axioms of probability

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1. The probability of an event is a nonnegative real number $P(A) \geq 0$ for any $A \subset S$
2. $P(\Omega) = 1$ (also denoted $P(S) = 1$)
3. If $A_1, A_2, A_3, \ldots$ is a sequence of **mutually exclusive events** of S, then:

$$P(A_1 \cup A_2 \cup A_3 \cup \cdots = P(A_1) + P(A_2) + P(A_3) + \cdots$$

further properties