

## Ehrhart Polynomials

For a  $d$ -dimensional polytope  $P$  defined as the convex hull of  $n$  vertices on the integer lattice  $\mathbb{Z}^d$ , the number of lattice points contained in  $kP$  for some integer  $k$  is given by a polynomial in  $k$ , denoted  $i_P(k)$ , of degree  $d$ . This result is known as Ehrhart's Theorem. We will prove this and discuss the behavior of the coefficients of  $i_P(k)$ , its roots, and other applications.