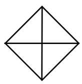


Why

We want to add and multiply complex numbers.[1]

Definition

Let $z_1, z_2 \in \mathbf{C}$ with $z_1 = (x_1, y_1)$ and $z_2 = (x_2, y_2)$. The *complex product* of z_1 and z_2 is the complex number $(x_1 x_2 - y_1 y_2, x_1 y_2 + y_1 x_2)$.

Notation

Properties

We have the following desirable properties.[2]

Proposition 1 (Commutativity)**.** *For all $z_1, z_2 \in \mathbf{C}$, we have $z_1 + z_2 = z_2 + z_1$ and $z_1 z_2 = z_2 z_2$.*

Proposition 2 (Commutativity)**.** *For all $z_1, z_2, z_3 \in \mathbf{C}$, we have $(z_1 + z_2) + z_3 = z_1 + (z_2 + z_3)$ and $z_1(z_2 z_3) = (z_1 z_2) z_3$.*

Proposition 3 (Distributivity)**.** *For all $z_1, z_2, z_3 \in \mathbf{C}$, we have $z_1(z_2 + z_3)$ and $z_1 z_2 + z_1 z_3$*

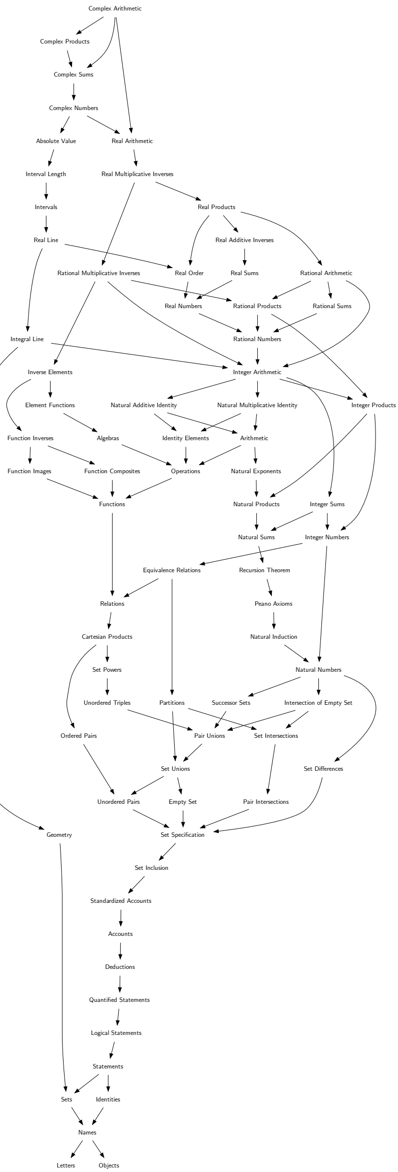
Relation to R^2

Addition in $\mathbf{C}$ corresponds to the usual addition of the corresponding vectors in the plane R^2. On the other hand, multiplication

[1] Future editions will expand in the genetic account for introducing complex numbers.

[2] Future editions will include accounts.

However multiplication in $\mathbf{C}$


Complex Arithmetic
Complex Products
Complex Sums
Complex Numbers
Absolute Value
Real Arithmetic
Interval Length
Real Multiplicative Inverses
Intervals
Real Products
Real Line
Real Additive Inverses
Rational Multiplicative Inverses
Real Order
Real Sums
Rational Arithmetic
Real Numbers
Rational Products
Rational Sums
Integral Line
Rational Numbers
Inverse Elements
Integer Arithmetic
Element Functions
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Function Inverses
Algebras
Identity Elements
Arithmetic
Function Images
Function Composites
Operations
Natural Exponents
Functions
Natural Products
Integer Sums
Natural Sums
Integer Numbers
Equivalence Relations
Recursion Theorem
Relations
Peano Axioms
Cartesian Products
Natural Induction
Set Powers
Natural Numbers
Unordered Triples
Partitions
Successor Sets
Intersection of Empty Set
Ordered Pairs
Pair Unions
Set Intersections
Set Unions
Set Differences
Unordered Pairs
Empty Set
Pair Intersections
Geometry
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects