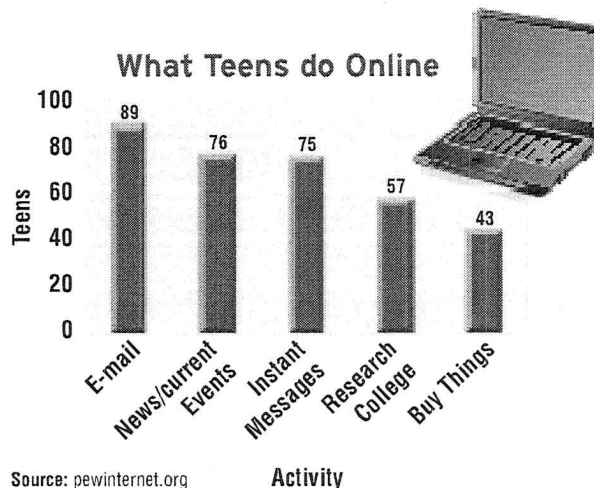# Adding Probabilities

Main Ideas

- Find the probability of mutually exclusive events.
- Find the probability of inclusive events.

New Vocabulary

simple event
compound event
mutually exclusive events
inclusive events

The graph shows the results of a survey about what teens do online. Determining the probability that a randomly selected teen sends/reads e-mail or buys things online requires adding probabilities.

What Teens do Online

Source: pewinternet.org

Mutually Exclusive Events When you roll a die, an event such as rolling a 1 is called a **simple event** because it cannot be broken down into smaller events. An event that consists of two or more simple events is called a **compound event**. For example, the event of rolling an odd number or a number greater than 5 is a compound event because it consists of the simple events rolling a 1, rolling a 3, rolling a 5, or rolling a 6.

When there are two events, it is important to understand how they are related before finding the probability of one or the other event occurring. Suppose you draw a card from a standard deck of cards. What is the probability of drawing a 2 or an ace? Since a card cannot be both a 2 *and* an ace, these are called **mutually exclusive events**. That is, the two events cannot occur at the same time. The probability of drawing a 2 or an ace is found by adding their individual probabilities.

$$P(2 \text{ or ace}) = P(2) + P(\text{ace}) \quad \text{Add probabilities.}$$

$$= \frac{4}{52} + \frac{4}{52} \quad \text{There are 4 twos and 4 aces in a deck.}$$

$$= \frac{8}{52} \text{ or } \frac{2}{13} \quad \text{Simplify.}$$

The probability of drawing a 2 or an ace is $\frac{2}{13}$.

Study Tip

Formula
This formula can be extended to any number of mutually exclusive events.

KEY CONCEPT	Probability of Mutually Exclusive Events
Words If two events, A and B, are mutually exclusive, then the probability that A or B occurs is the sum of their probabilities.	
Symbols $P(A \text{ or } B) = P(A) + P(B)$	