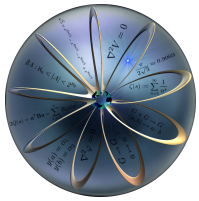

planetmath.org

Math for the people, by the people.

elementary function

Canonical name	ElementaryFunction
Date of creation	2013-03-22 14:46:29
Last modified on	2013-03-22 14:46:29
Owner	pahio (2872)
Last modified by	pahio (2872)
Numerical id	18
Author	pahio (2872)
Entry type	Definition
Classification	msc 26A99
Related topic	RiemannZetaFunction
Related topic	LogarithmicIntegral
Related topic	AlgebraicFunction
Related topic	TableOfMittagLefflerPartialFractionExpansions

An *elementary function* is a real function (of one variable) that can be constructed by a finite number of elementary operations (addition, subtraction, multiplication and division) and compositions from constant functions, the identity function ($x \mapsto x$), algebraic functions, exponential functions, logarithm functions, trigonometric functions and cyclometric functions.

Examples

- Consequently, the polynomial functions, the absolute value $|x| = \sqrt{x^2}$, the triangular-wave function $\arcsin(\sin x)$, the power function $x^\pi = e^{\pi \ln x}$ and the function $x^x = e^{x \ln x}$ are elementary functions (N.B., the real power functions entail that $x > 0$).

- $\zeta(x) := \sum_{n=1}^{\infty} \frac{1}{n^x}$ and $\operatorname{Li} x := \int_2^x \frac{dt}{\ln t}$ are not elementary functions — it may be shown that they can not be expressed is such a way which is required in the definition.