Quantitative Reasoning 28:
The Magic of Numbers

Homework 5

Assigned on Friday September 26th
Due at 12 noon Monday September 29th

Please submit problem sets at the end of the relevant lecture, or leave in the box labeled QR28 outside the Math Department's main office, on the third floor of the Science Center (Room 325).

Reading:

Gross-Harris, Chapters 4,5

Problems:

Please explain your reasoning and show your work.

1. How many distinct ways are there to rearrange the letters in "MISSIS-SIPPI"? How about "WOOLLOOMOOLOO"[1] (a town near Sydney, Australia)?

2. **Disaster!** You are stranded on a desert island following a plane crash. There is only one other survivor, and only one other object has been salvaged from the ashes – an ordinary deck of 52 playing cards.

   (a) To pass the time you of course play card games. As you prepare for a game of war, you quickly scan through the deck and notice that no two spades are next to each other. How many arrangement of the deck have this property? (NB: a standard deck has four suits of thirteen cards each)

   (b) Later you begin to tire of card games and together construct a rudimentary house out of palm trees and grass. In the house there is one

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[1] Also a friend of mine from high school convinced several people that this was his middle name.

room that would sleep 5 people, one that sleeps 3, two doubles, and a single. In this house will live your 13 "children" which are really just coconuts that you have decorated. In how many ways can you assign your children to the rooms?