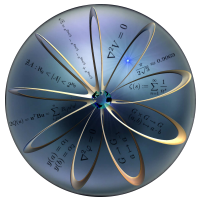

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## double factorial

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|---|---|
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The *double factorial* of a positive integer $n$ is the product $n!!$ of the positive integers less than or equal to $n$ that have the same parity as $n$, that is,

$$n!! = n(n-2)(n-4)\cdots k_n$$

where $k_n$ denotes 1 if $n$ is an odd number and 2 if $n$ is an even number.

For example,

$$7!! = 7 \cdot 5 \cdot 3 \cdot 1 = 105$$

$$10!! = 10 \cdot 8 \cdot 6 \cdot 4 \cdot 2 = 3840$$

Note that $n!!$ is not the same as $(n!)!$.

Observe that $(2n)!! = 2^n n!$ and $(2n+1)!! = \frac{(2n+1)!}{2^n n!}$.