Suggested reading for this week (from the textbook): §4.5 (probability), §5.1 (relations), §6.1 (functions)
Problems from the book: (First two numbers refer to the section number)

Note: unless otherwise stated, you may leave your answer unsimplified (e.g. as a product of numbers and binomial coefficients).

- 4.1.4 (divisors of 2310 with exactly 3 prime factors)
- 4.2.2 (finger positions on a three-valve trumpet)
- 4.2.5 (choices of a committee)
- 4.2.7 (number of six-letter passwords subject to certain conditions; six parts)
- 4.3.3 (coefficients from binomial expansions; five parts)
- 4.3.5 (counting the number of ways to bet on a race)
- 4.5.2 (probabilities from choosing two people for a prize; four parts)

Supplemental problems:

1. In an experiment, a coin is flipped 6 times. The "outcome" of the experiment is the list of which side came up on each throw (e.g. $HHTHTH$ is one possible outcome).
   (a) How many possible outcomes are there?
   (b) Suppose that $k \in \{0, 1, 2, 3, 4, 5, 6\}$. How many outcomes are there in which the coin came up heads k times? Express your answer as a binomial coefficient involving k.
   (c) Determine the probability that the coin lands heads *at least* four times. Simplify your answer as a decimal (use a calculator or computer)

2. A teacher wishes to divide a class of 12 students into four (disjoint) groups of three students each, labeled Group 1, Group 2, Group 3, and Group 4. How many ways are there to make this assignments? You may express your answer unsimplified as a product of binomial coefficients.

3. Find (and prove) a formula for the following sum, in terms of n.

$$\binom{n}{3} + \binom{n}{4} + \cdots \binom{n}{n}$$

   (Use the binomial theorem and formulas for $\binom{n}{0}$, $\binom{n}{1}$, and $\binom{n}{2}$).