Problem Set 15
Due: 9:00 a.m. on Wednesday, May 4

Instructions: Carefully read Sections 5.3, 5.4.1, and 5.4.2 of the textbook. Submit your solutions to the following problems. Be sure to adhere to the expectations outlined on the sheet *Guidelines for Problem Sets*. Submit your solutions in-class or to Dr. Cooper's mailbox in the Department of Mathematics.

Exercises: From pages 282–298 of the textbook.

1. Section 5.3 #5.21, pages 288–289

2. Section 5.3 #5.24, page 289

3. A deck of 52 cards is shuffled and 12 cards are dealt face up. You then take a second deck of 52 cards and choose 4 cards at random, replacing each chosen card before making the next choice. What is the probability of matching one of the cards from the first deck?

Note: You may use Maxima for tedious computations. If you do so, then please still show sufficient work. The following commands may be helpful:

- to find $a \pmod{n}$ type the command $\mathrm{mod}(a, n)$;

- to find the greatest common divisor of two positive integers a and b type the command $\gcd(a, b)$;

- to find the prime factorization of a positive integer n type the command $\mathrm{factor}(n)$;

- to find the inverse of n modulo m (where $\gcd(n, m) = 1$), type the command $\mathrm{inv\_mod}(n, m)$;

- to find $n!$, type the command $n!$;

- to find the binomial coefficient $\binom{n}{j}$, type the command $\mathrm{binomial}(n, j)$.