

How can I use the LOGEST function in Excel to calculate exponential regression?

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The LOGEST function in Excel is a powerful tool that can be used to calculate exponential regression for a given set of data points. This function uses the least squares method to find the best fit line for the data, which can then be used to make predictions and analyze the relationship between the variables. To use the LOGEST function, simply input the data points into a table, select the range of cells, and use the function to calculate the regression coefficients. This will generate an equation that can be used to plot the exponential curve and make accurate predictions. By utilizing the LOGEST function, users can easily analyze exponential data and make informed decisions based on the calculated regression.

In regression analysis, the LOGEST function calculates an exponential curve that fits your data and returns an array of values that describes the curve. Because this function returns an array of values, it must be entered as an array formula.

Note: If you have a current version of [Microsoft 365](#), then you can simply enter the formula in the top-left-cell of the output range, then press **ENTER** to confirm the formula as a dynamic array formula. Otherwise, the formula must be entered as a legacy array formula by first selecting the output range, entering the formula in the top-left-cell of the output range, and then pressing **CTRL+SHIFT+ENTER** to confirm it. Excel inserts curly brackets at the beginning and end of the formula for you. For more information on array formulas, see [Guidelines and examples of array formulas](#).

Description

The equation for the curve is:

$$y = b * m^x$$

or

$$y = (b * (m_1^{x_1}) * (m_2^{x_2}) * \dots)$$

if there are multiple x-values, where the dependent y-value is a function of the independent x-values. The m-values are bases corresponding to each exponent x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LOGEST returns is {m_n, m_{n-1}, ..., m₁, b}.

LOGEST(known_y's, , ,)

The LOGEST function syntax has the following arguments:

known_y's Required. The set of y-values you already know in the relationship $y = b * m^x$.

If the array known_y's is in a single column, then each column of known_x's is interpreted as a

separate variable.

If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

known_x's Optional. An optional set of x-values that you may already know in the relationship $y = b \cdot m^x$.

The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a range of cells with a height of one row or a width of one column (which is also known as a vector).

If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

const Optional. A logical value specifying whether to force the constant b to equal 1.

If const is TRUE or omitted, b is calculated normally.

If const is FALSE, b is set equal to 1, and the m-values are fitted to $y = m^x$.

stats Optional. A logical value specifying whether to return additional regression statistics.

If stats is TRUE, LOGEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r 2,sey; F,df;ssreg,ssresid}.

If stats is FALSE or omitted, LOGEST returns only the m-coefficients and the constant b.

For more information about additional regression statistics, see the [LINEST function](#).

The more a plot of your data resembles an exponential curve, the better the calculated line will fit your data. Like LINEST, LOGEST returns an array of values that describes a relationship among the values, but LINEST fits a straight line to your data; LOGEST fits an exponential curve. For more information, see LINEST.

When you have only one independent x-variable, you can obtain y-intercept (b) values directly by using the following formula:

Y-intercept (b):

INDEX(LOGEST(known_y's,known_x's),2)

You can use the $y = b \cdot m^x$ equation to predict future values of y, but Microsoft Excel provides the GROWTH function to do this for you. For more information, see [GROWTH function](#).

When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your regional settings.

You should note that the y-values predicted by the regression equation may not be valid if they are outside the range of y-values you used to determine the equation.

Need more help?

You can always ask an expert in the [Excel Tech Community](#) or get support in [Communities](#).

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