10.5 Find Probabilities of Independent and Dependent Events

TEKS a.1, a.5

Before You found probabilities of compound events.

Now You will examine independent and dependent events.

Why? So you can formulate coaching strategies, as in Ex. 41.

Key Vocabulary
- **independent events**
- **dependent events**
- **conditional probability**

Two events are **independent** if the occurrence of one has no effect on the occurrence of the other. For instance, if a coin is tossed twice, the outcome of the first toss (heads or tails) has no effect on the outcome of the second toss.

KEY CONCEPT *For Your Notebook*

Probability of Independent Events

If A and B are independent events, then the probability that both A and B occur is:

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

More generally, the probability that n independent events occur is the product of the n probabilities of the individual events.

TAKS

EXAMPLE 1 **TAKS PRACTICE: Multiple Choice**

For a fundraiser, a class sells 200 raffle tickets for a mall gift certificate and 250 raffle tickets for a booklet of movie passes. Juan buys 5 raffle tickets for each prize. What is the probability that Juan wins both prizes?

Ⓐ $\frac{1}{6000}$ Ⓑ $\frac{1}{2000}$ Ⓒ $\frac{1}{450}$ Ⓓ $\frac{1}{90}$

Solution

Let events A and B be getting the winning ticket for the gift certificate and movie passes, respectively. The events are independent. So, the probability is:

$$P(A \text{ and } B) = P(A) \cdot P(B) = \frac{5}{200} \cdot \frac{5}{250} = \frac{1}{40} \cdot \frac{1}{50} = \frac{1}{2000}$$

▶ The correct answer is B. Ⓐ Ⓑ Ⓒ Ⓓ

✓ **GUIDED PRACTICE** for Example 1

1. **WHAT IF?** In Example 1, what is the probability that you win the mall gift certificate but not the booklet of movie passes?