

Here we will construct the toric variety \mathbb{P}^2 from its fan, which I will draw on the board.

- (1) Calculate the affine toric variety of each 2-dimensional cone.
- (2) Show that the affine toric variety of the trivial cone $\{0\}$ is the torus $\text{Spec } \mathbb{C}[M]$.
- (3) Write ring maps for each of the inclusions of coordinate rings implied by the structure of the fan.
- (4) For each inclusion identify the element which is inverted and describe it as a character.
- (5) Identify the subset of points $(a : b : c)$ (in the usual coordinates on \mathbb{P}^2) corresponding to each affine toric variety.
- (6) Describe the action of the torus on itself and its characters in the coordinates of (5).
- (7) Compare your answers to those on the first worksheet.