Homework 10   92.386 203 **Prob & Stat I**   **Due April 8**

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

1. Let X be the number of rolls of a die until you get a 6.

   (a) Find f_X.

   (b) Find $P(X > 10)$.

   (c) Find the smallest n so that $P(X > n) < 0.01$.

2. Let X be the result of a die toss and Y the number of heads when a coin is tossed X times. Find a formula for the joint density function $f_{X,Y}$.

3. A typist has probability 0.01 of typing a word incorrectly.

   (a) Use the Binomial distribution to find the probability of typing 2 or fewer words incorrectly on a page of 250 words.

   (b) Redo (a) using the Poisson distribution.

4. The life expectancy of a memory chip is 4 years.

   (a) Find the probability that a chip will last more than 5 years.   *Hint.* This is exponential with $\lambda = 1/4$.

   (b) If a second chip is used to replace the first when it fails, what is the probability you will still have a good chip after 5 years?   *Hint.* This is a gamma distribution.

   (c) If two chips start being used at the same time, what is the probability at least one of them is still good after 5 years?