

Statistics Intervals and Tests on the TI-83/84

The TI-83/84 family of graphing calculators comes equipped with many statistics functions, from simple computations to complex tests. We will discuss in this handout several tests and confidence intervals commonly used in statistics courses. The steps below are nearly identical across all TI-83's and TI-84's with two exceptions. First, this handout focuses on the TI-83 Plus and higher. If you are using the original TI-83 (without "Plus" in the title) then the keyboard layout is slightly different; you may need to modify the directions on this handout accordingly. Second, the latest update to the TI-84 (currently version 2.55MP) introduced a Statistics Wizard, which greatly simplified the usage of many statistics functions. To find out if your TI-84 has the latest update, press $\boxed{2\text{nd}}$ \rightarrow $\boxed{+}$ for "MEM" \rightarrow $\boxed{\text{ENTER}}$ for the "About" screen. The version number will be under "TI-84 Plus". Press $\boxed{2\text{nd}}$ \rightarrow $\boxed{\text{MODE}}$ for "QUIT" to exit back to the Home screen.

Most of the directions on this handout present a side-by-side comparison between different versions of the TI-83/84 graphing calculator family. Simply follow the screenshots that match your device. Also, the menus shown in the screenshots will differ slightly between the TI-83 and TI-84. For compatibility reasons, most of these screenshots were captured from the TI-83 Plus.

Entering and Editing Data in a List

ALL

We input or edit data in the calculator via the List Editor. Press $\boxed{\text{STAT}}$ to enter the Statistics menu, then press $\boxed{\text{ENTER}}$ for "Edit..."

```

STAT CALC TESTS
1:Edit...
2:SortA(
3:SortD(
4:ClrList
5:SetUpEditor
    
```

We will be using two lists of values for this entire handout. Enter into the first list (L_1) the values 16, 20, 5, 8, 1, 19, 3, 1, 11, and 18 by typing each number and then pressing $\boxed{\text{ENTER}}$. That is, 16 \rightarrow $\boxed{\text{ENTER}}$ \rightarrow 20 \rightarrow $\boxed{\text{ENTER}}$... Press the $\boxed{\rightarrow}$ key to scroll over to the second list. As with L_1 , enter the values 25, 10, 10, 7, 6, 20, 5, 13, 11, and 25 into L_2 . You should now see the screen on the right. To exit the List Editor, press $\boxed{2\text{nd}}$ \rightarrow $\boxed{\text{MODE}}$ for "QUIT".

L1	L2	L3	2
1	6		
19	20		
3	5		
1	13		
11	11		
18	25		
-----	-----		
L2(1) =			

Confidence Intervals

All of the following examples are listed in the calculator's "Tests" statistics menu. To access this menu, press **[STAT]** → **[▶]** → **[▶]** for the "TESTS" menu.

Most of the confidence intervals demonstrated here have two modes, "Data" and "Stats". The "Data" mode performs computations on lists entered via the calculator's List Editor. The "Stats" mode performs computations on provided information (like mean and standard deviation) when the actual data is not given.

Unless otherwise stated, the "Data" mode in the following examples will utilize the L_1 and L_2 lists previously entered. Also, the examples will begin with the "Data" mode first and then "Stats". To switch between these two modes, use the left and right arrow keys to select the desired mode and press **[ENTER]**.

Z-Interval – 1 SAMPLE, σ KNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to "ZInterval..." and press [ENTER].</p>	<pre> EDIT CALC TESTS 1:Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... ZInterval... </pre>	<pre> EDIT CALC TESTS 1:Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... ZInterval... </pre>
<p>In the "Data" mode, input the population standard deviation, a list into "List:" (we used L_1), and a confidence level into "C-Level:" (we used the default 95%). Scroll down to "Calculate" and press [ENTER]. The confidence interval, sample mean, sample standard deviation, and sample size will be displayed on the screen.</p>	<pre> ZInterval Inpt:DATA Stats σ:5 List:L1 Freq:1 C-Level:.95 Calculate ZInterval (7.101,13.299) \bar{x}=10.2 Sx=7.612854626 n=10 </pre>	<pre> ZInterval Inpt:DATA Stats σ:5 List:L1 Freq:1 C-Level:.95 Calculate ZInterval (7.101,13.299) \bar{x}=10.2 Sx=7.612854626 n=10 </pre>
<p>In the "Stats" mode, input the population standard deviation, sample mean, and sample size. Then input the confidence level into "C-Level:" (we used the default 95%). Scroll down to "Calculate" and press [ENTER]. The confidence interval, sample mean and sample size will be displayed on the screen.</p>	<pre> ZInterval Inpt:Data Stats σ:5 \bar{x}:10.2 n:10 C-Level:.95 Calculate ZInterval (7.101,13.299) \bar{x}=10.2 n=10 </pre>	<pre> ZInterval Inpt:Data Stats σ:5 \bar{x}:10.2 n:10 C-Level:.95 Calculate ZInterval (7.101,13.299) \bar{x}=10.2 n=10 </pre>

Z-Interval – FOR $\mu_1 - \mu_2$, σ 'S KNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to “2-SampZInt...” and press ENTER.</p>	<pre> EDIT CALC TESTS 3↑2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 8:TInterval... 22-SampZInt... </pre>	<pre> EDIT CALC TESTS 3↑2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 8:TInterval... 22-SampZInt... </pre>
<p>In the “Data” mode, input both population standard deviations, a list into “List1:” (we used L₁), and a list into “List2:” (we used L₂). Scroll down and input a confidence level into “C-Level:” (we used the default 95%). Scroll down to “Calculate” and press ENTER.</p>	<pre> 2-SampZInt Inpt:DATA Stats σ1:5 σ2:2 List1:L1 List2:L2 Freq1:1 ↓Freq2:1 C-Level:.95 Calculate </pre>	<pre> 2-SampZInt Inpt:DATA Stats σ1:5 σ2:2 List1:L1 List2:L2 Freq1:1 ↓Freq2:1 C-Level:.95 Calculate </pre>
<p>The confidence interval, both sample means, both sample standard deviations, and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre> 2-SampZInt (-6.338,.3377) x̄1=10.2 x̄2=13.2 Sx1=7.61285463 Sx2=7.50999334 ↓n1=10 n2=10 </pre>	<pre> 2-SampZInt (-6.338,.3377) x̄1=10.2 x̄2=13.2 Sx1=7.61285463 Sx2=7.50999334 ↓n1=10 n2=10 </pre>
<p>In the “Stats” mode, input both population standard deviations, the first sample mean and sample size then the second sample mean and sample size. Then scroll down and input the confidence level into “C-Level:” (we used the default 95%). Scroll down to “Calculate” and press ENTER.</p>	<pre> 2-SampZInt Inpt:Data STATS σ1:5 σ2:2 x̄1:10.2 n1:10 x̄2:13.2 ↓n2:10 C-Level:.95 Calculate </pre>	<pre> 2-SampZInt Inpt:Data STATS σ1:5 σ2:2 x̄1:10.2 n1:10 x̄2:13.2 ↓n2:10 C-Level:.95 Calculate </pre>
<p>The confidence interval, both sample means and sample sizes will be displayed on the screen.</p>	<pre> 2-SampZInt (-6.338,.3377) x̄1=10.2 x̄2=13.2 n1=10 n2=10 </pre>	<pre> 2-SampZInt (-6.338,.3377) x̄1=10.2 x̄2=13.2 n1=10 n2=10 </pre>

T-Interval – 1 SAMPLE, σ UNKNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to “TInterval...” and press ENTER.</p>	<pre> EDIT CALC TESTS 2↑T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 2TInterval... </pre>	<pre> EDIT CALC TESTS 2↑T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 2TInterval... </pre>
---	---	---

<p>In the "Data" mode, input a list into "List:" (we used L₁), and a confidence level into "C-Level:" (we used the default 95%). Scroll down to "Calculate" and press ENTER. The confidence interval, sample mean, sample standard deviation, and sample size will be displayed on the screen.</p>	<pre>TInterval Inpt:DATA Stats List:L1 Freq:1 C-Level:.95 Calculate TInterval (4.7541,15.646) x̄=10.2 Sx=7.612854626 n=10</pre>	<pre>TInterval Inpt:DATA Stats List:L1 Freq:1 C-Level:.95 Calculate TInterval (4.7541,15.646) x̄=10.2 Sx=7.612854626 n=10</pre>
<p>In the "Stats" mode, input the sample mean, sample standard deviation, and sample size. Then input the confidence level into "C-Level:" (we used the default 95%). Scroll down to "Calculate" and press ENTER. The confidence interval, sample mean, sample standard deviation, and sample size will be displayed on the screen.</p>	<pre>TInterval Inpt:Data STATS x̄:10.2 Sx:7.61285 n:10 C-Level:.95 Calculate TInterval (4.7541,15.646) x̄=10.2 Sx=7.61285 n=10</pre>	<pre>TInterval Inpt:Data STATS x̄:10.2 Sx:7.61285 n:10 C-Level:.95 Calculate TInterval (4.7541,15.646) x̄=10.2 Sx=7.61285 n=10</pre>

T-Interval – FOR $\mu_1 - \mu_2$, σ 'S UNKNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to "2-SampTInt..." and press ENTER.</p>	<pre>EDIT CALC TESTS 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 8:TInterval... 9:2-SampZInt... 0:2-SampTInt...</pre>	<pre>EDIT CALC TESTS 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7:ZInterval... 8:TInterval... 9:2-SampZInt... 0:2-SampTInt...</pre>
<p>In the "Data" mode, input a list into "List1:" (we used L₁), a list into "List2:" (we used L₂), and a confidence level into "C-Level:" (we used the default 95%). For "Pooled:", leave as "No" unless you are assuming equal population standard deviations. Scroll down to "Calculate" and press ENTER.</p>	<pre>2-SampTInt Inpt:DATA Stats List1:L1 List2:L2 Freq1:1 Freq2:1 C-Level:.95 ↓Pooled: NO Yes Pooled: NO Yes Calculate</pre>	<pre>2-SampTInt Inpt:DATA Stats List1:L1 List2:L2 Freq1:1 Freq2:1 C-Level:.95 ↓Pooled: NO Yes Pooled: NO Yes Calculate</pre>
<p>The confidence interval, degrees of freedom, both sample means, both sample standard deviations, and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre>2-SampTInt (-10.1,4.1047) df=17.99666997 x̄1=10.2 x̄2=13.2 Sx1=7.61285463 ↓Sx2=7.50999334 n1=10 n2=10</pre>	<pre>2-SampTInt (-10.1,4.1047) df=17.99666997 x̄1=10.2 x̄2=13.2 Sx1=7.61285463 ↓Sx2=7.50999334 n1=10 n2=10</pre>

In the “Stats” mode, input the first sample mean, sample standard deviation and sample size, then the second sample mean, sample standard deviation and sample size. Then scroll down and input the confidence level into “C-Level:” (we used the default 95%). For “Pooled:”, leave as “No” unless you are assuming equal population standard deviations. Scroll down to “Calculate” and press **ENTER**.

```
2-SampTInt
Inpt:Data Stats
x1:10.2
Sx1:7.61285
n1:10
x2:13.2
Sx2:7.50999
↓n2:10

C-Level:.95
Pooled: Yes
Calculate
```

```
2-SampTInt
Inpt:Data Stats
x1:10.2
Sx1:7.61285
n1:10
x2:13.2
Sx2:7.50999
↓n2:10

C-Level:.95
Pooled: Yes
Calculate
```

The confidence interval, degrees of freedom, both sample means, both sample standard deviations, and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.

```
2-SampTInt
(-10.1,4.1047)
df=17.99667005
x1=10.2
x2=13.2
Sx1=7.61285
↓Sx2=7.50999

n1=10
n2=10
```

```
2-SampTInt
(-10.1,4.1047)
df=17.99667005
x1=10.2
x2=13.2
Sx1=7.61285
↓Sx2=7.50999

n1=10
n2=10
```

Proportion Z-Interval – 1 SAMPLE

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

In the Tests menu, scroll down to “1-PropZInt...” and press **ENTER**.

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

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

Input the x value and the sample size n . Then input the confidence level into “C-Level:” (we used the default 95%). Scroll down to “Calculate” and press **ENTER**.

```
1-PropZInt
x:40
n:100
C-Level:.95
Calculate
```

```
1-PropZInt
x:40
n:100
C-Level:.95
Calculate
```

The confidence interval, sample proportion, and the sample size will be displayed on the screen.

```
1-PropZInt
(.30398,.49602)
p=.4
n=100
```

```
1-PropZInt
(.30398,.49602)
p=.4
n=100
```

Proportion Z-Interval – FOR p_1-p_2

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to “2-PropZInt...” and press ENTER.</p>	<pre> EDIT CALC TESTS 6↓2-PropZTest... 7:ZInterval... 8:TInterval... 9:2-SampZInt... 0:2-SampTInt... A:1-PropZInt... 3↓2-PropZInt... </pre>	<pre> EDIT CALC TESTS 6↓2-PropZTest... 7:ZInterval... 8:TInterval... 9:2-SampZInt... 0:2-SampTInt... A:1-PropZInt... 3↓2-PropZInt... </pre>
<p>Input the first x value and sample size, then the second x value and sample size. Then input the confidence level into “C-Level:” (we used the default 95%). Scroll down to “Calculate” and press ENTER.</p>	<pre> 2-PropZInt x1:35 n1:100 x2:15 n2:40 C-Level:.95 Calculate </pre>	<pre> 2-PropZInt x1:35 n1:100 x2:15 n2:40 C-Level:.95 Calculate </pre>
<p>The confidence interval, both sample proportions, and both sample sizes will be displayed on the screen.</p>	<pre> 2-PropZInt (-.2018,.15177) p1=.35 p2=.375 n1=100 n2=40 </pre>	<pre> 2-PropZInt (-.2018,.15177) p1=.35 p2=.375 n1=100 n2=40 </pre>

Tests

All of the following examples are listed in the calculator’s “Tests” statistics menu. To access this menu, press **STAT** → **▶** → **▶** for the “TESTS” menu.

Most of the tests demonstrated here have two modes, “Data” and “Stats”. The “Data” mode performs computations on lists entered via the calculator’s List Editor. The “Stats” mode performs computations on provided information (like mean and standard deviation) when the actual data is not given.

Unless otherwise stated, the “Data” mode in the following examples will utilize the L_1 and L_2 lists entered at the beginning of this handout. Also, the examples will begin with the “Data” mode first and then “Stats”. To switch between these two modes, use the left and right arrow keys to select the desired mode and press **ENTER**.

Z-Test – 1 SAMPLE, σ KNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, make sure “ZTest...” is selected and press ENTER.</p>	<pre> EDIT CALC TESTS 1↓Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7↓ZInterval... </pre>	<pre> EDIT CALC TESTS 1↓Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7↓ZInterval... </pre>
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In the "Data" mode, input the population mean, population standard deviation, and a list into "List:" (we used L₁). Then choose an alternative hypothesis (we used the default two-tail). Scroll down to "Calculate" and press **ENTER**. The test statistic, *p*-value, sample mean, sample standard deviation and sample size will be displayed on the screen.

```
Z-Test
Inpt: DATA Stats
μ₀:12
σ:3
List:L₁
Freq:1
μ:≠μ₀ <μ₀ >μ₀
Calculate Draw

Z-Test
μ#12
z=-1.897366596
P=.0577794376
x̄=10.2
Sx=7.612854626
n=10
```

```
Z-Test
Inpt: DATA Stats
μ₀:12
σ:3
List:L₁
Freq:1
μ:≠μ₀ <μ₀ >μ₀
Calculate Draw

Z-Test
μ#12
z=-1.897366596
P=.0577794376
x̄=10.2
Sx=7.612854626
n=10
```

In the "Stats" mode, input the population mean, population standard deviation, sample mean and sample size. Then choose an alternative hypothesis (we used the default two-tail). Scroll down to "Calculate" and press **ENTER**. The test statistic, *p*-value, sample mean and sample size will be displayed on the screen.

```
Z-Test
Inpt:Data Stats
μ₀:12
σ:3
x̄:10.2
n:10
μ:≠μ₀ <μ₀ >μ₀
Calculate Draw

Z-Test
μ#12
z=-1.897366596
P=.0577794376
x̄=10.2
n=10
```

```
Z-Test
Inpt:Data Stats
μ₀:12
σ:3
x̄:10.2
n:10
μ:≠μ₀ <μ₀ >μ₀
Calculate Draw

Z-Test
μ#12
z=-1.897366596
P=.0577794376
x̄=10.2
n=10
```

Z-Test – FOR $\mu_1 = \mu_2$, σ 'S KNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

In the Tests menu, scroll down to "2-SampZTest..." and press **ENTER**.

```
EDIT CALC TESTS
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7↓ZInterval...
```

```
EDIT CALC TESTS
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7↓ZInterval...
```

In the "Data" mode, input the first and second population standard deviations, a list into "List1:" (we used L₁) and a list into "List2:" (we used L₂). Then scroll down and choose an alternative hypothesis (we used the default two-tail). Scroll down to "Calculate" and press **ENTER**.

```
2-SampZTest
Inpt: DATA Stats
σ1:5
σ2:2
List1:L₁
List2:L₂
Freq1:1
↓Freq2:1
μ1:≠μ2 <μ2 >μ2
Calculate Draw
```

```
2-SampZTest
Inpt: DATA Stats
σ1:5
σ2:2
List1:L₁
List2:L₂
Freq1:1
↓Freq2:1
μ1:≠μ2 <μ2 >μ2
Calculate Draw
```

<p>The test statistic, p-value, both sample means, both sample standard deviations and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre>2-SampZTest μ1≠μ2 z=-1.761660659 P=.0781265567 x̄1=10.2 x̄2=13.2 ↓Sx1=7.61285463 Sx2=7.50999334 n1=10 n2=10</pre>	<pre>2-SampZTest μ1≠μ2 z=-1.761660659 P=.0781265567 x̄1=10.2 x̄2=13.2 ↓Sx1=7.61285463 Sx2=7.50999334 n1=10 n2=10</pre>
<p>In the “Stats” mode, input both population standard deviations, the first sample mean and sample size, and then the second sample mean and sample size. Then scroll down and choose an alternative hypothesis (we used the default two-tail). Scroll down to “Calculate” and press ENTER.</p>	<pre>2-SampZTest Inpt:Data Stats σ1:5 σ2:2 x̄1:10.2 n1:10 x̄2:13.2 ↓n2:10 μ1:≠μ2 <μ2 >μ2 Calculate Draw</pre>	<pre>2-SampZTest Inpt:Data Stats σ1:5 σ2:2 x̄1:10.2 n1:10 x̄2:13.2 ↓n2:10 μ1:≠μ2 <μ2 >μ2 Calculate Draw</pre>
<p>The test statistic, p-value, both sample means and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre>2-SampZTest μ1≠μ2 z=-1.761660659 P=.0781265567 x̄1=10.2 x̄2=13.2 ↓n1=10 n2=10</pre>	<pre>2-SampZTest μ1≠μ2 z=-1.761660659 P=.0781265567 x̄1=10.2 x̄2=13.2 ↓n1=10 n2=10</pre>

T-Test – 1 SAMPLE, σ UNKNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to “TTest...” and press ENTER.</p>	<pre>EDIT CALC TESTS 1:Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7↓ZInterval...</pre>	<pre>EDIT CALC TESTS 1:Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 6:2-PropZTest... 7↓ZInterval...</pre>
<p>In the “Data” mode, input the population mean and a list into “List:” (we used L_1). Then choose an alternative hypothesis (we used the default two-tail). Scroll down to “Calculate” and press ENTER. The test statistic, p-value, sample mean, sample standard deviation and sample size will be displayed on the screen.</p>	<pre>T-Test Inpt:DATA Stats μ0:12 List:L1 Freq:1 μ:≠μ0 <μ0 >μ0 Calculate Draw T-Test μ≠12 t=-.7476958471 P=.4737262235 x̄=10.2 Sx=7.612854626 n=10</pre>	<pre>T-Test Inpt:DATA Stats μ0:12 List:L1 Freq:1 μ:≠μ0 <μ0 >μ0 Calculate Draw T-Test μ≠12 t=-.7476958471 P=.4737262235 x̄=10.2 Sx=7.612854626 n=10</pre>

In the “Stats” mode, input the population mean, sample mean, sample standard deviation and sample size. Then choose an alternative hypothesis (we used the default two-tail). Scroll down to “Calculate” and press **ENTER**. The test statistic, p -value, sample mean, sample standard deviation and sample size will be displayed on the screen.

```
T-Test
Inpt:Data Stats
μ:12
x̄:10.2
Sx:7.61285
n:10
μ:≠12 <μ₀ >μ₀
Calculate Draw
```

```
T-Test
Inpt:Data Stats
μ:12
x̄:10.2
Sx:7.61285
n:10
μ:≠12 <μ₀ >μ₀
Calculate Draw
```

```
T-Test
μ≠12
t=-.7476963014
P=.4737259627
x̄=10.2
Sx=7.61285
n=10
```

```
T-Test
μ≠12
t=-.7476963014
P=.4737259627
x̄=10.2
Sx=7.61285
n=10
```

T-Test – FOR $\mu_1 = \mu_2$, σ 'S UNKNOWN

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

In the Tests menu, scroll down to “2-SampTTest...” and press **ENTER**.

```
EDIT CALC TESTS
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7↓ZInterval...
```

```
EDIT CALC TESTS
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7↓ZInterval...
```

In the “Data” mode, input a list into “List1:” (we used L_1) and a list into “List2:” (we used L_2). Then choose an alternative hypothesis (we used the default two-tail). For “Pooled:”, leave as “No” unless you are assuming equal population standard deviations. Scroll down to “Calculate” and press **ENTER**.

```
2-SampTTest
Inpt:DATA Stats
List1:L1
List2:L2
Freat:1
Frea2:1
μ1:≠μ2 <μ2 >μ2
↓Pooled:NO Yes
Pooled:NO Yes
Calculate Draw
```

```
2-SampTTest
Inpt:DATA Stats
List1:L1
List2:L2
Freat:1
Frea2:1
μ1:≠μ2 <μ2 >μ2
↓Pooled:NO Yes
Pooled:NO Yes
Calculate Draw
```

The test statistic, p -value, degrees of freedom, both sample means, both sample standard deviations and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.

```
2-SampTTest
μ1≠μ2
t=-.887140938
P=.3867053887
df=17.99666997
x̄1=10.2
↓x̄2=13.2
Sx1=7.61285463
Sx2=7.50999334
n1=10
n2=10
```

```
2-SampTTest
μ1≠μ2
t=-.887140938
P=.3867053887
df=17.99666997
x̄1=10.2
↓x̄2=13.2
Sx1=7.61285463
Sx2=7.50999334
n1=10
n2=10
```

In the “Stats” mode, input both sample means, sample standard deviations, and sample sizes. Then scroll down and choose an alternative hypothesis (we used the default two-tail). For “Pooled:”, leave as “No” unless you are assuming equal population standard deviations. Scroll down to “Calculate” and press **ENTER**.

```
2-SampTTest
Inpt:Data Stats
x1:10.2
Sx1:7.61285
n1:10
x2:13.2
Sx2:7.50999
↓n2:10
μ1:≠μ2 <μ2 >μ2
Pooled:NO Yes
Calculate Draw
```

```
2-SampTTest
Inpt:Data Stats
x1:10.2
Sx1:7.61285
n1:10
x2:13.2
Sx2:7.50999
↓n2:10
μ1:≠μ2 <μ2 >μ2
Pooled:NO Yes
Calculate Draw
```

The test statistic, p -value, degrees of freedom, both sample means, both sample standard deviations and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.

```

2-SampTTest
μ1≠μ2
t=-.8871414059
P=.3867051434
df=17.99667005
x̄1=10.2
x̄2=13.2

Sx1=7.61285
Sx2=7.50999
n1=10
n2=10
    
```

```

2-SampTTest
μ1≠μ2
t=-.8871414059
P=.3867051434
df=17.99667005
x̄1=10.2
x̄2=13.2

Sx1=7.61285
Sx2=7.50999
n1=10
n2=10
    
```

T-Test – FOR PAIRED SAMPLES

To run a test on paired samples, we must first compute the difference between these samples. Let's say that our paired sample data is stored in L₁ and L₂. In the List Editor, press \blacktriangleright till you get to L₃, then \blacktriangle to highlight the "L3" name. Press $\text{2nd} \rightarrow \text{1} \rightarrow \text{[-]} \rightarrow \text{2nd} \rightarrow \text{2}$ to paste "L₁-L₂" onto the screen. Press ENTER .

ALL

```

|L2| |L3| 3
|25| |----|
|10|
|40|

L3=L1-L2
    
```

The list L₃ will become populated with the difference between L₁ and L₂. We finish the paired samples test by running the One Sample T-Test on L₃.

```

L1 |L2| |L3| 3
16 |25| |19|
20 |10| |10|
5  |10| | -5|
8  |7  | |1  |
1  |6  | | -5|
19 |20| | -1|
3  |5  | | -2|

L3(1)=-9
    
```

Proportion Z Test – 1 SAMPLE

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

In the Tests menu, scroll down to "1-PropZTest..." and press ENTER .

```

EDIT CALC TESTS
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7:ZInterval...
    
```

```

EDIT CALC TESTS
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7:ZInterval...
    
```

Input the population proportion, the x value, and the sample size n . Then choose an alternative hypothesis (we used the default two-tail). Scroll down to "Calculate" and press ENTER .

```

1-PropZTest
P0:.3
x:40
n:100
PROPTP0 <P0 >P0
Calculate Draw
    
```

```

1-PropZTest
P0:.3
x:40
n:100
PROPTP0 <P0 >P0
Calculate Draw
    
```

The test statistic, p -value, sample proportion, and sample size will be displayed on the screen.

```

1-PropZTest
PROPT.3
z=2.182178902
P=.0290962284
P̂=.4
n=100
    
```

```

1-PropZTest
PROPT.3
z=2.182178902
P=.0290962284
P̂=.4
n=100
    
```

Proportion Z Test – FOR $p_1=p_2$

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to “2-PropZTest...” and press ENTER.</p>	<pre>EDIT CALC TESTS 1:Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 2:2-PropZTest... 7↓ZInterval...</pre>	<pre>EDIT CALC TESTS 1:Z-Test... 2:T-Test... 3:2-SampZTest... 4:2-SampTTest... 5:1-PropZTest... 2:2-PropZTest... 7↓ZInterval...</pre>
<p>Input the first x value and sample size, then the second x value and sample size. Then choose an alternative hypothesis (we used the default two-tail). Scroll down to “Calculate” and press ENTER.</p>	<pre>2-PropZTest x1:35 n1:100 x2:15 n2:40 P1:EQ <P2 >P2 Calculate Draw</pre>	<pre>2-PropZTest x1:35 n1:100 x2:15 n2:40 P1:EQ <P2 >P2 Calculate Draw</pre>
<p>The test statistic, p-value, both individual sample proportions, combined sample proportion, and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre>2-PropZTest P1≠P2 z=-.2788866755 P=.7803319161 P̂1=.35 P̂2=.375 ↓P=.3571428571 n1=100 n2=40</pre>	<pre>2-PropZTest P1≠P2 z=-.2788866755 P=.7803319161 P̂1=.35 P̂2=.375 ↓P=.3571428571 n1=100 n2=40</pre>

Chi-Square Test

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>(This tests for independence between a row variable and a column variable.) In the Tests menu, scroll down to “χ^2-Test...” and press ENTER.</p>	<pre>EDIT CALC TESTS 0↑2-SampTInt... A:1-PropZInt... B:2-PropZInt... 2:χ^2-Test... D:2-SampFTest... E:LinRegTTest... F:ANOVA(</pre>	<pre>EDIT CALC TESTS B↑2-PropZInt... 2:χ^2-Test... D:χ^2GOF-Test... E:2-SampFTest... F:LinRegTTest... G:LinRegTInt... H:ANOVA(</pre>
<p>Unlike previous tests, this test uses matrices instead of lists. Input the following matrix as “[A]” into the calculator.</p> $\begin{bmatrix} 39 & 19 & 12 & 28 & 18 \\ 172 & 61 & 44 & 70 & 37 \end{bmatrix}$ <p>We will use this as our Observed matrix. Now choose a matrix where the calculator will store the Expected matrix (we chose “[B]”). Scroll down to “Calculate” and press ENTER.</p>	<pre>χ^2-Test Observed: [A] Expected: [B] Calculate Draw</pre>	<pre>χ^2-Test Observed: [A] Expected: [B] Calculate Draw</pre>
<p>The test statistic, p-value, and degrees of freedom will be displayed on the screen.</p>	<pre>χ^2-Test χ^2=7.135464193 P=.128900399 df=4</pre>	<pre>χ^2-Test χ^2=7.135464193 P=.128900399 df=4</pre>

Chi-Square Goodness of Fit Test

TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>(This tests an observed distribution against an expected or claimed distribution.) In the Tests menu, scroll down to “χ^2GOF-Test...” and press ENTER. (This test is not available on the TI-83.)</p>	<pre>EDIT CALC TESTS B:2-PropZInt... C:X²-Test... D:χ^2GOF-Test... E:2-SampFTest... F:LinRegTTest... G:LinRegTInt... H:ANOVA<</pre>	<pre>EDIT CALC TESTS B:2-PropZInt... C:X²-Test... D:χ^2GOF-Test... E:2-SampFTest... F:LinRegTTest... G:LinRegTInt... H:ANOVA<</pre>
<p>For this test we will need two new lists. Input 20, 40, 20, 30, 30, and 10 as L₃, and 26.67, 37.33, 16, 23.33, 32.67, and 14 as L₄. Input 2 for the degrees of freedom. Scroll down to “Calculate” and press ENTER.</p>	<pre>χ^2GOF-Test Observed:L3 Expected:L4 df:2 Calculate Draw</pre>	<pre>χ^2GOF-Test Observed:L3 Expected:L4 df:2 Calculate Draw</pre>
<p>The test statistic, <i>p</i>-value, and degrees of freedom will be displayed on the screen.</p>	<pre>χ^2GOF-Test X²=6.127101036 P=.0467215148 df=2 CNTRB=(1.66812...</pre>	<pre>χ^2GOF-Test X²=6.127101036 P=.0467215148 df=2 CNTRB=(1.66812...</pre>

F-Test – FOR $\sigma_1 = \sigma_2$

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>In the Tests menu, scroll down to “2-SampFTest...” and press ENTER.</p>	<pre>EDIT CALC TESTS 0:2-SampTInt... A:1-PropZInt... B:2-PropZInt... C:X²-Test... D:χ^2GOF-Test... E:2-SampFTest... F:LinRegTTest... G:LinRegTInt... H:ANOVA<</pre>	<pre>EDIT CALC TESTS B:2-PropZInt... C:X²-Test... D:χ^2GOF-Test... E:2-SampFTest... F:LinRegTTest... G:LinRegTInt... H:ANOVA<</pre>
<p>In the “Data” mode, input a list into “List1:” (we used L₁) and a list into “List2:” (we used L₂). Then choose an alternative hypothesis (we used the default two-tail). Scroll down to “Calculate” and press ENTER.</p>	<pre>2-SampFTest Inpt:TEST Stats List1:L1 List2:L2 Freq1:1 Freq2:1 σ_1:EQ σ_2 <σ_2 >σ_2 Calculate Draw</pre>	<pre>2-SampFTest Inpt:TEST Stats List1:L1 List2:L2 Freq1:1 Freq2:1 σ_1:EQ σ_2 <σ_2 >σ_2 Calculate Draw</pre>
<p>The test statistic, <i>p</i>-value, both sample standard deviations, both sample means and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre>2-SampFTest $\sigma_1 \neq \sigma_2$ F=1.027580772 P=.9683366722 Sx1=7.61285463 Sx2=7.50999334 ↓x1=10.2 x2=13.2 n1=10 n2=10</pre>	<pre>2-SampFTest $\sigma_1 \neq \sigma_2$ F=1.027580772 P=.9683366722 Sx1=7.61285463 Sx2=7.50999334 ↓x1=10.2 x2=13.2 n1=10 n2=10</pre>

<p>In the “Stats” mode, input the first sample standard deviation and the first sample size, then the second sample standard deviation and the second sample size. Then choose an alternative hypothesis (we used the default two-tail). Scroll down to “Calculate” and press ENTER.</p>	<pre>2-SampFTest Inpt:Data Stats Sx1:7.61285 n1:10 Sx2:7.50999 n2:10 σ1:≠ <σ2 >σ2 Calculate Draw</pre>	<pre>2-SampFTest Inpt:Data Stats Sx1:7.61285 n1:10 Sx2:7.50999 n2:10 σ1:≠ <σ2 >σ2 Calculate Draw</pre>
<p>The test statistic, p-value, both sample standard deviations and both sample sizes will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p>	<pre>2-SampFTest σ1≠σ2 F=1.027580438 P=.9683370505 Sx1=7.61285 Sx2=7.50999 ↓n1=10 n2=10</pre>	<pre>2-SampFTest σ1≠σ2 F=1.027580438 P=.9683370505 Sx1=7.61285 Sx2=7.50999 ↓n1=10 n2=10</pre>

Linear Regression T-Test

TI-83, TI-84 (2.53MP AND LESS)

TI-84 (2.55MP)

<p>(This tests for the significance of the slope β and, by inference, the population correlation coefficient ρ). In the Tests menu, scroll down to “LinRegTTest...” and press ENTER.</p>	<pre>EDIT CALC TESTS 0↑2-SampTInt... A:1-PropZInt... B:2-PropZInt... C:X²-Test... D:2-SampFTest... 2LinRegTTest... F:ANOVA<</pre>	<pre>EDIT CALC TESTS B↑2-PropZInt... C:X²-Test... D:X²GOF-Test... E:2-SampFTest... 2LinRegTTest... G:LinRegTInt... H:ANOVA<</pre>
<p>Input a list into “Xlist:” (we used L₁) and a list into “Ylist:” (we used L₂). Then choose an alternative hypothesis (we used the default two-tail). For “RegEQ:”, we can insert a “Y=” name to have the calculator store the regression equation for graphing later. To insert a “Y=” name, press VAR → ▶ → ENTER → ENTER to paste Y₁. Scroll down to “Calculate” and press ENTER.</p>	<pre>LinRegTTest Xlist:L1 Ylist:L2 Freq:1 B & P:≠ <0 >0 RegEQ:Y1 Calculate</pre>	<pre>LinRegTTest Xlist:L1 Ylist:L2 Freq:1 B & P:≠ <0 >0 RegEQ:Y1 Calculate</pre>
<p>The test statistic, p-value, degrees of freedom, and linear regression information will be displayed on the screen.</p>	<pre>LinRegTTest y=a+bx B≠0 and P≠0 t=2.550712616 P=.0341367838 df=8 ↓a=6.461273006 ↑b=.6606595092 s=5.915411367 r²=.448509194 r=.6697082902</pre>	<pre>LinRegTTest y=a+bx B≠0 and P≠0 t=2.550712616 P=.0341367838 df=8 ↓a=6.461273006 ↑b=.6606595092 s=5.915411367 r²=.448509194 r=.6697082902</pre>

<p>(Tests for $\mu_1 = \mu_2 = \mu_3 = \dots = \mu_k$ for 2 to 20 populations.) In the Tests menu, scroll down to “ANOVA(“ and press ENTER.</p>	<pre> EDIT CALC TESTS 0: 2-SampTInt... A: 1-PropZInt... B: 2-PropZInt... C: χ^2-Test... D: 2-SampFTest... E: LinRegTTest... 2: ANOVA(</pre>	<pre> EDIT CALC TESTS B: 2-PropZInt... C: χ^2-Test... D: χ^2GOF-Test... E: 2-SampFTest... F: LinRegTTest... G: LinRegTInt... 2: ANOVA(</pre>
<p>We used L_1 and L_2 for the command, so press 2nd → 1 → . → 2nd → 2 to paste “L_1, L_2” onto the screen. Press ENTER.</p>	<pre>ANOVA(L1, L2)</pre>	<pre>ANOVA(L1, L2)</pre>
<p>The results of the one-way ANOVA test on the two lists will be displayed on the screen. Use the up and down arrow keys to scroll through the answers.</p> <p>Since the ANOVA command tests up to 20 populations, then it can accept up to 20 lists of data. So, what if you need more than the default six lists provided by the calculator?</p>	<pre> One-way ANOVA F=.7870190439 P=.3867032524 Factor df=1 SS=45 ↓ MS=45 Error df=18 SS=1029.2 MS=57.1777778 SxP=7.56159889 </pre>	<pre> One-way ANOVA F=.7870190439 P=.3867032524 Factor df=1 SS=45 ↓ MS=45 Error df=18 SS=1029.2 MS=57.1777778 SxP=7.56159889 </pre>

How to Input More Than Six Lists

ALL

<p>Sometimes, you may need more than the six lists provided by the calculator, or you may want custom names for your lists.</p>	
<p>We can do this in the List Editor. Scroll all the way to the right to get to L_6. Press ▲ to highlight the “L_6” name and then press ▶ to reveal a new empty list with a blank name. Notice the capital “A”; this means that the calculator is now in alpha-lock mode. Pressing any button with a green letter above it will type that letter onto the screen. Using these buttons, type your custom name for the list (five characters max). Press ENTER then ▼ after typing the name.</p>	<pre> L5 WA 6 46.67 2178.1 77.33 5979.9 L6 AAAAA A 2178.1 5979.9 </pre>
<p>Your custom empty list has now been created. You can now input data values in the same manner as with the default lists.</p>	<pre> L6 CARS 7 2178.1 5979.9 </pre>
<p>To use your custom list in a test (like ANOVA), press 2nd → STAT for “LIST”. This will display all the lists stored on the calculator. Scroll down to your custom list and press ENTER. This will paste the list name onto the screen.</p>	<pre> TESTS OPS MATH 1: L1 2: L2 3: L3 4: L4 5: L5 6: L6 7: CARS ANOVA(L1, L2, LCAR S) </pre>