**Introduction to Probability**
**Quiz 3**

Let $S = \{1, 2, \ldots, n\}$ and suppose that $A$ and $B$ are independently, equally likely to be any of the $2^n$ subsets (including the null set and $S$ itself) of $S$. Show that

$$P\{A \subset B\} = \left(\frac{3}{4}\right)^n.$$

**Hint:** Let $\#B$ denote the number of elements in $B$. Use

$$P\{A \subset B\} = \sum_{i=0}^{n} P\{A \subset B | \#B = i\} P\{\#B = i\}$$