

Using the TI-83 to Find Confidence Intervals

You can use the TI-83 calculator to find confidence intervals for population means (both large and small samples) as well as population proportions.

Hit STAT and arrow over to the TESTS menu. We will use 7: ZInterval for the large sample ($n \geq 30$) confidence interval for the population mean μ and 8: TInterval for the small sample ($n < 30$, σ unknown) confidence interval for the population mean μ . We will use A:1—PropZInt for the confidence interval for the population proportion p .

```
EDIT CALC TESTS
6↑2-PropZTest...
7:ZInterval...
8:TInterval...
9:2-SampZInt...
0:2-SampTInt...
A:1-PropZInt...
B↓2-PropZInt...
```

Confidence Interval for the Population Mean μ (Large Samples)

Example: Dr. Edgar Anderson was a botanist who collected vast amounts of data for several species of wild iris. *Iris virginica*, a lovely wildflower spread over most of the American continent and much of Europe, is one species Dr. Anderson studied. His friend R.A. Fisher published the data in a paper entitled "The Use of Multiple Measurements in Taxonomic Problems." For a sample of 50 *Iris virginica*,

- The sample mean petal length was $\bar{X} = 5.55$ cm with a sample standard deviation $s = 0.57$ cm. Compute an 85% confidence interval for the population mean petal length.
- The sample mean petal length was $\bar{X} = 2.03$ cm with a sample standard deviation $s = 0.27$ cm. Compute a 90% confidence interval for the population mean petal length.

Since our sample size is $n = 50$, we will use the normal distribution for (a) and (b).

- Select Stats from the ZInterval and input the standard deviation, sample mean, sample size, and confidence level. Highlight Calculate and hit the ENTER key. The confidence interval is displayed in parentheses along with the sample mean and sample size.

```
EDIT CALC TESTS
6↑2-PropZTest...
7:ZInterval...
8:TInterval...
9:2-SampZInt...
0:2-SampTInt...
A:1-PropZInt...
B↓2-PropZInt...
```

```
ZInterval
Inpt:Data STAT
σ: .57
x: 5.55
n: 50
C-Level: .85
Calculate
```

```
ZInterval
(5.4340, 5.6660)
x=5.5500
n=50.0000
```

- Use the same procedure as above, except use a 90% confidence level.

```
EDIT CALC TESTS
5↑1-PropZTest...
6:2-PropZTest...
7:ZInterval...
8:TInterval...
9:2-SampZInt...
0:2-SampTInt...
A↓1-PropZInt...
```

```
ZInterval
Inpt:Data STAT
σ: .27
x: 2.03
n: 50
C-Level: .9
Calculate
```

```
ZInterval
(1.9672, 2.0928)
x=2.0300
n=50.0000
```

Confidence Interval for the Population Mean μ (Small Samples)

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
5.3	1.8	1.9	5.2	1.8	5.1	1.6	5.4

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

Since $n < 30$, σ is unknown, and the population is approximately normally distributed, use the t-distribution.

(c) First, enter the data in list L1. Then use 8: TInterval from the TESTS menu. Since we entered our data in list L1, use the data option, selecting L1 as the list and 95% as our confidence level. Highlight Calculate and hit the ENTER key. The confidence interval is displayed in parentheses along with the sample mean, sample standard deviation and sample size.

L1	L2	L3	1
2.3000	-----	-----	
2.5000			
4.2000			
6.1000			
5.7000			
5.5000			
1.3000			
L1(n)=2.3			

```

EDIT CALC TESTS
6↑2-PropZTest...
7:ZInterval...
8:TInterval...
9:2-SampZInt...
0:2-SampTInt...
A:1-PropZInt...
B↓2-PropZInt...
    
```

```

TInterval
Inpt:DATA Stats
List:L1
Freq:1
C-Level:.95
Calculate
    
```

```

TInterval
(2.5874, 4.5626)
x̄=3.5750
Sx=1.8535
n=16.0000
    
```

Confidence Interval for the Population Proportion, p

Example: In a survey of 2503 men and women aged 18 to 75 years and representative of the nation as a whole, 1927 people said the homeless are not adequately assisted by the government. Find a point estimate and a 90% confidence interval for the proportion p of adults in the general population who agree that the homeless are not adequately assisted by the government.

Select A:1—PropZInt for the confidence interval for the population proportion p. Enter the number of successes x, the sample size and the confidence level. Highlight Calculate and hit the ENTER key. The confidence interval is displayed in parentheses along with the point estimate \hat{p} and sample size.

```

EDIT CALC TESTS
8↑TInterval...
9:2-SampZInt...
0:2-SampTInt...
A:1-PropZInt...
B:2-PropZInt...
C:X²-Test...
D↓2-SampFTest...
    
```

```

1-PropZInt
x:1927
n:2503
C-Level:.9
Calculate
    
```

```

1-PropZInt
(.7560, .7837)
p̂=.7699
n=2503.0000
    
```