

# PROBLEM 1

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Description:

Beta Function  $B(x, y)$  can be defined in terms of the Gamma Function or several integrals, also known as Euler integral of the first kind. The beta function is similar to gamma function, can have complex factors and is unclassified at 0 and negative integers. The beta function takes place in the evaluation of certain integrals and defines binomial co-efficient after adjusting indices.

Characteristics:

In mathematics, the Beta function (also known as the Euler integral of the first kind), is a special function defined by:

$$B(x, y) = \int_0^1 t^{x-1} (1-t)^{y-1} dt, \quad (1)$$

The Beta function is symmetric, meaning that  $B(x, y) = B(y, x)$ . And the Beta function is related to the Gamma function by the following formula:

$$B(x, y) = \frac{\Gamma(x) \times \Gamma(y)}{\Gamma(x+y)} \quad (2)$$

Domain:

$\text{Re}(x) > 0, \text{Re}(y) > 0$

## References

[1]<https://ncalculators.com/statistics/beta-function-calculator.htm>

[2]<https://www.miniwebtool.com/beta-function-calculator>

[3][https://en.wikipedia.org/wiki/Beta function](https://en.wikipedia.org/wiki/Beta_function)Relationship between gamma function and beta function