last time:

open subset of $\mathbb{R}^N$

def: $U \subset \mathbb{R}^N$ is called open if U is a union of open balls

b def: A subset U of $\mathbb{R}^N$ is called open iff:

$\forall x \in U$

$\exists r \in \mathbb{R}, r > 0$

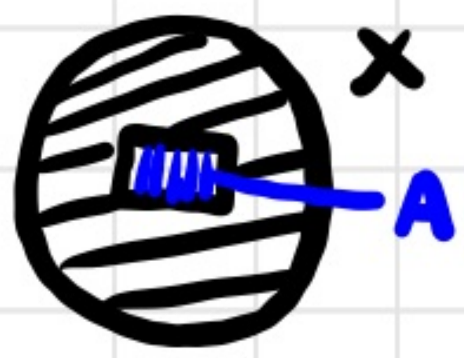
s.t. $Ball(x, r) \subset U$

prop: U satisfies a

$\Leftrightarrow$ U satisfies b

Given a subset $A \subset X$ recall that the **complement** of A is the set of all $x \in X$ NOT in A. Often we write A^c for the complement (of A in X). Denoted

$A^c = \{x \in X \mid x \notin A\}$

Ex: 

$\Rightarrow$ $A^c =$ 

Ex: 

$X = \mathbb{R}^2$ $\Rightarrow$ A^c 

Notation: $X \setminus A$ (or $X - A$) $= A^c$

A subset $K \subset \mathbb{R}^N$ is called **CLOSED** if K^c is open.

⚠ It's possible for some subsets to be open **and** closed