Factorials

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n factorial $(n!) = n \times (n-1) \times (n-2) \cdots \times 1 = \prod_{k=0}^{n} n - k$
In general, the number of ways of placing n different objects in a line is $n!$

Example 1

There are 5 flags in a line, find the probability of the flags being a alphabetical order.
$5! = 120 \Rightarrow p = \frac{1}{120}$

Note: factorials only work if we are ordering objects. If you are choosing objects from a group we need something different.
${}_nC_r = \binom{n}{r} = \frac{n!}{(n-r)!r!}$

Example 2

What are the possible ways of placing 8 flags for a line of 5.
${}_8C_5 = 56$