How do you perform a Repeated Measures ANOVA in Google Sheets?

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Repeated Measures ANOVA, also known as within-subjects ANOVA, is a statistical method used to analyze the differences between three or more related groups in a single factor design. In order to perform a Repeated Measures ANOVA in Google Sheets, one must first set up their data in a specific format, with each row representing a participant and each column representing a different time point or condition. Then, using the built-in "Data Analysis" tool, one can select the "ANOVA: Two-Factor with Replication" option and input their data range. Google Sheets will then calculate the ANOVA results, including the F-statistic, p-value, and effect size, allowing for the comparison of means between groups and determining if there is a significant difference. This method is useful for analyzing repeated measures data and can be easily performed using Google Sheets' user-friendly interface.

Repeated Measures ANOVA in Google Sheets (Step-by-Step)

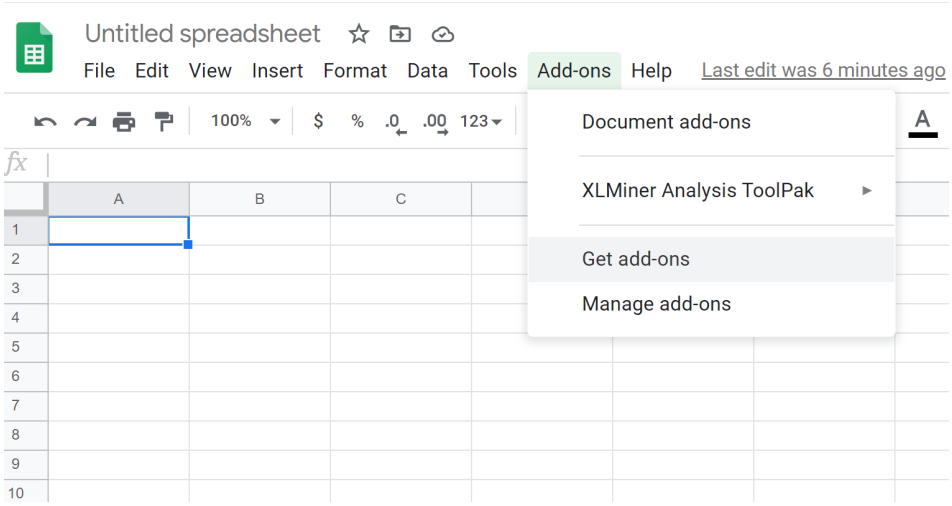
A repeated measures ANOVA is used to determine whether or not there is a statistically significant difference between the means of three or more groups in which the same subjects show up in each group.

This tutorial provides a step-by-step example of how to perform a repeated measures ANOVA in Google Sheets.

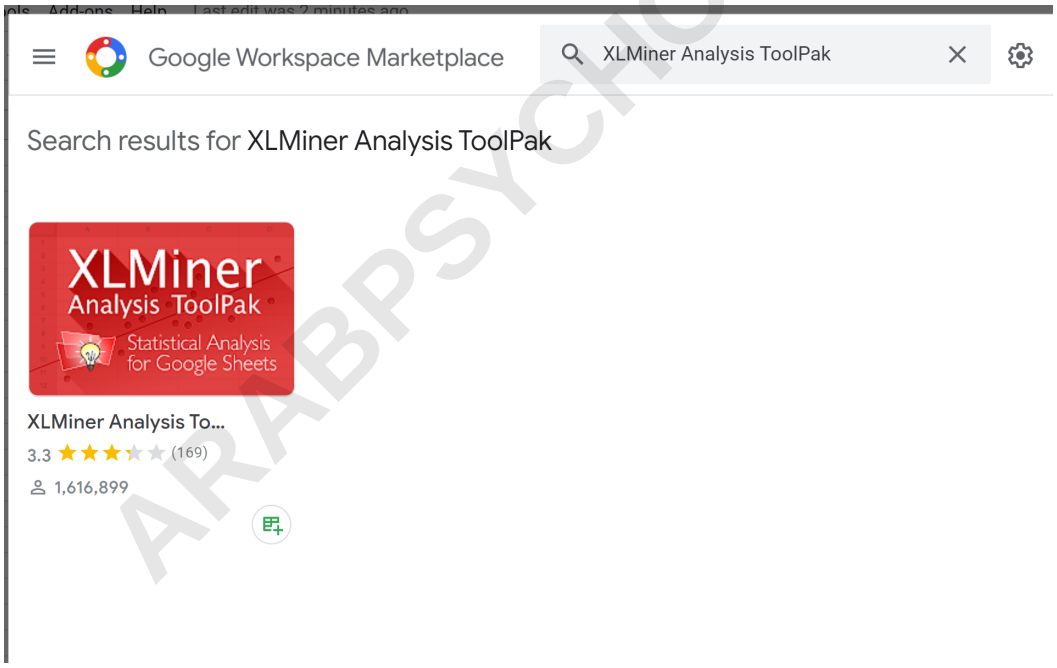
Step 1: Install the XLMiner Analysis ToolPak

To perform a one-way ANOVA in Google Sheets, we need to first install the free XLMiner Analysis Toolpak.

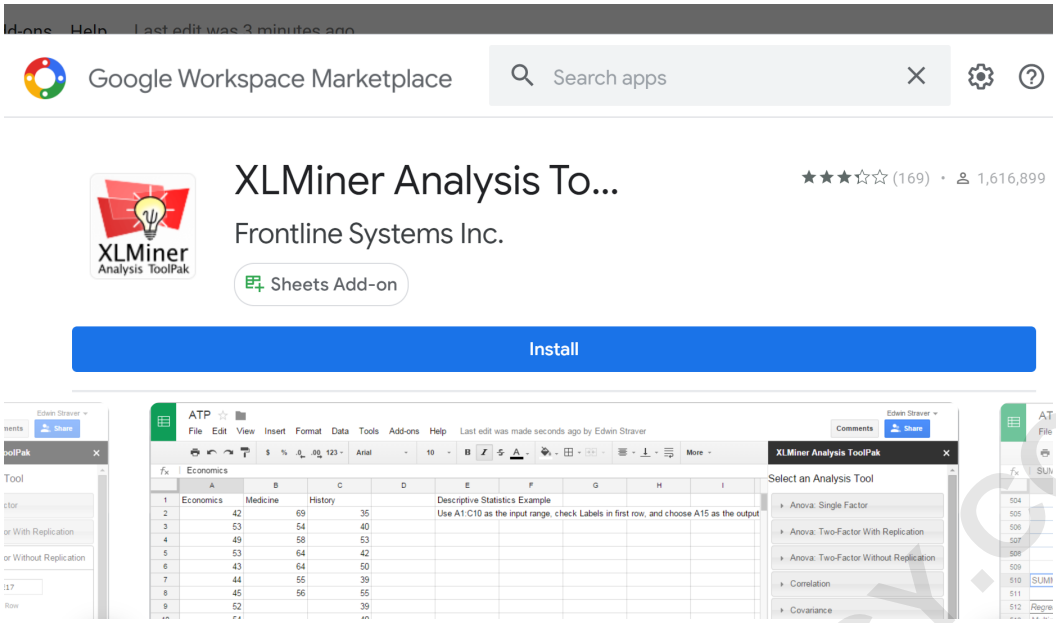
To do so, click Add-ons > Get add-ons:



Next, type XLMiner Analysis ToolPak in the search bar and click the icon that appears:



Lastly, click the Install button.

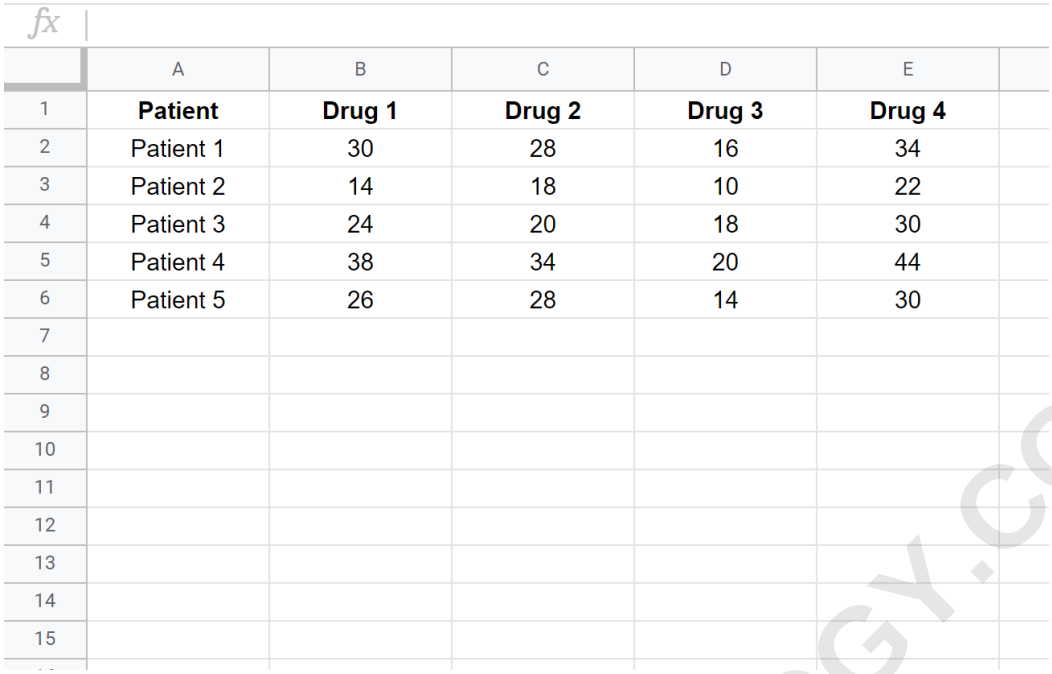


Step 2: Enter the Data

Next, we need to enter the data to use for the repeated measures ANOVA.

For this example, suppose researchers want to know if four different drugs lead to different reaction times. To test this, they measure the reaction time of five patients on the four different drugs.

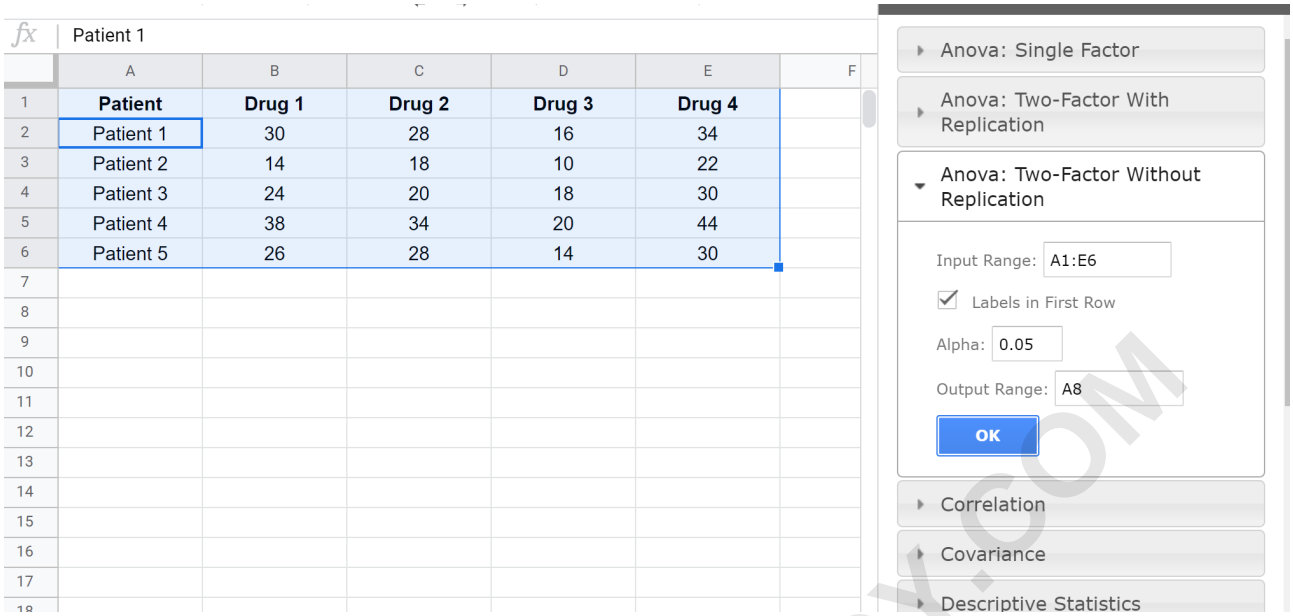
The reaction times are shown below:



	A	B	C	D	E
1	**Patient**	**Drug 1**	**Drug 2**	**Drug 3**	**Drug 4**
2	Patient 1	30	28	16	34
3	Patient 2	14	18	10	22
4	Patient 3	24	20	18	30
5	Patient 4	38	34	20	44
6	Patient 5	26	28	14	30
7					
8					
9					
10					
11					
12					
13					
14					
15					

Step 3: Perform the Repeated Measures ANOVA

To perform a repeated measures ANOVA on this dataset, click Add-ons > XLMiner Analysis ToolPak > Start. The Analysis ToolPak will appear on the right side of the screen.



Step 4: Interpret the Results

Once you click OK, the results of the repeated measures ANOVA will appear starting in the cell you specified in Output Range. In our case, we chose to display the results starting in cell A8:

8	Anova: Two-Factor Without Replication						
9							
10	*SUMMARY*	*Count*	*Sum*	*Average*	*Variance*		
11	Patient 1	4	108	27	60		
12	Patient 2	4	64	16	26.66666667		
13	Patient 3	4	92	23	28		
14	Patient 4	4	136	34	104		
15	Patient 5	4	98	24.5	51.66666667		
16							
17	Drug 1	5	132	26.4	76.8		
18	Drug 2	5	128	25.6	42.8		
19	Drug 3	5	78	15.6	14.8		
20	Drug 4	5	160	32	64		
21							
22							
23	ANOVA						
24	*ource of Variatio*	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
25	Rows	680.8	4	170.2	18.10638298	0.000050689778	3.259166727
26	Columns	698.2	3	232.7333333	24.75886525	0.000019925013	3.490294821
27	Error	112.8	12	9.4			
28							
29	Total	1491.8	19				
30							

In this case we are not interested in the results for the Rows, only for the Columns, which tell us the variation in response time based on the drug.

From the output we can see that the F test-statistic is 24.75887 and the corresponding p-value is 0.0000199.

Since this p-value is less than 0.05, we reject the null hypothesis and conclude that there is a statistically significant difference in mean response times between the four drugs.

How to Perform a Repeated Measures ANOVA in Excel

How to Perform a Repeated Measures ANOVA By Hand

One-Way Repeated Measures ANOVA Calculator