutations and Combinations

Review

- What is a *permutation* (or *ordered set*)?

- We proved: the number of permutations of an n-element set is $n!$

- We proved: the number of ordered k-element subsets of an n-element set is $\frac{n!}{(n-k)!}$.

1. If there are 10 runners, how many ways are there to select two for door prizes?

2. How many ways are there to select three for door prizes?

3. List all 2-element subsets (2-subsets) of the set $\{A, B, C, D, E\}$.

4. How many 2-subsets are there? What is the relationship between this number and the number of *ordered* 2-subsets we previously computed?

5. List all 3-subsets of the set $\{A, B, C, D, E\}$.

6. How many 3-subsets are there? What is the relationship between this number and the number of *ordered* 3-subsets we previously computed?

7. How many k-subsets are there of an n-set? (How should we think about this?)

8. What is a *combination*?

9. (**Notation**) What is $\binom{n}{k}$?

10. Find a *formula* for $\binom{n}{k}$.

11. Find $\binom{5}{2}$ and $\binom{5}{3}$.

12. Find $\binom{1}{0} + \binom{1}{1}$.

13. Find $\binom{2}{0} + \binom{2}{1} + \binom{2}{2}$.

14. Find $\binom{3}{0} + \binom{3}{1} + \binom{3}{2} + \binom{3}{3}$.

15. Conjecture the value of the sum: $\binom{n}{0} + \binom{n}{1} + \ldots + \binom{n}{n-1} + \binom{n}{n}$.