

How to Add a Regression Line to a Scatterplot in Google Sheets

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Adding a regression line, or trendline, to a scatterplot in Google Sheets is a core function for visualizing statistical relationships. The process begins by selecting the relevant data points that define your scatterplot. Once your data is selected, you navigate to the **Insert** tab and choose **Chart**. Within the powerful Chart Editor panel, you must locate the **Series** customization options, where the dropdown menu next to **Trendline** resides.

From this menu, selecting **Linear** typically adds the standard linear regression line to your visualization. Furthermore, Google Sheets provides robust controls to customize the line's aesthetics--including its color, thickness, and style. This visual tool serves a critical function: it allows you to immediately grasp the visual relationship between your two variables and quantitatively determine the strength and direction of the underlying correlation.

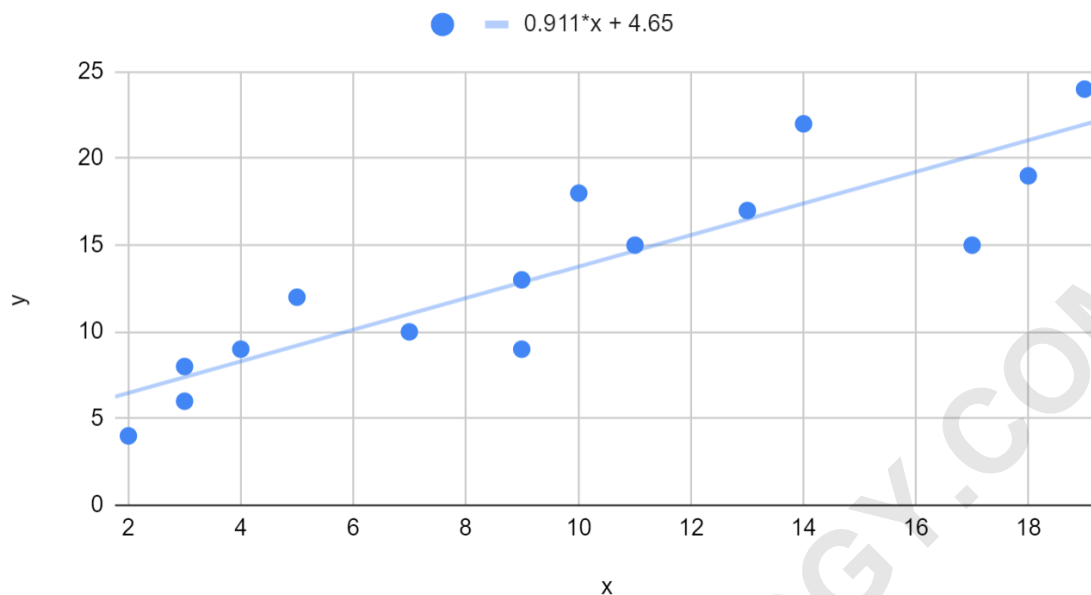
Analyzing relationships between variables is a fundamental task in data science and statistics. One of the most effective ways to visualize this relationship is through a scatterplot. However, to quantify and summarize the observed pattern, we often rely on a regression line (also commonly known as a trendline).

A regression line represents the line that best "fits" the dataset, allowing analysts to predict outcomes or understand the strength and direction of the correlation between two variables. Whether you are tracking sales against marketing spend or studying biological measurements, visualizing the linear relationship is crucial.

The core objective of adding a regression line is to mathematically represent the line that best "fits" the dataset, minimizing the distance between the line and the actual data points. This process is the graphical representation of linear regression.

We will use a detailed, step-by-step example featuring sample data to illustrate exactly how to add this critical visual element to a scatterplot within Google Sheets:

y vs. x



Let us begin the process of data preparation and visualization immediately!

Data Preparation and Entry in Google Sheets

The foundation of any statistical visualization is clean, well-organized data. Before plotting the relationship between two variables, you must ensure your independent (X) and dependent (Y) variables are entered into separate, adjacent columns in your Google Sheet. Proper data setup is essential for the charting function to correctly identify the series you wish to analyze.

For this tutorial, we will use a hypothetical dataset representing fifteen observations. Typically, the X variable (the predictor) is placed in the first column, and the corresponding Y variable (the outcome) is placed immediately next to it. This convention helps streamline the process when selecting the data range for chart creation.

Begin by entering the following values for the dataset into your spreadsheet, starting from cell A1. Ensure your columns are clearly labeled, which aids in interpreting the final chart:

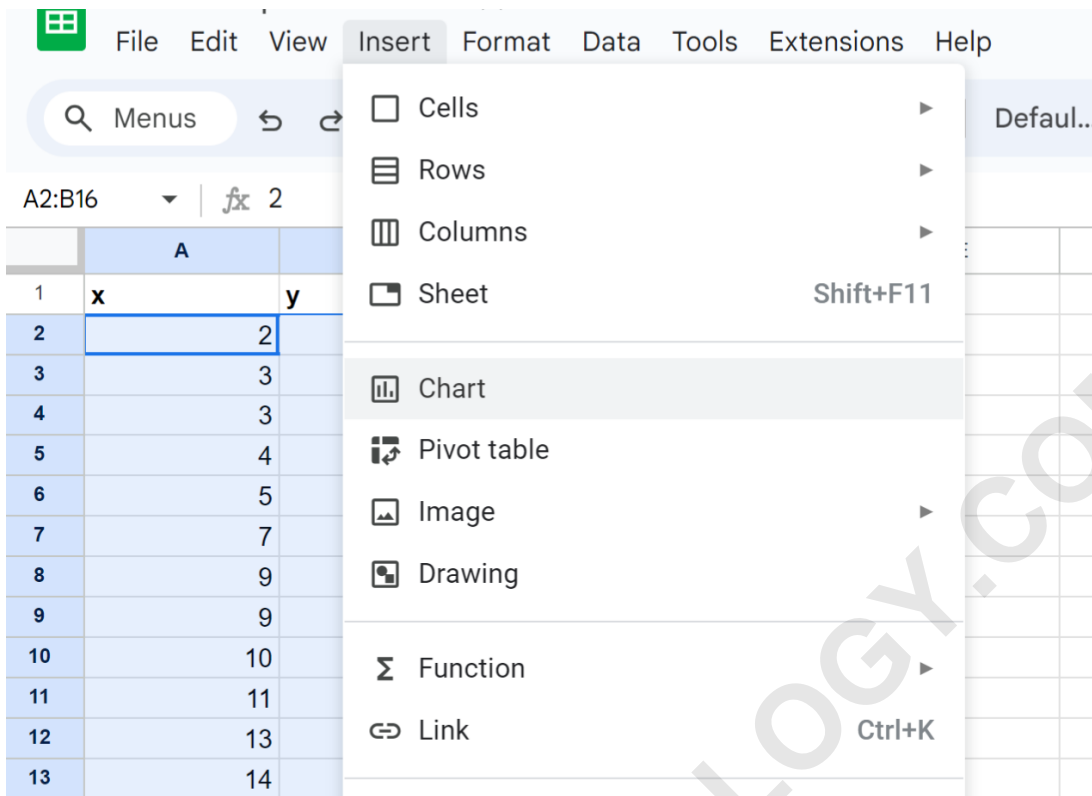
	A	B	C	D
1	x	y		
2	2	4		
3	3	8		
4	3	6		
5	4	9		
6	5	12		
7	7	10		
8	9	9		
9	9	13		
10	10	18		
11	11	15		
12	13	17		
13	14	22		
14	17	15		
15	18	19		
16	19	24		
17				

Once your data is accurately entered across the specified cell range (A2 to B16), you are ready to proceed to the crucial visualization phase. Remember that the accuracy of your regression analysis hinges entirely on the quality and integrity of this initial data entry.

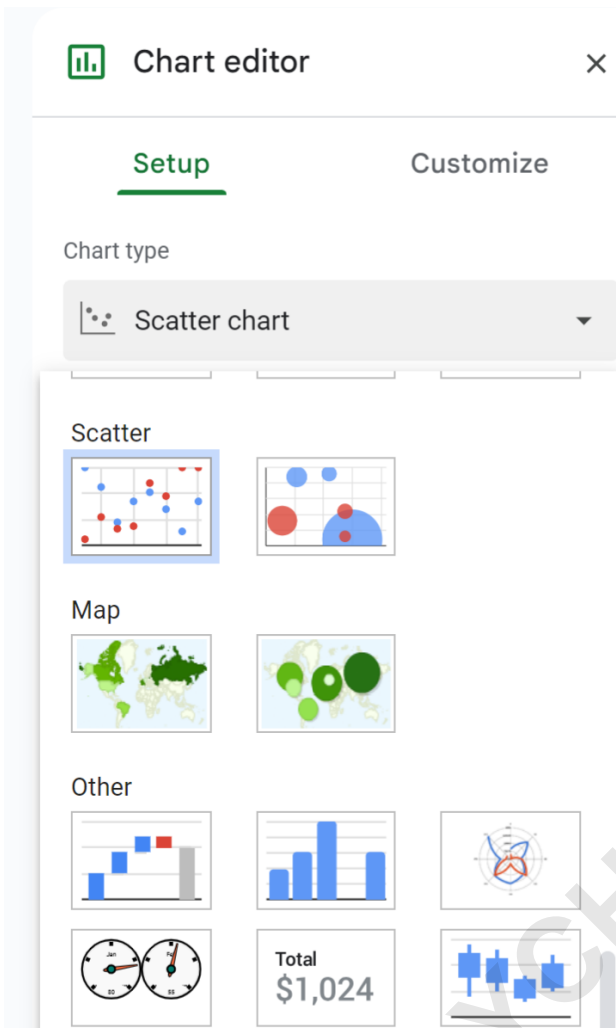
Generating the Initial Scatter Chart

With the dataset prepared, the next logical step is to visualize the raw data points. The scatter chart is the definitive choice for displaying the relationship between two continuous numerical variables, showing how individual data points distribute across a two-dimensional plane.

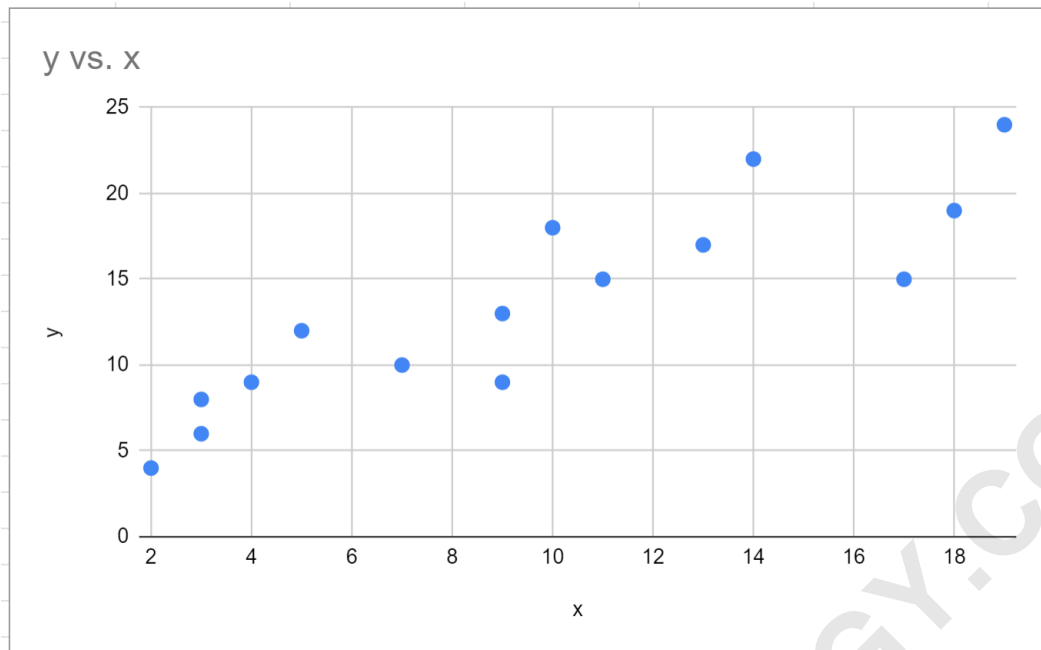
To initiate the chart creation process, first, carefully highlight the entire data range that contains the numerical values. In our example, this corresponds to the cell range **A2:B16**. After selecting the data, navigate to the **Insert** tab located in the main menu ribbon at the top of the Google Sheets interface, and then click on the **Chart** option.



Upon clicking **Chart**, the **Chart editor** panel will open on the right side of your screen. Google Sheets often attempts to guess the appropriate chart type, but you must ensure it selects the correct visualization. Within the **Setup** tab of the editor, locate the **Chart type** dropdown menu. Scroll through the options until you find and select **Scatter chart**.



Once confirmed, the initial scatterplot will be embedded into your sheet. This visualization provides a clear, initial sense of the relationship. In this case, we can visually infer a strong positive trend, suggesting that as the X variable increases, the Y variable also tends to increase. However, to formalize this observation, we require the statistical addition of the regression line. The resulting scatterplot should look like the image below:

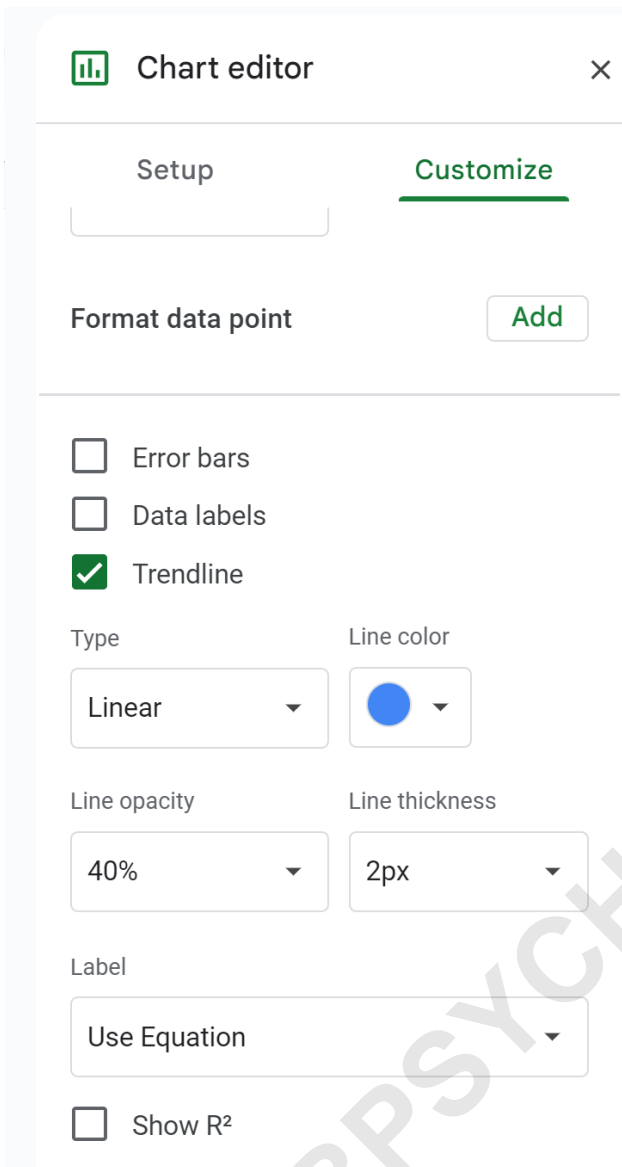


Implementing the Trendline (Regression Line)

The addition of the trendline is accomplished entirely within the **Chart editor** panel, which should still be open on the right side of your screen. If the editor closed, simply double-click on the chart to reopen it. Once open, navigate from the **Setup** tab to the **Customize** tab.

The **Customize** menu offers extensive options for adjusting the appearance and statistical components of your chart. Locate and expand the section labeled **Series**. This section controls the visual properties of the data points and any associated statistical overlays, which is exactly where the trendline option resides.

Within the **Series** options, scroll down until you find the **Trendline** checkbox. Clicking this box instructs Google Sheets to calculate and overlay the line of best fit based on the selected series data. By default, Sheets usually selects the **Type: Linear**, which is appropriate for simple linear regression analysis.



The image shows the 'Chart editor' window in Google Sheets, specifically the 'Customize' tab. The 'Format data point' section has an 'Add' button. Under the 'Trendline' section, the 'Trendline' checkbox is checked. The 'Type' dropdown is set to 'Linear', and the 'Line color' is a blue circle. The 'Line opacity' is set to '40%' and the 'Line thickness' is '2px'. The 'Label' dropdown is set to 'Use Equation'. The 'Show R²' checkbox is unchecked.

As soon as the **Trendline** box is checked, a straight line will appear through your scatterplot, visually summarizing the relationship. This line provides immediate insight into the central tendency of the data. Furthermore, to fully leverage this statistical tool, you must instruct Sheets to display the relevant statistics.

Displaying the Regression Equation and R-Squared Value

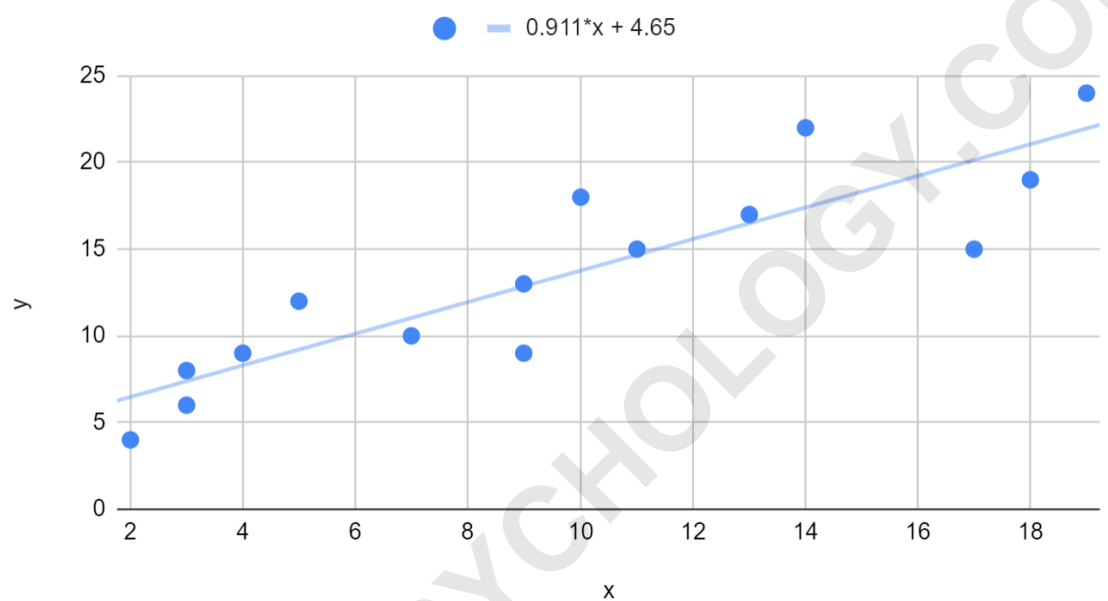
A visual trendline is powerful, but the true statistical value lies in the equation that defines it. To display this crucial mathematical information, remain within the **Series** subsection under the **Customize** tab. Scroll down slightly past the **Trendline** checkbox.

You will find a dropdown menu labeled **Label**. By default, this is set to **None**. Click this menu and select **Use Equation**. This action immediately overlays the calculated regression formula ($y = mx +$

b) onto the chart, directly above the plot area. Additionally, for rigorous statistical reporting, it is highly recommended to check the box labeled **Show R²**. The R-squared value indicates the proportion of the variance in the dependent variable that is predictable from the independent variable--a measure of the goodness of fit.

Once both the equation and R-squared are displayed, your finalized chart will look like this, featuring the line of best fit and its mathematical definition:

y vs. x



For this specific dataset, the system generates a precise regression equation. This equation is the mathematical key to understanding the quantified relationship between the variables, moving beyond mere visual inspection to numerical prediction.

Interpreting the Linear Regression Equation

The standard format for a simple linear regression equation is $Y = mX + b$, where Y is the predicted value, X is the predictor variable, m is the slope, and b is the Y-intercept. Understanding these components is critical for deriving meaningful conclusions from your data.

Based on our provided dataset, Google Sheets calculated the following specific regression line:

$$y = 0.911x + 4.65$$

This equation contains two highly significant parameters that define the statistical relationship observed in the scatterplot:

The **Slope (m = 0.911)**: This value represents the rate of change. It signifies that for every one-unit increase in the independent variable (x), the dependent variable (y) is expected to increase by **0.911** units, on average. Since the slope is positive, this confirms the initial visual assessment of a positive correlation.

The **Y-Intercept (b = 4.65)**: The intercept indicates the predicted value of the dependent variable (y) when the independent variable (x) is zero. In practical terms, when the x variable is equal to zero, the average value for the y variable is **4.65**. Note that interpreting the intercept only makes contextual sense if x=0 is a plausible value in your dataset.

Furthermore, the regression equation is a powerful tool for making predictions within the observed range of the data (interpolation). We can use this derived formula to estimate the expected value of y for any given value of x.

For instance, if we wanted to predict the value of y when x is equal to 15, we substitute 15 into the equation:

$$y = 0.911 * (15) + 4.65 = \mathbf{18.315}$$

Therefore, the expected value for y when x equals 15 is 18.315. This predictive capability is the primary reason why fitting a regression line is essential for analytical tasks.

Advanced Trendline Customization Options

While the default linear trendline is sufficient for most basic analyses, Google Sheets offers several options to customize the appearance and functional type of the regression line, tailoring the visualization to specific analytical needs or visual preferences.

Remaining in the **Series** section under the **Customize** tab, you can adjust the visual properties of the line itself:

Color and Thickness: You can change the line color to improve contrast against the background or data points. Similarly, adjusting the line thickness (opacity and dash type) can make the trendline more prominent or subtle, depending on your presentation requirements.

Type Selection: Although we used the default **Linear** type for basic regression, Sheets supports other model types. If your scatterplot suggests a non-linear relationship (e.g., a curve), you might explore options such as **Exponential**, **Polynomial**, or **Moving Average**. Choosing the correct model type is vital; fitting a linear line to inherently non-linear data will result in inaccurate predictions and a low R-squared value.

R-Squared Formatting: Ensure the R-squared value is legible. You can adjust the font size and formatting of the label that displays the equation and R-squared value, improving the overall clarity of the statistical output on the chart.

Effective customization ensures that the data visualization is not only statistically sound but also aesthetically clear and professional, maximizing the impact of your findings when shared with an audience.

Alternative Methods: Using the LINEST Function

While the Chart Editor method is the fastest way to visually overlay a regression line, Google Sheets also provides dedicated functions for advanced users who need the raw coefficients or predictive confidence intervals without generating a chart. The primary function for calculating linear regression statistics is **LINEST**.

The **LINEST** function returns an array of statistics about the relationship between two datasets, including the slope, intercept, standard errors, R-squared value, and degrees of freedom. This allows for a deeper, non-visual statistical analysis of the data.

To use **LINEST**, you must specify the known Y values and known X values. For our example data (Y in B2:B16, X in A2:A16), a basic formula to find the slope and intercept would be:

```
=LINEST(B2:B16, A2:A16, TRUE, FALSE)
```

The **TRUE** argument enforces the calculation of the intercept, and the **FALSE** argument tells the function not to return additional statistical information. The output will spill into two cells, providing the slope (0.911) and the intercept (4.65), confirming the values obtained graphically via the trendline feature.

Using **LINEST** is essential when you need to integrate the regression parameters directly into complex formulas or dashboard calculations, bypassing the need to read the values off the chart image.

Conclusion and Next Steps for Google Sheets Analysis

Successfully adding a regression line to a scatterplot in Google Sheets transforms a simple visualization into a powerful analytical tool. This process, spanning data entry to chart customization, provides both a visual confirmation of the relationship between two variables and the precise mathematical model (the equation) needed for forecasting and deeper statistical inference.

The steps are highly replicable and fundamental for any data analysis performed within the Google Sheets environment:

Ensure data is structured correctly in two adjacent columns.

Insert a **Scatter chart** via the **Insert** menu.

Navigate to the **Customize** tab and select **Series**.

Check the **Trendline** box and choose the **Linear** type.

Display the **Equation** and **Show R²** for complete statistical transparency.

Mastering this technique is a cornerstone of effective data visualization, enabling you to clearly communicate the existence, strength, and direction of correlation in your datasets. For those seeking to deepen their mastery, the following tutorials explain how to perform other common tasks in Google Sheets and leverage its advanced statistical capabilities.

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