The Number Permutation of n Objects taken k at a Time

The number of permutations of a set of n objects taken k at a time denoted ${}_nP_k$ is given by

$$ {}_nP_k = \underbrace{n(n-1)(n-2)\cdots\{n-(k-1)\}}_{k \text{ factors}} \tag{1} $$

$$ = \frac{n!}{(n-k)!} \tag{2} $$

For a set of n objects in which n_1 are of one kind, n_2 are of another kind,..., and n_k are of a k^{th} kind, the number of distinguishable permutations is

$$ \frac{n!}{n_1! \cdot n_2! \cdot n_k!} $$