Problem 7 (Resnick, page 63 Problem 4) Suppose $\mathbb{P}$ is a probability measure on a σ-algebra $\mathcal{B}$ and suppose $A \notin \mathcal{B}$. Let $\mathcal{B}_1 := \sigma(\mathcal{B} \cup \{A\})$ and show that $\mathbb{P}$ has an extension to a probability measure $\mathbb{P}_1$ on $\mathcal{B}_1$ (Do this without applying an extension theorem).