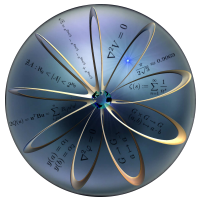

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natural log base

Canonical name	NaturalLogBase
Date of creation	2013-03-22 11:55:56
Last modified on	2013-03-22 11:55:56
Owner	CWoo (3771)
Last modified by	CWoo (3771)
Numerical id	11
Author	CWoo (3771)
Entry type	Definition
Classification	msc 33B99
Synonym	Euler number
Synonym	Eulerian number
Synonym	Napier's constant
Synonym	e
Related topic	ExampleOfTaylorPolynomialsForTheExponentialFunction
Related topic	EIsTranscendental
Related topic	EIsIrrationalProof
Related topic	ApplicationOfCauchyCriterionForConvergence

The *natural log base*, or e, has value

$$2.718281828459045\ldots$$

e was extensively studied by Euler in the 1720's, but it was originally discovered by John Napier.

e is defined by

$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$$

It is more effectively calculated, however, by using the Taylor series for $f(x)=e^x$ at $x=1$ to get the representation

$$e=\frac{1}{0!}+\frac{1}{1!}+\frac{1}{2!}+\frac{1}{3!}+\frac{1}{4!}+\cdots$$