

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.

STAT

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

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

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

STAT

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**

ENTER

and press **ENTER**. The confidence interval is displayed in parentheses along with the sample mean and sample size.

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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  Stats
σ:7.5
x̄:86.5
n:50
C-Level:.90
Calculate
    
```

```

ZInterval
(84.755,88.245)
x̄=86.5
n=50
    
```

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
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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 L₁. Then go to **STAT** and arrow to **TESTS** to choose **8: TInterval**. Since we entered our data in list L₁, highlight **Data**. Then enter L₁ 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.

<pre>L1 L2 L3 1 2.5 4.2 6.1 5.7 5.5 1.3 L1(1)=2.3</pre>	<pre>EDIT CALC TESTS 2↑T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 8:TInterval...</pre>	<pre>TInterval Inpt:DATA Stats List:L1 Freq:1 C-Level:.95</pre>	<pre>TInterval (1.9889,5.2861) x̄=3.6375 Sx=1.971900823 n=8</pre>
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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.

<pre>EDIT CALC TESTS 5↑1-PropZTest... 6:2-PropZTest... 7:ZInterval... 8:TInterval... 9:2-SampZInt... 0:2-SampTInt... 1-PropZInt...</pre>	<pre>1-PropZInt x:40*.25 n:40 C-Level:.92 Calculate</pre>	<pre>1-PropZInt x:10 n:40 C-Level:.92 Calculate</pre>	<pre>1-PropZInt (.13014,.36986) p̂=.25 n=40</pre>
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