

# Independent and Dependent Events

(pages 542–545)

If you roll two number cubes, the number that you roll on the second cube is not affected by the number you rolled on the first cube. These events are called **independent events**. If the result of one event affects the result of a second event, the events are called **dependent events**.

## Probability of Independent Events

The probability of two independent events can be found by multiplying the probability of one event by the probability of the second event.

## EXAMPLES

- A** Find the probability of tossing a 5 on each of two number cubes.

*These are independent events.*

$P(5 \text{ on one cube}) = \frac{1}{6}$  because there are six numbers on a cube.

$P(5 \text{ on each cube}) = \frac{1}{6} \times \frac{1}{6}$ , or  $\frac{1}{36}$ .

- B** You have four pennies and four nickels in a bag. What is the probability of drawing two pennies in a row, if you keep the first coin you draw?

*These two draws are dependent events.*

$P(\text{penny on first draw}) = \frac{4}{8}$  or  $\frac{1}{2}$  because there are 4 pennies and 8 coins total.

$P(\text{penny on second draw}) = \frac{3}{7}$  because you removed one penny, leaving 3 pennies and 7 coins total.

$P(\text{two pennies in a row}) = \frac{1}{2} \times \frac{3}{7}$  or  $\frac{3}{14}$ .

## Try These Together

**Tell whether each event is independent or dependent.**

- tossing a coin twenty times
- choosing two cards from one deck, keeping the first card.

*Hint: Does one event affect the other event?*

## PRACTICE

**Find the probability of each event.**

- tossing an even number on each of two number cubes
- A bag contains three blue marbles, four red marbles and two clear marbles. Three are drawn without each selection being replaced. Find  $P(\text{red, then blue, then clear})$ .

- 5. Standardized Test Practice** There are 3 bottles of juice and 4 bottles of water in Nate's ice chest. What is the probability that he will reach into the ice chest without looking and pull out two bottles of water in a row if he does not replace the first bottle?

**A**  $\frac{1}{2}$

**B**  $\frac{4}{7}$

**C**  $\frac{2}{7}$

**D**  $\frac{3}{6}$

Answers: 1. independent 2. dependent 3.  $\frac{4}{1}$  4.  $\frac{21}{1}$  5. C