14-3 Probability of Compound Events (Pages 769–776)

A **compound event** consists of two or more simple events. When one event *does not* affect the others, we say that these are **independent events**. If the outcome of an event *does* affect the outcome of another event, we say that these are **dependent events**.

Examples — A bag contains 4 red marbles, 5 blue marbles, and 3 green marbles. Two marbles are picked at random. Find each probability.

a. 2 red marbles if the first marble is returned before the second is chosen

Since the first marble is returned before the second one is chosen, the events are independent.

$P(red) = \frac{4}{12}$ or $\frac{1}{3}$

$P(red, then red) = \frac{1}{3} \cdot \frac{1}{3}$ or $\frac{1}{9}$

b. 2 red marbles if the first marble is *not* returned before the second is chosen

Since the first marble is not *returned before the second one is chosen, the events are dependent.*

$P(red) = \frac{4}{12}$ or $\frac{1}{3}$

$P(red\ after\ one\ red\ is\ selected) = \frac{3}{11}$

$P(red, then red) = \frac{1}{3} \cdot \frac{3}{11}$ or $\frac{1}{11}$

Practice

1. **School** Eva forgot to study one of the chapters for her history test so she had to guess on two multiple-choice questions which each had four answer choices. What is the probability that she got both questions correct?

2. During a magic trick, a magician randomly selects two cards from a standard deck of cards.
   a. Find the probability both cards are clubs if the first card is returned to the deck before the second card is selected.
   b. Find the probability both cards are clubs if the first card is not returned to the deck before the second card is selected.

3. **Gift Wrapping** A gift-wrapping service offers the following choices.
   Paper: Sunflowers, Stripes, Spirals, Silver, Plaid
   Ribbon: White, Silver, Yellow, Gold
   a. What is the probability that a customer who chooses at random will choose sunflower paper and yellow ribbon?
   b. If you choose at random, what is the probability of selecting paper with either stripes or spirals with white ribbon?

4. Standardized Test Practice The probability that Tara will make a free throw is $\frac{3}{4}$. What is the probability that Tara will make her next two free throws?

   A $\frac{3}{4}$ **B** $\frac{1}{2}$ **C** $\frac{9}{16}$ **D** $\frac{3}{8}$