Homework 4 **92.386 203 Prob & Stat I** **Due Feb 18**

Show all your work. Late Homework will not be accepted without prior approval.

1. Continuing Hw3 Q2 in which balls are selected one at a time with replacement from a box containing 4 red and 6 white balls.

   (a) If the third ball is red, what is the probability the first ball was red?

   (b) If the third ball is red, what is the probability the first two balls were red?

2. Redo Q1 if the balls are selected without replacement.

3. One of a die and a coin (sides 0 and 1) is selected at random and tossed.

   (a) If the outcome is 0, what is the probability the coin was chosen?

   (b) If the outcome is 1, what is the probability the coin was chosen?

4. An HIV test is known to be 98% accurate (i.e. the probability of a correct diagnosis is 0.98) and 0.5% of the population is known to be HIV positive.

   (a) What is the probability that a random person will test positive?

   (b) If a person selected at random does test positive, what is the probability that he is infected?

Bonus. A gambler has three coins in his pocket, one is normal, one is head-head and the third is tail-tail. He picks one at random and tosses it and it shows heads. The gambler says that since you now know the coin is either head-head or head-tail the odds that the other side is tails is $1/2$. Is this true?