

Lesson 3.4 Counting Rule for Probability

Assign: p174 - 177 1 - 6 all ; 8 - 56 evens

Fundamental Counting Rule for a sequence of 2 events in which the first can occur m ways and the second event can occur n ways, the events together can occur a total of $m \cdot n$ ways.

Ex #1. If a medical researcher must select 1 of the 2 Rh types (positive or negative) and 1 of the 4 blood groups (A, B, O, or AB), how many different possibilities are there?

Ex #2. If a survey has 5 questions, how many different versions of the survey are possible?

Factorial Symbol "!" denotes the product of decreasing positive whole numbers.

Factorial Rule says a collection of n different items can be arranged in order $n!$ different ways.

Permutation Rule says the number of ways to arrange IN ORDER n distinct objects, taking r at a time is

$${}_n P_r = \frac{n!}{(n-r)!}$$

Ex #1. Suppose you are in charge of 12 nurses and must assign one to be the head of the first floor ward, one to be the head of the second floor ward, and one to be the head of the third floor, and one to be the head of the fourth floor. Each floor has different types of patients. In how many different ways can the nurses be assigned?

Ex #2. In planning the Monday night prime-time lineup for TV, an executive must select shows from 30 that are available. How many lineups are possible?

Ex#3. How many ways can the letters in the word MISSISSIPPI be arranged?

Combination rule is the number of combinations of n objects take r at a time when **order is NOT** important.

$${}_n C_r = \frac{n!}{r!(n-r)!}$$

Ex #1. You are the supervisor of nurses and have 12 nurses working for you. In how many ways can you choose 4 to have the weekend off?

Ex #2. The Board of Trustees at a college has 9 members. Each year, they select a 3-person committee to oversee buildings and grounds. How many different committees are possible?