Permutations

- In how many permutations are there of counting a subset of k elements, when there are n elements in total.
- The number of permutations of a set of n elements is denoted n! (pronounced n factorial.)

Permutation Formula

A formula for the number of possible permutations of k objects from a set of n. This is usually written ${}^{n}P_{k}$.

Formula:

$$ {}^{n}P_{k} = \frac{n!}{(n-k)!} = n.(n-1).(n-2).\ldots.(n-k+1) $$

Permutation Formula

Example:
How many ways can 4 students from a group of 15 be lined up for a photograph?

Answer:
There are ${}^{15}P_4$ possible permutations of 4 students from a group of 15.

$$ {}^{15}P_4 = \frac{15!}{11!} = 15 \times 14 \times 13 \times 12 = 32760 $$

There are 32760 different lineups.