Name: ______________________ Score (Out of 5 points):

1. (3 points) Let (X, d) be a metric space, and let $A, B \subseteq X$. Show that, if A and B are sequentially compact, then so is $A \cap B$.

2. Consider the metric space $X = (0, \infty) \subseteq \mathbb{R}$ with the Euclidean metric. For the following questions, simply state an example. **No justification needed.**

   (a) (1 point) Find a sequence $(a_n)_{n\in\mathbb{N}}$ in X that is Cauchy, and a continuous function $f\colon X \to X$ such that the sequence $(f(a_n))_{n\in\mathbb{N}}$ is not Cauchy.

   (b) (1 point) Find a sequence $(a_n)_{n\in\mathbb{N}}$ in X that is unbounded, and a continuous function $f\colon X \to X$ such that the sequence $(f(a_n))_{n\in\mathbb{N}}$ is bounded.