

The notation (nk) for the binomial coefficient was introduced by Andreas Freiherr von Ettingshausen in his 1826 work *Die combinatorische Analysis*.

It appears to have become the de facto standard in recent years.

$$\binom{N}{K} = \binom{N-1}{K-1} + \binom{N-1}{K} \quad (1)$$

$$\binom{N}{0} = 1 \quad (2)$$

Identities

$$\binom{n}{k} = \frac{n}{k} \binom{n-1}{k-1} \quad (3)$$

proof

$$\binom{n}{k} = \frac{n!}{k!(n-k)!} \quad (4)$$

$$= \frac{n * (n-1)!}{k * (k-1)!(n-k)!} \quad (5)$$

$$u = n - 1 \quad (6)$$

$$z = k - 1 \quad (7)$$

$$u - z = (n - 1) - (k - 1) \quad (8)$$

$$= n - 1 - k + 1 \quad (9)$$

$$= n - k \quad (10)$$

$$= \frac{n}{k} * \frac{u!}{z!(u-z)!} \quad (11)$$

$$= \frac{n}{k} * \binom{u}{z} \quad (12)$$

$$= \frac{n}{k} * \binom{n-1}{k-1} \quad (13)$$