How can I use the GAMMA.DIST function in Excel?

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The GAMMA.DIST function in Excel is a statistical tool that allows users to calculate the probability of a value falling within a specified range for a gamma distribution. This function takes into account the shape and scale parameters of the distribution to accurately determine the probability. To use the GAMMA.DIST function, users must input the necessary parameters and specify the desired probability range. This function is useful for analyzing and understanding data that follows a gamma distribution, such as wait times, insurance claim amounts, or test scores. By utilizing the GAMMA.DIST function, users can make informed decisions and draw meaningful insights from their data in Excel.

This article describes the formula syntax and usage of the **GAMMA.DIST** function in Microsoft Excel.

Returns the gamma distribution. You can use this function to study variables that may have a skewed distribution. The gamma distribution is commonly used in queuing analysis.

Syntax

GAMMA.DIST(x,alpha,beta,cumulative)

The GAMMA.DIST function syntax has the following arguments:

X Required. The value at which you want to evaluate the distribution.

Alpha Required. A parameter to the distribution.

Beta Required. A parameter to the distribution. If beta = 1, GAMMA.DIST returns the standard gamma distribution.

Cumulative Required. A logical value that determines the form of the function. If cumulative is TRUE, GAMMA.DIST returns the cumulative distribution function; if FALSE, it returns the probability density function.

Remarks

If x, alpha, or beta is nonnumeric, GAMMA.DIST returns the #VALUE! error value.

If $x < 0$, GAMMA.DIST returns the #NUM! error value.

If $\alpha \le 0$ or if $\beta \le 0$, GAMMA.DIST returns the #NUM! error value.

The equation for the gamma probability density function is:

$$f(x;\alpha,\beta) = \frac{1}{\beta^{\alpha}\Gamma(\alpha)} x^{\alpha-1} e^{-\frac{x}{\beta}}$$

The standard gamma probability density function is:

$$f(x;\alpha) = \frac{x^{\alpha-1}e^{-x}}{\Gamma(\alpha)}$$

When alpha = 1, GAMMA.DIST returns the exponential distribution with:

$$\lambda = \frac{1}{\beta}$$

For a positive integer n, when alpha = n/2, beta = 2, and cumulative = TRUE, GAMMA.DIST returns (1 - CHISQ.DIST.RT(x)) with n degrees of freedom.

When alpha is a positive integer, GAMMA.DIST is also known as the Erlang distribution.

Example

Copy the example data in the following table, and paste it in cell A1 of a new Excel worksheet. For formulas to show results, select them, press F2, and then press Enter. If you need to, you can adjust the column widths to see all the data.

Data	Description	
10.00001131	Value at which you want to evaluate the distribution	
9	Alpha parameter to the distribution	
2	Beta parameter to the distribution	
Formula	**Description**	**Result**
=GAMMA.DIST(A2,A3,A4,FALSE)	Probability density using the x, alpha, and beta values in A2, A3, A4, with FALSE cumulative argument.	0.032639
=GAMMA.DIST(A2,A3,A4,TRUE)	Cumulative distributuion using the x, alpha, and beta values in A2, A3, A4, with TRUE cumulative argument.	0.068094