HW4

(1) Give an example of topologies $\mathcal{T}$ and $\mathcal{T}'$ on $\{1, 2, 3\}$ such that $\mathcal{T} \cup \mathcal{T}'$ is not a topology.

(2) [Grad. only] Prove that if a topology $\mathcal{T}$ has a countable subbase, then it also has a countable base.

(3) Prove that $[0, 1)$ is NOT open in $\mathbb{R}$ (with the standard topology).