

CONFIDENCE INTERVAL FOR A MEAN

STEP 1. Decide: “t” interval or “z” interval.

σ unknown – “t” interval

STAT > TESTS 8: TInterval

Inpt: Data **Stats**

~: sample mean

Sx: sample standard deviation

n: sample size

C-Level: degree of confidence

Output screen

TInterval

(lower endpoint , upper endpoint)

σ known – “z” interval

STAT > TESTS 7: ZInterval

Inpt: Data **Stats**

σ: population standard deviation

~: sample mean

n: sample size

C-Level: degree of confidence

Output screen

ZInterval

(lower endpoint , upper endpoint)

STEP 2. Interpret the confidence interval.

We are ____% confident that the *population* mean is between _____ and _____.

MARGIN OF ERROR CONFIDENCE INTERVAL

STEP 1. Find the 95% t-critical value (t_c) for a sample size, $n = 12$.

TI-84 calculator path - 2nd VARS (DISTR)

4: invT

area: 1.95/2

df: degrees of freedom ($n - 1$) = 11

$$\text{invT}(1.95/2, 11) = 2.200985143$$

OR from the t-Distribution Critical Value table

	confidence level				
df	80%	90%	95%	98%	99%
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.719	2.681	3.055

STEP 2. Use 2.201 for t_c and n and s_x to calculate the margin of error.

$$M.E. = t_c * \frac{s_x}{\sqrt{n}}$$

$$\text{confidence interval} = \bar{x} \pm M.E.$$

Note: Increasing the level of confidence widens the interval giving a larger margin of error. Conversely, increasing the sample size decreases the margin of error, narrowing the interval.

To find margin of error with calculator output

$$\text{Margin of Error} = \frac{\text{upper endpoint} - \text{lower endpoint}}{2}$$