SLOPE

Hide All

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

Syntax

SLOPE(**known_y's**,**known_x's**)

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

  where x and y are the sample means AVERAGE(known_x's) and AVERAGE(known_y's).

- The underlying algorithm used in the SLOPE and INTERCEPT functions is different than the underlying algorithm used in the LINEST function. The difference between these algorithms can lead to different results when data is undetermined and collinear. For example, if the data points of the known_y's argument are 0 and the data points of the known_x's argument are 1:
  - SLOPE and INTERCEPT return a #DIV/0! error. The SLOPE and INTERCEPT algorithm is designed to look for one and only one answer, and in this case there can be more than one answer.
  - LINEST returns a value of 0. The LINEST algorithm is designed to return reasonable results for collinear data, and in this case at least one answer can be found.

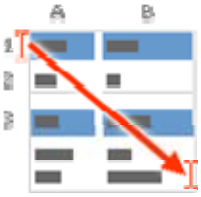
Example

The example may be easier to understand if you copy it to a blank worksheet.

How to copy an example

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic.

   NOTE Do not select the row or column headers.

   Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Formulas** tab, in the **Formula Auditing** group, click the **Show Formulas** button.

	A	B
1	**Known y**	**Known x**
2	2	6
3	3	5
4	9	11
5	1	7
6	8	5
7	7	4
8	5	4

Formula	Description (Result)
=SLOPE(A2:A8,B2:B8)	Slope of the linear regression line through the data points above (0.305556)

See Also

- INTERCEPT
- LINEST

- LOGEST
- PEARSON
- RSQ
- Statistical functions
- STEYX
- TREND