

# How can I use the WEIBULL function in Excel to calculate the probability density or cumulative distribution of a particular data set?

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The WEIBULL function in Excel is a statistical tool that allows users to calculate the probability density or cumulative distribution of a particular data set. This function is based on the Weibull distribution, which is commonly used in reliability and survival analysis. By inputting the necessary parameters such as the shape and scale of the distribution, users can generate a graph showing the probability density or cumulative distribution of their data. This can be useful in analyzing the likelihood of certain events occurring within a given data set. Overall, the WEIBULL function is a powerful tool that can aid in understanding and interpreting data in various fields such as engineering, economics, and medicine.

Returns the Weibull distribution. Use this distribution in reliability analysis, such as calculating a device's mean time to failure.

**Important:** This function has been replaced with one or more new functions that may provide improved accuracy and whose names better reflect their usage. Although this function is still available for backward compatibility, you should consider using the new functions from now on, because this function may not be available in future versions of Excel.

For more information about the new function, see [WEIBULL.DIST function](#).

## Syntax

WEIBULL(x,alpha,beta,cumulative)

The WEIBULL function syntax has the following arguments:

**X** Required. The value at which to evaluate the function.

**Alpha** Required. A parameter to the distribution.

**Beta** Required. A parameter to the distribution.

**Cumulative** Required. Determines the form of the function.

## Remarks

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

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

If  $\alpha \leq 0$  or if  $\beta \leq 0$ , WEIBULL returns the #NUM! error value.

The equation for the Weibull cumulative distribution function is:



The equation for the Weibull probability density function is:



When alpha = 1, WEIBULL returns the exponential distribution with:

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

## 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	
105	Value at which to evaluate the function	
20	Alpha parameter to the distribution	
100	Beta parameter to the distribution	
Formula	Description (Result)	Result
=WEIBULL(A2,A3,A4,TRUE)	Weibull cumulative distribution function for the terms above (0.929581)	0.929581
=WEIBULL(A2,A3,A4,FALSE)	Weibull probability density function for the terms above (0.035589)	0.035589