

Name: _____ Date: _____ Period: _____

11-1 Permutations and Combinations

State Standards

A2. S.IC.A.1 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

Objective

Count permutations and combinations

Key Concepts

_____ describes the method of using multiplication to count.

nPr -the number of _____ of n items in a set arranged r items at a time.
(order matters)

nCr -the number of _____ of n items in a set chosen r items at a time.
(order does NOT matter)

_____ $n! = n(n - 1) \cdot \dots \cdot 3 \cdot 2 \cdot 1$

take note

Key Concept Fundamental Counting Principle

If event M can occur in m ways and is followed by event N that can occur in n ways, then event M followed by event N can occur in $m \cdot n$ ways.

Example 3 pants and 2 shirts give $3 \cdot 2 = 6$ possible outfits.

Examples

1. (I do) Many motor vehicle license plates are arranged with a series of 3 letters followed by a series of 3 numbers. How many possible license plates can there be of this style?

2. (I do) In how many ways can you file 12 folders one after another in a drawer?

3. (We do) Ten students are in a race. First, second and third place will earn medals. In how many ways can 10 runners finish first, second, third (no ties allowed)?

4. (We do) Permutation or Combination? A teacher divides the class into 8 groups for a project. She decides to display 4 of the projects. In how many different ways can the teacher select the projects for display?

5. (They do) Permutation or Combination? In a raffle, three winners are chosen. The first ticket drawn wins \$100, the second wins \$50, the third wins \$10. In how many different ways can you draw 3 winning tickets out of a total of 25 raffle tickets?

You do Practice 11-1: Complete your assignment on a separate sheet of paper. Show all work.

1. You have five shirts and four pairs of pants. How many different ways can you arrange your shirts and pants into outfits?
2. To create a passcode, you need to first choose a letter and then, three single-digit numbers. How many different passcodes can you create?
3. Evaluate
 - a. $10!$
 - b. ${}_6P_3$
 - c. ${}_7C_5$
4. How many different nine-player batting orders can be chosen from a baseball team of 16?
5. Explain the difference between permutations and combinations.