## Homework 7 Solutions

## Problems

1. Flipping through your Rolodex you choose at random three friends, call them up, and find out when they were born. What is the probability that at least two of the people you chose were born on the same day of the week?
There are $7^{3}$ different ways the 3 people could be distributed amongst the day s of the week. The number of ways that the 3 could be arranged so that none of them share a birthday is $7 \times 6 \times 5$, so there are $7^{3}-7 \times 6 \times 5$ ways that at least two of them share a birthday. Hence the probability is:

$$
\frac{7^{3}-7 \times 6 \times 5}{7^{3}}
$$

2. What is the probability of getting a flush in a game of poker? (NB: A flush is a hand with all cards having the same suit. Recall that there are four suits, each with thirteen cards. Assume that you're playing a game of five card stud: you just draw five cards and see what you get)
There are four suits, and for any given suit there are $\binom{13}{5}$ ways of selecting five cards from that suit. Using the multiplicative principle, the probability of getting a flush is $\frac{4 \cdot\binom{13}{5}}{\binom{52}{5}}$, or approximately . $19 \%$.
