

LESSON
6.2**Challenge Practice***For use with the lesson "Construct and Interpret Binomial Distributions"*

In Exercises 1–4, determine whether the experiment described is a binomial experiment. If it is, identify a success, list the values of n , p , and $1 - p$, and list the possible values of the random variable x . If it is not a binomial experiment, explain why.

1. A state lottery randomly chooses 6 balls numbered 1–40. You choose 6 numbers and purchase a lottery ticket. The random variable represents the number of matches on your ticket to the numbers drawn in the lottery.
2. From past records, a clothing store finds that 34% of the people who enter the store will make a purchase. During a one-hour period, 22 people enter the store. The random variable represents the number of people who do not make a purchase.
3. A bag of marbles contains 20% red marbles. One marble is selected from each of 10 bags. The random variable represents the number of red marbles selected.
4. A fair coin is tossed repeatedly until 15 heads are obtained. The random variable represents the number of tosses.
5. Draw a histogram for a binomial distribution in which $n = 6$ and (a) $p = 0.25$, (b) $p = 0.5$, and (c) $p = 0.75$. (d) Use your results to make a general statement about the shapes of binomial distributions.
6. Draw a histogram for a binomial distribution in which $p = 0.35$ and (a) $n = 4$, (b) $n = 8$, and (c) $n = 12$. (d) What happens as the value of n increases and the probability of success remains the same?
7. In Savannah, Georgia, about 62% of the days in a year are sunny.
 - a. You randomly select a week in the month of June. Draw a histogram showing the binomial distribution of the number of sunny days in a week in June.
 - b. What is the probability that exactly 4 days out of the week are cloudy?
 - c. What is the probability that at least 2 days out of the week are cloudy?
 - d. To find the mean of a binomial distribution, multiply each value of k of the distribution by its corresponding probability, then add the products. Find the mean for the number of sunny days in a week in June.
 - e. Divide the mean from part (d) by n . What significance does this number have relative to the probability of success on any trial? Use this result to find a simpler formula for the mean of a binomial distribution.
 - f. Use your formula from part (e) to find the mean number of sunny days during the month of June. How does this value compare to your answer to part (d)?
Explain your reasoning.