

Enter your data in Excel and then select this range as shown

|    | A                 | B        | C | D |
|----|-------------------|----------|---|---|
| 1  | Experimental Data |          |   |   |
| 2  |                   |          |   |   |
| 3  | <b>t</b>          | <b>x</b> |   |   |
| 4  | 0.00              | 0.00     |   |   |
| 5  | 0.10              | 1.05     |   |   |
| 6  | 0.20              | 3.98     |   |   |
| 7  | 0.30              | 9.02     |   |   |
| 8  | 0.40              | 15.90    |   |   |
| 9  |                   |          |   |   |
| 10 |                   |          |   |   |

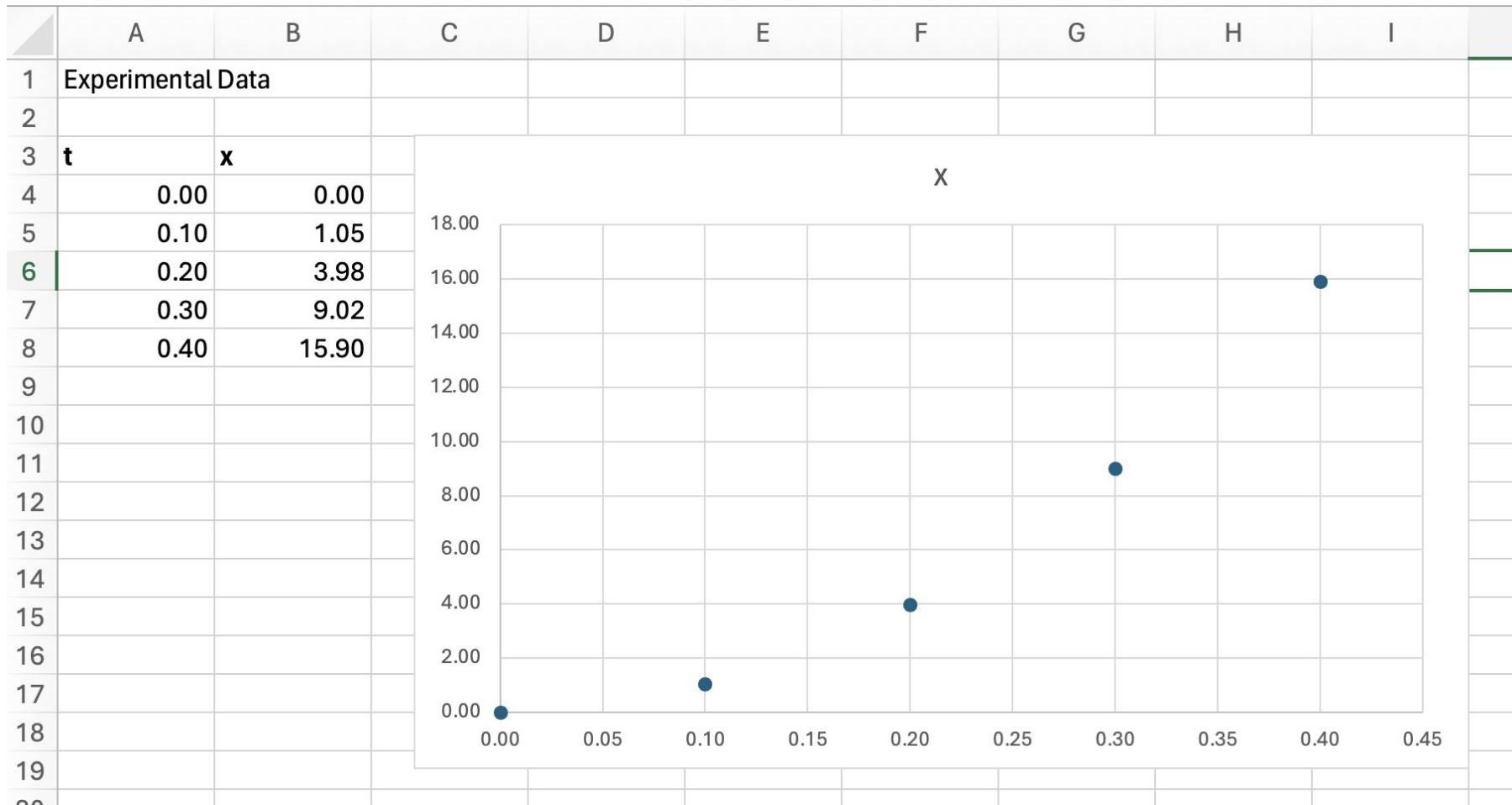
|   | A                 | B        |  |
|---|-------------------|----------|--|
| 1 | Experimental Data |          |  |
| 2 |                   |          |  |
| 3 | <b>t</b>          | <b>x</b> |  |
| 4 | 0.00              | 0.00     |  |
| 5 | 0.10              | 1.05     |  |
| 6 | 0.20              | 3.98     |  |
| 7 | 0.30              | 9.02     |  |
| 8 | 0.40              | 15.90    |  |
| 9 |                   |          |  |

## Insert a scatter plot

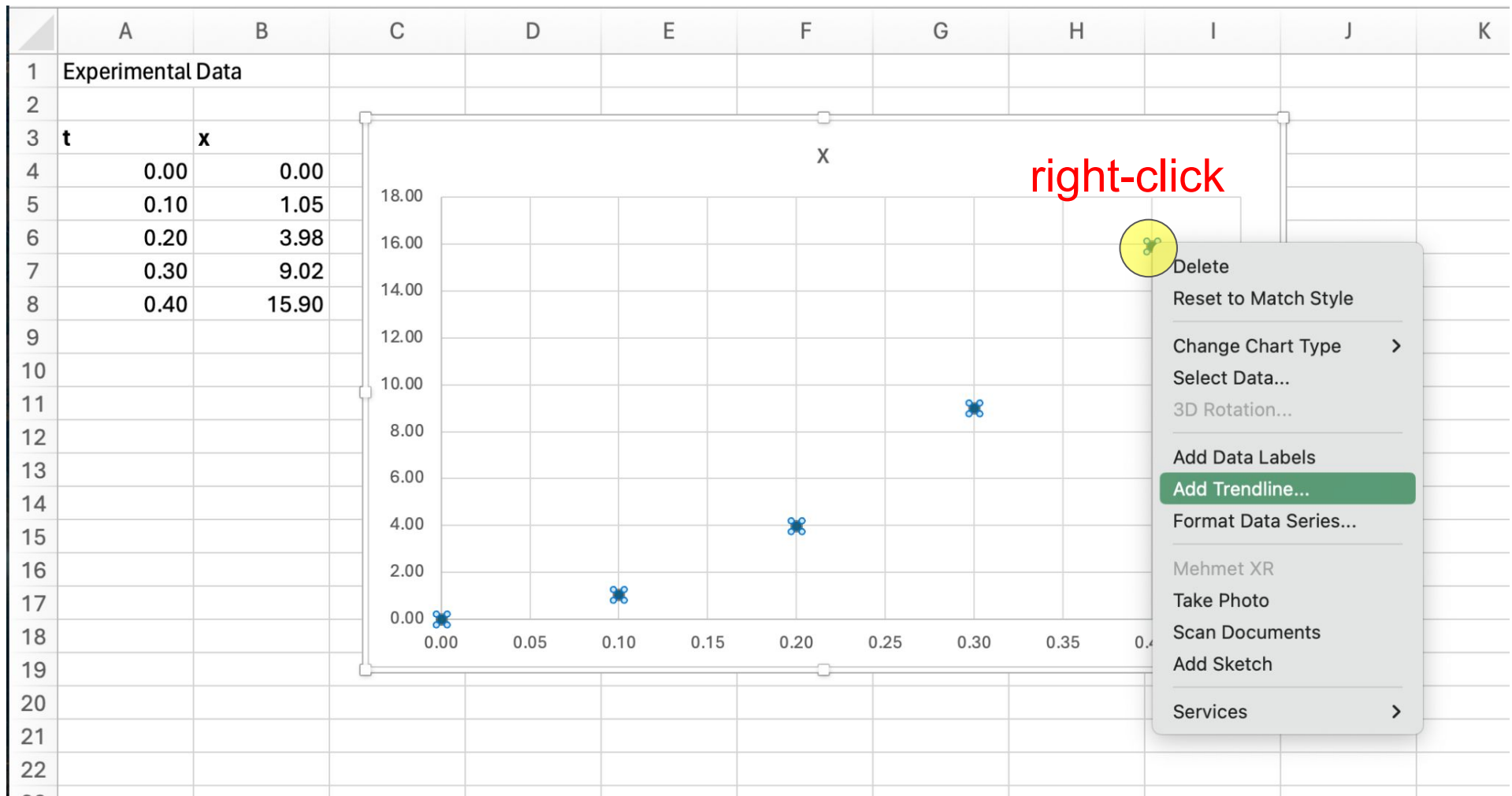
The screenshot shows the Microsoft Excel interface with the **Insert** tab selected. The ribbon includes options for Pivot Table, Recommended Pivot Tables, Table, From Picture, Pictures, Shapes, Icons, 3D Models, SmartArt, Screenshot, Recommended Charts, and Maps. A scatter plot selection menu is open, showing the **Scatter** option highlighted. The spreadsheet data is as follows:

|    | A                 | B        | C | D | E | F |
|----|-------------------|----------|---|---|---|---|
| 1  | Experimental Data |          |   |   |   |   |
| 2  |                   |          |   |   |   |   |
| 3  | <b>t</b>          | <b>x</b> |   |   |   |   |
| 4  | 0.00              | 0.00     |   |   |   |   |
| 5  | 0.10              | 1.05     |   |   |   |   |
| 6  | 0.20              | 3.98     |   |   |   |   |
| 7  | 0.30              | 9.02     |   |   |   |   |
| 8  | 0.40              | 15.90    |   |   |   |   |
| 9  |                   |          |   |   |   |   |
| 10 |                   |          |   |   |   |   |

You should get something like this



Right click one of the data points and click on **Add Trendline**



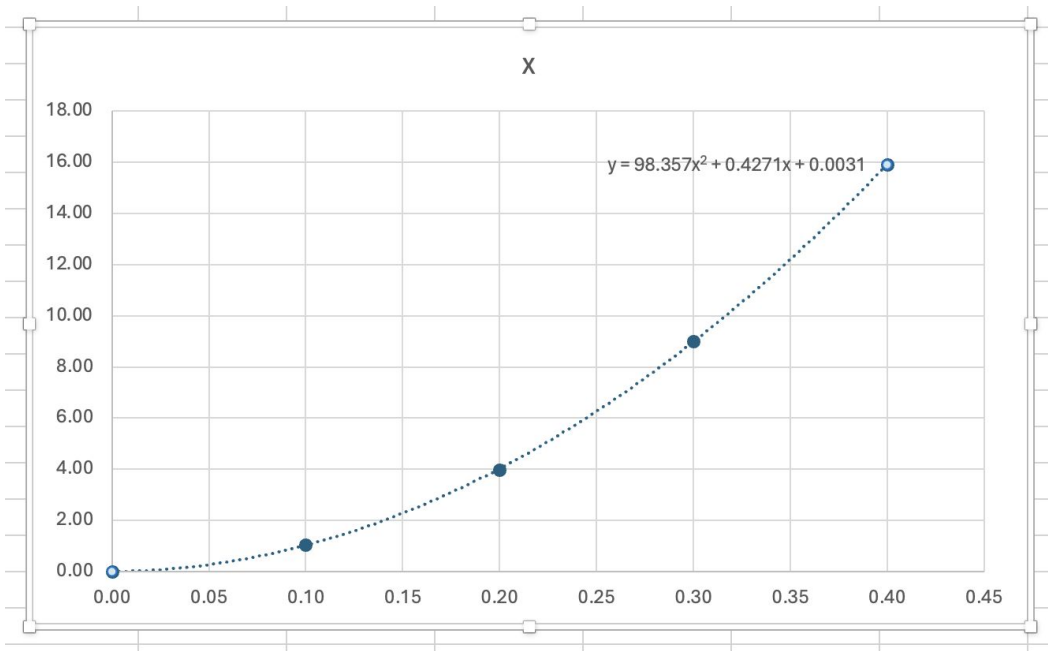
# Plotting in Excel

25 Apr 2024

Format the trendline as shown on the right

- Polynomial 2
- Show equation

It should now look like this



**Format Trendline**

**Trendline Options**

- Exponential
- Linear
- Logarithmic
- Polynomial **Order** 2
- Power
- Moving Average **Period**

**Trendline Name**

- Automatic Poly. (x)
- Custom

**Forecast**

Forwards 0.0 periods

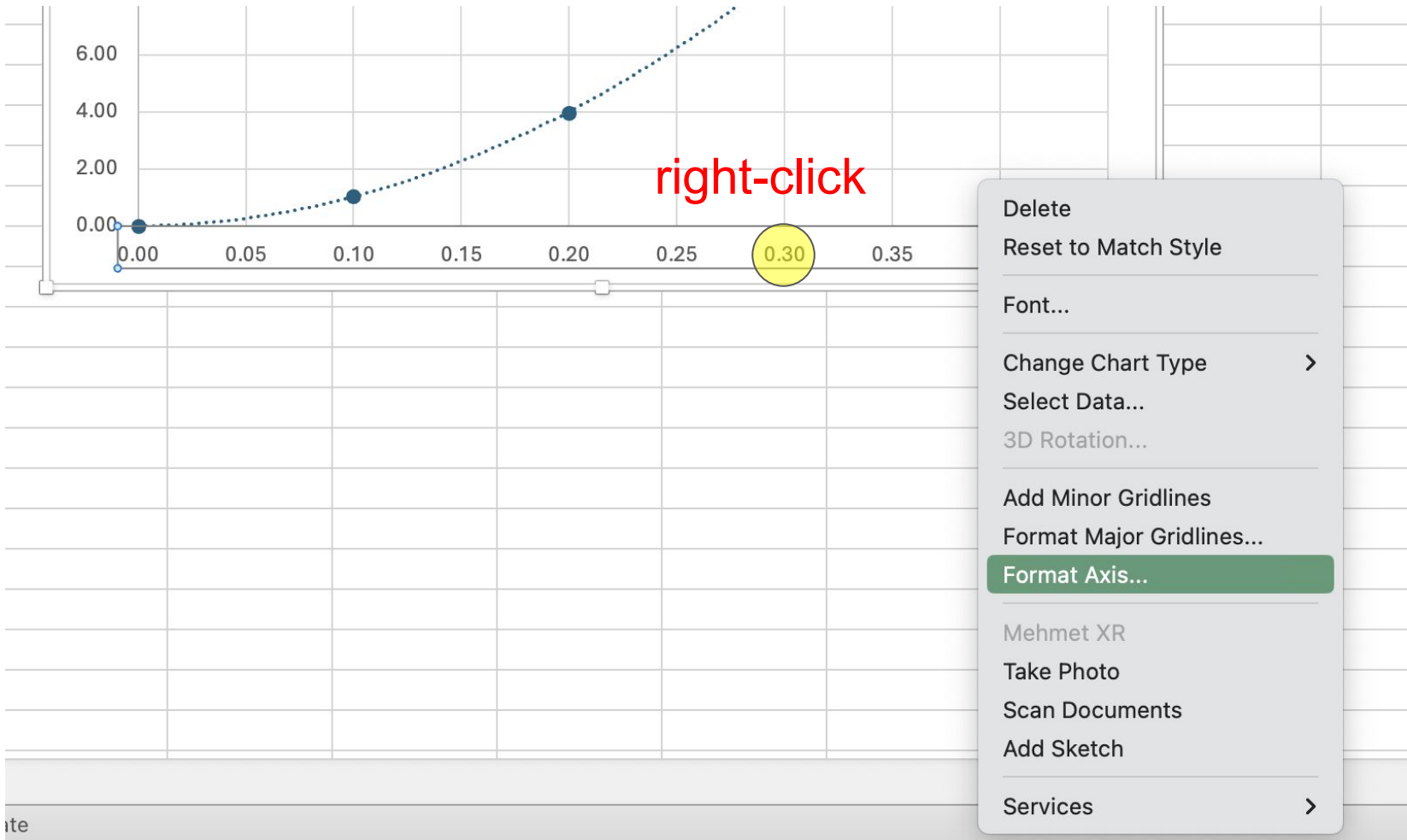
Backwards 0.0 periods

Set Intercept 0.0

Display Equation on chart

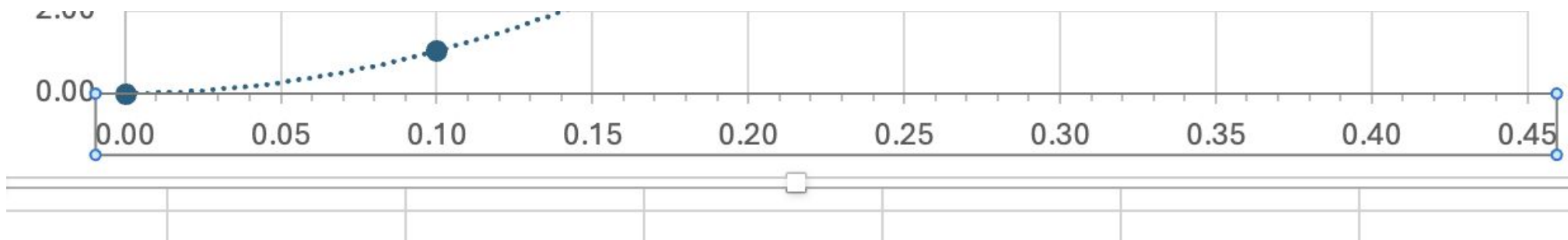
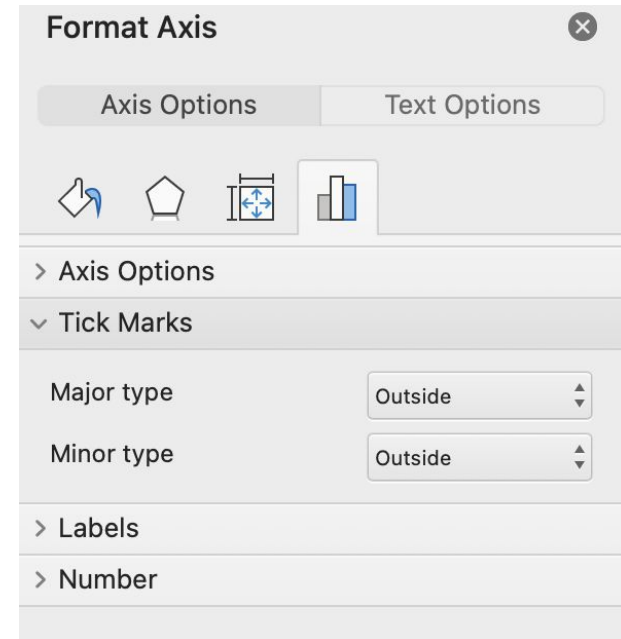
Display R-squared value on chart

Right click on the time axis and select **Format Axis**

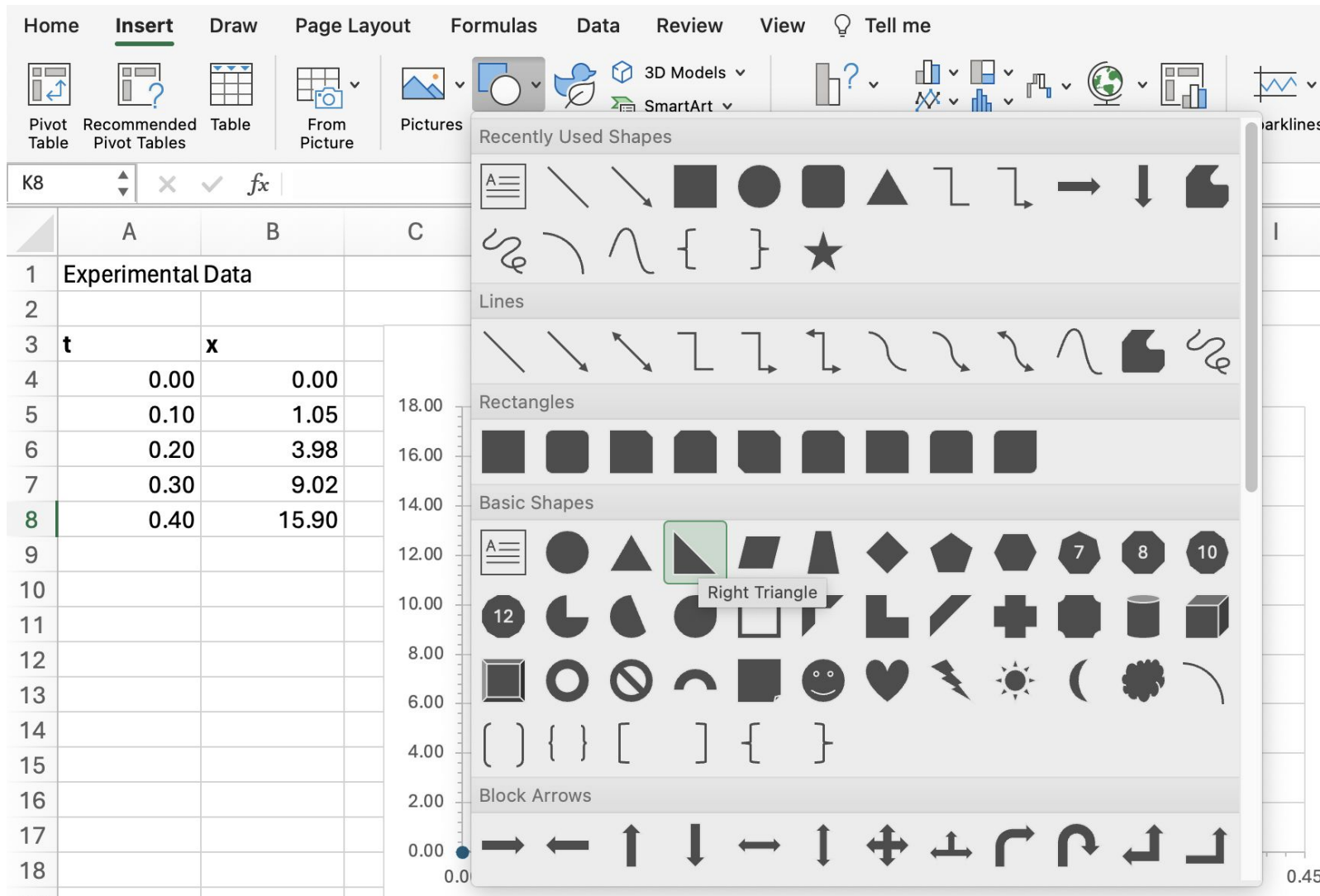


In the **Format Axis** dialog, select Tick Marks for both minor and major tick marks to be outside and you should Get the Tick Marks as shown

Do the same for the x values (vertical axis)



To read the tangent line insert a **triangle** shape and put it in as tangent

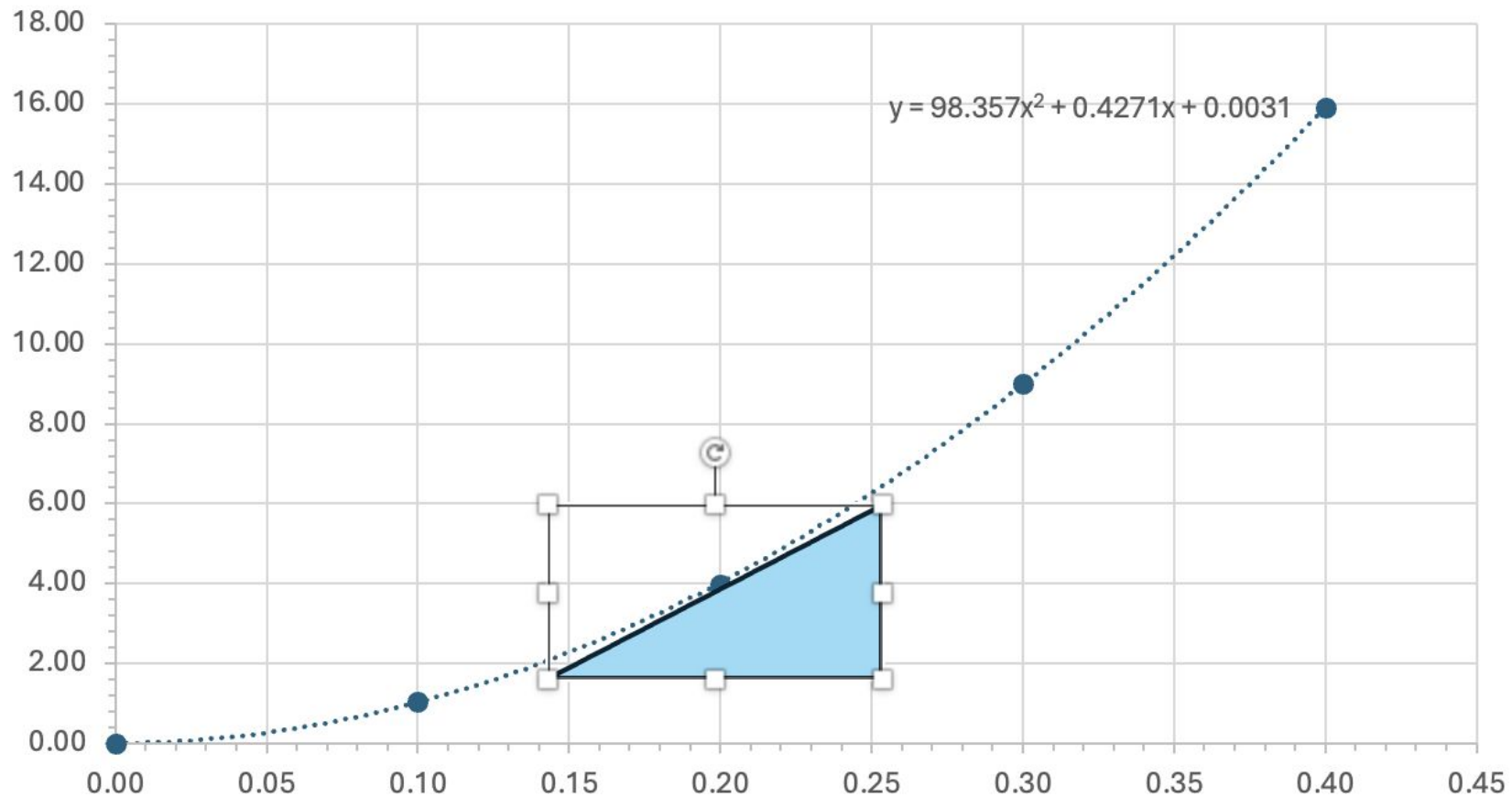




You should have something like shown. You can adjust the position, and the sides of the triangle until you are happy that it's a tangent and it's large enough to be able to be measured.

**Makes sure the triangle is as large as it can be**

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Now move the triangle to the origin. You can read off the t-values and x-values corresponding to the base and height of the triangle. The ratio will be your slope, i.e. tangent. And it will be in the right units.

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