

## Revised Combinatorics Chart

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Here is a revised version of the chart for combinatorics formulas. It correctly shows that when we are selecting  $r$  objects from a set of  $n$  objects with repetition allowed,  $r$  can be larger than  $n$ . When repetition is not allowed, we must have  $r \leq n$ .

Set of size  $n$ , selecting  $r$  items

	Permutations (ordered)	Combinations (unordered)
Without repetition ( $0 \leq r \leq n$ )	$P(n, r) = n(n-1)(n-2)\cdots(n-r+1)$ $= \frac{n!}{(n-r)!}$	$C(n, r) = \frac{P(n, r)}{r!}$ $= \frac{n!}{r!(n-r)!}$
With repetition	$n^r$	$C(n+r-1, r)$ <p style="text-align: center;">or</p> $C(n+r-1, n-1)$ <p>(<math>0 &lt; n</math> to avoid negatives)</p>