

TI-83/83 Plus: Hypothesis Testing for One-Sample Mean with σ Unknown

The following pages contain some instructions on the usage of the TI-83/83 Plus graphing calculator.

The example used below is taken out of David Moore's text titled "The Basic Practice of Statistics, 2nd Edition".

Example#7.2 Sweetening colas p. 371: Cola makers test new recipes for loss of sweetness during storage. Trained tasters rate sweetness before and after storage. Here are the sweetness losses (sweetness before storage minus sweetness after storage) found by 10 tasters for one new cola recipe.

2.0 0.4 0.7 2.0 -0.4 2.2 -1.3 1.2 1.1 2.3

Are these data good evidence that the cola lost sweetness?

To enter the above data set press **[STAT]**. Press **[ENTER]** to select **1:Edit** from the STAT EDIT menu. Press **[↑]** to move the cursor to the top line where the list names are located and then press **[→]** until you reach the unnamed column. The cursor is in alpha mode as it is indicated by the highlighted capital A in the upper right hand corner of your display. Type in the name COLA short for the sweetness losses of the cola recipe. Press **[ENTER]** to store the list name. Press **[↓]** to begin entering the data set. Start typing in the numbers from the data set, pressing **[ENTER]** after each data point. When you have finished entering the last data point, your screen should look like the screen on the left given below.

CON5	DGLUC	COLA	15
	23.78	-4	
	-----	2.2	
		-1.3	
		1.2	
		1.1	
		2.3	
COLA(1) =			

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

T-Test
Inpt: DATA Stats
μ_0 : 128
List: DGLUC
Freq: 1
μ : ≠ μ_0 < μ_0 > μ_0
Calculate Draw

Press **[STAT]**. Press **[→]** two times to scroll right to the TESTS menu option. Press **[↓]** to move the cursor down to **2:T-Test**, which stands for one-sample t test with σ unknown. At this point, your screen should look like the screen in the middle given above.

Press **[ENTER]** to select **2:T-Test** and go into the STAT TESTS menu screen. At this point, your screen should look like the screen on the right given above with the cursor blinking over either the **Data** or **Stats** input options. You may possibly have different numbers. Scroll over to the **Data** input option and press **[ENTER]** to select that option. Press **[↓]** to scroll down to μ_0 : , then type in 0 for the value of μ_0 , which is the null hypothesis stating "no loss". Press **[↓]** to scroll down to **List**: The list name COLA, which had been already stored, must be assigned to **List**: Press **[2nd]** and **[STAT]** to access the LIST menu. Press **[↓]** till you move the cursor by the name COLA and press **[ENTER]** to paste the name by **List**: Press **[↓]** to move the cursor down to **Freq**:, which is left at the default value of 1. Press **[↓]** to move the cursor down to μ : **≠** μ_0 < μ_0 > μ_0 . Since the alternative hypothesis for this

example says “there is a loss”, scroll over to the $>\mu_0$ option and press **ENTER** to select that option. Press **▼** to move the cursor down to **Calculate** option. At this point, your screen should look like the screen on the left given below with the cursor blinking over the **Calculate** option.

```
T-Test
Inpt: μ≠μ₀ Stats
μ₀: 0
List: COLA
Freq: 1
μ: ≠μ₀ <μ₀ >μ₀
Calculate Draw
```

```
T-Test
μ>0
t=2.69668949
p=.0122631561
x̄=1.02
Sx=1.196104789
n=10
```

Press **ENTER** to select the **Calculate** option. Your calculated result screen should look like the screen on the right given above.

In addition to the statement of the alternative hypothesis, t-test value, t , and the P-value, the calculator will have computed the sample mean, \bar{x} , and sample standard deviation, s , and will display them along with the sample size n .

The above computed P-value of 0.012 suggests quite strong evidence that there is a loss of sweetness.

The P-value for $t=2.69668949$ is the area to the right of 2.69668949 under the t distribution curve. We could also show this area. Press **STAT**. Press **▶** two times to scroll right to the TESTS menu option. Press **▼** to move the cursor down to **2:T-Test**. Press **ENTER** to select **2:T-Test** and go into the STAT TESTS menu screen. Scroll all the way down to the **Calculate Draw** option. Press **▶** to move the cursor over the **Draw** option. Press **ENTER** to select this option. Your screen should look like the screen given below.

