Last name _____

First name _____

LARSON—MATH 550—CLASSROOM WORKSHEET 14
Rising and Falling Factorials.

Concepts & Notation

- Sec. 2.4. Multiple sums. General Distributive Law. Chebychev's Monotonic Inequalities.
- Sec. 2.6. Δ operator. Rising and falling factorials.
- Sec. 3.1. floor and ceiling notation.
- Sec. 3.2. interval notation.
- Sec. 3.4. mod notation.
- Sec. 4.4. Analyzing the size of $n!$
- Sec. 5.1. Binomial coefficients!

Homework

1. Define $\Delta f(x)$

2. Define $x^{\underline{m}}$.

3. Define $x^{\overline{m}}$.

4. Find $\Delta(x^{\underline{m}})$.

5. Check: $n! = n^{\underline{n}} = 1^{\overline{n}}$.

6. How can we "investigate" the *General Law*?:

$$\sum_{0 \le k < n} k^{\underline{m}} = \frac{k^{\underline{m+1}}}{m+1}\Bigg|_0^n$$

7. What are $\lceil x \rceil$ and $\lfloor x \rfloor$?

8. Claim: $\lceil x \rceil = x \Leftrightarrow x$ is an integer $\Leftrightarrow \lfloor x \rfloor = x$

9. Claim: $\lceil x \rceil - \lfloor x \rfloor = [x$ is an integer $]$

10. Claim: $x - 1 < \lfloor x \rfloor \le x \le \lceil x \rceil < x + 1$.