Stat 201A, Fall 2012
HOMEWORK 2 (due Thursday 8/30)

The lack of one GSI has several consequences, including a short homework. Enjoy this, as we'll have our full set of GSIs next week.

1. 1.10.20. The ideas here are very similar to those we discussed in class in the context of rolling a randomly chosen die.

2. Let X be the number of heads in n tosses of a coin that lands heads with probability p. Let $m < n$ be a positive integer, and let Y be the number of heads in the first m tosses.

Fix an integer k so that $0 \leq k \leq n$. Given that $X = k$, list (carefully!) the possible values of Y.

Now find the conditional distribution of Y given $X = k$. That is, for each possible value y on your list, find $P(Y = y|X = k)$. Does your answer depend on p?

Recognize your answer as a well known distribution, and provide its name and parameters.

3. A coin lands heads with probability p. My friend and I take turns tossing the coin, with my friend tossing first. Whoever gets the first head wins. Find the chance that my friend wins, in two ways:

a) For each i, find the chance that my friend wins on toss i, and sum.

b) Let x be the chance that you are trying to find. Set up an equation for x, using the observtion that either my friend wins on the first toss, or we both get tails and then the game starts over. Solve for x and confirm that it's the same as what you got in part (a). This is an example of how arranging probability calculations in the right way can reduce the amount of algebra you have to do.

That's it. Just three problems. Have a nice day.