1. A researcher is interested in mortality in Mexico and the United States. She draws a random sample of 1,000 people from each country. She records their age (young, middle-aged, or old) and whether they are alive or dead five years after the beginning of the study. She finds the following:

	Mexico			United States		
Alive\Age	Young	Middle	Old	Young	Middle	Old
Alive	560	280	60	195	490	215
Dead	40	20	40	5	10	85

a. In Mexico, what percentage of the people who died were old? What is the comparable figure for the United States? Does this mean the United States is a much more dangerous place for the elderly to live than is Mexico? If not, why not?

b. The researcher had expected mortality to be higher in Mexico. She was therefore surprised to find that, in both of her samples, exactly 100 people, or 10%, died. She notes, however, that the age distributions are very different between the two countries. Suppose Mexico had the same age distribution as the United States, while maintaining its own age-specific death rates - what would Mexico's mortality rate be then?

2. Find the expectation and variance of the sum obtained in tossing 10 fair dice. [NOTE: One way to do this is to first figure the probability of sums of 10, 11, 12…60. As an alternative, you might prefer to do it the nice easy way…]

3. In a lottery there are 200 prizes of $5, 20 prizes of $25, and 5 prizes of $100. There will be 10,000 tickets sold. How much can you expect to win if you buy one ticket?

4. Let $Z = (X - \mu_X)/\sigma_X$. This is referred to as a z-score transformation; or, Z is the standardized score. Suppose the mean of a set of IQ scores is 100 and the standard deviation is 15:

(a) Calculate the standardized score of a student with a raw score of 125.

(b) Calculate the raw (unstandardized) score of a student receiving a standardized score of 2.4.

5. There is a family with two children. You have been told this family has a daughter. What are the odds they also have a son, assuming the biological odds of having a male or female child are equal? Solve this problem using the rules for conditional probability, i.e. find P(family has a son | family has at least one daughter).

6. In a family of 6 children:

a. what is the probability that there will be more boys than girls?

b. what is the probability that there will be at least one boy and at least one girl?

7. Brand B Aspirin Company decides to survey 10 doctors who were randomly selected from a large population. If 50% of the population of doctors actually prefer Brand B, what is the probability that the results of the survey will show that “9 out of 10 doctors surveyed prefer Brand B”?