Due by 4pm on Friday, November 1. Please leave your homework on the table before class begins on Friday or leave it in the dropbox outside my office. Do not forget to attach the honor code. Each problem is worth 10 points.

(1) An urn contains five balls numbered 1 to 5. Two balls are drawn simultaneously.

    (a) Let X be the larger of the two numbers drawn. Find $p_X(k)$.
    (b) Let V be the sum of the two numbers drawn. Find $p_V(k)$.

(2) A fair coin is tossed three times. Let X be the number of heads in the tosses minus the number of tails. Find $p_X(k)$.

(3) Suppose a particle moves along the x-axis beginning at 0. It moves one integer step to the left or right with equal probability. What is the pdf of its position after four steps?

(4) Suppose that five people, including you and a friend, line up at random. Let the random variable X denote the number of people standing between you and your friend. What is $p_X(k)$?

(5) Suppose X is a binomial random variable with $n = 4$ and $p = \frac{2}{3}$. What is the pdf of $2X + 1$?

(6) A fair die is rolled four times. Let the random variable X denote the number of 6's that appear. Find and graph the cdf for X.

(7) Find the pdf for the discrete random variable X whose cdf at the points $x = 0, 1, \ldots, 6$ is given by $F_X(x) = \frac{x^3}{216}$.

(8) Suppose three fair dice are tossed repeatedly. Let the random variable X denote the roll on which a sum of 4 appears for the first time. Compute $P(65 \le X \le 75)$.

(9) A door-to-door encyclopedia salesperson is required to document five in-home visits each day. Suppose that she has a 30% chance of being invited into any given home, with each address representing an independent trial. What is the probability that she requires fewer than eight houses to achieve her fifth success?

(10)   (a) Is the following set of data likely to have come from the geometric pdf $p_X(k) = \left(\frac{3}{4}\right)^{k-1} \cdot \left(\frac{1}{4}\right)$, $k = 1, 2, \ldots$? Explain.

2	8	1	2	2	5	1	2	8	3
5	4	2	4	7	2	2	8	4	7
2	6	2	3	5	1	3	3	2	5
4	2	2	3	6	3	6	4	9	3
3	7	5	1	3	4	3	4	6	2

  (b) Darryl's statistics homework last night was to flip a fair coin and record the toss, X, when heads appeared for the second time. The experiment was to be repeated a total of one hundred times. The following are the one hundred values for X that Darryl turned in this morning. Do you think that he actually did the assignment? Explain.

3	7	3	2	9	3	4	3	3	2
7	3	8	4	3	3	3	4	3	3
4	3	2	2	4	5	2	2	2	4
2	5	6	4	2	6	2	8	3	2
8	2	3	2	4	3	2	6	3	3
3	2	5	3	6	4	5	6	5	6
3	5	2	7	2	10	4	3	2	2
4	2	4	5	5	5	6	2	4	3
3	4	4	6	3	4	2	5	5	2
5	7	5	3	2	7	4	4	4	3