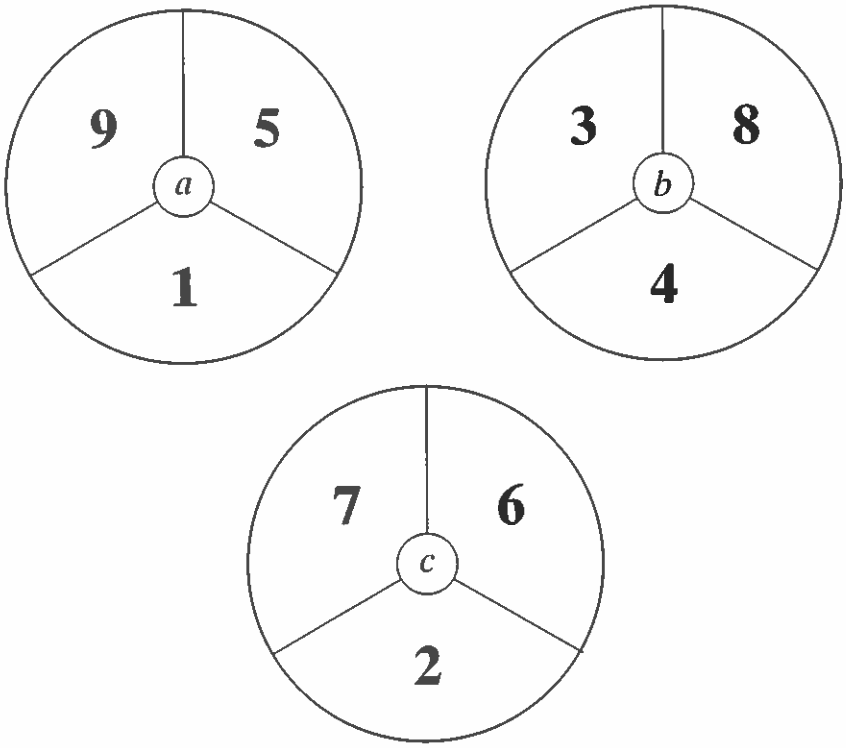

Figure 2.6 Spinners.

tical Exercises

e following relations:

$E \subset E \cup F$.

F, then $F^c \subset E^c$.

$E \cup FE^c$ and $E \cup F = E \cup E^c F$.

$\Big) F = \bigcup_1^\infty E_i F$ and

$\cup F = \bigcap_1^\infty (E_i \cup F)$.

ny sequence of events $E_1, E_2, \ldots$, define a new $F_1, F_2, \ldots$ of disjoint events (that is, events such $= \emptyset$ whenever $i \neq j$) such that for all $n \geq 1$,

$$\bigcup_1^n F_i = \bigcup_1^n E_i$$

6. Let E, F, and G be three events. Find expressions for the events so that, of E, F, and G,

(a) only E occurs;
(b) both E and G, but not F, occur;
(c) at least one of the events occurs;
(d) at least two of the events occur;
(e) all three events occur;
(f) none of the events occurs;
(g) at most one of the events occurs;
(h) at most two of the events occur;
(i) exactly two of the events occur;
(j) at most three of the events occur.

7. Use Venn diagrams
(a) to simplify the expressions $(E \cup F)(E \cup F^c)$;
(b) to prove DeMorgan's laws for events E and F. [That is, prove $(E \cup F)^c = E^c F^c$, and $(EF)^c = E^c \cup F^c$.]

8. Let S be a given set. If, for some $k > 0$, $S_1, S_2, \ldots, S_k$ are mutually exclusive nonempty subsets of S such that