Permutations and Factorials

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$P_{nk} = n(n-1)\ldots(n-k+1)$
$P_{nn} = n(n-1)\ldots(1)$

$$n! = 1.2.\ldots.n = \prod_{k=1}^{n} k$$

$$n! \approx \sqrt{2\pi n}\left(\frac{n}{e}\right)$$