

(X, d) metr. space

X is some set

$$d: X \times X \rightarrow [0, \infty) \subseteq \mathbb{R}$$

$$(x, y) \mapsto d(x, y)$$

← distance from
 x to y

1) positive definite $d(x, y) \geq 0$
 $d(x, y) = 0$ iff $x = y$

2) symmetry $d(x, y) = d(y, x)$

3) Δ -ineq $d(x, z) \leq d(x, y) + d(y, z)$

Complete: "Every Cauchy seq converges"

- HW** * Find an example of a complete space
* Find an example of a space which is not complete

~~$A \subseteq X$:~~

$A \subseteq X$?

$A \subsetneq X$?

HW Cook up some examples of
 C^1 functions, C^∞ functions
 C^1 but not C^∞ functions

HW Is every proper function cts?

$$f: X \rightarrow Y$$

$K \subseteq Y$ compact

th $f^{-1}(K) \subseteq X$ is
cpt

HW Prove proposition 8.