MATH 113: DISCRETE STRUCTURES
HOMEWORK FOR MONDAY WEEK 8

Problem 1. Suppose that P is a probability distribution and A and B are events. Prove that

$$P(A \cup B) + P(A^c \cap B^c) = 1.$$

Problem 2. Let S be a finite set and suppose $p : S \to \mathbb{R}_{>0}$ is a function such that $p(s) > 0$ for all $s \in S$ and $\sum_{s \in S} p(s) = 1$. (The notation "$\sum_{s \in S} p(s)$" means that we add up all of the values $p(s)$ where s ranges through all of S.) For an event $A \subseteq S$, define $P(A) = \sum_{a \in A} p(a)$. Prove that P is a probability distribution on the sample space S.