

CONFIDENCE INTERVALS USING THE T-DISTRIBUTION

TI-83 INSTRUCTIONS

These instructions show how to calculate a confidence interval for the mean of a population from the statistics of a sample.

A random sample of 8 independent observations of a normal random variable was taken. The sum of the observations was found to be 72.8 and the sum of the squares was found to be 837.49.

An unbiased estimate of the population mean and population standard deviation can be calculated as follows:

$$\begin{aligned}\bar{x} &= \frac{\sum x}{n} = \frac{72.8}{8} = 9.1 \\ s_n^2 &= \frac{\sum x^2}{n} - \bar{x}^2 = \frac{837.49}{8} - 9.1^2 = 21.876 \\ s_{n-1}^2 &= \frac{n}{n-1} s_n^2 = \frac{8}{7} \cdot 21.876 = 25.00 \\ s_{n-1} &= 5.00\end{aligned}$$

Once these values are found, a 90% confidence interval for the population mean can be found using the following steps:

Step 1: Press **STAT** and use **▶** to scroll to **TESTS** and then choose **8:TInterval**.

```
EDIT CALC TESTS
3↑2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7:ZInterval...
8:TInterval...
9↓2-SampZInt...
```

Step 2: Set up the screen as shown to calculate the 90% confidence interval.

```
TInterval
Inpt:Data Stats
 $\bar{x}$ :9.1
Sx:5.000142855
n:8
C-Level:.9
Calculate
```

Step 3: Highlight **Calculate** and press **ENTER**.

```
TInterval
(5.7507,12.449)
 $\bar{x}$ =9.1
Sx=5.000142855
n=8
```

So, we are 90% confident that the population mean lies between 5.7507 and 12.449 grams.