How do I calculate confidence intervals in Google Sheets?

Authored by

stats writer

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Confidence intervals in Google Sheets refer to a statistical measure used to estimate the true value of a population parameter based on a sample of data. To calculate confidence intervals in Google Sheets, you first need to determine the sample mean and standard deviation of your data set. Then, using a formula or function such as CONFIDENCE.NORM, you can input the desired confidence level and the sample size to calculate the upper and lower bounds of the confidence interval. This provides a range of values within which the true population parameter is likely to fall with a certain level of confidence. By following these steps, you can easily calculate confidence intervals in Google Sheets to make informed decisions and draw accurate conclusions from your data.

Calculate Confidence Intervals in Google Sheets

A confidence interval for a mean is a range of values that is likely to contain a population mean with a certain level of confidence.

It is calculated as:

Confidence Interval = x +/- t*(s/√n)

where:

x: sample meant: t-value that corresponds to the confidence levels: sample standard deviationn: sample size

This tutorial explains how to calculate confidence intervals in Google Sheets.

Confidence Intervals Using the t Distribution

If we're working with a small sample (n < 30), we can use the t-Distribution to calculate a confidence interval for a population mean.

For example, suppose we want to calculate a confidence interval for the true population mean height (in inches) of a certain species of plant, using a sample of 15 plants:

	A	B	C	D	E
1	**Data**				
2	8				
3	11				
4	12				
5	13				
6	13				
7	14				
8	15				
9	17				
10	18				
11	18				
12	19				
13	20				
14	22				
15	24				
16	26				
17					
18					
19					
20					
21					

First, we can calculate the sample mean, sample standard deviation, and sample size:

	A	B	C	D	E
1	**Data**		**Sample mean**	16.667	=average(A2:A16)
2	8		**Sample std. dev**	5.038	=stdev.s(A2:A16)
3	11		**Sample Size**	15	=COUNTA(A2:A16)
4	12				
5	13				
6	13				
7	14				
8	15				
9	17				
10	18				
11	18				
12	19				
13	20				
14	22				
15	24				
16	26				
17					
18					
19					
20					
21					

Next, we can use the following formulas to calculate the lower and upper bound for the 95% confidence interval:

	A	B	C	D	E	F
1	**Data**		**Sample mean**	16.667	=average(A2:A16)	
2	8		**Sample std. dev**	5.038	=stdev.s(A2:A16)	
3	11		**Sample Size**	15	=COUNTA(A2:A16)	
4	12					
5	13		**95% Lower CI**	13.877	=D1 - T.INV(0.975, D3-1)*(D2/SQRT(D3))	
6	13		**95% Upper CI**	19.457	=D1 + T.INV(0.975, D3-1)*(D2/SQRT(D3))	
7	14					
8	15					
9	17					
10	18					
11	18					
12	19					
13	20					
14	22					
15	24					
16	26					
17						
18						
19						

The 95% confidence interval for the true population mean height is (13.877, 19.457).

Confidence Intervals Using the Normal Distribution

If we're working with larger samples (n≥ 30), we can assume that the sampling distribution of the sample mean is normally distributed thanks to the .

The following example shows how to calculate a confidence interval for the true population mean height (in inches) of a certain species of plant, using a sample of 30 plants:

	A	B	C	D	E	F
1	**Data**		**Sample mean**	23.500	=AVERAGE(A2:A31)	
2	8		**Sample std. dev**	8.186	=STDEV.S(A2:A31)	
3	11		**Sample Size**	30	=COUNTA(A2:A31)	
4	12					
5	13		**95% Lower CI**	20.571	=D1 - NORM.S.INV(0.975)*(D2/SQRT(D3))	
6	13		**95% Upper CI**	26.429	=D1 + NORM.S.INV(0.975)*(D2/SQRT(D3))	
7	14					
8	15					
9	17					
10	18					
11	18					
12	19					
13	20					
14	22					
15	24					
16	26					
17	26					
18	26					
19	26					
20	27					
21	27					
22	28					
23	29					
24	30					
25	31					
26	33					
27	33					
28	33					
29	34					
30	35					
31	37					

The 95% confidence interval for the true population mean height is (20.571, 26.429).

Note that larger confidence levels lead to wider confidence intervals. For example, here's how to calculate a 99% C.I. for the exact same data:

	A	B	C	D	E	F
1	**Data**		**Sample mean**	23.500	=AVERAGE(A2:A31)	
2	8		**Sample std. dev**	8.186	=STDEV.S(A2:A31)	
3	11		**Sample Size**	30	=COUNTA(A2:A31)	
4	12					
5	13		**95% Lower CI**	19.650	=D1 - NORM.S.INV(0.995)*(D2/SQRT(D3))	
6	13		**95% Upper CI**	27.350	=D1 + NORM.S.INV(0.995)*(D2/SQRT(D3))	
7	14					
8	15					
9	17					
10	18					
11	18					
12	19					
13	20					
14	22					
15	24					
16	26					
17	26					
18	26					
19	26					
20	27					
21	27					

The 99% confidence interval for the true population mean height is (19.650, 27.350).

Notice that this 99% confidence interval is wider than the 95% confidence interval we calculated earlier.

The following tutorials explain how to calculate confidence intervals using other statistical software: