Type	Definition	Ordered	Formula	Denotation	Repetitions
Permutation	A permutation of n objects is an ordered rearrangement of these n objects where every element appears exactly once.	Yes	$n!$	P_n	No
Ordered Subset	An ordered subset with k elements of n objects is a list which consists of k elements taken from the n objects such that each element in the list appears not more than once. **Note:** An ordered subset with n elements of n objects is a permutation of the n objects.	Yes	$\frac{n!}{(n-k)!}$	O_n^k	No
Combination	A combination of n objects with k elements is a subset of the n objects with k elements for which every element appears at most once and for which order does not matter.	No	$\frac{n!}{k!(n-k)!}$	C_n^k OR $\binom{n}{k}$	No
Combination With Repetition	A combination with repetition with k elements of n objects is an unordered collection of k elements from the n given objects where each element might appear repeatedly up to k times.	No	$\binom{n+k-1}{k}$	E_n^k OR $\left[\begin{smallmatrix} n \\ k \end{smallmatrix}\right]$	Yes
Permutation With Repetition	Suppose there are n objects, O1, O2, ... On such that O1 is repeated K1 times, O2 is repeated K2 times, ..., On is repeated Kn times. In total, there are (K1 + K2 + ... + Kn) objects. A permutation with repetition is an ordered rearrangement of these (K1 + K2 + ... + Kn) objects.	Yes	$\frac{k_1+k_2+\ldots+k_n}{k_1!\cdot k_2!\cdot\ldots\cdot k_n!}$	None	Yes