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examples of periodic functions

Canonical name	ExamplesOfPeriodicFunctions
Date of creation	2013-03-22 17:57:29
Last modified on	2013-03-22 17:57:29
Owner	pahio (2872)
Last modified by	pahio (2872)
Numerical id	10
Author	pahio (2872)
Entry type	Example
Classification	msc 30A99
Classification	msc 26A09
Synonym	common periodic functions
Related topic	PeriodicityOfExponentialFunction
Related topic	HyperbolicIdentities
Related topic	RationalAndIrrational
Related topic	PeriodicFunctions
Related topic	FloorFunction
Related topic	Floor

We list common periodic functions. In the parentheses, there are given their period with least modulus.

- One-periodic functions with a real period:

  sine (2π), cosine (2π), tangent (π), cotangent (π), secant (2π), cosecant (2π), and functions depending on them – especially the triangular-wave function (2π); the mantissa function $x - \lfloor x \rfloor$ (1).

- One-periodic functions with an `http://planetmath.org/ImaginaryNumber`imaginary period:

  exponential function $(2i\pi)$, hyperbolic sine $(2i\pi)$, hyperbolic cosine $(2i\pi)$, hyperbolic tangent $(i\pi)$, hyperbolic cotangent $(i\pi)$, and functions depending on them.

- Two-periodic functions: elliptic functions.

- Functions with `http://planetmath.org/Infinite`infinitely many periods:

  the Dirichlet's function

  $$f\colon\ x \mapsto\ \begin{cases} 1 & \text{when } x \in \mathbb{Q} \\ 0 & \text{when } x \in \mathbb{R} \smallsetminus \mathbb{Q} \end{cases}$$

  has any rational number as its period; a constant function has any number as its period.