La aproximación se expresa como

$$\ln n! \approx n \ln n - n$$

La fórmula de Stirling está dada por:

$$\lim_{n\to\infty} \frac{n!}{\sqrt{2\pi n}\;\left(\frac{n}{e}\right)^n} = 1$$

que se reescribe frecuentemente como:

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

$$n! \cong \sqrt{2n} \cdot n^{n+1/2}\; e^{-n}$$

Una acotación de la fórmula es:

$$\sqrt{2\pi n}\;\left(\frac{n}{e}\right)^n e^{\frac{1}{12n+1}} < n! < \sqrt{2\pi n}\;\left(\frac{n}{e}\right)^n e^{\frac{1}{12n}}$$

# COMBINATORIA

$$\binom{n}{k} = \binom{n}{n-k}$$

$$\binom{n}{0} + \binom{n}{1} + \cdots + \binom{n}{k} + \cdots + \binom{n}{n} = 2^n$$

$$\binom{n}{0}\binom{n}{n} + \binom{n}{1}\binom{n}{n-1} + \cdots + \binom{n}{n}\binom{n}{0} = \binom{2n}{n}$$

$$\sum_{k=0}^{n} \binom{n}{k}\binom{n}{n-k} = \binom{2n}{n}$$

$$\sum_{k=0}^{m-1} \binom{m}{k}\binom{n-1}{m-k-1} = \binom{n+m-1}{n}$$

$$\binom{n-1}{k} + \binom{n-2}{k-1} + \cdots + \binom{n-k-1}{0} = \binom{n}{k}$$