How do I perform a power regression in Excel?

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A power regression in Excel is a statistical method used to model a relationship between two variables, where one variable is raised to a power. This type of regression is useful for analyzing data that follows a non-linear pattern, and can be performed using the built-in "Power" function in Excel. To perform a power regression, first organize the data into two columns, with the independent variable in the first column and the dependent variable in the second column. Then, select the data and click on the "Insert" tab, followed by "Scatter" and "Scatter with Only Markers". Next, right-click on one of the data points and select "Add Trendline". In the "Format Trendline" menu, select "Power" as the type of regression and check the "Display Equation on chart" and "Display R-squared value on chart" boxes to show the regression equation and the goodness of fit on the graph. This will give you the power regression equation and allow you to make predictions based on your data.

Perform Power Regression in Excel (Step-by-Step)

Power regression is a type of non-linear regression that takes on the following form:

y = axb

where:

y: The response variablex: The predictor variablea, b: The regression coefficients that describe the relationship between *x* and *y*

This type of regression is used to model situations where the is equal to the predictor variable raised to a power.

The following step-by-step example shows how to

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perform power regression for a given dataset in Excel.

Step 1: Create the Data

First, let's create some fake data for two variables: x and y.

	A	B
1	x	y
2	1	1
3	2	8
4	3	5
5	4	7
6	5	6
7	6	20
8	7	15
9	8	19
10	9	23
11	10	37
12	11	33
13	12	38
14	13	49
15	14	50
16	15	56
17	16	52
18	17	70
19	18	89
20	19	97
21	20	115

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Step 2: Transform the Data

Next, let's take the natural log of both x and y by using the =LN(number) formula:

	A	B	C	D	E	F	G	H
1	x	y		ln(x)	ln(y)			
2	1	1		=LN(A2)	0			
3	2	8		0.69	2.08			
4	3	5		1.10	1.61			
5	4	7		1.39	1.95			
6	5	6		1.61	1.79			
7	6	20		1.79	3.00			
8	7	15		1.95	2.71			
9	8	19		2.08	2.94			
10	9	23		2.20	3.14			
11	10	37		2.30	3.61			
12	11	33		2.40	3.50			
13	12	38		2.48	3.64			
14	13	49		2.56	3.89			
15	14	50		2.64	3.91			
16	15	56		2.71	4.03			
17	16	52		2.77	3.95			
18	17	70		2.83	4.25			
19	18	89		2.89	4.49			
20	19	97		2.94	4.57			
21	20	115		3.00	4.74			
22								
23								
24								
25								

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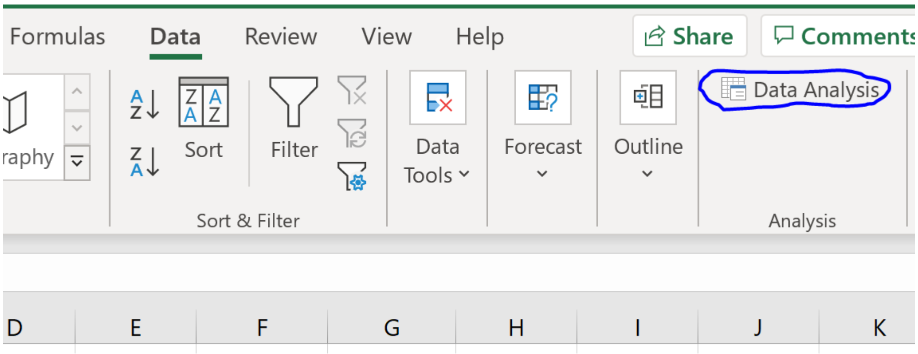
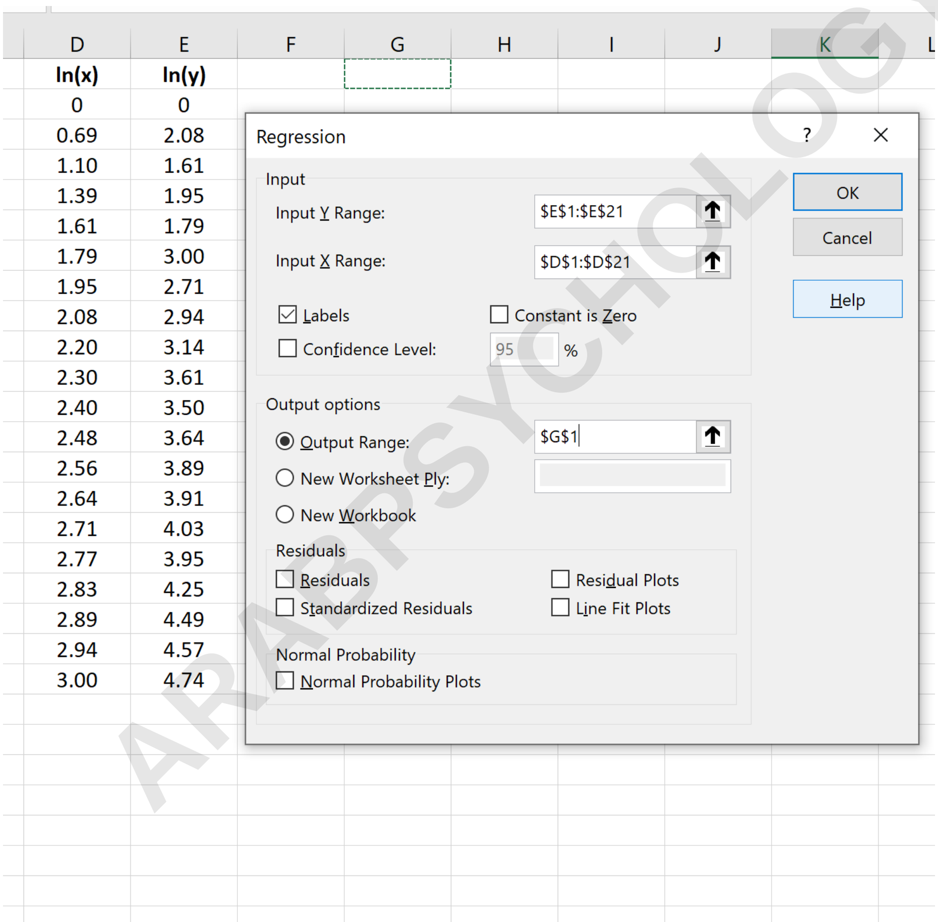
Step 3: Fit the Power Regression Model

Next, we'll fit a regression model to the transformed data.

To do so, click the Data tab along the top ribbon. Then click the Data Analysis option within the Analyze section.



If you don't see this option available, you need to first .



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Once you click OK, the regression output will automatically appear:

G	H	I	J	K	L	M	N	O
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.966375							
R Square	0.933881							
Adjusted R	0.930208							
Standard E	0.318685							
Observatio	20							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	25.82038	25.82038	254.2367	4.61887E-12			
Residual	18	1.828087	0.10156					
Total	19	27.64847						
	Coefficients	*andard Errc*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Jpper 95.0%*
Intercept	0.153334	0.203322	0.754143	0.460516	-0.273829448	0.580497	-0.27383	0.580497
ln(x)	1.434391	0.08996	15.9448	4.62E-12	1.245392243	1.623389	1.245392	1.623389

The of the model is 254.2367 and the corresponding p-value is extremely small (4.61887e-12), which indicates that the model as a whole is useful.

Using the coefficients from the output table, we can see that the fitted power regression equation is:

$\ln(y) = 0.15333 + 1.43439\ln(x)$

Applying *e* to both sides, we can rewrite the equation as:

y = e 0.15333 + 1.43439ln(x)y = 1.1657x1.43439

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We can use this equation to predict the response variable, *y*, based on the value of the predictor variable, *x*.

For example, if *x* = 12, then we would predict that *y* would be 41.167:

y = 1.1657(12)1.43439 = 41.167

Bonus: Feel free to use this online to automatically compute the power regression equation for a given predictor and response variable.

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