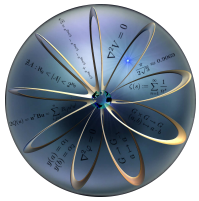

planetmath.org

Math for the people, by the people.

beta function

Canonical name	BetaFunction
Date of creation	2013-03-22 13:26:23
Last modified on	2013-03-22 13:26:23
Owner	yark (2760)
Last modified by	yark (2760)
Numerical id	21
Author	yark (2760)
Entry type	Definition
Classification	msc 33B15

The *beta function* is defined as

$$B(p,q) = \int_0^1 x^{p-1}(1-x)^{q-1}dx$$

for any real numbers $p, q > 0$. For other complex values of p and q, we can define $B(p,q)$ by analytic continuation.

The beta function has the property

$$B(p,q) = \frac{\Gamma(p)\Gamma(q)}{\Gamma(p+q)}$$

for all complex numbers p and q for which the right-hand side is defined. Here Γ is the gamma function.

Also,

$$B(p,q) = B(q,p)$$

and

$$B(\tfrac{1}{2},\tfrac{1}{2}) = \pi.$$

The beta function was first defined by `http://planetmath.org/EulerLeonhard`L. Euler in 1730, and the name was given by J. Binet.