Quantitative Reasoning 28:
The Magic of Numbers

Homework 4

Assigned on Wednesday Sept 26th
Due at 12 noon Friday Sept 28th

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, Chapter 4

Problems:

Please explain your reasoning and show your work.

1. Filling in the favorite books section of her facebook.com entry, a student chooses 4 books out of the 10 standard books of choice: Catcher in the Rye, Portnoy's Complaint, Lord of the Rings, The Great Gatsby, 1984, To Kill a Mockingbird, Catch 22, Harry Potter, Nullstellensatz, and The Sun Also Rises. How many ways are there for her to make the choice?

   Suppose she has actually read 1984 so she decides to definitely choose that one. How many ways are there for her to make a choice of 4 given that one of them must be 1984?

2. It's time to look ahead to the next season for the Harvard women's ice hockey team. Keeping Cahow, Sifers, Vaillancourt, and Wilson on the side will mean it's going to be a good one. Suppose they play 30 games in the season and end up winning 23 of those games, and losing 7. How many possible win/loss records are there? (By win/loss record I mean a list of which games were won and which were lost.)

   What if we drop the condition that the team win 23 games and only require that they win more than half of their games – how many possible win/loss

records are there (assuming that each game ends in a win or a loss)? *Hint:* There are three possibilities for a season – winning more than half of your games, winning less than half of your games, and winning exactly half of your games. Using this you should be able to derive a concise solution.