

Let  $S$  be the sample space for an experiment and let  $E$  be any event (possible outcome) in  $S$ .

1. If  $P(E)$  represents the probability that event  $E$  will occur, then  $0 \leq P(E) \leq 1$ ; that is, the probability of any event must be between 0 and 1 inclusive.
2.  $P(S) = 1$ ; that is, if  $S = \{E_1, E_2, E_3, \dots, E_k\}$ , then  $P(E_1) + P(E_2) + P(E_3) + \dots + P(E_k) = 1$
3. A simple event is an event containing only one possible outcome.
4. A compound event is an event containing more than one outcome.
5. If  $E$  is a compound event, then  $P(E)$  is equal to the sum of the probabilities of the simple events in  $E$ .
6. If  $S = \{E_1, E_2, E_3, \dots, E_k\}$ , where  $E_1, E_2, E_3, \dots, E_k$  are equally likely simple events, then the probability of each of these simple events is  $\frac{1}{k}$ .
7. If  $S$  consists of equally likely events, and if  $E$  is a compound event that is a subset of  $S$ , then  $P(E) = \frac{n(E)}{n(S)}$ .

### Exercises

1. An experiment consists of tossing a coin three times and recording the outcomes (heads or tails) in order.
  - (a) Write the sample space.
  - (b) What is the probability of getting heads exactly twice?
  - (c) What is the probability of getting heads at least twice?

OVER 

2. A box contains four pieces of blue paper, numbered 1 through 4, and a second box contains three pieces of yellow paper, numbered 1 through 3. An experiment consists of selecting a piece of blue paper from the first box and a piece of yellow paper from the second box.
- (a) Write the sample space.
  - (b) What is the probability that the sum of the numbers on the papers selected is 5?
  - (c) What is the probability that the numbers chosen are equal?
  - (d) What is the probability that the sum of the numbers on the papers selected is 8?
3. Five cards are selected from a standard 52-card deck.
- (a) What is the probability that all five cards are red?
  - (b) What is the probability that three cards are red and two are black?
  - (c) What is the probability that all five cards are hearts?
4. (p. 436/#78) A 4-person grievance committee is to be composed of employees in 2 departments, A and B, with 15 and 20 employees, respectively. If the 4 people are selected at random from the 35 employees, what is the probability of selecting
- (a) 3 from A and 1 from B?
  - (b) 2 from A and 2 from B?
  - (c) All from A?
  - (d) At least 3 from A?