

MORE CONFIDENCE INTERVALS

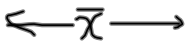
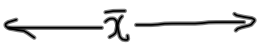
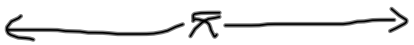
There are two parts to a confidence interval:

- the interval itself
- the confidence level

One is never given without the other, especially since the confidence level will affect the width of the interval.

How does the confidence level affect the width of the interval? Think of a number between 1 and 100. If I want to guess the number, I have a 1/100 chance of being correct. If I guess an interval, say between 50 and 75, then I have a 25% chance of being correct.

The wider the interval, the higher my confidence that the guess is correct.

Confidence Level	Interval Width
90%	
95%	
99%	

Example:

AP biology students tested the bacteria levels in the daycare. They chose 10 random locations, took swabs, and swiped these in prepared petri dishes to let the bacteria cultures grow. After 48 hrs, these were examined under a microscope and the bacteria count was recorded. The results are given. This bacteria population is known to have a growth pattern that follows a normal curve.

Dish#	1	2	3	4	5	6	7	8	9	10
Count	156	233	148	205	187	194	173	227	198	169

Determine the average bacteria count for the daycare with 95% confidence.

OPTION 1 => use 1-Var STATS => \bar{x} and s_x

$$CI = \bar{x} \pm z \frac{\sigma}{\sqrt{n}}$$

OPTION 2 => use the data to create the CI by using the calculator.

L1	L2	L3	1
156			
233			
148			
205			
187			
194			
173			

L1(1)=156

Interval
Incl: ~~USE~~ Stats
List: L1
Freq: 1
C-Level: .95
Calculate

TInterval
(168.81, 209.19)
 $\bar{x}=189$
 $s_x=28.22922048$
 $n=10$

① Check that the population is normal
or $n \geq 30$ → told that the bacteria growth followed a normal distribution.

② Enter data in L1
- could find \bar{x} and s_x using 1-Var STATS. => CI

OR
③ STATS | TESTS | T-interval
- use the data from L1

We are 95% confident that the mean bacteria count for the Day care is (168.81, 209.19) using this method.