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Matthias Beck, San Francisco, CA, **Benjamin Braun**, Lexington, KY , and **Andres R Vindas Melendez*** (andres.vindas@uky.edu), Department of Mathematics, 719 Patterson Office Tower, Lexington, KY 40506. *Decompositions of Ehrhart h^* -Polynomials for Rational Polytopes.*

The Ehrhart quasipolynomial of a rational polytope P encodes the number of integer lattice points in dilates of P , and the h^* -polynomial of P is the numerator of the accompanying generating function. We provide two decomposition formulas for the h^* -polynomial of a rational polytope. The first decomposition generalizes a theorem of Betke and McMullen for lattice polytopes. We use our rational Betke–McMullen formula to provide a novel proof of Stanley’s Monotonicity Theorem for the h^* -polynomial of a rational polytope. The second decomposition generalizes a result of Stapledon, which we use to provide rational extensions of the Stanley and Hibi inequalities satisfied by the coefficients of the h^* -polynomial for lattice polytopes. Lastly, we apply our results to rational polytopes containing the origin whose duals are lattice polytopes. (Received September 03, 2020)