WILLIAM D. LAW, JR.
LEARNING **COMMONS**

CONFIDENCE INTERVAL FOR A MEAN

STEP 1. Decide: "*t*" interval or "*z*" interval.

ð 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 **)**

ð known – "*z*" interval

STAT > TESTS **7: ZInterval**

Inpt: Data **Stats**
ð: 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 ________.

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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 $(n-1) = \mathbf{11}$

invT(1.95/2,11) = 2.2OO985143

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.

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

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

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

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