Math 105-102
Elementary Probability & Statistics
Exam2, Spring 2005
March 28, 2005
Tools: Basic Calculator
[Show all your work for each problem]

1. a. Determine whether each distribution is a probability distribution.
    i.

X		0	2	4	6
P(X)		-1.0	1.5	0.3	0.2

   ii.

X		2	3	7
P(X)		0.5	0.3	0.4

   b. Calculate the mean and variance from the following probability distribution.

X		0	1	2
P(X)		1/4	1/2	1/4

2. Suppose that a committee of eight persons is to be selected from a group of 20 persons. How many committees can be formed?

3. In how many ways three digit numbers can be formed from 1, 3, 6, 9?

4. Find the mean and the standard deviation when a fair die is rolled.

5. A carton contains 12 eggs, 3 of which are cracked. If we randomly select 5 of the eggs for hard boiling, what is the probability of the following events?

    a. all of the cracked eggs are selected.
    b. none of the cracked eggs are selected
    c. two of the cracked eggs are selected.

6. Four fair coins are flipped. If the outcomes are assumed independent, what is the probability that two heads and two tails are obtained?

7. It is known that all items produced by a certain machine will be defective with probability 0.1, independently of each other. What is the probability that in a sample of three items, at most one will be defective?

8. A survey found that one out of five Americans say he or she has visited a doctor in any given month. If 10 people are selected at random, find the probability that exactly 3 will have visited a doctor last month.

9. *Public Opinion* reported that 5% of Americans are afraid of being alone in a house at night. If a random sample of 20 Americans is selected, find the probability that at least 3 people in the sample who are afraid of being alone at night.

10. Find the following probabilities using the normal table:
    i. $P(0<Z<2.32)$
    ii. $P(Z>1.91)$
    iii. $P(Z<1.645)$

11. The mean number of hours an American worker spends on the computer is 3.1 hours per workday. Assume the standard deviation is 0.5 hour. Find the percentage of workers who spend less than 3.5 hours on the computer. Assume the variable is normally distributed.