Quantitative Reasoning 28:
The Magic of Numbers

Homework 2

Assigned on Fri Sept 21
Due at 12 noon, Mon Sept 24

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 2

Problems:

Please explain your reasoning and show your work.

1. Cameron goes out to dinner at Veggie Planet to celebrate the fact that he's not teaching calculus this year. On the menu board are listed three possible salads and five possible pizzas. How many ways are there for Cameron to order if he intends to get a salad, a pizza, and either lemonade or iced tea to wash it down?

2. How many 4 digit numbers are there using the digits 0, 1, 2, 3, 4, and 5? Be careful: the first digit can't be zero! How many of these are even?

3. How many license plates are there of the form 3 letters, then 3 numbers? What if we restrict the 3 numbers, considered as a 3-digit number, to be between 437 and 981, inclusive?

4. By tricolor flag we shall mean a flag composed of three equal vertical bands of color (like the French one, or the one of Côte d'Ivoire). If we allow ourselves the colors blue, green, orange, red, and white, how many flags can we make? (We allow neighboring bands to have the same color).

   Suppose we want to save money on dye by requiring that *at least one* of the bands is white - how many flags can we make then? (Hint: First figure out how many of the flags have *no* bands being white and then use this to answer the question. This is an example of the *subtraction principle* which we shall learn about in the next lecture).