How can I perform a normality test in Google Sheets?

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A normality test in Google Sheets is a statistical tool used to determine if a given data set follows a normal distribution. To perform this test, one can use the built-in function "NORM.S.DIST" or "NORM.DIST" in the spreadsheet program. These functions calculate the probability of a data point falling within a certain range based on the mean and standard deviation of the data set. By comparing the calculated probabilities to expected values, one can determine if the data set is normally distributed. This test is useful for analyzing the shape and pattern of data and can help in making informed decisions about statistical analysis.

Perform a Normality Test in Google Sheets

Many statistical tests make the assumption that the values in a dataset are .

One of the easiest ways to test this assumption is to perform a Jarque-Bera test, which is a goodness-of-fit test that determines whether or not sample data have skewness and kurtosis that matches a normal distribution.

This test uses the following hypotheses:

H0: The data is normally distributed.HA: The data is *not* normally distributed.

The test statistic *JB* is defined as:

JB =(n/6) * (S2 + (C2/4))

where:

n: the number of in the sampleS: the sample skewnessC: the sample kurtosis

Under the null hypothesis of normality, *JB* ~ X2(2).

If the that corresponds to the test statistic is less than some significance level (e.g. α = .05), then we can reject the null hypothesis and conclude that the data is not normally distributed.

This tutorial provides a step-by-step example of how to perform a Jarque-Bera test for a given dataset in Google Sheets.

Step 1: Enter the Data

First, let's create a fake dataset with 15 values:

	A	B	C	D
1	**Data**			
2	4			
3	5.6			
4	7.8			
5	7.9			
6	9			
7	9.3			
8	10.4			
9	12			
10	13.4			
11	14.4			
12	15.6			
13	18.7			
14	20.1			
15	20.5			
16	20.9			
17				
18				
19				
20				

Step 2: Calculate the Test Statistic

Next, we will calculate the JB test statistic.

Column E shows the formulas used:

	A	B	C	D	E
1	**Data**		sample size	15	=COUNT(A2:A16)
2	4		sample skewness	0.1942787388	=SKEW(A2:A16)
3	5.6		sample kurtosis	-1.215334818	=KURT(A2:A16)
4	7.8				
5	7.9		JB test statistic	1.01750977	=(D1/6)*(D2^2+(D3^2)/4)
6	9				
7	9.3				
8	10.4				
9	12				
10	13.4				
11	14.4				
12	15.6				
13	18.7				
14	20.1				
15	20.5				
16	20.9				
17					
18					
19					
20					
21					

The test statistic turns out to be 1.0175.

Step 3: Calculate the P-Value

Under the null hypothesis of normality, the test statistic JB follows a Chi-Square distribution with 2 degrees of freedom.

So, to find the for the test we will use the following formula:

=CHISQ.DIST.RT(JB test statistic, 2)

The following screenshot shows how to use this formula in practice:

	A	B	C	D	E
1	**Data**		sample size	15	=COUNT(A2:A16)
2	4		sample skewness	0.1942787388	=SKEW(A2:A16)
3	5.6		sample kurtosis	-1.215334818	=KURT(A2:A16)
4	7.8				
5	7.9		JB test statistic	1.01750977	=(D1/6)*(D2^2+(D3^2)/4)
6	9		p-value	0.6012437305	=CHISQ.DIST.RT(D5, 2)
7	9.3				
8	10.4				
9	12				
10	13.4				
11	14.4				
12	15.6				
13	18.7				
14	20.1				
15	20.5				
16	20.9				
17					
18					
19					
20					
21					
22					

The p-value of the test is 0.601244.

Recall that this Jarque-Bera normality test uses the following hypotheses:

H0: The data is normally distributed.HA: The data is *not* normally distributed.

Since this p-value is not less than 0.05, we fail to reject the null hypothesis.

This means we don't have sufficient evidence to say that the dataset is not normally distributed.

In other words, we can assume that the data is normally distributed.

Additional Resources

The following tutorials explain how to perform other common tasks in Google Sheets: