

Section 8.6 Counting Principles

Objective: In this lesson you learned how to solve counting problems using the Fundamental Counting Principle, permutations, and combinations.

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Fundamental Counting Principle

Permutation

Distinguishable permutations

Combination

I. Simple Counting Problems (Page 626)

If two balls are randomly drawn from a bag of six balls, numbered from 1 to 6, such that it is possible to choose two 3's, the random selection occurs _____. If two balls are drawn from the bag at the same time, the random selection occurs _____, which eliminates the possibility of choosing two 3's.

What you should learn

How to solve simple counting problems

II. The Fundamental Counting Principle (Page 627)

The Fundamental Counting Principle can be extended to three or more events. For instance, if E_1 can occur in m_1 ways, E_2 in m_2 ways, and E_3 in m_3 ways, the number of ways that three events E_1 , E_2 , and E_3 can occur is _____.

What you should learn

How to use the Fundamental Counting Principle to solve counting problems

Example 1: A diner offers breakfast combination plates which can be made from a choice of one of 4 different types of breakfast meats, one of 8 different styles of eggs, and one of 5 different types of breakfast breads. How many different breakfast combination plates are possible?

III. Permutations (Pages 628–630)

The number of different ways that n elements can be ordered is _____.

The number of ways of ordering a subset of a collection of elements, called a permutation of n elements taken r at a time, is given as ${}_nP_r =$ _____.

Example 2: In how many ways can a chairperson, a vice chairperson, and a recording secretary be chosen from a committee of 14 people?

Example 3: In how many distinguishable ways can the letters COMMITTEE be written?

What you should learn
How to use permutations to solve counting problems

IV. Combinations (Pages 631–632)

The number of combinations of n elements taken r at a time is ${}_nC_r =$ _____.

For a combination, the order in which the elements are listed _____ important.

Example 4: In how many ways can a research team of 3 students be chosen from a class of 14 students?

What you should learn
How to use combinations to solve counting problems

Homework Assignment

Page(s)

Exercises