The factorial function, integer-valued polynomials, and $p$-adic calculus.

We take another look at the factorial function ($!$), and introduce some generalizations that have turned out to be very useful in a number of recent number-theoretic, ring-theoretic, and combinatorial contexts. In particular, we will discuss some of the recent applications of these generalized "factorial functions" to the study of integer-valued polynomials and to $p$-adic analysis. (Received November 03, 2009)