Name:

Problem 1. State the binomial theorem for the expansion of $(x + y)^n$.

Problem 2. Suppose we have a probability distribution with sample space $S = \{a, b, c\}$. What are the relations that $p(a), p(b)$, and $p(c)$ must satisfy so that we have a valid probability distribution?

Problem 3. Give an arithmetical expression for the following. For this problem, expressions involving factorials like $5 \cdot 3!$ are fine, but expressions involving like $\binom{4}{2}$ or $P(5,3)$ are not.

(No work needed)

(a) $\binom{8}{3}$

(b) $P(8,3)$

(c) The number of distinct permutations of the string AAAABBCCCD (different copies of the same letter are taken to be indistinguishable).