

Suggested reading for this week (from the textbook): §6.2 (inverse functions), §6.3 (cardinality)

Problems from the book: (First two numbers refer to the section number)

- 4.5.4 (some poker probabilities; four parts)
- 4.5.5 (lottery probabilities; three parts)
- 4.5.8 (*Hint:* count the divisors of 1200 using the fundamental theorem of arithmetic and the fundamental counting principle) (probability that a number divides 1200)
- 6.1.2 (Analyzing some functions from their relations; five parts)
- 6.1.3, parts (a) and (b) (one-to-one and onto with some continuous functions)
- 6.1.12 (relating one-to-one and onto to function composition; two parts)

Supplemental problems:

1. A drawer contains 8 gray socks, 10 black socks, and 6 white socks (as in Midterm 1, problem 2). Suppose that you draw nine socks from this drawer.
 - (a) Not considering the order in which the socks are drawn, there are $\binom{8+10+6}{9}$ different ways to select these nine socks. Evaluate this number explicitly (use a calculator or computer to help with the arithmetic).
 - (b) In how many of these outcomes do you *not* end up with exactly three socks of each color? You may leave your answer unsimplified in this part.
 - (c) What is the probability that you do *not* draw any four socks of the same color? Simplify your answer in this part, and express it as a decimal. (This is the probability that you are in the “worst case scenario” when applying the pigeonhole principle to this problem).
2. A professor distributes a list of 20 questions, and tells the students that she will choose five of these questions, at random, to put on an exam. The professor uses a lazy grading scheme in which each question is marked either “correct” or “incorrect” (without partial credit), and a student must answer three questions correctly in order to pass.
 - (a) Suppose that a student knows the answers to only 3 of the 20 questions. What is the probability that the student passes the exam? Express your answer as a decimal (use a calculator).
 - (b) Suppose that a student knows the answers to 12 of the 20 questions. What is the probability that the student passes the exam? Express your answer as a decimal (use a calculator).