Statistics/Mathematics 309 — Example Uniform Probability Problems
Fall 2008

1. The top two cards of a well-shuffled standard 52-card deck are both hearts. What is the probability that exactly three of the next five cards are also hearts? (In Texas Hold ’Em poker, where your hand is the best 5-card poker hand that can be made from the two cards dealt to you and the five cards dealt face-up for everyone to use, if you were dealt two hearts, this event would give you a flush, a very strong hand).

2. The top two cards of a well-shuffled standard 52-card deck are both hearts. What is the probability that three or more of the next five cards are also hearts?

3. The top two cards of a well-shuffled standard 52-card deck are both tens. What is the probability that exactly one of the next five cards is a ten? What is the probability that exactly two of the next five cards are tens?

4. Roll five standard 6-sided dice. Find the probability that three or more of the dice are 5’s. (In the dice game Yahtzee, the score in one category is five times the number of fives.)

5. Roll five standard 6-sided dice. What is the probability of one or more 5’s?

6. Roll a standard 6-sided white die and three standard 6-sided red dice. What is the probability that the maximum of the three red dice is larger than the value on the white die? (In the board game Risk, if the attacker has four or more armies and the defender has only one army, the attacker wins when this happens.)

7. Toss a fair coin ten times. What is the probability that the longest run of heads has length 3?

8. Roll six fair 10-sided dice, each with numbers 0, 1, 2, …, 9. Find the probability that the sum is two. Find the probability that the sum is three.

9. Consider all 1 × 4 tables of non-negative integers where the row sum is 6. How many such different tables are there? If one is selected at random, what is the probability that there are no zeros?