

TREND MODEL

When we view the description for a trend line model, there are several values listed. e.g: Model formula, Model degrees of freedom, Residual degrees of freedom (DF), R-Squared, Standard error, p-value (significance), Analysis of Variance etc.

Although there are many model terms, we will be concentrating on the 2 main terms

R-Squared

p-value (significance)

TREND MODEL

R-Squared:

R-squared is the statistical measure of how well the data fits the linear model.

R-squared value needs to be closer to 1 for a good fit

It is the ratio of the variance of the model's error, or unexplained variance, to the total variance of the data.

p-value:

p-value is the probability value that is associated with the trendline significance.

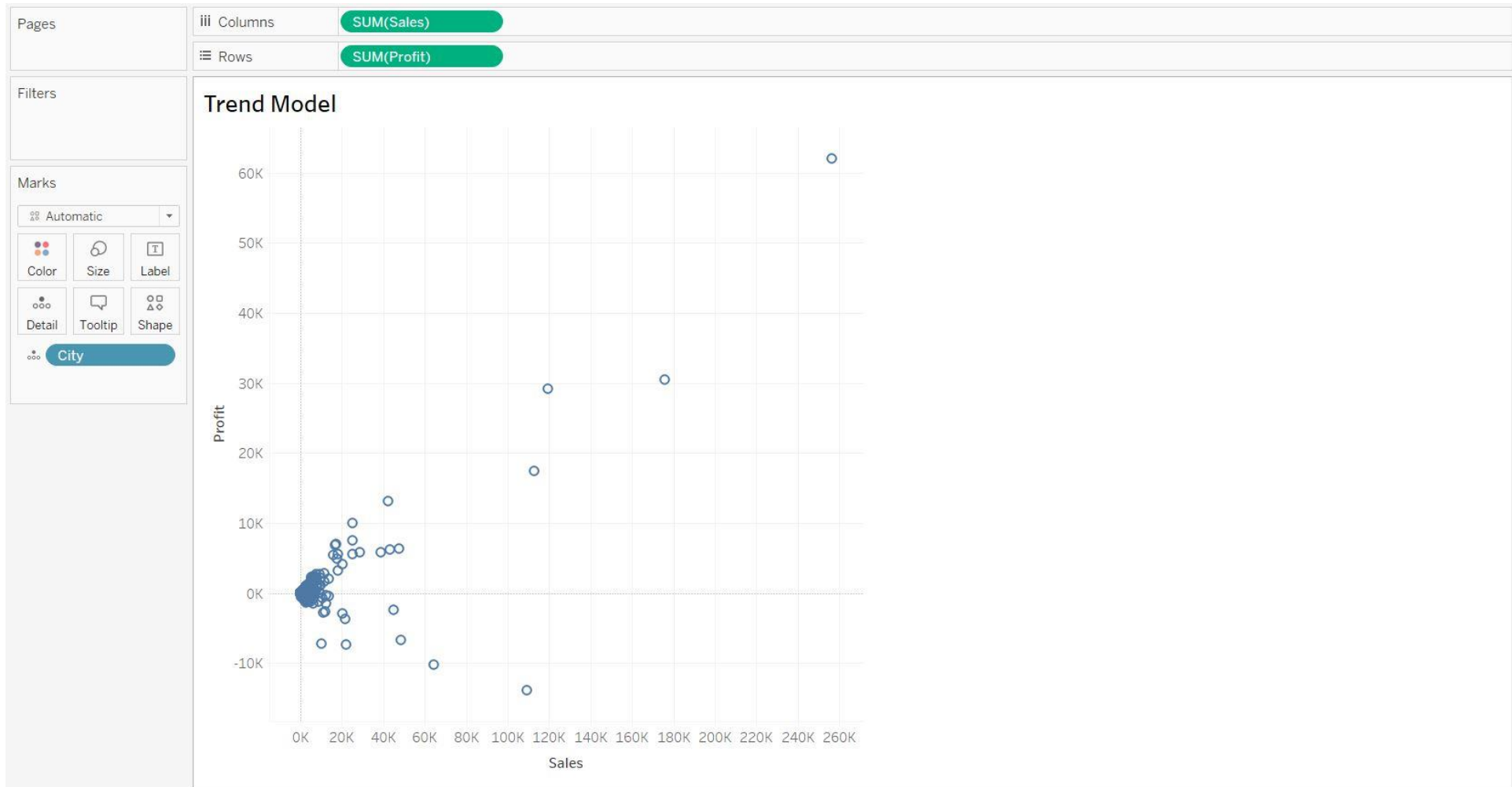
The p-value reports the probability that the equation in the trend line was a result of random chance.

The smaller the p-value, the more significant the model is.

A p-value of 0.05 or less is often considered sufficient

TREND MODEL

STEP 1: Assume that we have a Scatter Plot of **Sales Vs Profit** with **City** in **Detail of Marks** card

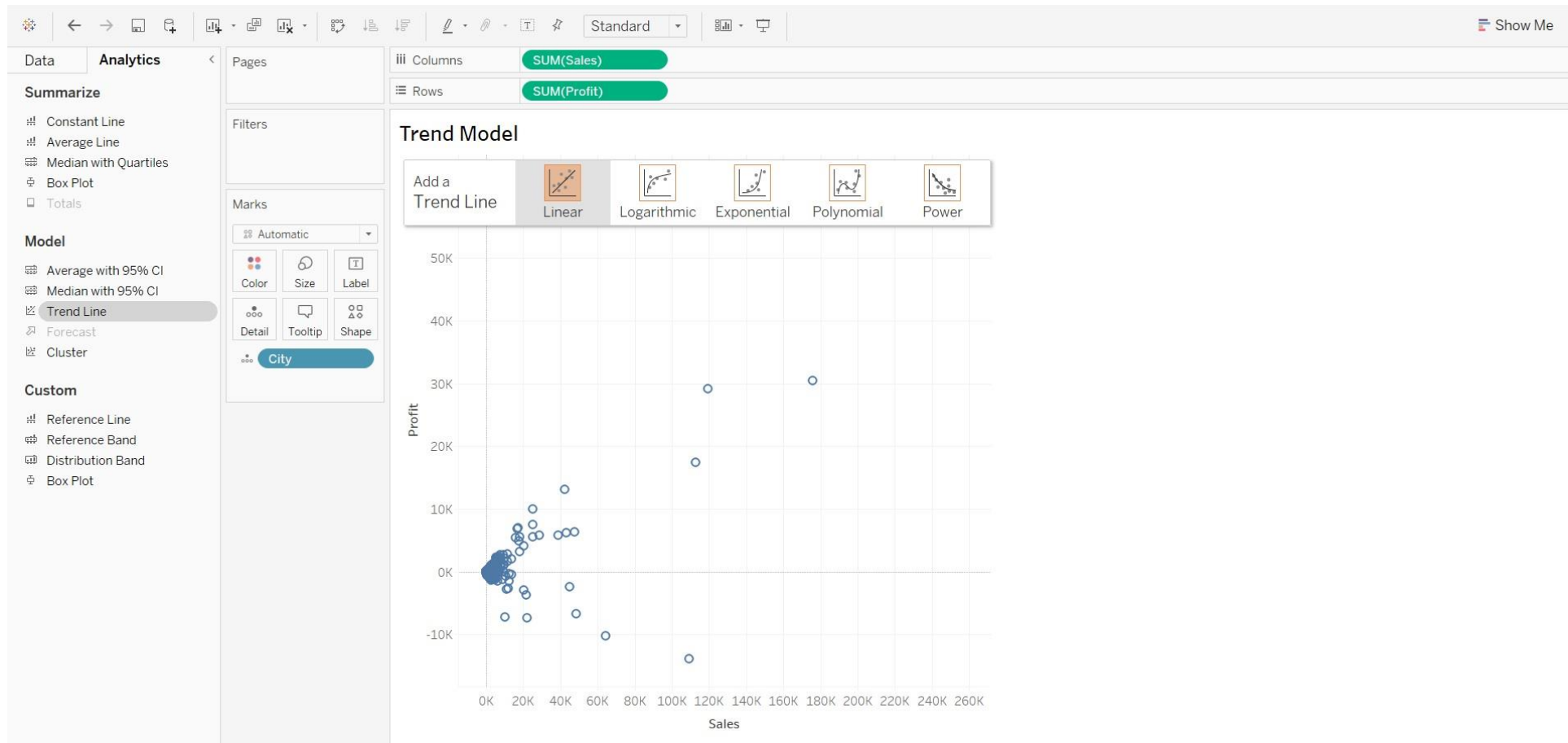


TREND MODEL

STEP 2: Drag **Trend Line** from the **Analytics** pane into the view.

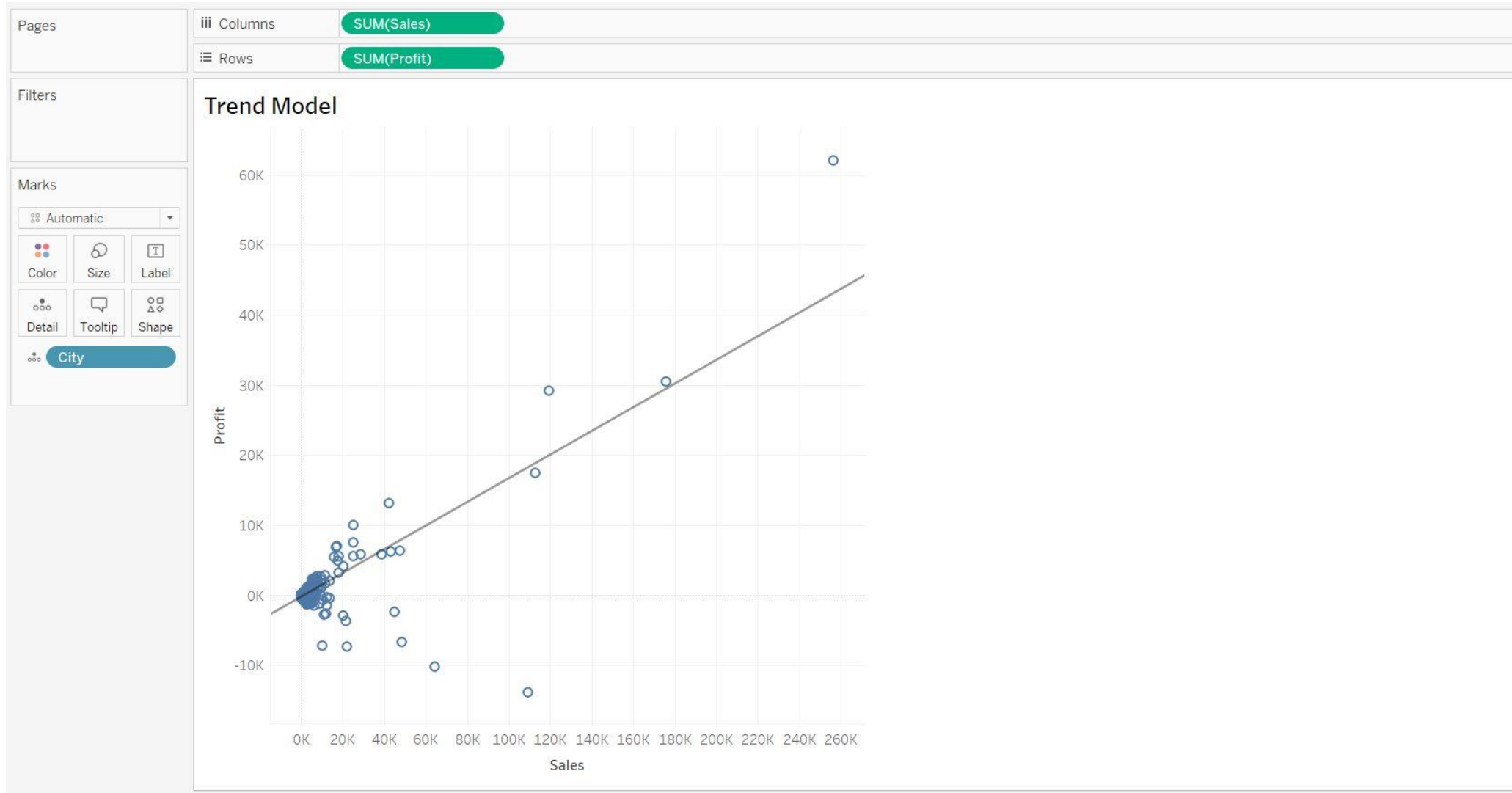
There are many drop target area options: Linear, Logarithmic, Exponential, Polynomial, or Power model types

For this example, we will drop it in **Linear**



TREND MODEL

STEP 3: The added Trend Line is now visible in the view



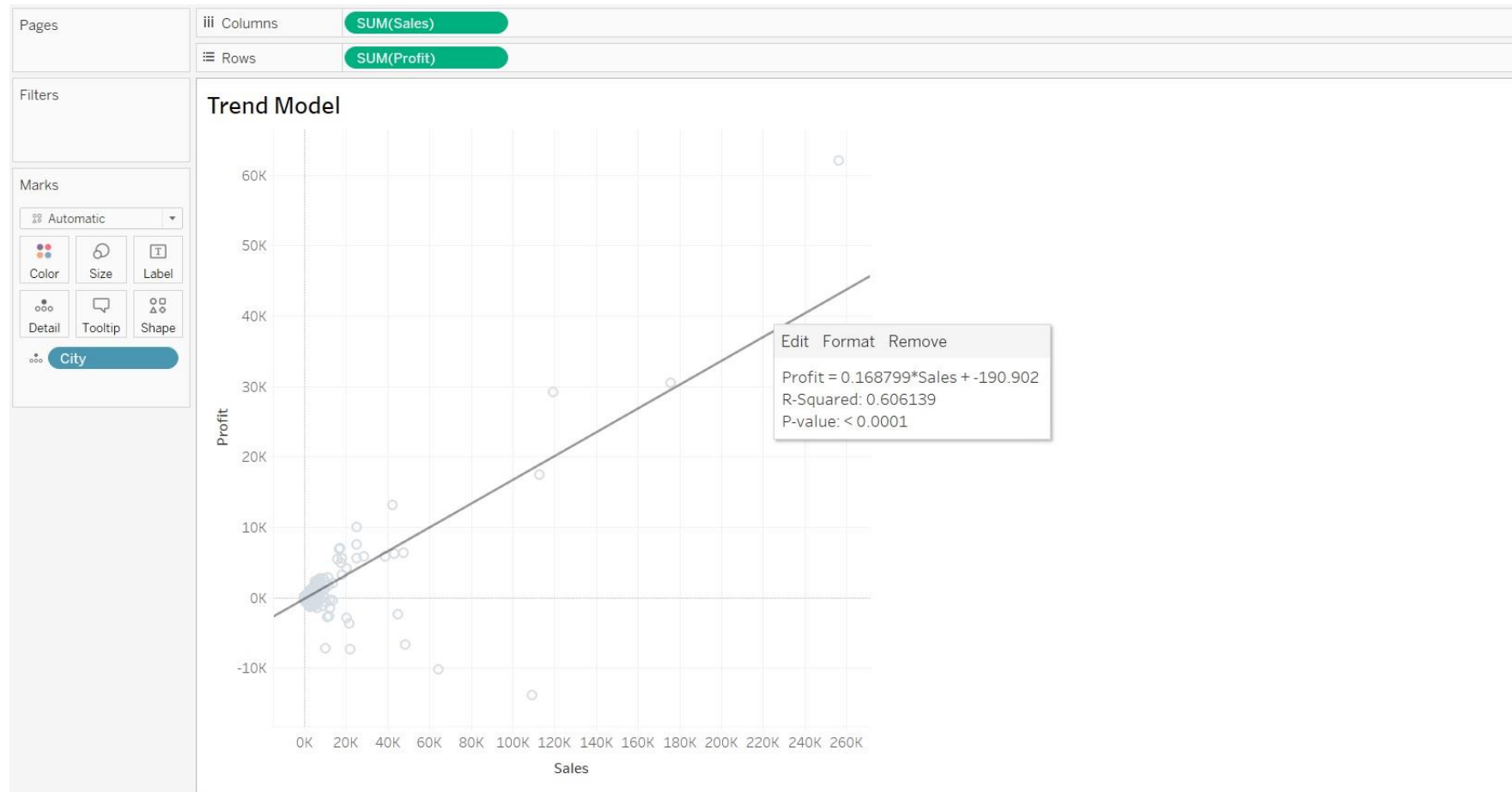
TREND MODEL

STEP 4: Click on the trend line to see its description.

The **Linear Trend Line** has a **R-Squared Value** of 0.606139 and **p-value** < 0.001

Let us try changing the type of Trend Line to see if we get a better R-Squared value

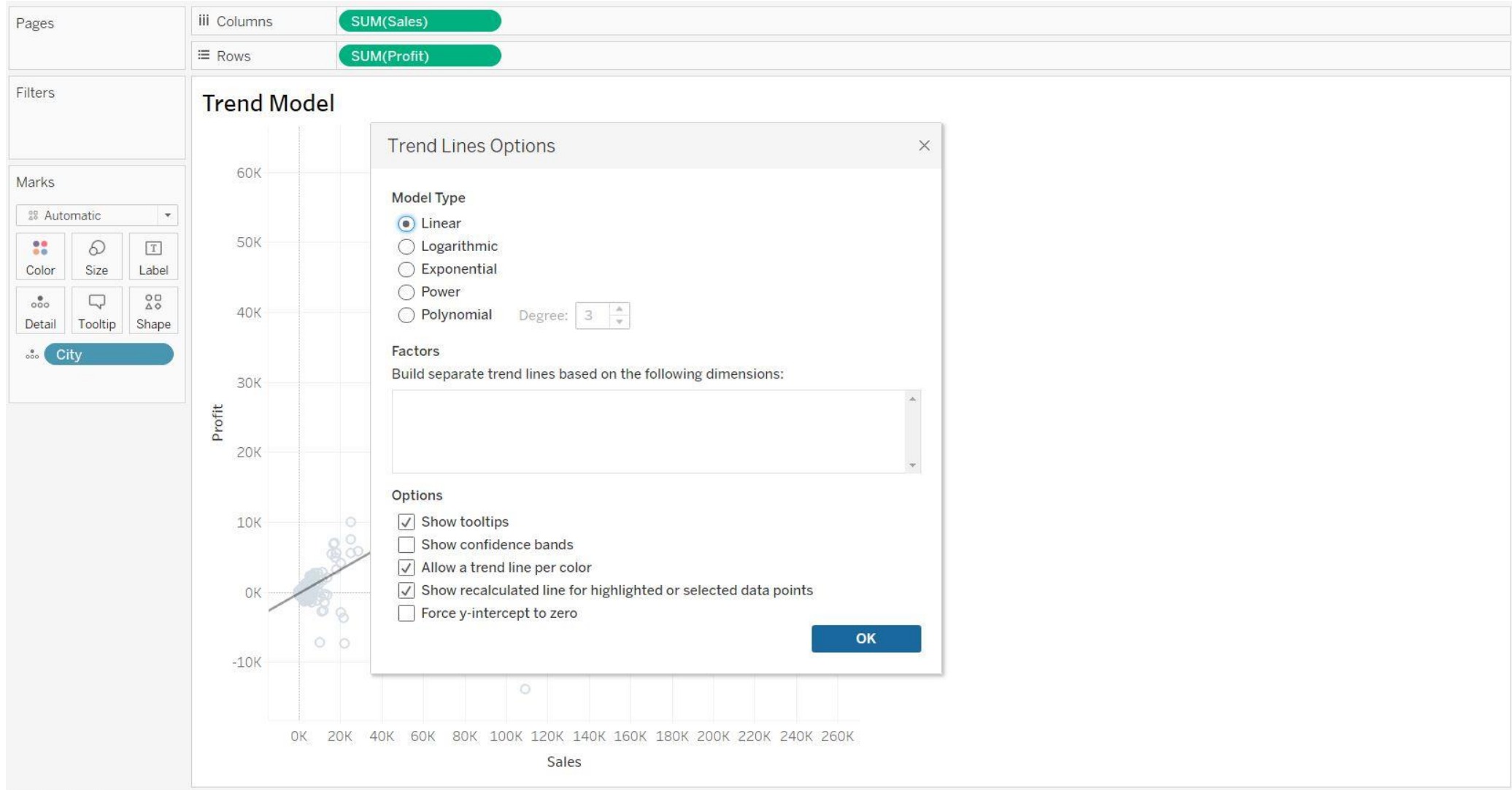
Click on **Edit**



TREND MODEL

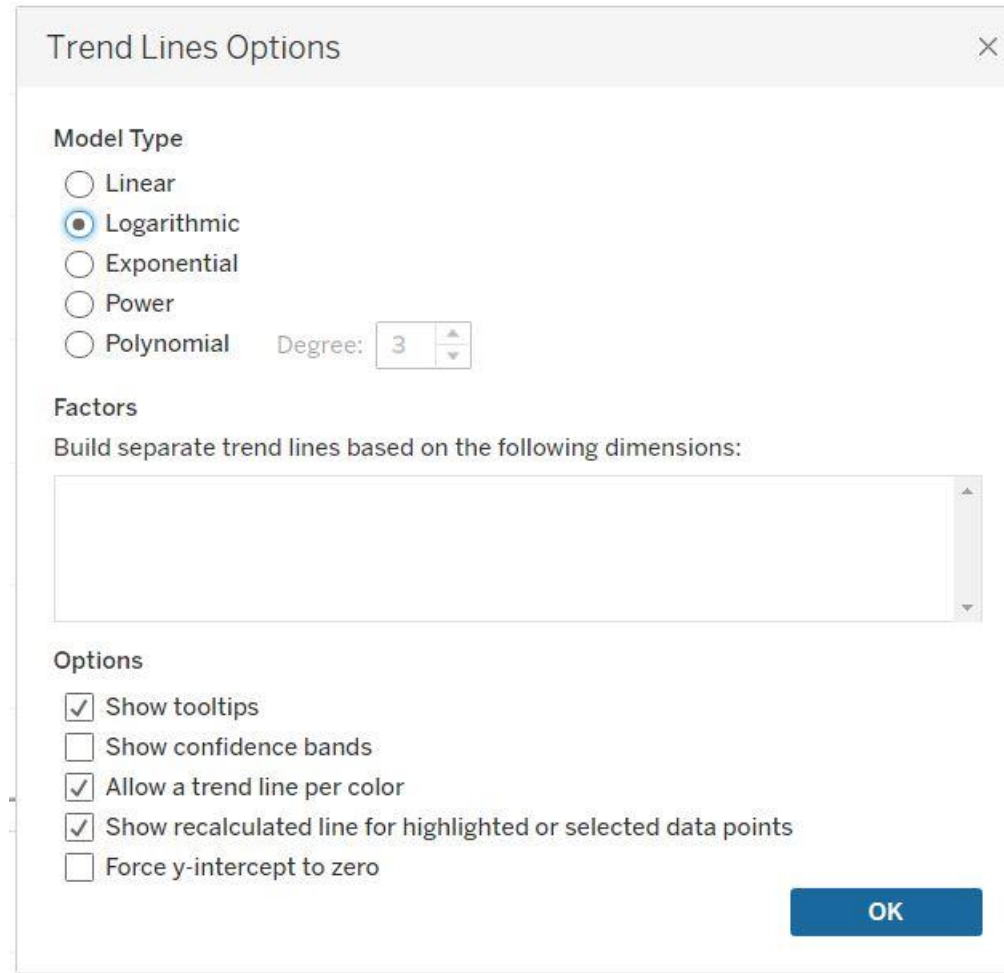
STEP 5: Trend Line Options dialog box opens

Click **OK**



TREND MODEL

STEP 6: Change the Model Type to Logarithmic
Click OK



Trend Lines Options

Model Type

☐ Linear

☒ Logarithmic

☐ Exponential

☐ Power

☐ Polynomial Degree: 3

Factors

Build separate trend lines based on the following dimensions:

Options

☒ Show tooltips

☐ Show confidence bands

☒ Allow a trend line per color

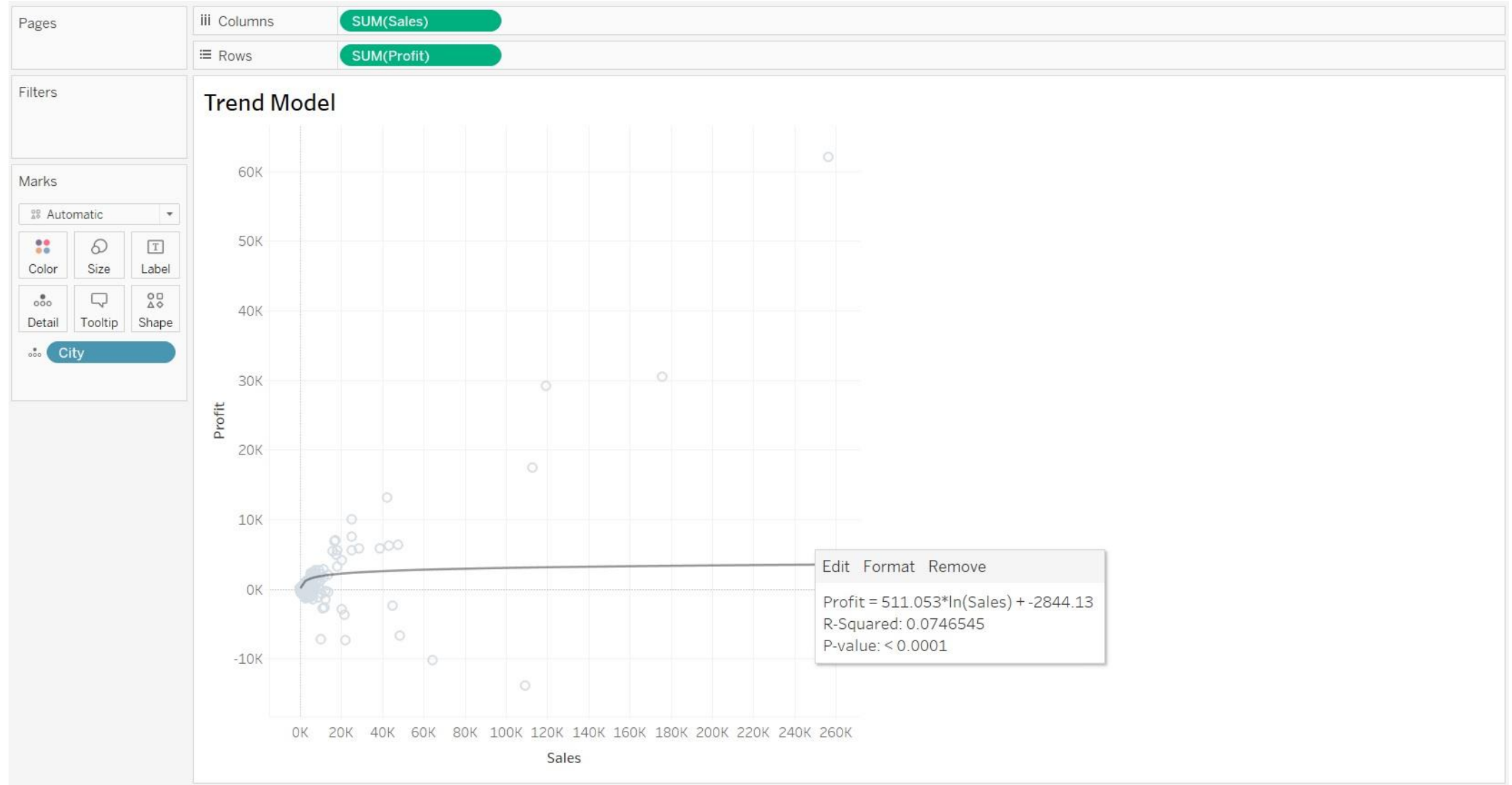
☒ Show recalculated line for highlighted or selected data points

☐ Force y-intercept to zero

OK

TREND MODEL

STEP 7: We observe that **R-Squared value** is lesser for **Logarithmic Trend Line**
Click on the trend line and Click on **Edit**



TREND MODEL

STEP 8: Change the **Model Type** to **Exponential**
Click **OK**

Trend Lines Options

Model Type

- ☐ Linear
- ☐ Logarithmic
- ☒ Exponential
- ☐ Power
- ☐ Polynomial Degree:

Factors

Build separate trend lines based on the following dimensions:

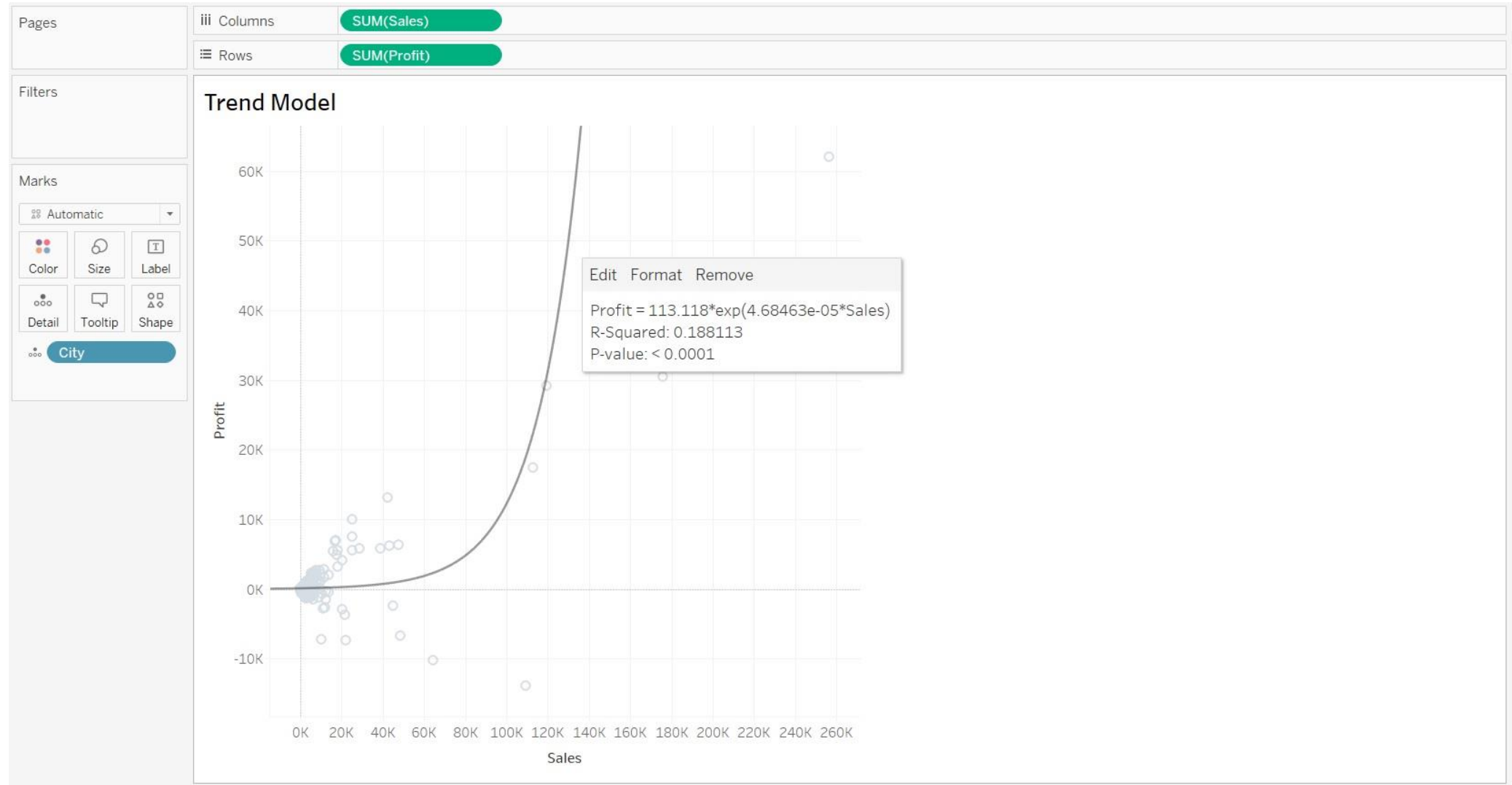
Options

- ☒ Show tooltips
- ☐ Show confidence bands
- ☒ Allow a trend line per color
- ☒ Show recalculated line for highlighted or selected data points
- ☐ Force y-intercept to zero

OK

TREND MODEL

STEP 9: We observe that **R-Squared value** is also less for **Exponential Trend Line**
Click on the trend line and Click on **Edit**



TREND MODEL

STEP 10: Change the **Model Type** to **Power**
Click **OK**

Trend Lines Options

Model Type

- ☐ Linear
- ☐ Logarithmic
- ☐ Exponential
- ☒ Power
- ☐ Polynomial Degree: 3

Factors

Build separate trend lines based on the following dimensions:

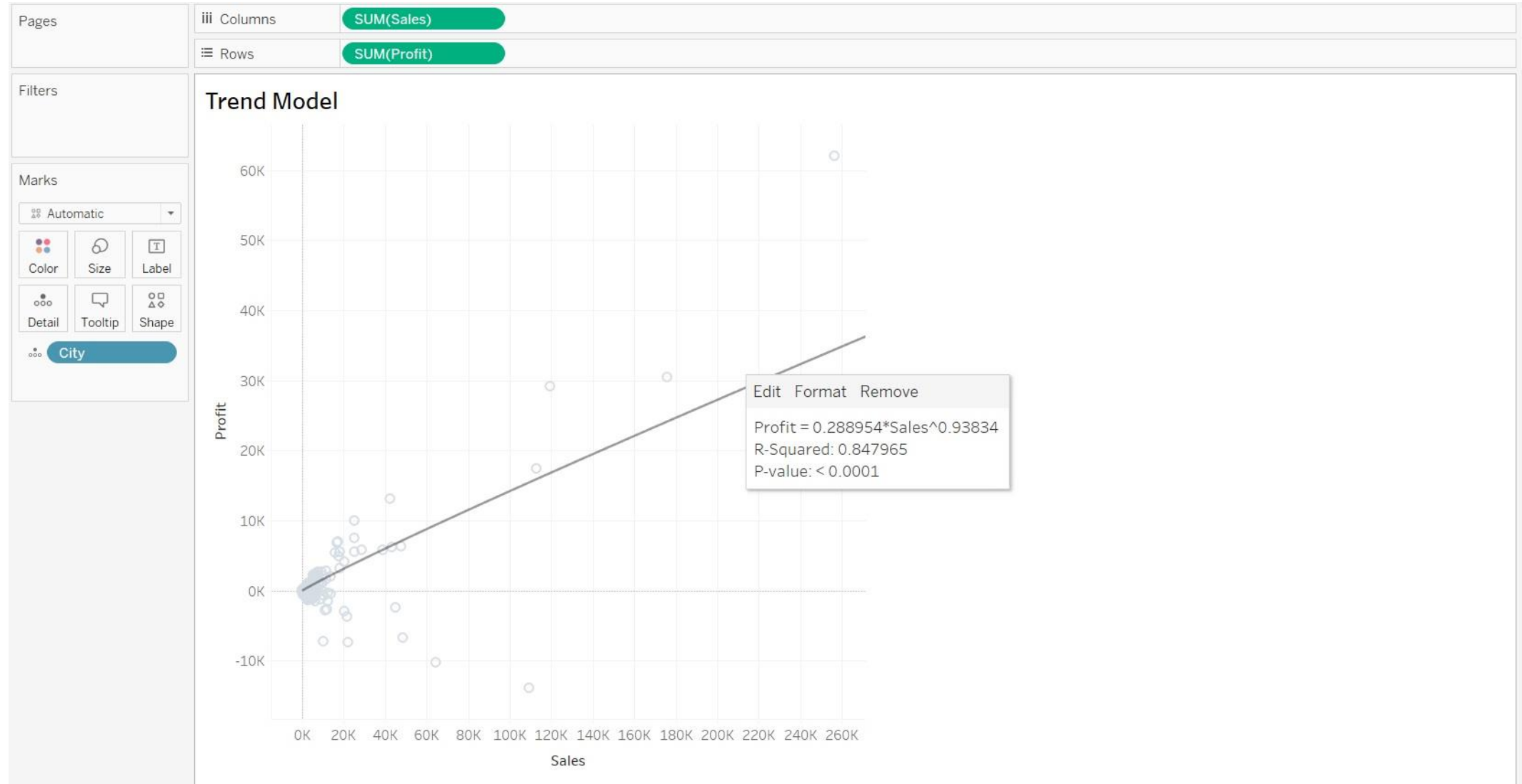
Options

- ☒ Show tooltips
- ☐ Show confidence bands
- ☒ Allow a trend line per color
- ☒ Show recalculated line for highlighted or selected data points
- ☐ Force y-intercept to zero

OK

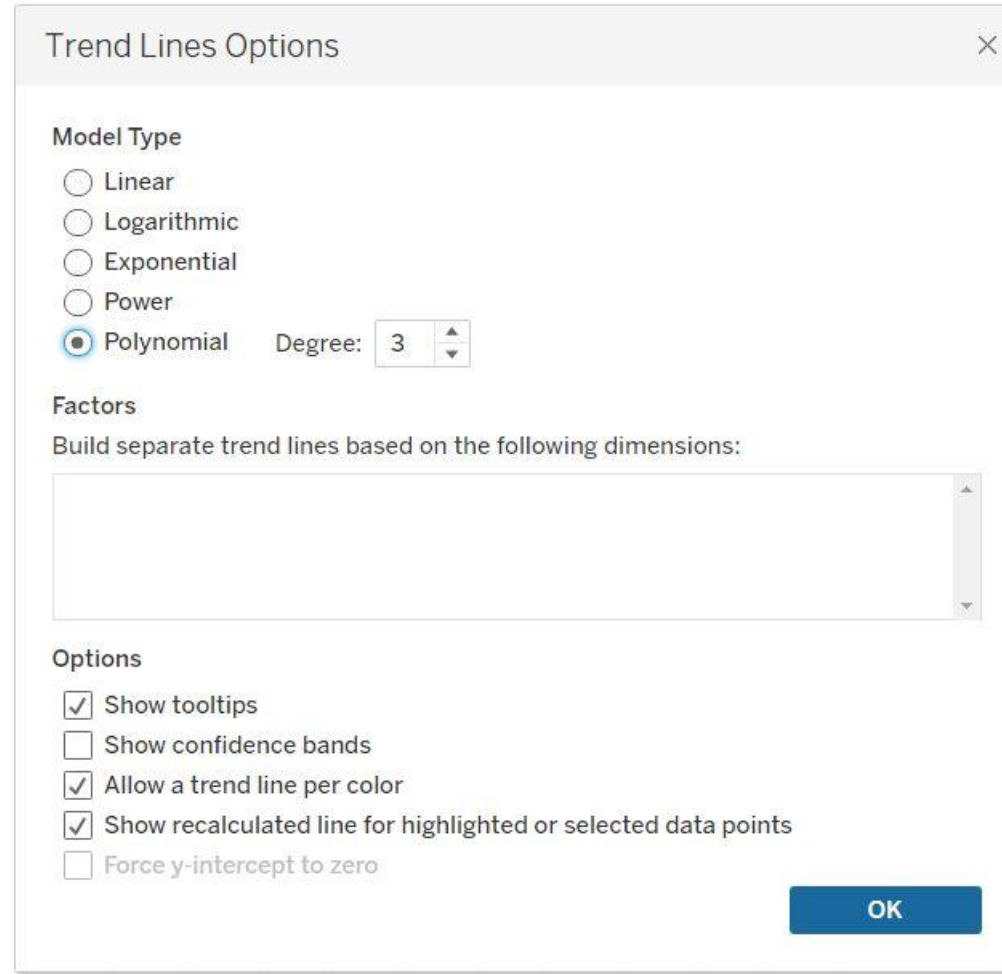
TREND MODEL

STEP 11: We observe that **R-Squared value** is the best for **Power Trend Line**
Click on the trend line and Click on **Edit**



TREND MODEL

STEP 12: Change the **Model Type** to **Polynomial** and change **Degree** to **3**
Click **OK**



Trend Lines Options

Model Type

- ☐ Linear
- ☐ Logarithmic
- ☐ Exponential
- ☐ Power
- ☒ Polynomial

Degree: 3

Factors

Build separate trend lines based on the following dimensions:

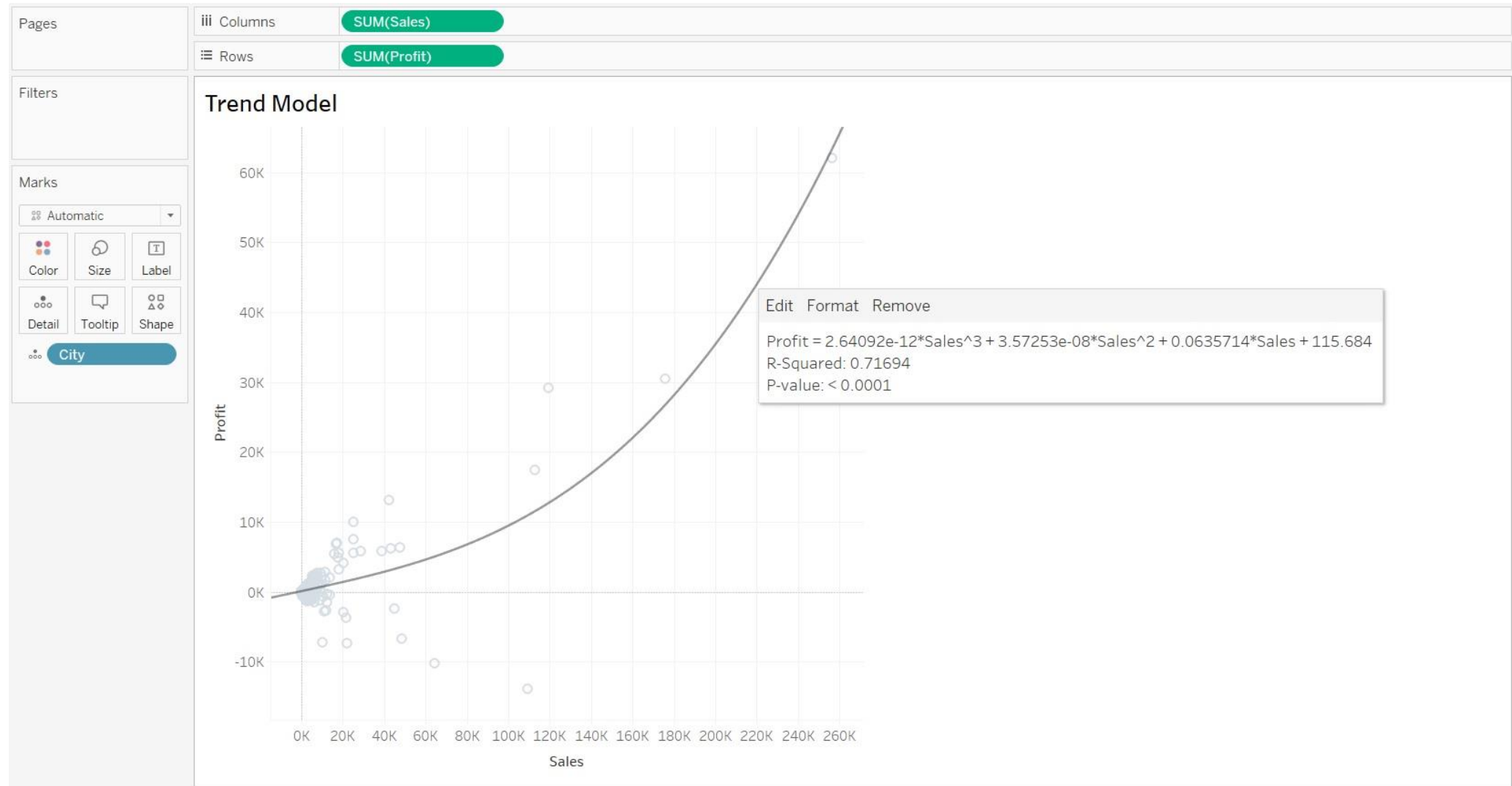
Options

- ☒ Show tooltips
- ☐ Show confidence bands
- ☒ Allow a trend line per color
- ☒ Show recalculated line for highlighted or selected data points
- ☐ Force y-intercept to zero

OK

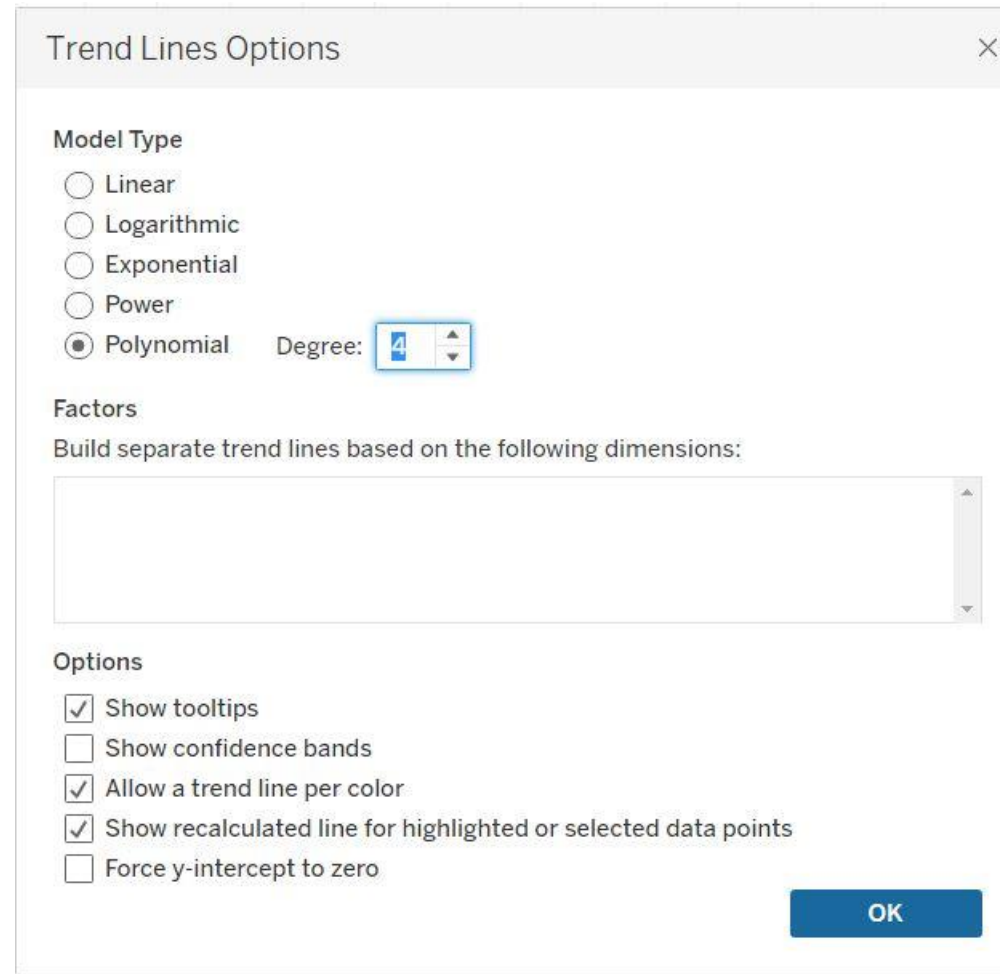
TREND MODEL

STEP 13: We observe that R-Squared value is the lesser than of **Power Trend Line**
Click on the trend line and Click on **Edit**



TREND MODEL

STEP 14: Change the **Model Type** to **Polynomial** and change **Degree** to **4**
Click **OK**



Trend Lines Options

Model Type

- ☐ Linear
- ☐ Logarithmic
- ☐ Exponential
- ☐ Power
- ☒ Polynomial Degree: 4

Factors

Build separate trend lines based on the following dimensions:

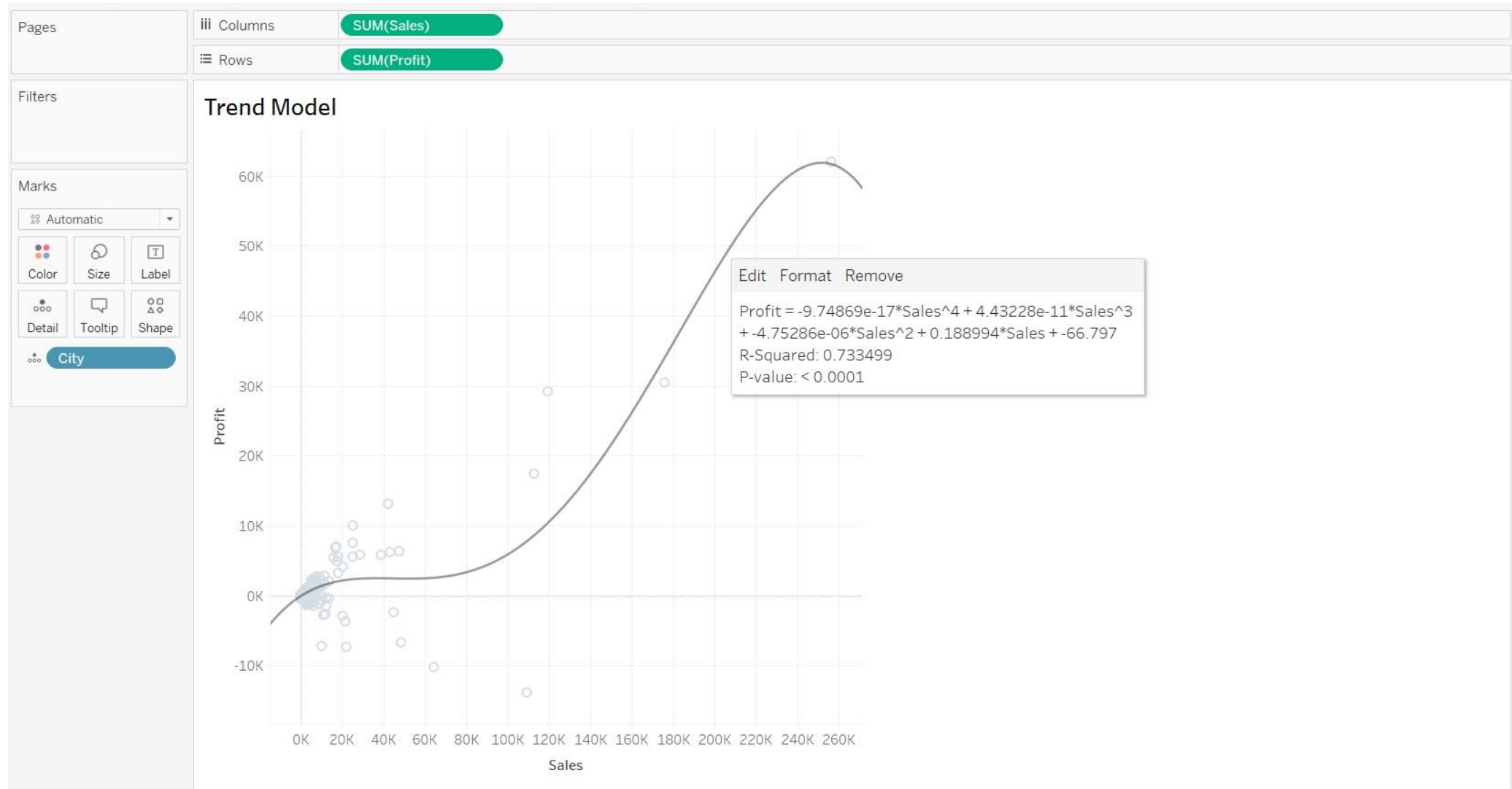
Options

- ☒ Show tooltips
- ☐ Show confidence bands
- ☒ Allow a trend line per color
- ☒ Show recalculated line for highlighted or selected data points
- ☐ Force y-intercept to zero

OK

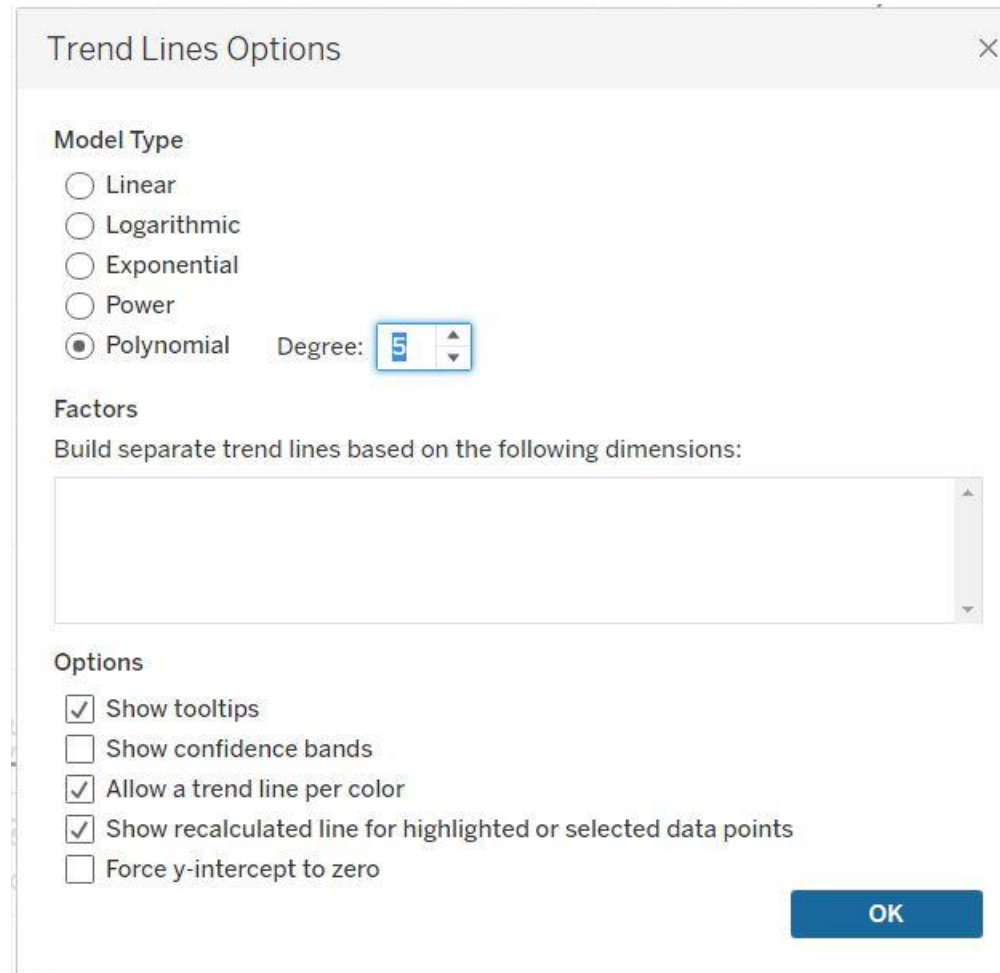
TREND MODEL

STEP 15: We observe that **R-Squared value** is the lesser than of **Power Trend Line**
Click on the trend line and Click on **Edit**



TREND MODEL

STEP 16: Change the **Model Type** to **Polynomial** and change **Degree** to **5**
Click **OK**



Trend Lines Options

Model Type

- ☐ Linear
- ☐ Logarithmic
- ☐ Exponential
- ☐ Power
- ☒ Polynomial

Degree: 5

Factors

Build separate trend lines based on the following dimensions:

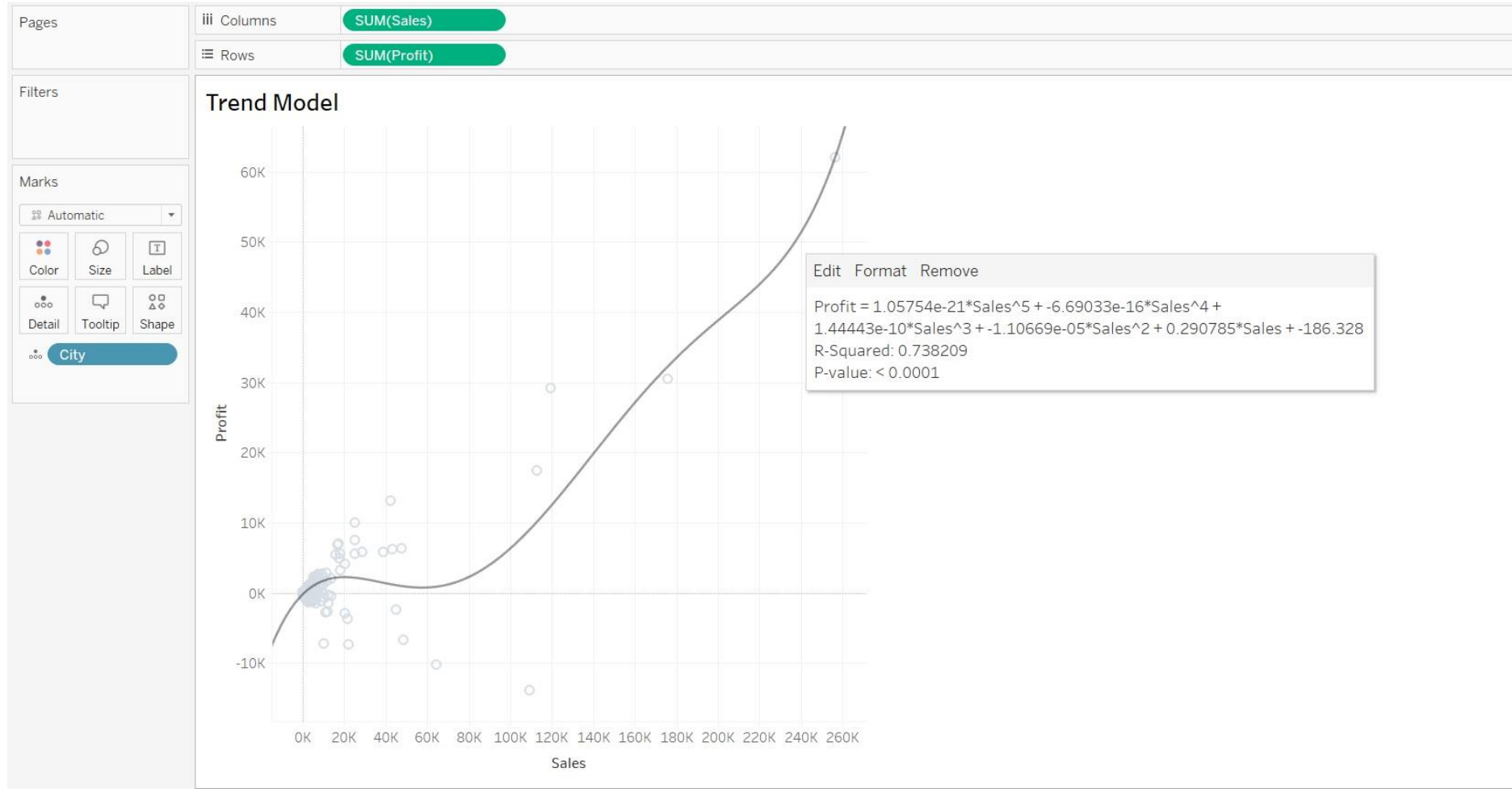
Options

- ☒ Show tooltips
- ☐ Show confidence bands
- ☒ Allow a trend line per color
- ☒ Show recalculated line for highlighted or selected data points
- ☐ Force y-intercept to zero

OK

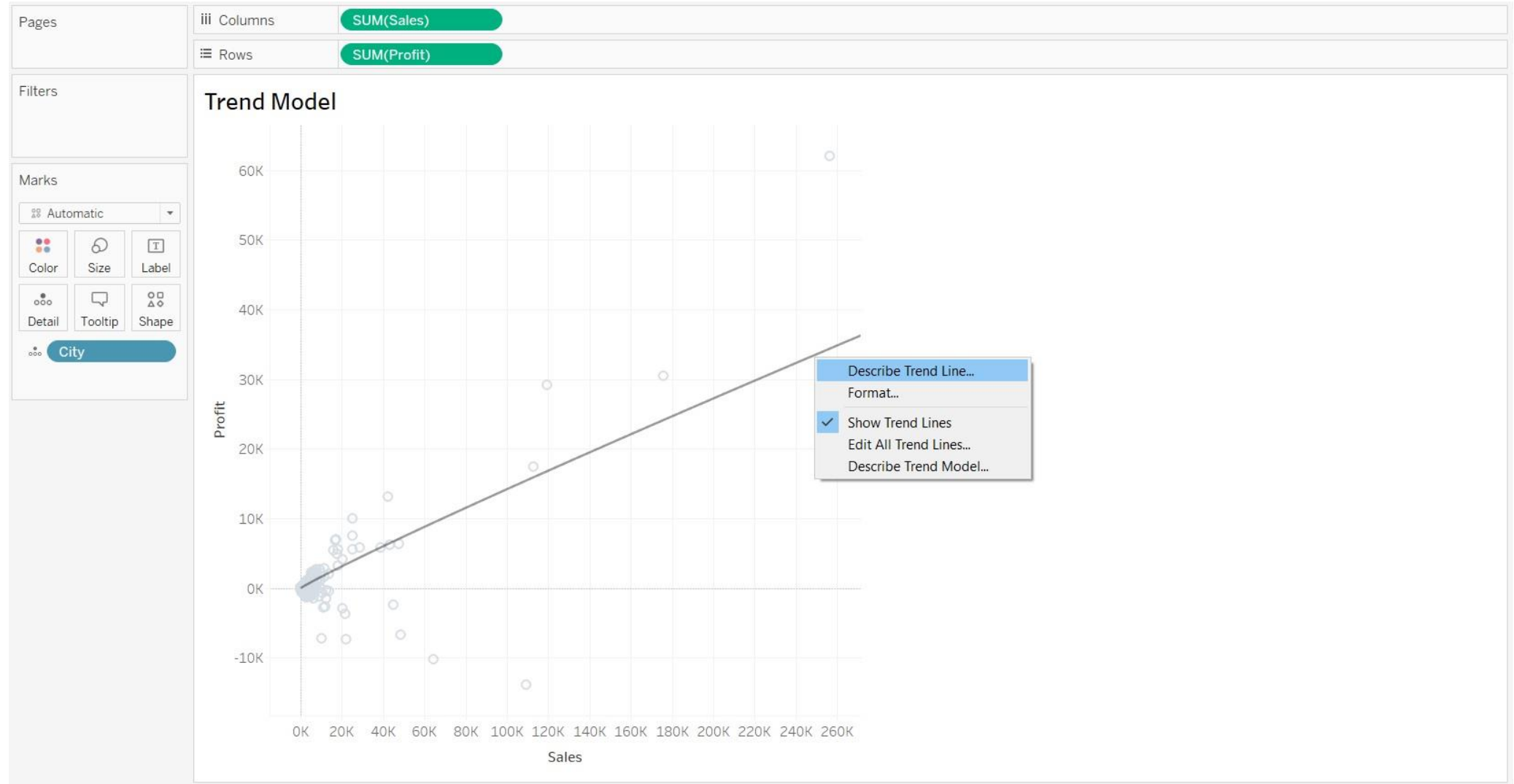
TREND MODEL

STEP 17: We observe that R-Squared value is the lesser than of **Power Trend Line**
Click on the trend line and Click on **Edit** Click on **Edit** and let us go back to **Power Trend Line**



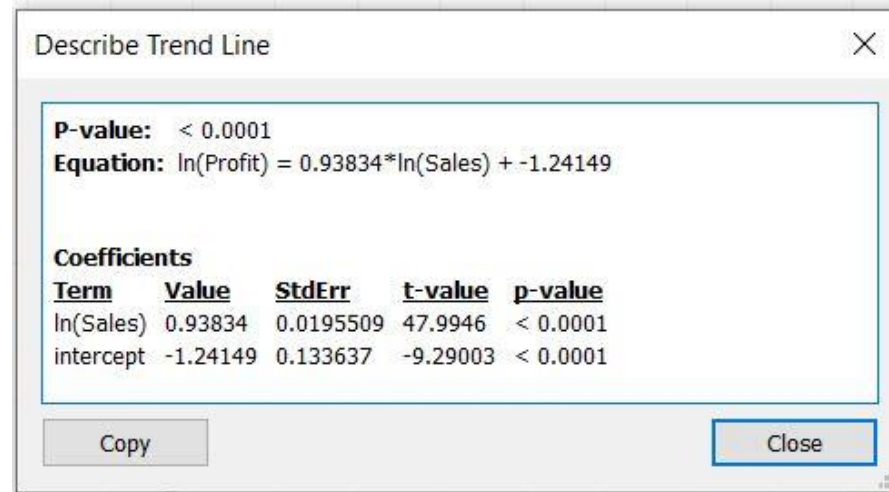
TREND MODEL

STEP 18: Right-click the Trend Line, Click Describe Trend Line



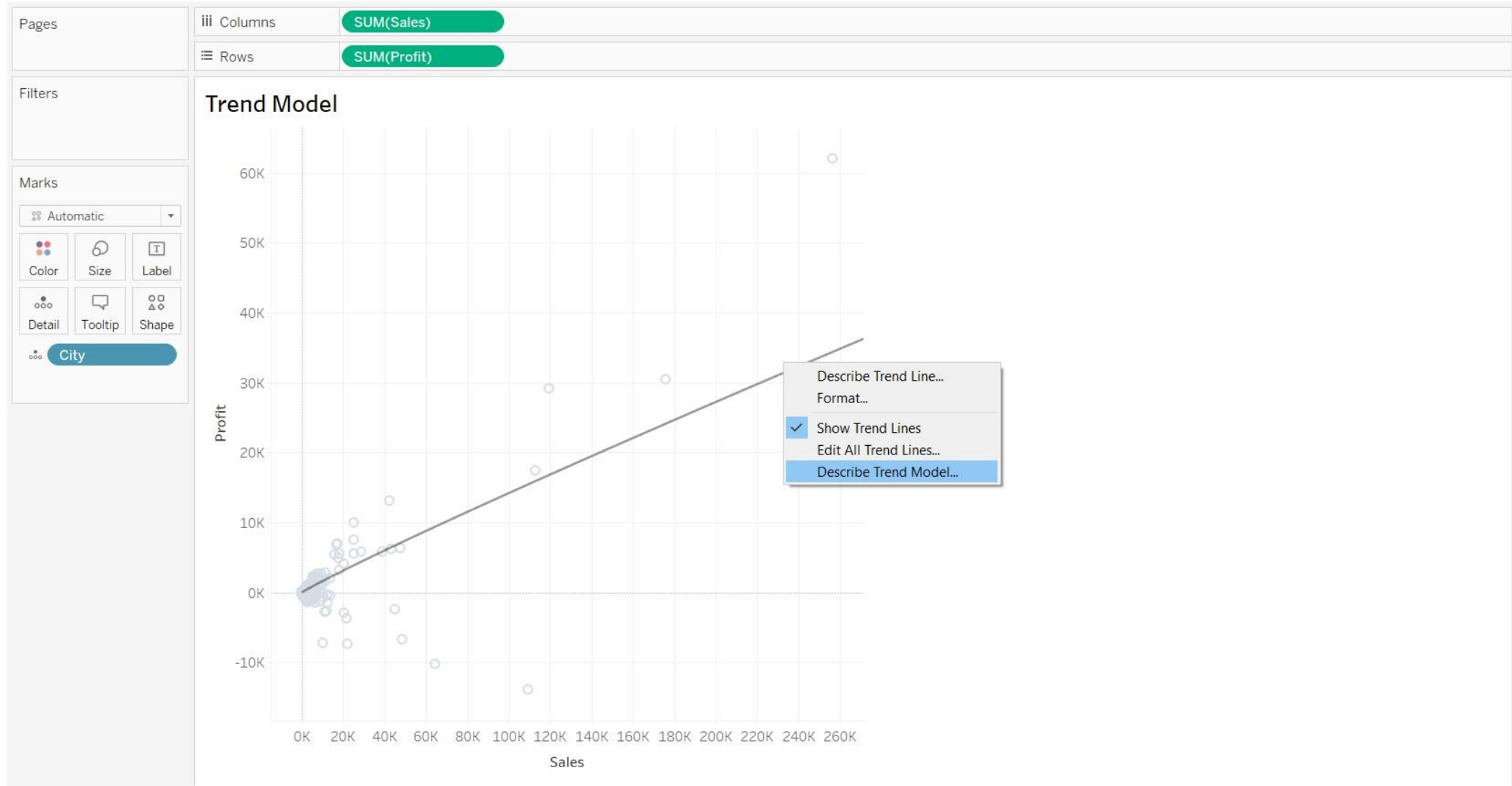
TREND MODEL

STEP 19: Given below is the brief description of **Trend Line**
Click **Close**



TREND MODEL

STEP 20: Right-click the Trend Line, Click Describe Trend Model



TREND MODEL

STEP 21: Given below is the full description of the model being used in the current view

Click **Close**

Describe Trend Model

Trend Lines Model

A linear trend model is computed for natural log of sum of Profit given natural log of sum of Sales. The model may be significant at $p \leq 0.05$.

Model formula:

(ln(Sales) + intercept)

Number of modeled observations:

415

Number of filtered observations:

116

Model degrees of freedom:

2

Residual degrees of freedom (DF):

413

SSE (sum squared error):

233.925

MSE (mean squared error):

0.566403

R-Squared:

0.847965

Standard error:

0.752598

p-value (significance):

< 0.0001

Individual trend lines:

Panes	Line	Coefficients						
Row	Column	p-value	DF	Term	Value	StdErr	t-value	p-value
Profit	Sales	< 0.0001	413	ln(Sales)	0.93834	0.0195509	47.9946	< 0.0001
				intercept	-1.24149	0.133637	-9.29003	< 0.0001

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Close