Confidence Intervals – One Sample

You can use the TI-83/84 calculator to calculate confidence intervals for population means (both when σ is known and unknown) as well as population proportions.

Press STAT and arrow over to the **TESTS** menu. Scroll down to find

7: ZInterval for the confidence interval for the population mean μ when σ (*population* standard deviation) is known

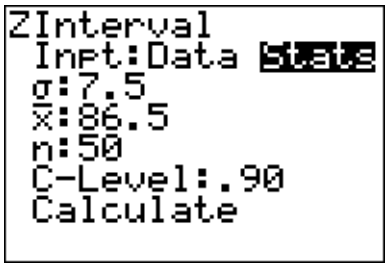
8: TInterval for the confidence interval for the population mean μ when σ is unknown

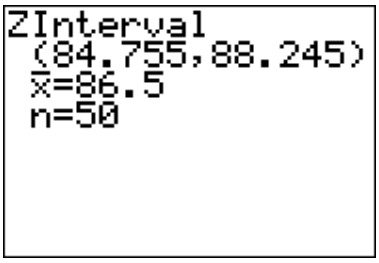
A: 1-PropZInt for the confidence interval for the population proportion *p*

Confidence Interval for the Population Mean μ (When σ is Known)

Example: Suppose a random sample of 50 pigs at a local farm result in a mean weight of 86.5 lbs. The population standard deviation is known to be 7.5 lbs. Calculate the 90% confidence interval for the population mean.

Since the population standard deviation is known and the sample size is greater than 40, use the Normal Distribution (*z*). Press STAT and arrow down to **7: ZInterval**. Highlight **Stats** and input the population standard deviation, sample mean, sample size, and confidence level. Highlight **Calculate** and press ENTER. The confidence interval is displayed in parentheses along with the sample mean and sample size.





Confidence Interval for the Population Mean μ (When σ is Unknown)

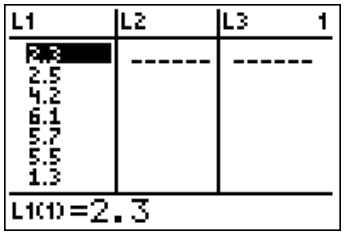
Example: *Consumer Reports* gave the following information about the life (hours) of size AA batteries in toys:

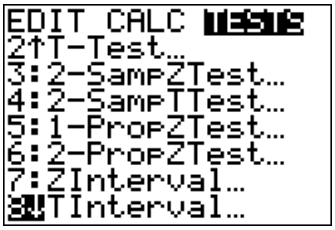
2.3	2.5	4.2	6.1	5.7	5.5	1.3	1.5

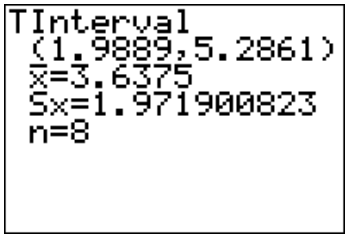
Assume that the population of battery lives is approximately a normal distribution. Find a 95% confidence interval for the mean life in hours for all AA batteries used in toys.

Since σ is unknown, the sample size is also less than 40, and the population is approximately normally distributed, use the t-distribution.

First, enter the data in list L_1. Then go to STAT and arrow to **TESTS** to choose **8: TInterval**. Since we entered our data in list L_1, highlight **Data**. Then enter L_1 as the List (press 2nd 1) and 95% as our confidence level. Highlight **Calculate** and press ENTER. The confidence interval is displayed in parentheses along with the sample mean, sample standard deviation and sample size.







Confidence Interval for the Population Proportion, *p*

Example: Suppose a random sample of 40 community college students shows that 25% have enrolled in one or more on-line classes. Calculate the 92% confidence interval for the population proportion.

Press STAT and select **A:1-PropZInt** for the confidence interval for the population proportion *p*. Enter the number of successes *x* (must be a whole number! Round to a whole number if this calculation results in a decimal value), the sample size *n*, and the confidence level C. Highlight **Calculate** and press ENTER. The confidence interval is displayed in parentheses along with the point estimate $\hat{p}$ and sample size.