

How to Calculate Confidence Intervals in Google Sheets: A Step-by-Step Guide

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To calculate confidence intervals in Google Sheets, you must first enter your data into the spreadsheet. Then, you can use the CONFIDENCE function to calculate the confidence interval for your data. This function requires three inputs - the significance level, the mean, and the standard deviation. Once those values are entered, you can use the function to calculate the desired confidence interval.

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:

$$\text{Confidence Interval} = x \pm t^*(s/\sqrt{n})$$

where:

x: sample mean

t: t-value that corresponds to the confidence level

s: sample standard deviation

n: 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 ($n \geq 30$), 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	G
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: