

# Quantitative Reasoning 28: The Magic of Numbers

## Homework 5

Assigned on Friday September 28th  
**Due at 12 noon Monday October 1st**

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 "MISSISSIPPI"? How about "WOOLLOOMOOLOO"<sup>1</sup> (a town near Sydney, Australia)?
2. You roll two standard 6-sided dice. What is the probability that their sum is at least 8? What is the probability that their difference is at least 2?  
*Hint:* There might not be any super-quick extraordinarily-clever way to do this problem.
3. **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. What is the probability that when four cards are dealt at random from this ordinary deck, each suit is present (note that a standard deck has four suits of thirteen cards each)?

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<sup>1</sup>Also a friend of mine from high school convinced several people that this was his middle name.

- (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 room that would sleep 5 people, one that sleeps 4, two doubles, and a single. In this house will live your 14 “children” which are really just coconuts that you have decorated. In how many ways can you assign your children to the rooms?