

## Homework 2

Do the problems on webwork and turn the following problems in class on Sept. 17th.

Homework should be written neatly and clearly explained. If it requires more than one sheet, the sheets must be stapled. Include your name and id number in the top right corner of your homework.

**Problem 1.** You play a game in which you draw two cards from a well shuffled deck of twenty cards marked with numbers 1 to 10 in two different suits and your opponent then draws two cards from the rest of the deck. The winner is the person who has the highest card. After dealing the cards, both players have the option to withdraw from the game.

- (a) Given that both your cards are  $k$ , what is the probability you will win?
- (b) Given that your high card is  $k$  and your other card is not  $k$ , what is the probability you will win?
- (c) Given that your high card is  $k$ , what is the probability you will win?  
(Your answers should depend on  $k$ )

**Problem 2.** A burglar just stole your keychain which has  $n$  keys, exactly three of which open your apartment door. They will try to open your door using the keys one by one in a random order. Whenever a key does not open your door, they will not attempt to use this key again. The burglar will make  $m$  attempts to break in and then give up and leave. What is the probability they break in? You can assume  $n > 3$  and  $m < n - 2$ .