

Math 451 001 Assignment 2

Due Jan 26th

Complete all of the following questions.

1. (10 pts) Construct a bounded set of real numbers with exactly three limit points.
2. (10 pts) Is every point of every open set $E \subset \mathbb{R}^2$ a limit point of E ? Answer the same question for closed sets in \mathbb{R}^2 .
3. (10 pts) Let X be an infinite set. For $p \in X$ and $q \in X$, define $d(p, q) = 1$ if $p \neq q$ or $d(p, q) = 0$ if $p = q$. Prove that this is a metric. Which subsets of the resulting metric space are open? Which are closed?
4. (10 pts) Let A be a non-empty subset of real numbers which is bounded below. Let $-A$ be the set of all numbers $-x$, where $x \in A$. Prove that $\inf A = -\sup(-A)$.