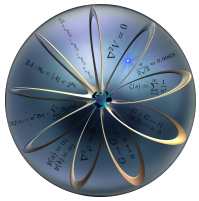

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## Gaussian polynomials

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For an indeterminate $q$ and integers $n \geq m \geq 0$ we define the following:
(a) $(m)_q = q^{m-1} + q^{m-2} + \cdots + 1$ for $m > 0$,
(b) $(m!)_q = (m)_q(m-1)_q \cdots (1)_q$ for $m > 0$, and $(0!)_q = 1$,
(c) $\binom{n}{m}_q = \frac{(n!)_q}{(m!)_q((n-m)!)_q}$. If $m > n$ then we define $\binom{n}{m}_q = 0$.

The expressions $\binom{n}{m}_q$ are called *q-binomial coefficients* or *Gaussian polynomials*.

Note: if we replace $q$ with 1, then we obtain the familiar integers, factorials, and binomial coefficients. Specifically,
(a) $(m)_1 = m$,
(b) $(m!)_1 = m!$,
(c) $\binom{n}{m}_1 = \binom{n}{m}$.
(d) $\binom{m}{m}_q = 1$.