How do I perform exponential regression in Excel (step-by-step)?

Authored by

stats writer

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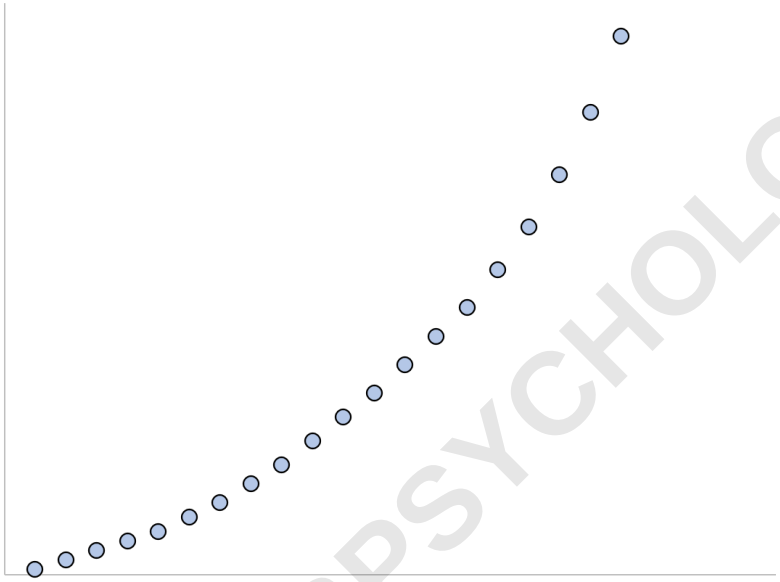
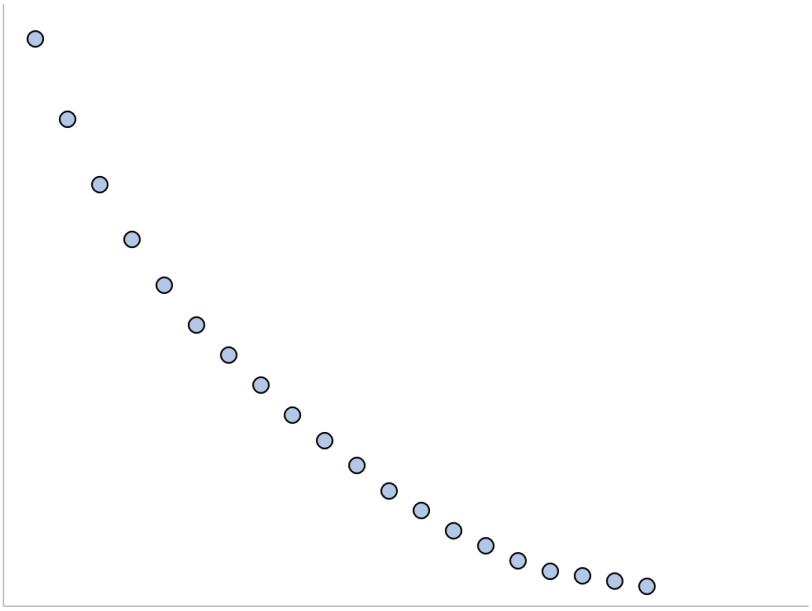
To perform exponential regression in Excel, start by plotting your data in the form of a scatterplot and adding a trendline to the chart. Next, right-click on the trendline, choose "Format Trendline" and select the "Exponential" option for the trendline type. You can then adjust the trendline's display properties, such as its color and line width, if desired. Finally, click the "Options" tab and click the "Display Equation On Chart" checkbox to display the equation of the exponential trendline on the chart.

Exponential regression is a type of regression model that can be used to model the following situations:

1. Exponential growth: Growth begins slowly and then accelerates rapidly without bound.



2. Exponential decay: Decay begins rapidly and then slows down to get closer and closer to zero.



The equation of an exponential regression model takes the following form:

y = abx

where:

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

The following step-by-step example shows how to perform exponential regression in Excel.

Step 1: Create the Data

First, let's create a fake dataset that contains 20 :

	A	B	C	D	E
1	**x**	**y**			
2	1	1			
3	2	3			
4	3	5			
5	4	7			
6	5	9			
7	6	12			
8	7	15			
9	8	19			
10	9	23			
11	10	28			
12	11	33			
13	12	38			
14	13	44			
15	14	50			
16	15	56			
17	16	64			
18	17	73			
19	18	84			
20	19	97			
21	20	113			
22					
23					
24					

Step 2: Take the Natural Log of the Response Variable

Next, we need to create a new column that represents the natural log of the response variable *y*:

	A	B	C	D	E	F
1	**x**	**y**	**ln(y)**			
2	1	1	0	=LN(B2)		
3	2	3	1.098612			
4	3	5	1.609438			
5	4	7	1.94591			
6	5	9	2.197225			
7	6	12	2.484907			
8	7	15	2.70805			
9	8	19	2.944439			
10	9	23	3.135494			
11	10	28	3.332205			
12	11	33	3.496508			
13	12	38	3.637586			
14	13	44	3.78419			
15	14	50	3.912023			
16	15	56	4.025352			
17	16	64	4.158883			
18	17	73	4.290459			
19	18	84	4.430817			
20	19	97	4.574711			
21	20	113	4.727388			
22						
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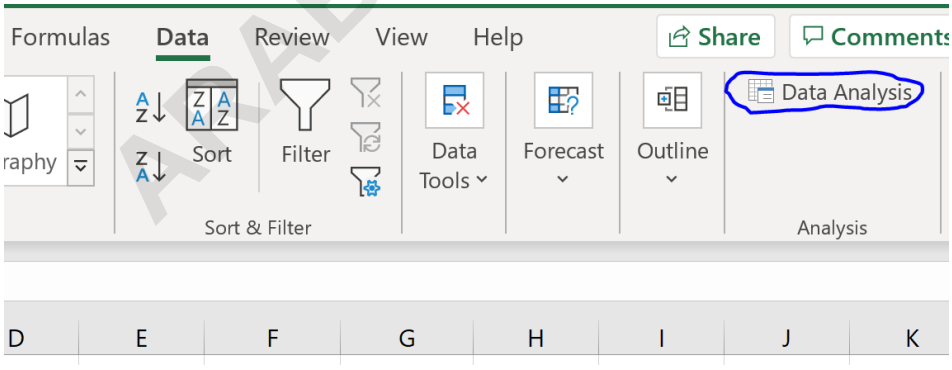
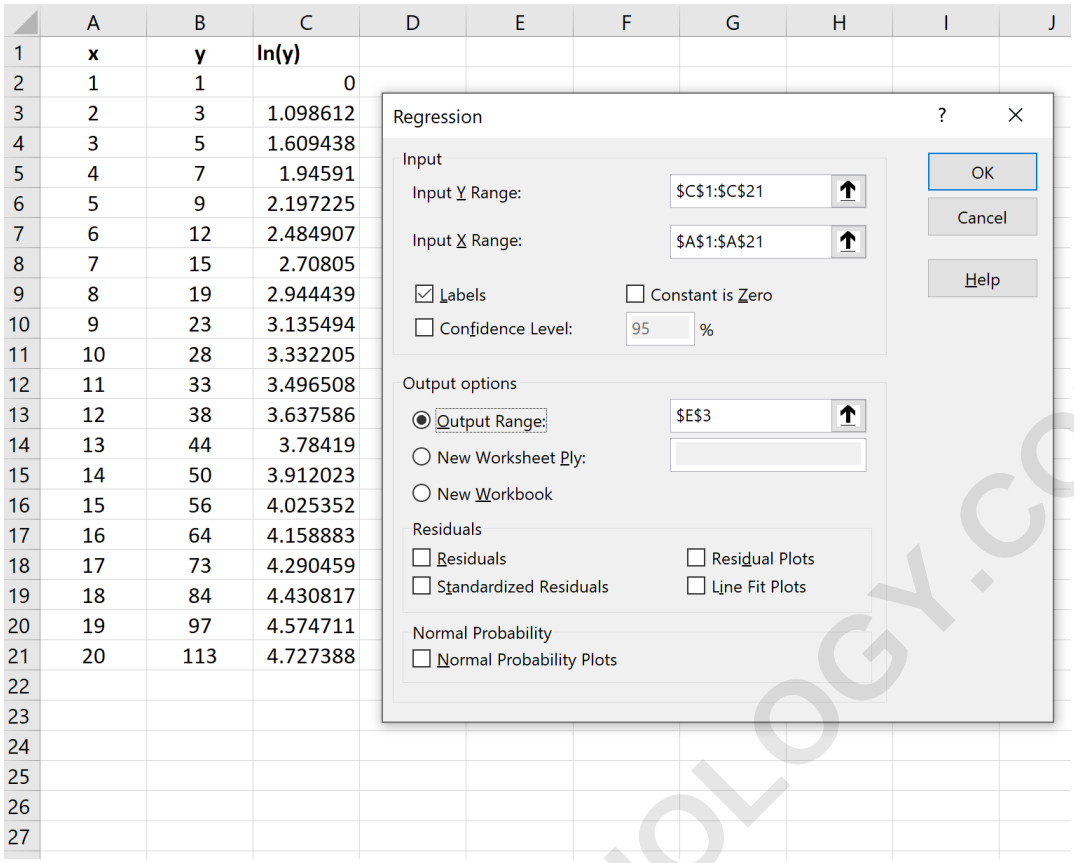
Step 3: Fit the Exponential Regression Model



If you don't see Data Analysis as an option, you need to first .

In the window that pops up, click **Regression**. In the new window that pops up, fill in the following information:



	A	B	C
1	x	y	ln(y)
2	1	1	0
3	2	3	1.098612
4	3	5	1.609438
5	4	7	1.94591
6	5	9	2.197225
7	6	12	2.484907
8	7	15	2.70805
9	8	19	2.944439
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15	14	50	3.912023
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17	16	64	4.158883
18	17	73	4.290459
19	18	84	4.430817
20	19	97	4.574711
21	20	113	4.727388

Once you click **OK**, the output of the exponential regression model will be shown:

E	F	G	H	I	J
SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.958604				
R Square	0.918921				
Adjusted R Square	0.914417				
Standard Error	0.368496				
Observations	20				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	27.70183194	27.70183	204.006	2.91682E-11
Residual	18	2.444207721	0.135789		
Total	19	30.14603966			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	0.981658	0.171177993	5.734719	1.95E-05	0.622026102
x	0.2041	0.014289663	14.28307	2.92E-11	0.174078729

The of the model is 204.006 and the corresponding p-value is extremely small, which indicates that the model as a whole is useful.

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

ln(y) = 0.9817 + 0.2041(x)

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

y = 2.6689 * 1.2264x

We can use this equation to predict the response variable, *y*, based on the value of the predictor variable, *x*. For example, if *x* = 14, then we would predict that *y* would be **46.47**:

y = 2.6689 * 1.226414 = 46.47

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