

- (1) An urn contains eight chips, numbered 1 through 8. A sample of three is drawn without replacement. What is the probability that the largest chip in the sample is a 5?
- (2) An urn contains  $n$  red chips numbered 1 through  $n$ ,  $n$  white chips numbered 1 through  $n$ , and  $n$  blue chips numbered 1 through  $n$ . Two chips are drawn at random and without replacement. What is the probability that the two drawn are either the same color or the same number?
- (3) Twelve fair dice are rolled. What is the probability that
  - (a) the first six dice all show one face and the last six dice all show a second face?
  - (b) not all the faces are the same?
  - (c) each face appears exactly twice?
- (4) A fair die is tossed  $n$  times. What is the probability that the sum of the faces showing  $n + 2$ ?

- (5) Two monkeys, Mickey and Marian, are strolling along a moonlit beach when Mickey sees an abandoned Scrabble set. Investigating, he notices that some of the letters are missing, and what remain are the following fifty-nine:

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	<i>K</i>	<i>L</i>	<i>M</i>
4	1	2	2	7	1	1	3	5	0	3	5	1
<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>	<i>U</i>	<i>V</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>
3	2	0	0	2	8	4	2	0	1	0	2	0

Mickey, being of a romantic bent, would like to impress Marian, so he rearranges the letters in hopes of spelling out something clever. (Note: The rearranging is random because Mickey can't spell; fortunately, Marian can't read, so it really doesn't matter.) What is the probability that Mickey gets lucky and spells out

She walks in beauty, like the night  
Of cloudless climes and starry skies

- (6) Suppose that  $k$  people are selected at random from the general population. What are the chances that at least two of those  $k$  were born on the same day? This is known as the *birthday problem*.
- (7) Five cards are dealt from a poker deck. What are the chances of being dealt
  - (a) a *full house*,
  - (b) *one pair*, and
  - (c) *a straight*?
- (8) A local fraternity is conducting a raffle where 50 tickets are to be sold - one per customer. There are three prizes to be awarded. If the four organizers of the raffle each buy one ticket, what is the probability that the four organizers win
  - (a) all of the prizes?
  - (b) exactly two of the prizes?
  - (c) exactly one of the prizes?
  - (d) none of the prizes?
- (9) A group of three undergraduate and five graduate students are available to fill certain student government posts. If four students are to be randomly selected from this group, find the probability that exactly two undergraduates will be among the four chosen.
- (10) A study is to be conducted in a hospital to determine the attitudes of nurses toward various administrative procedures. A sample of 10 nurses is to be selected from a total of the 90 nurses employed by the hospital.
  - (a) How many different samples of 10 nurses can be selected?
  - (b) Twenty of the 90 nurses are male. If 10 nurses are randomly selected from those employed by the hospital, what is the probability that the sample of ten will include exactly 4 male (and 6 female) nurses?
- (11) Two cards are drawn from a standard 52-card playing deck. What is the probability that the draw will yield an ace and a face card?
- (12) A balanced die is tossed six times, and the number on the uppermost face is recorded each time. What is the probability that the numbers recorded are 1, 2, 3, 4, 5, and 6 in any order? Suppose that the die has been altered so that the faces are 1, 2, 3, 4, 5, and 5. If the die is tossed five times, what is the probability that the numbers recorded are 1, 2, 3, 4, and 5 in any order?