

Stat 134: Section 8

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Conceptual Review

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

- a. State Markov's Inequality and Chebyshev's Inequality.

Problem 1

Consider a grid of n^2 cups, with n rows of n cups. Toss n ping pong balls at random into these cups, where at most one ball can occupy a particular cup. Let X be the number of unoccupied rows (i.e., where every cup in that row contains no balls). Find $\mathbb{E}(X)$.

Problem 2

Suppose we have n unique pairs of chopsticks in a drawer (so $2n$ sticks in total). Hurrying to prepare for dinner, we grab $2k$ of these at random from the drawer and try to make matching pairs from this pile of $2k$ chopsticks. Let X represent the number of matching pairs. Find $\mathbb{E}(X)$.

Problem 3

Suppose that bundles of yarn are 60 meters long on average, with an SD of 5 meters, and that bundles are independent of one another. In terms of n , find an upper bound (less than 1) on the probability that the total length of n bundles is less than 200 meters, for $n \geq 4$.