Discrete Structures
CSE 321, Spring 1998

Anna Karlin, 426C Sieg

Homework #7

Due at the beginning of class, Wednesday, May 27

Reading: Rosen, Sections 6.1, 7.1, 7.2.

Continued Policy: You are strongly encouraged to work in groups of 2 on this homework and turn in a single homework with both names on it. Both members of the group will receive the same score.

Don't let us have lonely office hours!

1. A deck of 10 cards, each bearing a distinct number from 1 to 10, is shuffled to mix the cards thoroughly, so that each order is equally likely. What is the probability that the top three cards are in sorted (increasing) order?
2. Suppose that A and B are events in a probability space, and that $Pr(A) = 0.5$, $Pr(B) = 0.2$ and $Pr(A \cup B) = 0.6$. What is $Pr(A \cap B)$?
3. Suppose that each of the students in a 100 person class is assigned uniformly and independently to one of four quiz sections. What is the probability that all six students named "David" are assigned to the same section?
4. Eight men and seven women, all single, happen randomly to have purchased single seats in the same 15-seat row of a theatre. What is the probability that the first two seats contain a (legally) marriageable couple?
5. A fair coin is flipped n times. What is the probability that all the heads occur at the end of the sequence?
6. Rosen, Section 4.5, problem 16.
7. Rosen, Section 4.5, problem 18.
8. Rosen, Section 4.5, problem 24.
9. Suppose a 6-sided dice is rolled. What is the expectation of the value showing? Suppose two 6-sided dice are rolled. What is the expectation of the value showing? What is the expectation of the maximum of the two values showing?
10. Suppose that a fair coin is tossed 100 times. What is the expected number of consecutive flips in which the coin takes on the same value?
11. **Extra Credit:** Prove that
$$\sum_{1 \le i \le n} i \binom{n}{i} = n2^{n-1}.$$