
Math 218: Combinatorics

HOMEWORK 2 : DUE SEPTEMBER 6

Deck of card background in case you need it. A standard deck of cards has 52 cards. There are four suits (hearts ♡, spades ♠, diamonds ♢, and clubs ♣) and each suit has 13 cards (the numbers 2 through 10 which I call the “number cards”, the Ace, and the “face cards”: king, queen, and jack). A “hand” is the set of cards you are dealt in a game like poker.

1. Morris Exercise 3.1.9 (2)
2. In poker, a hand consists of five cards dealt to a player. “Four of a kind” means your hand consists of four cards of the same face value. How many different “four of a kind” hands are there where we do not care what order the cards are dealt to you?
3. In how many ways can four dogs and eight cats be seated at a round table if there are to be two cats between consecutive dogs around the table?
4. How many ways are there to pick three cards out of a deck of 52 cards if our first choice must be a 6, the second choice must be a face card, and the third choice must be a “number card” from the hearts suit? Assume we do not return the already picked cards to the deck for the next choice, and assume the order we pick these in matters, i.e. we must pick a 6 first, and then a face card, and then a hearts number.
5. Morris Exercise 3.1.9 (4)
6. How many integers greater than 5400 have both the following properties:
 - (a) the digits are distinct, and
 - (b) the digits 2 and 7 do not occur?