

Probability, HW1

Practice problems:

1. Book, p.64: 6, 7, 19, 20, 23, 31
2. In the birthday problem and similar problems, we draw k times from n objects to get the probability of A : a shared birthday as

$$P(A) = 1 - \frac{(n)_k}{n^k}$$

To arrive at this formula we used drawing with respect to order. However, order is not important to this problem, so without order we instead get

$$P(A) = 1 - \frac{\binom{n}{k}}{\binom{n+k-1}{k}}$$

Show (for example by choosing simple values of n and k) that the expressions do not coincide. Also explain which is the correct one and why.

Turn-in problems:

1. In class we computed the probability to be dealt two pairs in poker by building up such a hand in stages, starting the the ranks of the pair, then the suits, and finally the 5th card. Now do it instead starting with the 5th card, then ranks, then suits, and show that you get the same result. Note: The “5th card” refers to the one that is not in any of the pairs, it does not refer to the order in which cards are drawn. This problem we solve without taking order into account.
2. Compute the probability of the suit distributions 13–0–0–0 and 5–4–3–1 for a bridge hand.
3. Book, problem 15, p.65