Lesson 12-2

Example 1 Probability of Independent Events
The two spinners are spun. What is the probability that both spinners will show an odd number?

$P(\text{first spinner is odd}) = \frac{1}{2}$

$P(\text{second spinner is odd}) = \frac{4}{7}$

$P(\text{both spinners are odd}) = \frac{1}{2} \cdot \frac{4}{7}$ or $\frac{2}{7}$

Example 2 STANDARDIZED TEST PRACTICE EXAMPLE
Use the information in the table at the right. What is the probability that a student picked at random will be an eighth grade girl?

A $\frac{1}{10}$ **B** $\frac{3}{10}$ **C** $\frac{1}{3}$ **D** $\frac{2}{5}$

Jefferson Middle School	
Group	**Fraction of the Population**
6th grade	$\frac{2}{9}$
7th grade	$\frac{4}{9}$
8th grade	$\frac{1}{3}$
boys	$\frac{7}{10}$
girls	$\frac{3}{10}$

Read the Test Item
You are asked to find the probability that a student picked at random will be an eighth grader and a girl. The events are independent because the grade of the student does not determine the gender.

Solve the Test Item
First, find the probability of each event.

$P(\text{8th grade}) = \frac{1}{3}$

$P(\text{girl}) = \frac{3}{10}$

Then, find the probability of both events occurring.

$P(\text{8th grade and girl}) = \frac{1}{3} \cdot \frac{3}{10}$ or $\frac{1}{10}$

The probability that the two events will occur is $\frac{1}{10}$, which is A.

Example 3 Probability of Dependent Events
There are 3 red, 6 blue, and 11 green marbles in a bag. Once a marble is selected, it is not replaced. Find the probability that 2 red marbles are chosen.

Since the first marble is not replaced, the first event affects the second event. These are dependent events.

$$P(\text{first marble is red}) = \frac{3}{20} \quad \begin{matrix} \leftarrow \text{number of red marbles} \\ \leftarrow \text{total number of marbles} \end{matrix}$$

$$P(\text{second marble is red}) = \frac{2}{19} \quad \begin{matrix} \leftarrow \text{number of red marbles after one red marble is removed} \\ \leftarrow \text{total number of marbles after one red marble is removed} \end{matrix}$$

$$P(\text{two red marbles}) = \frac{3}{\cancel{20}\,{}^{10}} \cdot \frac{\cancel{2}\,{}^{1}}{19} \text{ or } \frac{3}{190}$$