Practice Problems for Exam # 1 on 10/07/2004

These practice problems will give you an idea of what the actual exam is like. The problems in the actual exam may not be parallel or analogous to the practice problems.

In all the problems below give the answer for $n = 100$.

1. Find a formula for the number of ordered pairs (A, B) of subsets in $\{1, \ldots, n\}$ such that $A \cap B = \emptyset$. (Empty subsets A and/or B are allowed.)

2. Evaluate the sum $\displaystyle\sum_{k=0}^{n} \frac{1}{k+1}\binom{n}{k}$.

3. Find the number of partitions $\lambda = (\lambda_1 \geq \lambda_2 \geq \lambda_3 \geq \cdots)$ of n such that $\lambda_3 = 2$.

4. Find the number of ways to subdivide the set $\{1, \ldots, n\}$ into 3 nonempty blocks?

5. Find the number of ways to subdivide the set $\{1, \ldots, \binom{n+1}{2}\}$ into n blocks of sizes $1, 2, \ldots, n$ and then to linearly order each block.