Quantitative Reasoning 28:
The Magic of Numbers

Homework 7

Assigned on February 18
Due at 5:00 p.m. February 23

Please submit problem sets to the boxes outside the Math Department's main office, on the third floor of the Science Center (Room 325).

Reading:

Gross-Harris, Chapter 6 (and review the previous chapters as necessary)

Problems:

Please explain your reasoning and show your work.

1. In walking from work back home at the end of the day, Grigor must travel six blocks east and four blocks south. How many possible routes can he take, assuming that he goes either east or south at each intersection? How many routes are there if he needs to stop by the dry-cleaners on the way home, which is located at the center of the grid (that is, two blocks south and three east of his workplace)?

2. Express $\binom{7}{4} + \binom{7}{5}$ as a single binomial coefficient.

   Express $\binom{9}{4} + \binom{9}{3} + \binom{10}{3}$ as a single binomial coefficient.

3. Suppose you roll three fair dice. What is the probability that their sum is 5?

4. Suppose that you choose three people at random. What is the probability that two of them were born on the same day of the week (assume that a randomly chosen person is equally likely to have been born on any day of the week)?