

MA395 Assignment 3 - Combinatorial Probability

Name:

In the problems below, you may assume the following setting:

A standard deck of 52 playing cards is thoroughly shuffled and a 5-card poker hand is dealt.

The problems require you to apply the methods of combinatorial probability outlined in sections 2.6 and 2.7 in the text.

Since the answers are readily available on the internet, the steps you used to arrive at your answer are more important than the answer itself. Please show as much of your work as necessary to make it clear **how** you found the answer.

1) Find the probability of getting a hand with 4 aces.

2) Find the probability of getting a hand with 4 cards of the same denomination.

3) A hand in which all 5 cards belong to the same suit is called a *flush*. Find the probability of getting a flush in clubs.

4) What is the probability of getting a flush in any suit?

5) A hand with 3 cards in one denomination and 2 cards in another is called a *full house*. Find the probability of getting a full house in twos and tens.

6) Find the probability of getting any full house.

7) A hand in which exactly 3 cards have the same denomination while the fourth card has a different denomination, and the fifth card has yet another denomination is called *3 of a kind*. Find the probability of getting three of a kind in Jacks.

8) Find the probability of getting 3 of a kind in any denomination.

9) A hand with 5 consecutive denominations is called a *straight*. Assume Aces must be treated as denomination 1. Find the probability of getting a straight.

10) Find the probability of getting a straight if Aces can be treated as either lower than 2 or higher than King.

11) A hand in which exactly 2 cards have the same denomination is called a *pair*. Again, the usage of the term "pair" excludes hands with three of a kind, a full house, four of a kind, and two pair. Find the probability of getting a pair.

12) A hand which has all 5 cards in the same suit and in consecutive denominations is called a *straight flush*. If the denominations are 10,J,Q,K,A it is called a *royal straight flush*. Find the probability of a royal straight flush.

13) Find the probability of a straight flush.

14) A hand in which has exactly two cards in one denomination and exactly two in another is called *two pairs*. Find the probability of getting a hand with two pairs in aces and eights.

15) Find the probability of getting a hand with two pairs in any denominations.