Why
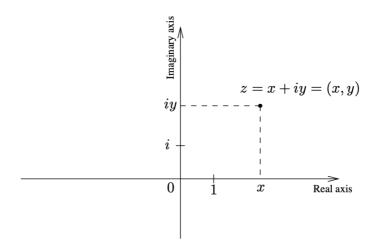
We are regularly thinking of $\mathbf{C}$ as plane.

Definition

Since $\mathbf{C} = \mathbf{R}^2$, we can identify elements of $\mathbf{C}$ with points in the plane (as we did in Real Plane). In this case, if $z = x + iy \in \mathbf{C}$ (i.e, $z = (x, y) \in \mathbf{R}^2$), we can visualize this identification in the following figure.

We can identify the origin with the complex number $(0, 0) = 0 \in \mathbf{C}$. For this reason we call $0 \in \mathbf{C}$ the *complex origin*. Likewise, the imaginary number $(0, 1) = i \in \mathbf{C}$ corresponds to $(0, 1)$ Clearly, the horizontal axis corresponds to the purely real numbers and the vertical axis corresponds to the purely imaginary numbers. For these reasons, we refer to these axes as the *real axis* and *imaginary axis*, respectively. We refer to the above figure as the *complex plane* (or *Argand diagram*).

Complex Plane

Complex Numbers

Real Arithmetic

Absolute Value

Real Multiplicative Inverses

Interval Length

Real Products

Intervals

Real Additive Inverses

Real Line

Real Plane

Rational Multiplicative Inverses

Rational Arithmetic

Real Sums

Real Order

Integral Line

Geometry

Rational Products

Rational Sums

Real Numbers

Rational Order

Rational Numbers

Integer Arithmetic

Lists

Natural Multiplicative Identity

Natural Additive Identity

Integer Products

Set Numbers

Identity Elements

Arithmetic

Finite Sets

Direct Products

Inverse Elements

Natural Powers

Equivalent Sets

Element Functions

Function Inverses

Natural Products

Integer Sums

Integer Order

Comparisons

Family Unions and Intersections

Operations

Function Images

Function Composites

Natural Sums

Integer Numbers

Orders

Families

Functions

Recursion Theorem

Converse Relations

Natural Order

Equivalence Relations

Peano Axioms

Relations

Natural Induction

Set Products

Natural Numbers

Set Powers

Generalized Set Dualities

Set Symmetric Differences

Successor Sets

Unordered Triples

Set Dualities

Intersection of Empty Set

Partitions

Set Unions and Intersections

Ordered Pairs

Set Complements

Pair Unions

Set Intersections

Set Differences

Unordered Pairs

Empty Set

Pair Intersections

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects