Counting Principles Decision Chart (Chapter 4)

Supplement 8

Does the order of selection matter, i.e., is ABC different from CBA?

Yes

Are repetitions allowed, i.e., sampling with replacement?

Yes

Permutation formula (with repetitions)

Yes

Permutation formula

No

Permutation formula

No

Permutation formula

Combination formula

Note: If \( N = n \), then use \( P_n^N = N! \)

Multiplication formula

\[ \begin{align*}
# \text{ arrangements} &= n_1 \cdot n_2 \cdot \ldots \cdot n_m \\
\text{or} \quad &= \prod_{i=1}^{m} n_i
\end{align*} \]

Note:
Different notations abound for combinations and permutations. On most calculators, they're indicated as \( _nC_r \) and \( _nP_r \), where \( n = \) our \( N \) and \( r = \) our \( n \). (Confusing, I know)

You'll sometimes see the combination operator written as \[ \binom{\text{population}}{\text{sample size}} \].