Math 131
Homework 4
2/20/17

1, 2, 3

1) Let X be a metric space. Prove or disprove the following statement: Every compact subset of X is bounded.

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2) Let X be a finite metric space. What can you say about the open subsets, closed subsets, and compact subsets of X?

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3) Let a and b be irrational real numbers such that $a < b$, and consider the following subset of the rational numbers:

$$A = \{q \in \mathbb{Q} : a < q < b\}.$$

View $\mathbb{Q}$ as a metric space with the usual metric.

a. Is A an open subset of $\mathbb{Q}$?

b. Is A a closed subset of $\mathbb{Q}$?

c. Is A a compact subset of $\mathbb{Q}$?

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