Math 140A: "Winter" 2016
Homework 10

Available	Friday, March 4	Due	Friday, March 11

Turn in the homework by 5:00pm on Friday, March 11, in the homework box in the basement of AP&M. Late homework will not be accepted.

1. Let $\{K_n \colon n \in \mathbb{N}\}$ be a collection of compact sets. Show that $\bigcap_n K_n$ is compact.

2. Exercise 1, p. 98 in Rudin.

3. Exercise 4, p. 98 in Rudin.

4. Let X, Y be metric spaces and let $f \colon X \to Y$ be *uniformly* continuous. If (x_n) is a Cauchy sequence in X, show that $(f(x_n))$ is a Cauchy sequence in Y. On the other hand, if the assumption of *uniform* continuity is dropped, the result is false: give an example of a continuous function $f \colon (0,1) \to \mathbb{R}$ that does not map Cauchy sequences to Cauchy sequences.