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number

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Number is an abstract concept which is **not defined generally** in mathematics. The numbers can be used for counting .

In mathematics one **can define** different **kinds** of numbers; some of the most common are . There are also many special kinds of e.g. : odd numbers, prime numbers, triangular numbers, Fibonacci numbers, etc. The `http://planetmath.org/AlgebraicNumberTheory`algebraic integers are a special kind of complex numbers, having `http://planetmath.org/Number`similar divisibility properties as the but much richer.

Usually the numbers, which can be thought to be formed by gradually expanding the available system of numbers:

- natural numbers 1, 2, 3, ...
- integers (added `http://planetmath.org/Null`0 and negative integers)
- rational numbers (added fractional numbers)
- real numbers (added irrational numbers)
- complex numbers (added imaginary numbers)

A usual applier of the mathematics, e.g. an engineer, probably believes that there are no other numbers than the complex numbers. Some school book may tell that the complex numbers form the widest possible `http://planetmath.org/Field`field of numbers. However, the mathematicians know that there exist infinitely many extension fields of the field $\mathbb{C}$ of the complex numbers, e.g. the rational function field $\mathbb{C}(X)$ or the formal Laurent series field $\mathbb{C}((X))$. That's a different matter if one wants to call *numbers* the elements of the last fields.

The field $\mathbb{Q}$ of the rational numbers can be extended also in another direction than the real and complex numbers: the field of `http://planetmath.org/PAdicIntegers`p-adic numbers makes a completion of $\mathbb{Q}$ which resembles $\mathbb{R}$ but which is not contained neither in $\mathbb{R}$ in $\mathbb{C}$.