

Math 4550 HW due Mar. 12, 2009

1. Let $K \subseteq \mathbb{R}^d$. Prove that K^Δ is a closed convex subset of $(\mathbb{R}^d)^\star$.
2. The lower bound theorem says that $h_2 \geq h_1$ for the boundary of a simplicial d -polytope whenever $d \geq 3$. Translate this into an inequality involving f_0, f_1 and d . Show by example that this inequality may not hold if P is not simplicial.
3. Let P and Q be d -polytopes in \mathbb{R}^d . Prove that if P and Q are affinely equivalent, then as posets $\mathcal{F}(P)$ is isomorphic to $\mathcal{F}(Q)$.