Homework 1: The Definition of a Topology

*Assignments should be **stapled** and written clearly and legibly.*

1. §1.1, #1.3, 1.4, 1.5, 1.7.
2. Suppose that $\mathcal{T}_1$ and $\mathcal{T}_2$ are two topologies on a set X. Prove that $\mathcal{T}_1 \cap \mathcal{T}_2$ is a topology on X, but $\mathcal{T}_1 \cup \mathcal{T}_2$ need not be a topology on X.