Theorem: 1.1-3

If events A and B are such that $A \subset B$, then $P(A) \leq P(B)$

Proof

Because $A \subset B$, we have

$$B = A \cup (B \cap A') \quad \text{and} \quad A \cap (B \cap A') = \emptyset$$

Hence, from property (c) of **probability**,

$$P(B) = P(A) + P(B \cap A') \geq P(A)$$

because, from property (a) of **probability**,

$$P(B \cap A') \geq 0$$