EXAMPLE 2 Interpret a probability distribution

Use the probability distribution in Example 1 to answer each question.

a. What is the most likely sum when rolling two six-sided dice?

b. What is the probability that the sum of the two dice is at least 10?

Solution

a. The most likely sum when rolling two six-sided dice is the value of X for which $P(X)$ is greatest. This probability is greatest for $X = 7$. So, the most likely sum when rolling the two dice is 7.

b. The probability that the sum of the two dice is at least 10 is:

$$\begin{aligned} P(X \geq 10) &= P(X = 10) + P(X = 11) + P(X = 12) \\ &= \frac{3}{36} + \frac{2}{36} + \frac{1}{36} \\ &= \frac{6}{36} \\ &= \frac{1}{6} \\ &\approx 0.167 \end{aligned}$$

✓ GUIDED PRACTICE for Examples 1 and 2

A tetrahedral die has four sides numbered 1 through 4. Let X be a random variable that represents the sum when two such dice are rolled.

1. Make a table and a histogram showing the probability distribution for X.

2. What is the most likely sum when rolling the two dice? What is the probability that the sum of the two dice is at most 3?

BINOMIAL DISTRIBUTIONS One type of probability distribution is a **binomial distribution**. A binomial distribution shows the probabilities of the outcomes of a *binomial experiment*.

KEY CONCEPT — *For Your Notebook*

Binomial Experiments

A **binomial experiment** meets the following conditions:

- There are n independent trials.
- Each trial has only two possible outcomes: success and failure.
- The probability of success is the same for each trial. This probability is denoted by p. The probability of failure is given by $1 - p$.

For a binomial experiment, the probability of exactly k successes in n trials is:

$$P(k \text{ successes}) = {}_nC_k p^k (1 - p)^{n - k}$$