- 1. If $\mathcal{B} \subset \mathcal{P}(X)$ is closed under complements and finite unions (i.e., is an algebra) and is also closed under countable disjoint unions, then \mathcal{B} is closed under countable unions (i.e., is a σ -algebra).
- 2. Assume that

$$\mu_*A = \max_{A \supset E \in \mathcal{A}} \mu E$$

where μ is a measure on \mathcal{A} , i.e., given $A \subset X$, find a set $E_* \in \mathcal{A}$ such that $E_* \subset A$ and $\mu E_* = \mu_* A$. This is inner approximation by measurable sets. Use this to simplify the proof given in class of Lemma C: The Carathéodory condition is equivalent to $\mu_* A = \mu^* A$.