

# How to graph trigonometric functions with Excel

Want to graph a trigonometric function but don't know where to start? Microsoft Excel can help you. Here's how to plot/graph a trigonometric function using Excel.



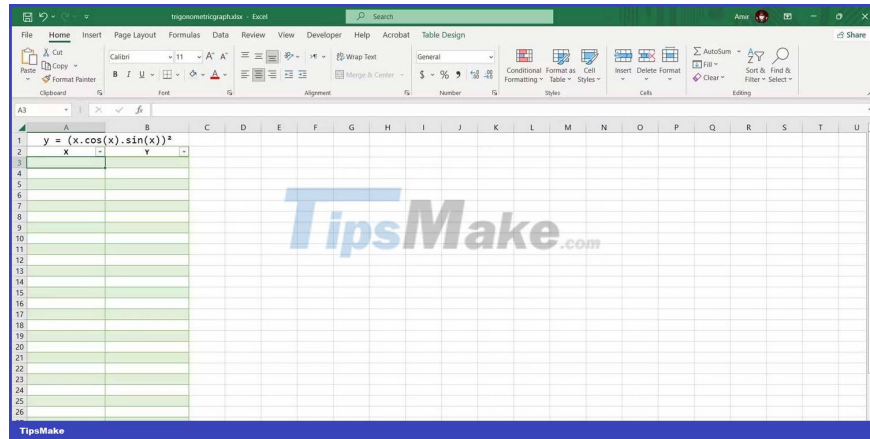
To graph an equation in Excel, you need to create axes for the X and y values. The great thing about this is that Microsoft Excel has support for trigonometric functions.

All you need to do here is create a table of data with X values, then write an Excel formula to automatically calculate the values for column Y. When the data table is ready, you can create a chart. Excel to graph equations.

Now let's look at the example of plotting the equation  $y = (x \cdot \cos(x) \cdot \sin(x))^2$  in Excel below so that it can be easily visualized how to do it.

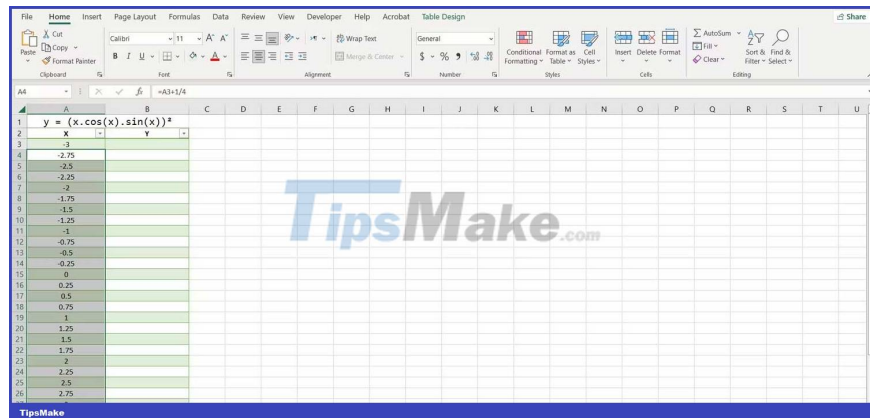
## 1. Enter the value X

A graph/chart always needs X and Y values. You can enter the domain you want to plot in the X value, then calculate the Y value using the formula in the next step. This is a good idea to create a data table because it allows you to run Excel's autofill feature.



The smaller the increment between your X values, the more accurate your graph will be. We will increase each X value by  $1/4$  in this table. Here's how you can automatically enter X values:

1. Enter the first value in a cell. Here, enter **-3** in cell **A3** .
2. Select the box below. In the example is **A4** .
3. In the formula bar, enter:  $=A3 + 1 / 4$
4. Press **Enter** .
5. Drag the fill bar and drop it into the boxes below.



Excel will now fill in all other X values. The benefit of using formulas to enter values ??is that you can now quickly change them by editing the first value or editing the formula.

## 2. Create a formula to calculate the value of Y

You can calculate the Y value by translating the trigonometric equation into the language of Excel.

When creating formulas, you can use carets to indicate powers. Use parentheses when necessary to indicate the order of operators.

1. Select the first cell where you want the Y value to be calculated. That's B3 in this case.

2. Go to the formula bar and enter:  $= (A3 * \cos(A3) * \sin(A3)) ^ 2$

3. Press **Enter** .

Excel will now calculate all Y values in the table. Excel's trigonometric functions use angular units, so this formula will take it as the unit for X values. If you want the X axis to be in pi - radians, you can multiply the cell reference by the number pi. using the PI function in Excel.

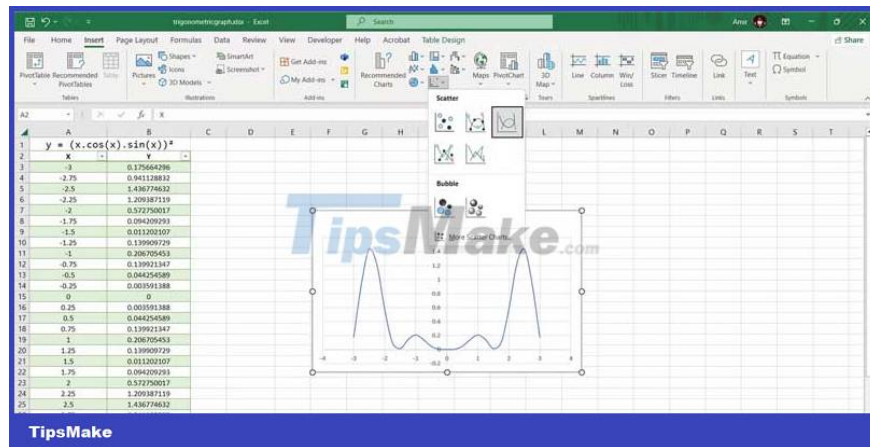
$= (A3 * \text{PI}() * \cos(A3 * \text{PI}()) * \sin(A3 * \text{PI}())) ^ 2$

This formula will output the Y value for the same trigonometric equation but the values will be in pi-radian measure.

### 3. Create a Scatter Chart

This is the best way to graph mathematical functions in Excel. Since you already have the X and Y values, you can plot the function with one click:

1. Select the table containing the X and Y values.
2. Go to the **Insert** tab .
3. In the **Charts** section , click **Scatter** , then select **Scatter with Smooth Lines** .



It's done! Now you can check the graph to better understand the meaning of the equation. This is the last step if you are looking for a quick visualization, but if you want to present it graphically, you can completely customize the Excel chart to plot the correct graph of the trigonometric equation.

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