MATH 461: Homework #20

1) Let $(X, \mathcal{T})$ be a set X with the cofinite topology ($O \subset X$ is open if and only if $X - O$ is finite, $\emptyset$, or X). Show that $(X, \mathcal{T})$ is compact. Is it sequentially compact?

2) Prove that any closed subset of a compact topological space is compact in the subspace topology. Is this true for sequentially compact spaces?

3) Let X and Y be sequentially compact topological spaces. Show that $X \times Y$ is sequentially compact.