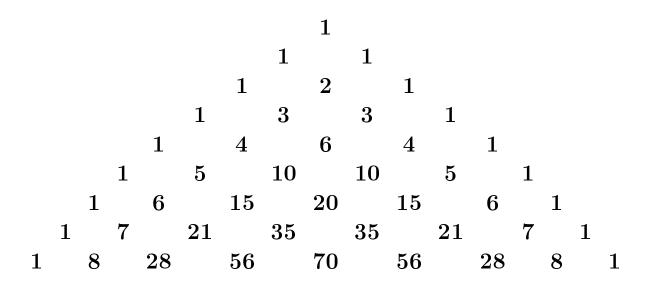
$\binom{n}{k}$ = the number of subsets of size k of a set with n elements.

Pascal's triangle:



Generating functions

Let $a_0, a_1, a_2 \dots a_n$ be a sequence of real numbers. The function

$$f(x) = a_0 + a_1 x + \dots + a_n x^n = \sum_{i=0}^n a_i x^i$$

is called the generating function of the sequence.

If the sequence is infinite, then the generating function will be a polynomial of infinite degree.

Binomial Theorem

$$(x+y)^n = \sum_{k=0}^n \binom{n}{k} x^k y^{n-k}$$

Corrollary:

$$(x+1)^n = \sum_{k=0}^n \binom{n}{k} x^k.$$