AILET

Tips And Tricks To Solve Permutation And Combination

Aparna Shukla · 07 Jan 2021

In law entrance tests, questions from Permutation and Combination cover a good part (around 3-4 questions) of math's section.

These questions are mostly easy but only if one has her basic concepts clear. So in this article, an attempt has been made to do so.

So starting with permutation, a permutation is an arrangement of all or part of a number of things in a definite order.

For example, the permutations of the three letters a, b, c taken all at a time are:

abc, acb, bca, bac, cba, cab. The permutations of the three letters a, b, c taken two at a time are- ab, ac, ba, bc, ca, cb.

Thus 8P 3 denotes the numbers of permutations of 8 different things taken 3 at a time and 5P 5 denotes the number of permutations of 5 different things taken 5 at a time. Important In permutations, the order of arrangement is taken into account; when the order is changed, a different permutation is obtained.

Example:

How many ways can we award a 1st, 2nd and 3rd place prize among eight contestants? (Gold / Silver / Bronze)

We're going to use permutations since the order we hand out these medals matters.

Here's how it breaks down:

- Gold medal: 8 choices: A B C D E F G H. Let's say A wins the Gold.
- Silver medal: 7 choices: B C D E F G H. Let's say B wins the silver.
- Bronze medal: 6 choices: C D E F G H. Let's say… C wins the bronze.

We picked certain people to win, but the details don't matter: we had 8 choices at first, then 7, then 6.

We had to order 3 people out of 8. To do this, we started with all options (8) then took them away one at a time (7, then 6) until we ran out of medals.

Where 8!/5! is just a fancy way of saying "Use the first 3 numbers of 8!". If we have n items total and want to pick k in a certain order, we get: P(n, k) or nPk = n! / (n – k)! (general formula)

So ways in which we can award 1 st 2 nd 3 rd price will be = 8.7.6 = 336

If we find the total number of ways in which 4 persons can take their places in a cab having 6 seats.

Solution:

The number of ways in which 4 persons can take their places in a cab having 6 seats

6p4 = 6 × 5 × 4 × 3 = 360 ways.

Mario, Sandy, Fred, and Shanna are running for the offices of president, secretary and treasurer. So, in how many ways can these offices be filled: 4P3 = 4 x 3 x 2 = 24. The offices can be filled 24 ways.

Permutations and Combinations for CLAT

Coming on Combinations, these are easy going. An order doesn't matter.

The general formula is:

C(n, k) or nCk = P(n, k) / k!

Which means "Find all the ways to pick k people from n, and divide by the k! variants". Writing this out, we get our combination formula or the number of ways to combine k items from a set of n:

C(n, k) = n! / (n-k)!.k!

A few examples

Here's a few examples of combinations (order doesn't matter) from permutations (order matters).

- Combination: Picking up 3 pens from a bunch of 10.

C(10,3) = 10!/(7!·3!) = 10 · 9 · 8 / (3 · 2 · 1) = 120.

Permutation: Picking a President, VP and Secretary from a group of 10.

P (10,3) = 10!/7! = 10 · 9 · 8 = 720.

- Combination: Choosing 3 dishes from a menu of 10.

C(10,3) = 120.

Permutation: Listing your 3 favourite dishes, in order, from a menu of 10.

P(10,3) = 720.

The difficulty arises sometimes when we fail to determine if the situation represents a permutation or a combination. So we need to first determine that order is important or not in the given situation.

In a Permutation the order of occurrence of the object or the arrangement is important but in Combination, the order of occurrence of the object or the arrangement is not important.

This article is posted in association with clatapult.com