Concepts
Probability Thinkers

1. Let $S = [k]$ for some positive integer k. Define P on S such that:

$$P(\{\omega\}) = \frac{\omega}{\alpha}$$

For every $\omega \in S$ for some α. If S is a finite probability space with P. find α.

2. Prove that if P is a probability function and A and B are events,

$$A \subseteq B \Rightarrow P(A) \leq P(B)$$

3. What is the expected number of heads in n tosses of a fair coin?

4. Use #3 to prove the following. *Hint: Use one of the definitions of expected values*.

$$\sum_{k=0}^{n} k \binom{n}{k} = n2^{n-1}$$

Solution is at http://www.andrew.cmu.edu/user/suesugi/concepts/probability_sol.pdf