

Math 366 : Geometry

Problem Set 1

1. Prove that if $v_1, \dots, v_k \in \mathbb{R}^n$, then the convex hull of the v_i is the set

$$\{t_1v_1 + \dots + t_kv_k \mid t_1, \dots, t_k \geq 0, t_1 + \dots + t_k = 1\}.$$

Hint : This set is clearly contained in the convex hull, so you have to prove the other inclusion. Prove by induction on k that all points of this form have to be contained in any convex set containing the v_i .

2. Pak's book, Exercises 1.2, 1.5, 1.6, 1.11a, 1.12, 1.13a (points in \mathbb{R}^2 are in *general position* if no three lie on a line).