indefinitely, the mean of the sample variances will be 2.9. Also, the middle portion of Table 6-5 shows that the distribution of the sample variances is a skewed distribution, not a normal distribution with its characteristic bell shape.

Interpretation

Based on the actual sample results shown in the middle portion of Table 6-5, we can describe the sampling distribution of the sample variance by the histogram in the middle of Table 6-5. The actual sampling distribution would be described by a histogram based on all possible samples, not the 10,000 samples included in the histogram, but the number of trials is large enough to suggest that the true sampling distribution of sample variances is a distribution skewed to the right.

The results of Example 3 allow us to observe the following two important properties of the sampling distribution of the sample variance.

Behavior of Sample Variances

1. The sample variances *target* the value of the population variance. (That is, the mean of the sample variances is the population variance. The expected value of the sample variance is equal to the population variance.)
2. The distribution of sample variances tends to be a distribution skewed to the right.

Sampling Distribution of Sample Proportion

We now consider the sampling distribution of a sample proportion.

DEFINITION The **sampling distribution of the sample proportion** is the distribution of sample proportions, with all samples having the same sample size n taken from the same population.

We need to distinguish between a population proportion p and some sample proportion, so the following notation is commonly used.

Notation for Proportions

p = *population* proportion

$\hat{p}$ = *sample* proportion

Example 4 Sampling Distribution of the Sample Proportion

Consider repeating this process: Roll a die 5 times and find the proportion of *odd* numbers. What do we know about the behavior of all sample proportions that are generated as this process continues indefinitely?

Solution

The bottom portion of Table 6-5 illustrates a process of rolling a die 5 times and finding the proportion of odd numbers. Table 6-5 shows results from repeating this process 10,000 times, but the true sampling distribution of the sample proportion involves repeating the process indefinitely. Because the values of 1, 2, 3, 4, 5, 6 are all equally likely, the proportion of odd numbers in the population is 0.5, and Table 6-5 shows that the 10,000 sample proportions have a mean of 0.50.

continued