1. Five balls, numbered 1, 2, 3, 4, and 5, are placed in an urn. Two balls are randomly selected without replacement. Find the probability distribution for

   (a) the larger of the two sampled numbers.
   (b) the sum of the two sampled numbers.

2. A rental agency that leases equipment by the day has found that a particular piece of equipment is leased on the average only one day in five. Assume that rental on one day is independent of rental on any other day. Let $Y$ be the number of days between rentals. Find the probability distribution of $Y$.

3. The maximum patent life for a new drug is 17 years. Subtracting the length of time required by the FDA for testing and approval of the drug provides the actual patent life for the drug—that is, the length of time that the company has to recover research and development costs and to make a profit. The distribution of the lengths of actual patent lives, in years, is as follows:

   $\begin{array}{c|cccccccccccc}
   y & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 \\
   p(y) & 0.03 & 0.05 & 0.07 & 0.10 & 0.14 & 0.20 & 0.18 & 0.12 & 0.07 & 0.03 & 0.01 \\
   \end{array}$

   Let $Y$ be the patent life for a randomly selected drug.

   (a) Find $E(Y)$.
   (b) Find $V(Y)$.
   (c) Let $\mu = E(Y)$ and $\sigma^2 = V(Y)$. Find the probability that $Y$ falls in the interval $\mu \pm 2\sigma$.

4. Ten percent of the glass bottles coming off a production line have flaws. If two bottles are randomly selected, find the mean and variance of the number of bottles that have flaws.

5. On any given day, a salesperson contacts one customer with probability $1/3$ and contacts two customers with probability $2/3$. Each contact results in no sale with probability 0.9 and a $50,000 sale with probability 0.1. Let $X$ be the amount of money made on a randomly chosen day.

   (a) Find the probability distribution of $X$.
   (b) Find the mean of $X$.
   (c) Find the standard deviation of $X$.

6. The manager of a factory stockroom has constructed the following probability distribution for the number of times a certain tool is used in a day.

   $\begin{array}{c|ccc}
   y & 0 & 1 & 2 \\
   p(y) & 0.1 & 0.5 & 0.4 \\
   \end{array}$

   It costs the factory $10 each time the tool is used. Find the mean and variance of the cost for use of the tool on a day.