

- *1. a. Show that the denumerable union of denumerable sets is denumerable.
 b. Show that for all finite d , \mathbb{N}^d is denumerable.

Les. 8 \mathbb{Q}, \mathbb{R}^*

- 3.* Let K be a symmetric convex set in \mathbb{R}^p . Show that the functional below is a norm:

$$\|\vec{x}\|_K = \inf_{t \geq 0} \{ t : \vec{x} \in tK \}$$

~~8.12~~ 9 $\mathbb{G}, \mathbb{H}, \mathbb{L}, \mathbb{O}, \mathbb{P}, \mathbb{Q}$

4. A real number x is algebraic if integers it it is a solution to $p(x) = 0$ where p is a polynomial with integer coefficients. Thus $1/3, \sqrt{2}, \sqrt[3]{3}, \frac{\sqrt{5} \pm 1}{2}$ are all algebraic integers. Show that the collection of algebraic integers is denumerable.