

Homework 1, Due Thursday, 03/11

1. Given a cone σ_1 in N , generated by the vector $(1, 2)$.
 - a) Find generators for a cone $\widehat{\sigma}_1$ in M , which is dual to σ_1 .
 - b) Describe the semigroup $\widehat{\sigma}_1 \cap M$ by generators and relations.
 - c) Describe the corresponding algebraic variety.
2. Given a cone σ_2 in N , generated by the vectors $(1, 0)$ and $(1, 2)$.
 - a) Find generators for a cone $\widehat{\sigma}_2$ in M , which is dual to σ_2 .
 - b) Describe the semigroup $\widehat{\sigma}_2 \cap M$ by generators and relations.
3. (Optional Bonus) Explain how the ring in Question 1 is a localization of the ring in Question 2 by writing down an explicit multiplicative subset.