1049-05-188   **Kevin Woods*** (`Kevin.Woods@oberlin.edu`), Department of Mathematics, Oberlin College,
                     Oberlin, OH 44074. *A Finite Calculus Approach to Ehrhart Polynomials.* Preliminary report.

Given a polytope P, the lattice point enumerator counts, as a function of t, the number of integer points in the dilated polytope tP. If P has rational vertices, this function is a quasi-polynomial in t, called the Ehrhart quasi-polynomial. Inspired by the analogy of Ehrhart quasi-polynomials as a discrete version of the volume of a polytope, we present a new proof of the existence of these quasi-polynomials. This proof uses finite calculus and induction, and provides quick proofs of two other related results: McMullen's theorem about the periods of the individual coefficients of the quasi-polynomial, and the Ehrhart-Macdonald theorem on reciprocity. This is joint work with Steven Sam. (Received March 03, 2009)