Name: _____   Score (Out of 6 points):

1. (3 points) Suppose that (X, d) is a metric space, and that X is a **finite** set. Prove that X is sequentially compact.

2. (3 points) Recall that a sequence of real numbers $(a_n)_{n \in \mathbb{N}}$ is said to *diverge to infinity* if for every $R \in \mathbb{R}$, there is some $N \in \mathbb{N}$ so that $a_n \geq R$ for all $n \geq N$.

   Suppose that $(a_n)_{n \in \mathbb{N}}$ is a sequence of real numbers that diverges to infinity. Show that no subsequence of $(a_n)_{n \in \mathbb{N}}$ converges.