

ALGEBRA

[PERMUTATION OF WORDS & NUMBERS]

Problem Statements by Harish Chandra Rajpoot

1. A given word having total ' n ' number of letters, out of which numbers of repetitive letters are p, q, r, s, \dots then total number of the words formed by permuting all the letters together is given as

$$N = \frac{n!}{p! q! r! s! \dots}$$

If these words are arranged in the correct alphabetic order then what will be alphabetic order (say Rank (R)) of any of the words formed in that alphabetic arrangement?

2. Similarly, a given positive integral number having total ' n ' no. of non-zero digits, out of which no. of repetitive digits are p, q, r, s, \dots then total no. of the numbers (permutations) formed by permuting all the digits together is given as

$$N = \frac{n!}{p! q! r! s! \dots}$$

If these numbers are arranged in increasing or decreasing order then what will be increasing or decreasing order (say Rank (R)) of any of the numbers formed in that numeric arrangement?

Is there any set-formula for solving equally both the problems above?

A set-formula has been derived for solving both the problems above. It is used to find out the alphabetic or numeric order of any word or positive integral no. is given as follows

$$\left[R(\text{word or number}) = \sum_{i=1}^{i=n} F_i \left(\frac{P_i}{S_i} \right) \right]$$

In above formula, the symbols have unusual meanings as $F \rightarrow Formerity, S \rightarrow Similarity, P \rightarrow Permuty, relevant to each selected letter or digit$, but usual way to find out their respective values. The above formula had been proposed & proved by H.C. Rajpoot which is based on inverse relation. It has been explained in his Research Paper. 19 January, 2014.