

## Problem 2.6

Two jurors are selected from 4 alternates to serve at a murder trial. Using the notation  $A_1A_3$ , for example, to denote the simple event that alternates 1 and 3 are selected, list the 6 elements of the sample space.

## Problem 2.8

An experiment involves tossing a pair of dice, 1 green and 1 red, and recording the numbers that come up. If  $x$  equals the outcome on the green die and  $y$  the outcome on the red die, let  $(x, y)$  denote the corresponding element of the sample space  $S$ . For this sample space:

- (a) list the elements corresponding to the event  $A$  that the sum is greater than 8;
- (b) list the elements corresponding to the event  $B$  that a 2 occurs on either die;
- (c) list the elements corresponding to the event  $C$  that a number greater than 4 comes up on the green die;
- (d) list the elements corresponding to the event  $A \cap C$ ;
- (e) list the elements corresponding to the event  $A \cap B$ ;
- (f) list the elements corresponding to the event  $B \cap C$ ;
- (g) construct a Venn diagram to illustrate the intersections and unions of the events  $A$ ,  $B$ , and  $C$ .

## Problem 2.10

An engineering firm is hired to determine if certain waterways in Virginia are safe for fishing. Samples are taken from three rivers.

- (a) List the elements of a sample space  $S$ , using the letters  $F$  for “safe to fish” and  $N$  for “not safe to fish.”
- (b) List the elements of  $S$  corresponding to event  $E$  that at least two of the rivers are safe for fishing.
- (c) Define an event that has as its elements the points

$$\{FFF, NFF, FFN, NFN\}.$$

## Problem 2.14

If  $S = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$  and  $A = \{0, 2, 4, 6, 8\}$ ,  $B = \{1, 3, 5, 7, 9\}$ ,  $C = \{2, 3, 4, 5\}$ , and  $D = \{1, 6, 7\}$ , list the elements of the sets corresponding to the following events:

- (a)  $A \cup C$ ;
- (b)  $A \cap B$ ;

- (c)  $C'$ ;
- (d)  $(C' \cap D) \cup B$ ;
- (e)  $(S \cap C)'$ ;
- (f)  $A \cap C \cap D'$ .

**Problem 2.16**

If  $S = \{x|0 < x < 12\}$ ,  $M = \{x|1 < x < 9\}$ , and  $N = \{x|0 < x < 5\}$ , find

- (a)  $M \cup N$ ;
- (b)  $M \cap N$ ;
- (c)  $M' \cap N'$ .

**Problem 2.20**

Suppose that a family is leaving on a summer vacation in their camper and that  $M$  is the event that they will experience mechanical problems,  $T$  is the event that they will receive a ticket for committing a traffic violation, and  $V$  is the event that they will arrive at a campsite with no vacancies. Referring to the Venn diagram below, list the numbers of the regions that represent the following events:

- (a) The family will experience no mechanical problems and commit no traffic violation but will arrive at a campsite with no vacancies.
- (b) The family will experience both mechanical problems and trouble in locating a campsite with a vacancy but will not receive a ticket for a traffic violation.
- (c) The family will either have mechanical trouble or arrive at a campsite with no vacancies but will not receive a ticket for committing a traffic violation.
- (d) The family will not arrive at a campsite with no vacancies.

