Exercise for sample space(P-38)

2.4 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, describe the sample space S
(a) by listing the elements (x, y);
(b) by using the rule method.

2.8 For the sample space of Exercise 2.4:

(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 $A \cap B$

(0 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.

Sample and Event :

2.5 An experiment consists of tossing a die and then flipping a coin once if the number on the die is even. If the number on the die is odd, the coin is flipped twice. Using the notation $4H$, for example, to denote the outcome that the die comes up 4 and then the coin comes up heads, and $3HT$ to denote the outcome that the die comes up 3 followed by a head and then a tail on the coin, construct a tree diagram to show the 18 elements of the sample space S.

2.9 For the sample space of Exercise 2.5,

(a) list the elements corresponding to the event A that a number less than 3 occurs on the die;

(b) list the elements corresponding to the event B that 2 tails occur;

(c) list the elements corresponding to the event A';

(d) list the elements corresponding to the event $A' \cap B$

(e) list the elements corresponding to the event $A \cup B$.

Exercise Page 47-48

2.22 In a medical study patients are classified in 8 ways according to whether they have blood type AB^+, $AB\sim$, A^+, A^-, B^+, $B\sim$, O^+, or O^-, and also according to whether their blood pressure is low, normal, or high. Find the number of ways in which a patient can be classified.

2.23 If an experiment consists of throwing a die and then drawing a letter at random from the English alphabet, how many points are there in the sample space?

Combination:

2.26 A California study concluded that by following 7 simple health rules a man's life can be extended by 11 years on the average and a woman's life by 7 years. These 7 rules are as follows: no smoking, regular exercise, use alcohol moderately, get, 7 to 8 hours of sleep, maintain proper weight, eat. breakfast, and do not eat between meals. In how many ways can a person adopt five of these rules to follow

(a) If the person presently violates all 7 rules?

(b) If the person never drinks and always eats breakfast?

Multiplication rule:

2.30 In how many different ways can a true-false test consisting of 9 questions be answered?

2.31 If a multiple-choice test consists of 5 questions each with 4 possible answers of which only 1 is correct,

(a) In how many different ways can a student check off one answer to each question?

(b) In how many ways can a student check off one answer to each question and get all the answers wrong?

Arrangement with restriction:

2.34 (a) In how many ways can 6 people be lined up to get on a bus?

(b) If 3 specific persons, among 6, insist on following each other, how many ways are possible?

(c) If 2 specific persons, among 6, refuse to follow each other, how many ways are possible?

2.36 (a) How many three-digit numbers can be formed from the digits 0, 1, 2, 3, 4, 5, and 6, if each digit can be used only once?

(b) How many of these are odd numbers?

(c) How many are greater than 330?

Permutation:

2.39 In a regional spelling bee, the 8 finalists consist of 3 boys and 5 girls. Find the number of sample points in the sample space S for the number of possible orders at the conclusion of the contest for

(a) all 8 finalists;

(b) the first 3 positions.

2.41 Find the number of ways that 6 teachers can be assigned to 4 sections of an introductory psychology course if no teacher is assigned to more than one section.

Circular and distinct permutation:

2.43 In how many ways can 5 different trees be planted in a circle?

2.44 In how many ways can a caravan of 8 covered wagons from Arizona be arranged in a circle?

2.45 How many distinct permutations can be made from the letters of the word *infinity?*

2.47 A college plays 12 football games during a season. In how many ways can the team end the season with 7 wins, 3 losses, and 2 ties?

Practice : Class activity

- How many three digit numbers with distinct digits can be formed with out using

  the digits 0, 2, 3, 4, 5, 6
- How many different two-digit numbers can be formed with the digits: 0, 1, 2, 3, 4, 5?
- How many even numbers consisting of 4 digits can be formed by using the digits 1, 2, 3, 5, 7?

- How many arrangements of the letters of

  the word REMAND are possible if:
  - there are no restrictions?
  - they begin with RE?
  - they do not begin with RE?
  - they have REM together in any order?
  - R, E and M are not to be together?

Practice :Class activity

- In a class there are 20 boys and 15 girls. In how many ways can the teacher

  select one boy and one girl from amongst the students of the class to represent

  the school in a quiz competition

- How many three lettered codes is possible using the first ten letters of the

  English alphabets if no letter can be repeated ?

Practice :Class activity

- If there are 20 buses plying between places A and B, in how many ways can a round trip from A be made if the return journey is made on a) same bus b) diff.

- A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of a) at least 3 girls
  b) exactly three girls

Class activity

- How many ways can the letter from the word TREES be ordered such that each word start with consonant and end with a vowel ?
- What will be n if ${}_nC_3=10$
- What is 3rd term in a row 22 of Pascal triangle.