

# Answers: Graphs and Gradients in Excel

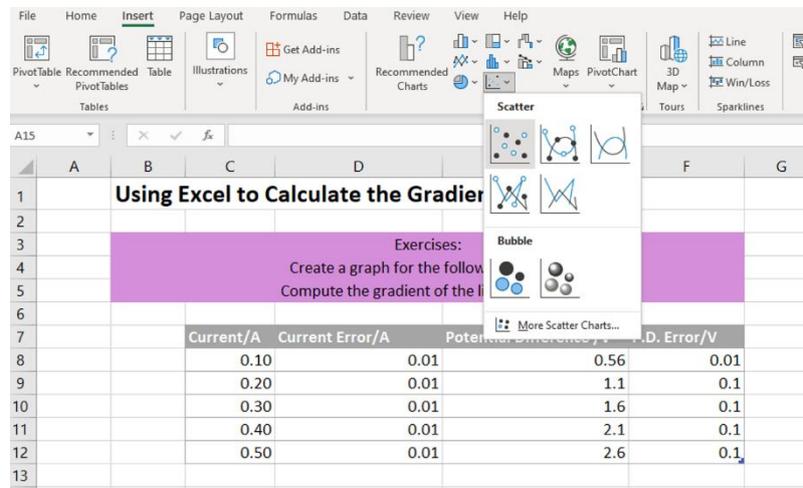
Here's a step-by-step guide in case you needed a little help!

## Contents:

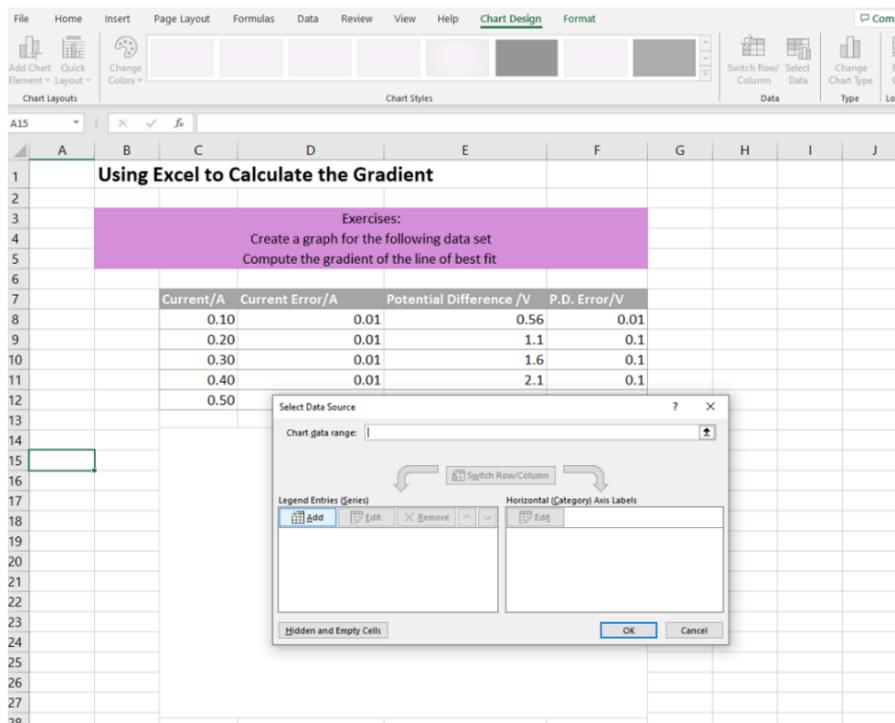
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## Graphs:

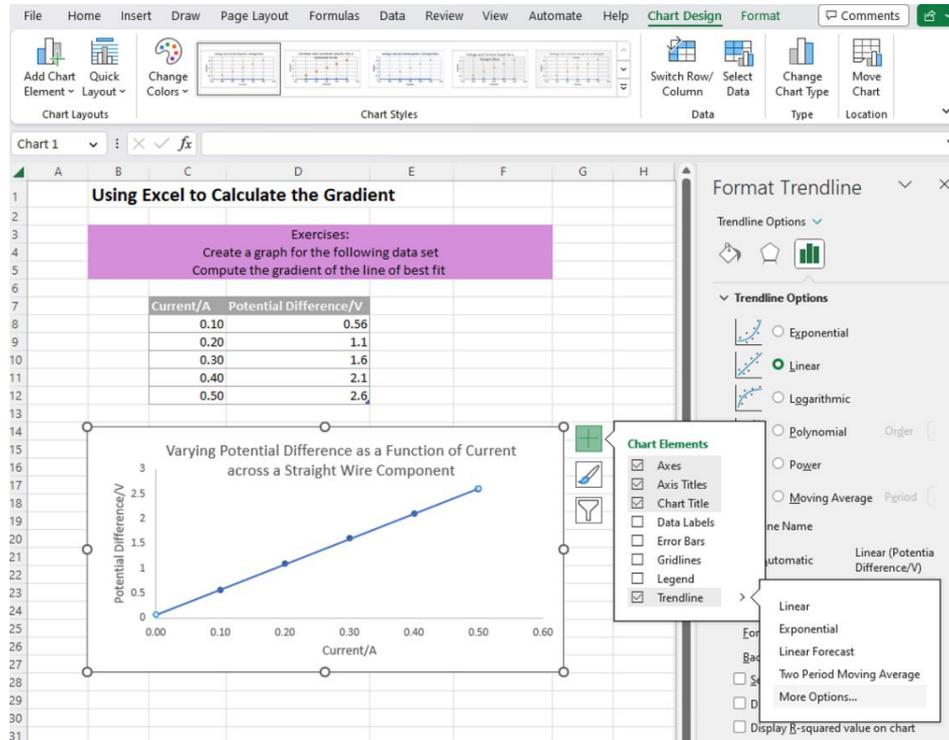
1. You can create a graph by clicking Insert. Scatter graphs are commonly used in physics.



2. To add data to your graph, click Chart Design >> Select Data



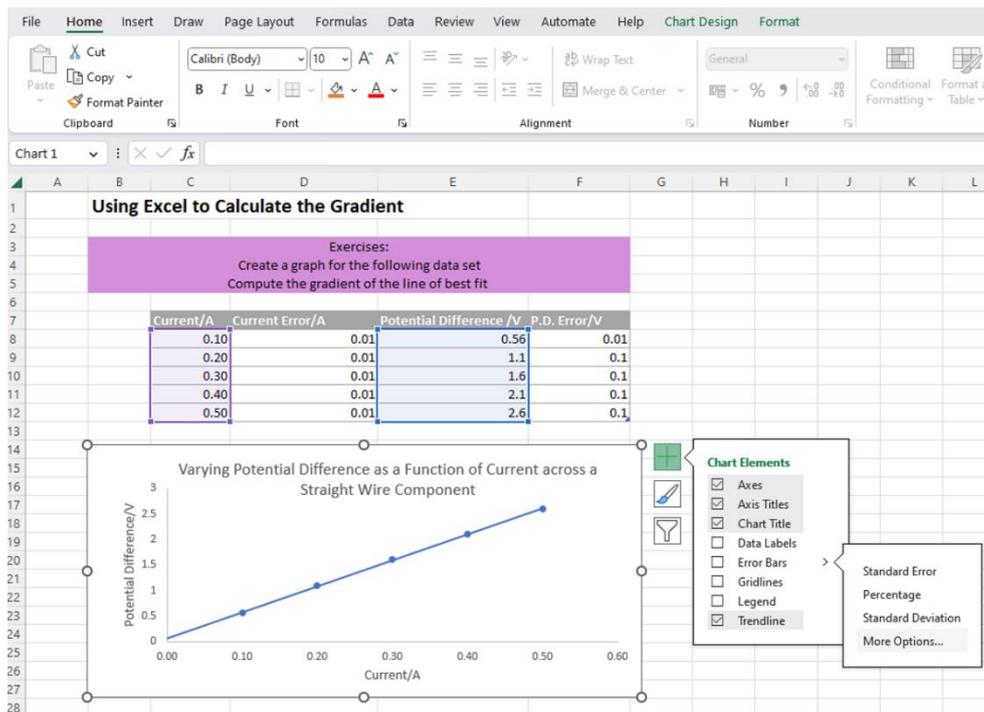
- To add more details to your graph, you can access Chart Elements via the + icon. This allows you to add an Axis Title, Error Bars, Trendline, etc. You can access further design features by clicking More Options...



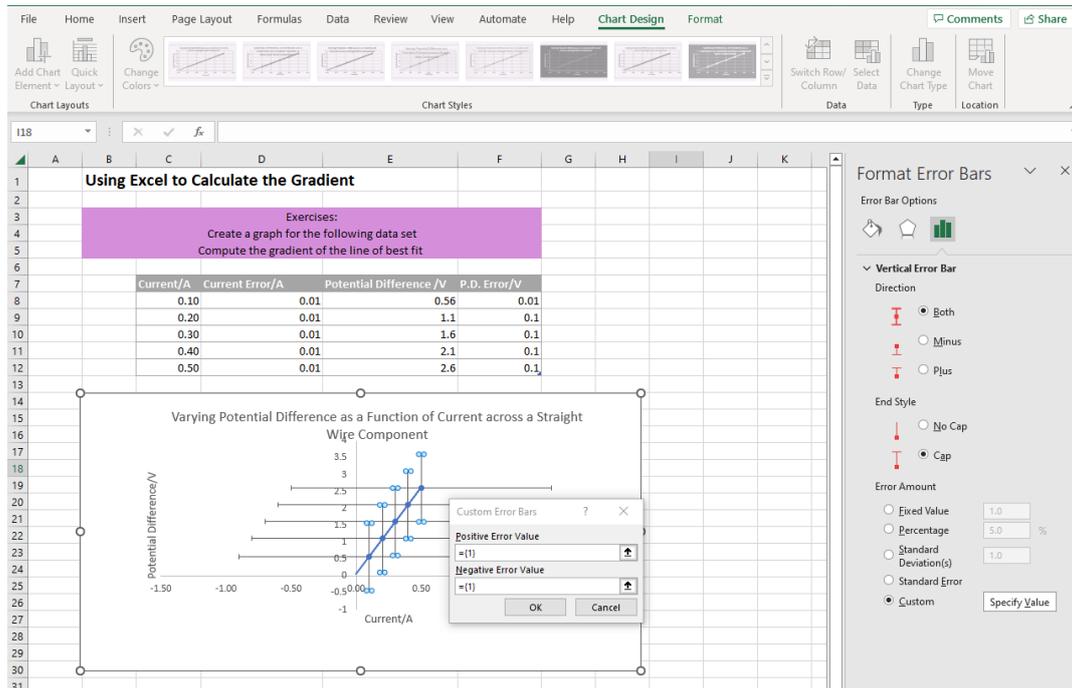
## Adding Error Bars:

Errors are very important in physics so your graphs should show the errors associated with each variable! You can add errors from your table as follows:

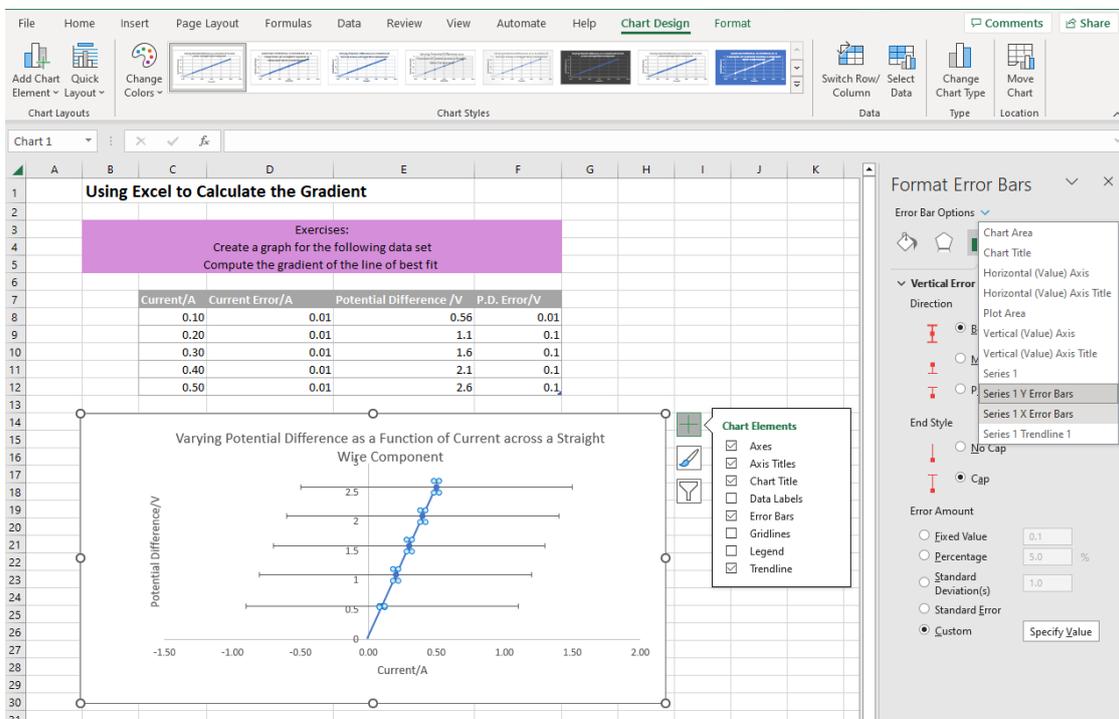
- Chart Elements (+ symbol) << Error Bars << More Options

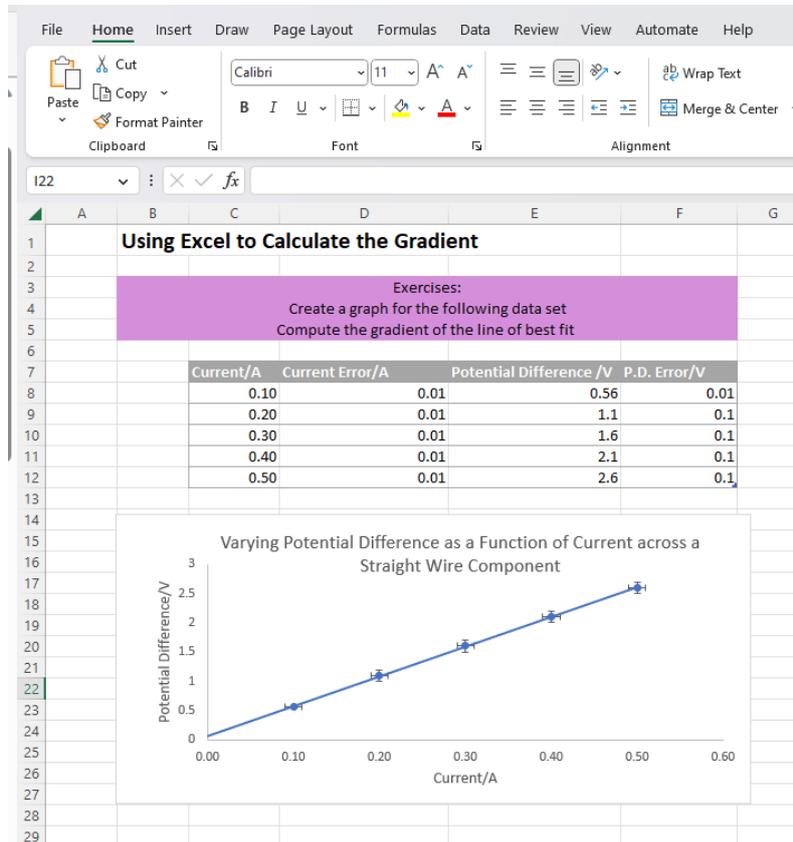


- You can add your own values by clicking “Specific Values” under “Custom”. This allows you to input the positive and negative error values.



- To access the other axis, click on the “Error Bar Options” drop down. This will provide more customisation options, including both the X and Y Error Bars

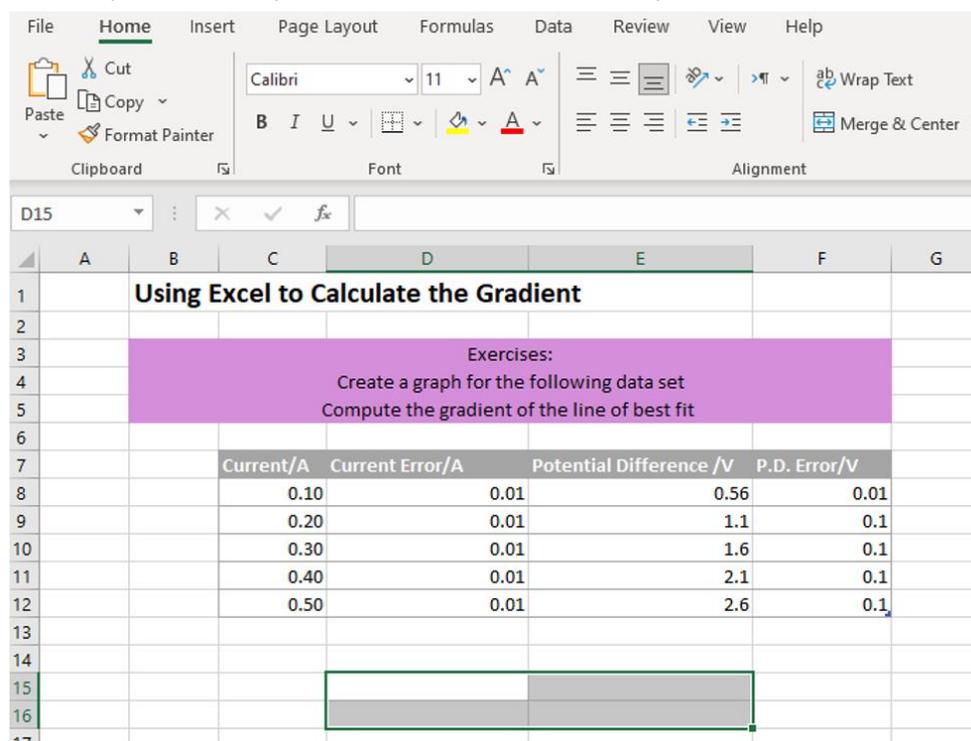




Now that you have a nice graph it's time to calculate the gradient!

## LINEST:

1. Select 4 squares where you would like the results to be presented.



- Type =LINEST([select all the y values], [select all the x values], 1, 1)

The screenshot shows the Excel interface with the formula bar containing `=LINEST(E8:E12,C8:C12,1,1)`. The worksheet contains the following data table:

Current/A	Current Error/A	Potential Difference /V	P.D. Error/V
0.10	0.01	0.56	0.01
0.20	0.01	1.1	0.1
0.30	0.01	1.6	0.1
0.40	0.01	2.1	0.1
0.50	0.01	2.6	0.1

The formula bar also shows the syntax: `LINEST(known_ys, [known_xs], [const], [stats])`.

- IMPORTANT:** then press Ctrl + Shift + Enter.

The screenshot shows the results of the LINEST function in cells E15 and E16. Arrows point from labels to the corresponding values:

- Gradient Value: 5.08
- Gradient Error: 0.046188022
- y-intercept Value: 0.068
- y-intercept Error: 0.015318834