Midterm 1B–Stat 100–Spring 2001

You may use calculators, but not books or notes. Different parts of a problem have equal weight unless otherwise indicated. Do not spend too much time on any one problem. Put a box around the final answer to a question.

1. (20 points) For the sample data 1,1,1,1,2,2,3 do the following.
(a) Compute the median.
(b) Compute the average.
(c) Draw a dotplot.
(d)Draw a histogram (be sure to label the axes so that the total area is 1).

2. (20 points) Concerning the events A and B, the following probabilities are given:

$$P(B) = \frac{1}{4}\ , \quad P(A|B) = \frac{1}{2}\ , \quad P(A|\overline{B}) = \frac{1}{2}\ .$$

Determine (a) $P(AB)$, (b) $P(A\overline{B})$, (c) $P(A)$, and (d) $P(B|A)$.
(e) Are A and B independent? Briefly justify your answer.

3. (20 points) Four students will be selected at random from a group of six juniors, eight sophomores, and four freshmen.
(a) What is the probability of selecting four freshmen?
(b) What is the probability of selecting two freshmen, one sophomore and one junior?

4.(15 points) For job applicants at Big Cheese Dairy, let X denote the number of positions previously held by an applicant. Suppose X has the following probability distribution (where $f(x)$ denotes the probability that $X = x$).

x	0	1	2	3	4
$f(x)$	0.75	0.1	0.05	0.03	0.07

(a) What is the probability that an applicant has held at least two previous jobs?
(b) Compute $E(X)$.
(c) How many previous jobs altogether do you expect 1000 job applicants to have held?

5. (15 points) For each part, answer TRUE or FALSE.
(a) If two events are mutually exclusive, then they must be independent.
(b) If the odds are 3 to 1 that there will be good weather tomorrow, then the probability of good weather tomorrow is 1/3.
(c) The model of Bernoulli trials is plausible in the following situation: a musical aptitude test is given to 10 students and the times to complete the test are recorded.

6. (10 points) Suppose $E(X) = 2$, the standard deviation of X is 3, and $Y = 1 - 5X$. What is $E(Y)$?