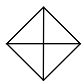


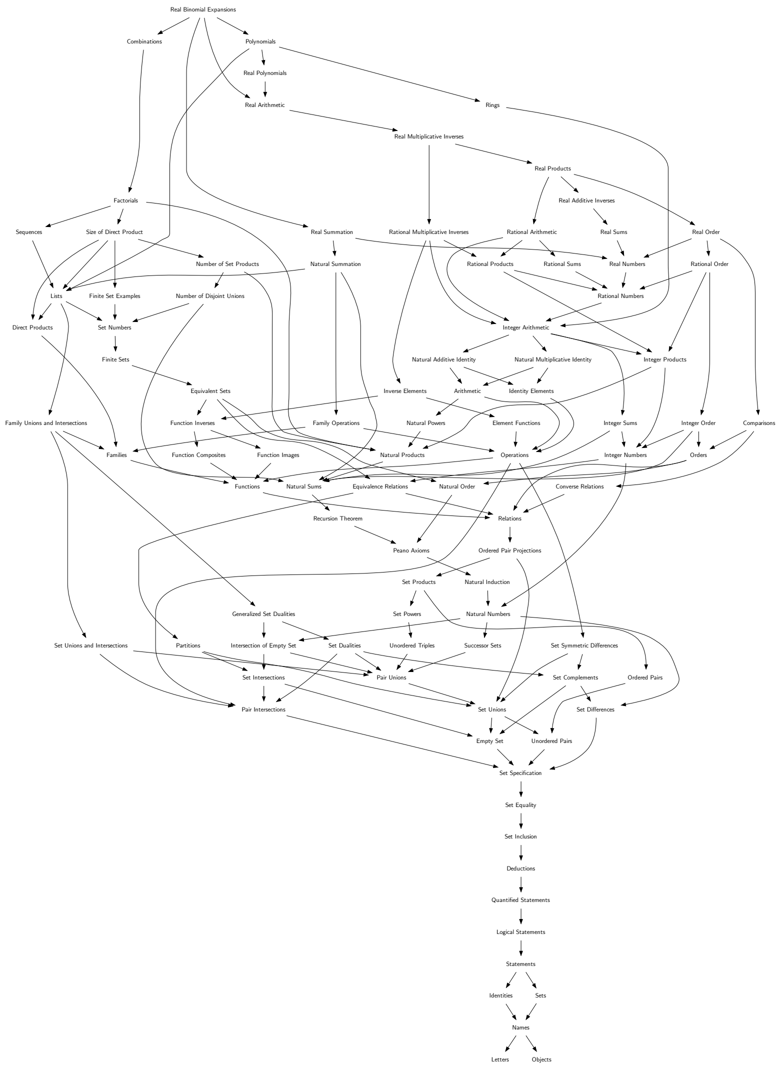
Result

Proposition 1. *Suppose x and y are real numbers. For any natural number n,*

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

Proof. Roughly speaking, expand $(a+b)^n$ using the distributive law, and count the number of terms containing k x's and $n-k$ y's. The number will be same as the number of ways of choosing k elements out of n, which is $\binom{n}{k}$. Each such term contributes $x^k y^{n-k}$ to the sum. Future editions will include a full proof, and perhaps some visualization. $\square$

The expression $x+y$ is called a *binomial* and this result is often called the *binomial formula*, *binomial theorem*, *binomial identity*. For these reasons, $\binom{n}{k}$ is often called a *binomial coefficient*.


Real Binomial Expansions
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Partitions
Intersection of Empty Set
Set Dualities
Unordered Triples
Successor Sets
Set Symmetric Differences
Set Intersections
Pair Unions
Set Complements
Ordered Pairs
Pair Intersections
Set Unions
Set Differences
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
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Statements
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