MIDTERM 1A–STAT 100–FALL 1996

You may use calculators, but not books or notes. Each problem is worth 20 points. Do not spend too much time on any one problem. Put a box around the final answer to a question.

1. Given is the following sample data: 5, 5, 5, 2, 3. For this data:
(a) (15 pts.) Calculate the sample mean, sample standard deviation, and median.
(b) (5 pts.) Draw a histogram, with bin (interval) length one.
Indicate your scale on the y-axis.

2(a) Suppose X is a random variable with mean 2 and with standard deviation 3. Let $Y = X - 5$. What are the mean and standard deviation of the random variable Y? (No explanation required.)
(b) Two fair dice are rolled. What is the probability that the sum of the numbers rolled is 5?

3. Suppose A, B and C are three events such that B and C are mutually exclusive, A and B are independent, $\mathrm{P}(A)$=.6 , $\mathrm{P}(B)$=.3 and $\mathrm{P}(C\overline{B})$=.25 .
Calculate the following:
a. $\mathrm{P}(C)$ b. $\mathrm{P}(\overline{B}|C)$ c. $\mathrm{P}(B|A)$ d. $\mathrm{P}(A \cup B)$

4. An instuctor will choose 4 problems from a set of 12 containing 7 hard and 5 easy problems.
a. What is the probability she selects exactly two easy problems?
b. What is the probability she selects at least one easy problem?

5. A new drug cures a certain disease with probability .4 . Consider a random sample of 25 patients with this disease.
a. What is the probability that 15 or fewer of these people will be cured?
b. What is the probability that exactly 15 will be cured?
c. What is the probability that at least 15 will be cured?
d. What is the expectation of the number of patients who will be cured?