



Statistics with List Editor Application for the TI-89 / TI-92 Plus

The Statistics with List Editor application (Stats/List Editor) adds inferential and more advanced statistics functionality to the TI-89 / TI-92 Plus through an easy-to-use list editor interface.

The Stats/List Editor is really two application in one. The list editor provides a means for viewing, editing, and working with data lists. The Statistics portion of the application provides basic inferential and advanced statistics functionality. The two work together to let you view and perform statistical analyses on data lists.

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The Statistics with List Editor Application (Stats/List Editor) for the TI-89 / TI-92 Plus is two applications in one. Stats/List Editor includes a list editor that provides a means for viewing, editing, and working with statistical data in lists. Stats/List Editor also provides basic inferential and advanced statistics functionality. The two work together to let you view and perform statistical analyses on data lists.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
6.5	.51						
11.	.68						
13.2	.73						
15.	.79						
18.	.88						
23.1	.99						
list2={.51,.68,.73,.79,.8...							
MAIN		RAD AUTO		FUNC		2/6	

Note: You must set your TI-89 / TI-92 Plus to the AUTO or APPROXIMATE mode when using the Stats/List Editor application.

Running and Quitting Stats/List Editor

Running Stats/List Editor

After installing Stats/List Editor:

1. Press **[APPS]**. The **APPLICATIONS** menu is displayed.



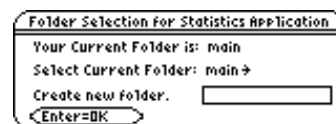
2. Select **1:FlashApps** to display the **FLASH APPLICATIONS** menu.

Tip: Pressing **[♦]** **[APPS]** from the Home screen of the TI-89 / TI-92 Plus will also display the FLASH APPLICATIONS menu.

3. If necessary, highlight **Stats/List Editor**.



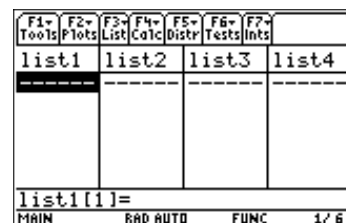
4. Press **[ENTER]**. The **Folder Selection for Statistics Application** dialog box appears.



5. Press **[↓]** to display the folders in the **Select Current Folder** field. Highlight the **main** folder, and then press **[ENTER]** **[ENTER]**.

Note: The Select Current Folder option always displays the folder names 1:main and 2:statvars, but it displays other folders only if you have created them. The statvars folder is primarily used by the Stats/List Editor Application. It is recommended that you use the main folder, or a folder that you have created as your current folder. Refer to your TI-89 / TI-92 Plus Guidebook for more information on creating, setting, and deleting folders.

6. Press **[ENTER]** when you have selected or created a folder. The list editor is displayed.



Quitting Stats/List Editor

To exit Stats/List Editor and return to the calculator Home screen:

- Press **[2nd]** **[QUIT]**.
- Press **[APPS]** and select another application from the **APPLICATIONS** menu.

Tip: Press **[2nd]** **[⇄]** to toggle between applications.

Any lists or other variables that you or the application stored while using Stats/List Editor are retained in memory. Variables that you created are stored in the current folder. Variables generated by Stats/List Editor are stored in the **STATVARS** folder.

Tip: Press **[2nd]** **[VAR-LINK]** from anywhere on the calculator to open the VAR-LINK [All] menu.

Stats/List Editor CATALOG

Accessing the Flash Apps CATALOG

Most statistical capabilities provided by the Stats/List Editor Application are also available for use from the Home screen and in programming.

Copy any function or instruction from the **CATALOG** (including the **Flash Apps CATALOG**) and paste it into the entry line on the previous screen.

- To access the **Flash Apps CATALOG**, press:
 - `CATALOG` `F3` (**Flash Apps**) for the TI-89
 - `2nd` `CATALOG` `F3` (**Flash Apps**) for the TI-92 Plus

The **CATALOG** with all **Flash Apps** functions is displayed.

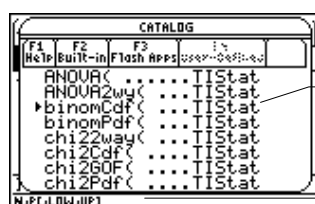
- Use the up and down arrow keys (\odot \ominus) to move the cursor (\blacktriangleright) to the Stats/List Editor function that you want to use.
- Press `ENTER` to paste the function or instruction to the entry line of previous screen—list editor, Home screen, program, etc.

Tip: To find an item in the CATALOG quickly, press the first letter in the item name. (You do not have to press `alpha` first.) The cursor (\blacktriangleright) moves to the first item that begins with that letter. Use \odot and \ominus to scroll the CATALOG until you find the item you are looking for.

Understanding the CATALOG Screen

To resolve duplicate name conflicts from other applications, the application name is combined with the function name. When viewed in the **Flash Apps CATALOG**, the application name follows the function name—`binomCdf(...TIStat`. When placed in the entry line, the application name precedes the function name—`TIStat.binomCdf(`.

Flash Apps CATALOG with `binomCdf(` selected



Function name (`binomCdf`) with application (`TIStat`) identified

Status line containing syntax for `binomCdf`

List editor with `binomCdf(` pasted to entry line



Function name (`binomCdf`) with application prefix (`TIStat`). Enter arguments here.

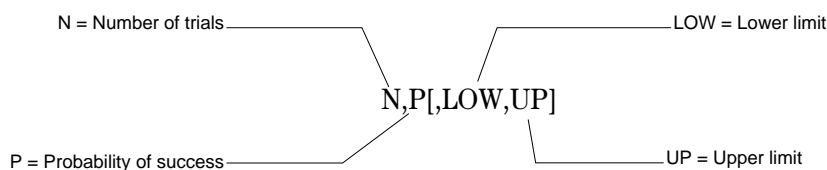
Status line containing syntax for `binomCdf`

Syntax

In the **CATALOG**, each function's syntax (all arguments and punctuation needed to execute the function) is included in the status line to help enter you enter the correct arguments for the function. This is especially useful for programming.

Tip: Press `F1` (**Help**) from the CATALOG to view the selected syntax statement at a larger size.

Example: `binomCdf`



Notes: Always separate arguments with commas. Arguments in brackets are optional.

Stats/List Editor Screens

Understanding the Stats/List Editor Screens

The three primary screens used in Stats/List Editor are shown below.

Note: All the screens used in this documentation were taken from the TI-89 calculator. The screens displayed on the TI-92 Plus are similar.



From the list editor screen, you can:

- Store, display, and edit statistical input data in lists.
- Perform statistical analyses and store results in output lists.



From menus you can access various statistical operations. For example, the **F4 Calc** menu lets you calculate:

- One- or two-variable statistics.
- Several types of regressions such as exponential, linear, and quadratic regressions.



In dialog boxes, you can view:

- Prompts for data input.
- Data output of statistical calculations.
- System messages.

You begin most of the procedures found in this guidebook at the list editor screen, where you execute instructions, perform statistical analyses, and view the results.

Example: Pendulum Lengths and Periods

Problem Setup

This is a fast-paced introduction to solving problems with Stats/List Editor. Read the remaining chapters for details.

A group of students is trying to determine the mathematical relationship between the length of a pendulum and its period (one complete swing of a pendulum). The group makes a simple pendulum from string and washers and then suspends it from the ceiling. They record the pendulum's period for each of 12 string lengths.

Length (cm)	Time (sec)
6.5	.51
11	.68
13.2	.73
15	.79
18	.88
23.1	.99
24.4	1.01
26.6	1.08
30.5	1.13
34.3	1.26
37.6	1.28
41.5	1.32

List Editor Setup

1. Display the list editor screen.
2. If necessary, press **MODE** \blacktriangleright and then select **1:Function** to set the **FUNCTION** graphing mode.

Press **ENTER** to return to the list editor screen.

3. Press **F1** (**Tools**) and select **3:Setup Editor** to display the **Setup Editor** dialog box.

4. Press **ENTER** to close the **Setup Editor** dialog box without entering any list names in the **Lists To View** field.

This removes all lists from the list editor and restores the list names **list1** through **list6** to columns 1 through 6.

Note: Removing lists from the list editor does not delete them from memory. However, clearing elements from lists does delete the elements permanently from memory.

5. If elements are stored in either **list1** or **list2**, clear them. Move the rectangular cursor onto **list1**, and then press **CLEAR** \blacktriangleright **CLEAR** **ENTER** to clear **list1** and **list2**.



Example: Entering the Data

- Use the arrow keys (⬅️ ➡️ ⬆️ ⬇️) to move the rectangular cursor to the first element in **list1**.

Press **6** **.** **5** **ENTER** to store the first pendulum string length (6.5 cm) in **list1**. The rectangular cursor moves to the next row.

Repeat this step to enter each of the 12 string length values.

Length (cm):

6.5
11
13.2
15
18
23.1
24.4
26.6
30.5
34.3
37.6
41.5

F1→	F2→	F3→	F4→	F5→	F6→	F7→
Tools	Plots	List	Calc	Distr	Tests	Ints
list1	list2	list3	list4			
26.6						
30.5						
34.3						
37.6						
41.5						
list1[13]=						
MAIN		RAD AUTO		FUNC		1/6

- Use the arrow keys to move the rectangular cursor to the first element in **list2**.

Press **.** **51** **ENTER** to store the first time measurement (.51 sec) in **list2** and to move the rectangular cursor to the next row.

Repeat this step to enter each of the 12 time values.

Time (sec):

.51
.68
.73
.79
.88
.99
1.01
1.08
1.13
1.26
1.28
1.32

F1→	F2→	F3→	F4→	F5→	F6→	F7→
Tools	Plots	List	Calc	Distr	Tests	Ints
list1	list2	list3	list4			
26.6	1.08					
30.5	1.13					
34.3	1.26					
37.6	1.28					
41.5	1.32					
list2[13]=						
MAIN		RAD AUTO		FUNC		2/6

Example: Plotting the Data

1. Press **[F2]** (**Plots**) to display the **F2 Plots** menu.



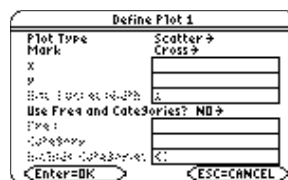
2. From the **F2 Plots** menu:
 - Select **3:PlotsOff** to turn off all plots.
 - Select **4:FnOff** to turn off all Y = functions.

3. Press **[F2]** (**Plots**). Select **1:Plot Setup** to display the **Plot Setup** dialog box.

Note: Your Plot Setup dialog box may not look exactly like the one shown here.

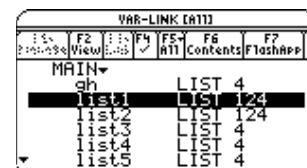


4. Highlight **Plot 1** and press **[F1]** (**Define**) to display the **Define Plot 1** dialog box.
5. If **Scatter** is not displayed, press **⏮** and select **1:Scatter**.
6. Press **⏮**. If **Cross** is not displayed, press **⏮** and select **2:Cross (+)** for the type of mark used for each data point on the scatter plot.

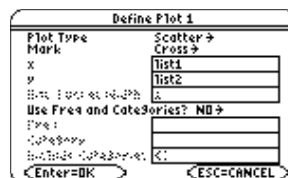


7. Press **⏮** to move the cursor to the **x** field. Then press **[2nd]** [**VAR-LINK**] to display the **VAR-LINK [All]** menu. Highlight **list1** and press **[ENTER]** to paste **list1** in the **x** value field.

Note: If the contents of the MAIN folder are not displayed, highlight the MAIN folder and then press **⏮** to expand it.



8. Press **⏮** to move the cursor to the **y** value field. Then press **[2nd]** [**VAR-LINK**] to display the **VAR-LINK [All]** menu again. Highlight **list2** and press **[ENTER]** to paste **list2** in the **y** value field.



9. Press **⏮** to move the cursor to the **Use Freq and Categories?** field. If **NO** is not displayed, press **⏮** and set **Use Freq and Categories?** to **NO**.

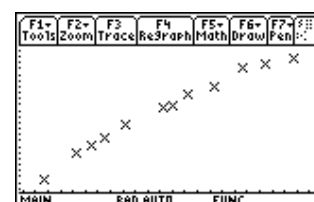
10. Press **[ENTER]** to close the dialog box with changes saved. **Plot1** is selected.

Tip: The **[ENTER]** key evaluates an expression, executes an instruction, or selects a menu item. When using the input examples in this guidebook you may need to press **[ENTER]** more than once in order to calculate the results. Press **[ENTER]** once to save your information, and then press **[ENTER]** again to close a dialog box.



11. Press **[F5]** (**ZoomData**) to make sure the entire plot may be viewed in the calculator screen and to begin plotting the data.

Tip: To return to the list editor after graphing an equation or plotting data, press **[2nd]** [**2nd]**.



Example: Fitting a Line to the Data

Since the scatter plot of time-versus-length data appears to be approximately linear, fit a line to the data.

1. Press $\boxed{2\text{nd}} \boxed{\boxed{=}}$ to return to the list editor.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
26.6	1.08					
30.5	1.13					
34.3	1.26					
37.6	1.28					
41.5	1.32					

list2[13]=						
MAIN		RAD AUTO		FUNC		2/6

2. Press $\boxed{F4}$ (**Calc**) and select **3:Regressions** to display the Regressions menu. Then select **1:LinReg(a+bx)** to display the **LinReg(a+bx)** input dialog box.

Note: This example shows all dialog boxes with no lists stored. Your calculator screen may show prepopulated X List and Y List fields.

LinReg(a+bx)...	
X List:	
Y List:	
Store RegEqn to:	y1(x) \rightarrow
Freq:	1
Category List:	
Include Categories:	$\boxed{C2}$
\leftarrow Enter=OK \leftarrow ESC=CANCEL \rightarrow	

3. Press $\boxed{2\text{nd}} \boxed{\text{VAR-LINK}}$ to display the **VAR-LINK [All]** menu. Highlight **list1** and press $\boxed{\text{ENTER}}$ to specify **list1** for the **X List** field.
4. Press \odot to move the cursor to the **Y List** field. Press $\boxed{2\text{nd}} \boxed{\text{VAR-LINK}}$ to display the **VAR-LINK [All]** menu, highlight **list2**, and press $\boxed{\text{ENTER}}$ to specify **list2** for the **Y List**.

LinReg(a+bx)...	
X List:	list1
Y List:	list2
Store RegEqn to:	none \rightarrow
Freq:	1
Category List:	
Include Categories:	$\boxed{C2}$
\leftarrow Enter=OK \leftarrow ESC=CANCEL \rightarrow	

5. Press \odot to move the cursor to the **Store RegEqn to** field and press \odot . Highlight **y1(x)** and press $\boxed{\text{ENTER}}$ to store the regression equation (**RegEqn**) variable to the **y1(x)** equation variable.
6. Leave **Freq**, **Category List**, and **Include Categories** at their defaults, as shown in the **LinReg(a+bx)** dialog box to the right.

LinReg(a+bx)...	
X List:	list1
Y List:	list2
Store RegEqn to:	y1(x) \rightarrow
Freq:	1
Category List:	
Include Categories:	$\boxed{C2}$
\leftarrow Enter=OK \leftarrow ESC=CANCEL \rightarrow	

7. Press $\boxed{\text{ENTER}}$ to execute the linear regression **LinReg(a+bx)** and display the results. The linear regression for the data in **list1** and **list2** is calculated. Values for **a**, **b**, **r²**, and **r** are displayed. The linear regression equation is stored in **Y1**.

LinReg(a+bx)...	
y=a+bx	
a	=.429683
b	=.023088
r ²	=.979579
r	=.989737
\leftarrow Enter=OK \rightarrow	

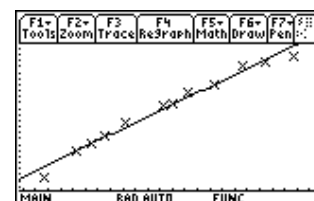
8. Press $\boxed{\text{ENTER}}$. The residuals are calculated and stored automatically in the **resid** list, which is then pasted in the last column of the list editor.

Note: To prevent the **resid** list from being pasted to the end of the list editor, press $\boxed{F1}$ **9:Format** to display the **FORMATS** dialog box. Change the **Results->Editor** setting to **NO**, and then press $\boxed{\text{ENTER}}$. **resid** is stored in the **STATVARS** folder.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list4	list5	list6	resid			
			.03618			
			-.0039			
			.03841			
			-.0178			
			-.0678			

resid[12]= -.0678226784565...						
MAIN		RAD AUTO		FUNC		???

9. Press $\boxed{\blacklozenge}$ **[GRAPH]** to graph the data. The regression line and the scatter plot are displayed.



Example: Producing a Scatter Plot of the Residuals

The regression line appears to fit the central portion of the scatter plot well. However, a residual plot may provide more information about this fit.

1. Press **[2nd]** **[⇐]** to return to the list editor.

Use the arrow keys to move the cursor onto **list3**.

Press **[2nd]** **[INS]**. An unnamed column is displayed in column three, and the remaining lists shift to the right one column.

The **Name=** prompt is displayed in the entry line, and alpha-lock is on.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	-----	list3			
6.5	.51					
11.	.68					
13.2	.73					
15.	.79					
18.	.88					
23.1	.99					
Name=						
MAIN <input type="checkbox"/> RAD AUTO FUNC 3/7						

2. Press **[F3]** (**List**) and select **1:Names** to display the **VAR-LINK [All]** menu. Highlight the **resid** variable, which is stored in the **STATVARS** folder.

Note: If the contents of the **STATVARS** folder are not displayed, highlight the **STATVARS** folder and press **[↓]** to expand it. You can then access **resid**.

VAR-LINK [All]						
F1- Manage	F2- View	F3- Link	F4- All	F5- Contents	F6- Flash	F7- App
▲ STATVARS						
	blist		LIST	34		
	pdf		LIST	4		
	resid		LIST	124		
	xval		LIST	13		

3. Press **[ENTER]** to paste **resid** to the entry line.

Note: Notice the path name in the entry line. If you paste a variable name that is not in the current folder, the variable's path name is pasted as well.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	-----	list3			
6.5	.51					
11.	.68					
13.2	.73					
15.	.79					
18.	.88					
23.1	.99					
Name=statvars\resid						
MAIN <input type="checkbox"/> RAD AUTO FUNC 3/7						

4. Press **[ENTER]**. **resid** is moved from the last column to column three of the list editor.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	resid	list3			
6.5	.51	-.0698				
11.	.68	-.0036				
13.2	.73	-.0044				
15.	.79	.014				
18.	.88	.03474				
23.1	.99	.02699				
resid[1]=-.06975275265102...						
MAIN <input type="checkbox"/> RAD AUTO FUNC 3/6						

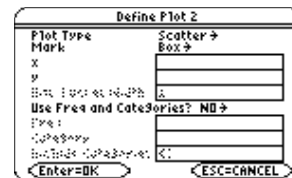
Notice that the first three residuals are negative. They correspond to the shortest pendulum string lengths in **list1**. The next five residuals are positive, and three of the last four are negative. The latter correspond to the longer string lengths in **list1**. Plotting the residuals will show this pattern more clearly.

5. Turn off all plots and functions.
 - Press **[F2]** (**Plots**) and select **3:PlotsOff** to turn off all plots.
 - Press **[F2]** (**Plots**) and select **4:FnOff** to turn off all Y = functions.
6. Press **[F2]** (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box.

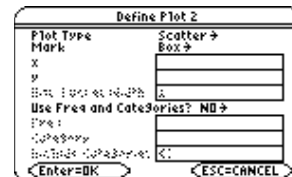
Plot Setup...				
F1	F2	F3	F4	F5
Define	Copy	Clear	Zoom	Data
Plot 1:	Plot 2:	Plot 3:	Plot 4:	Plot 5:
Plot 6:	Plot 7:	Plot 8:	Plot 9:	Plot 0:

Example: Producing a Scatter Plot of the Residuals (continued)

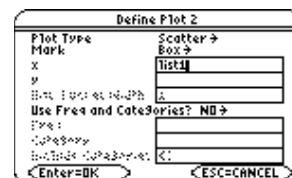
- Highlight **Plot2** and press **[F1]** (**Define**). The **Define Plot 2** dialog box is displayed.



- If **Scatter** is not already selected, press **⏏** and select **1:Scatter**.



- Press **⏏**. If **Box** is not already selected, press **⏏** and select **1:Box** to use the **Box** (□) mark for each data point on the scatter plot.



- Press **⏏** to move the cursor to the **x** field. Press **[2nd]** **[VAR-LINK]** to display the **VAR-LINK [All]** menu. Highlight **list1** (in the **MAIN** folder) and press **[ENTER]** to specify **list1** for the **x** value field.

Note: If the contents of the **MAIN** folder are not displayed, highlight the **MAIN** folder, and then press **⏏** to expand it.

- Press **⏏** to move the cursor to the **y** field. Press **[2nd]** **[VAR-LINK]** to display the **VAR-LINK [All]** menu. Highlight the **resid** list variable (in the **STATVARS** folder).



Tip: If the **MAIN** folder is expanded, highlight **MAIN**, and then press **⏏** to collapse the folder. You then have easy access to the **STATVARS** folder. Additionally, you can type a letter to scroll through a list. If there are any variable names that start with that letter, the cursor moves to highlight the first of those variable names.

- Press **[ENTER]** to specify the **statvars/resid** variable for the **y** field.

Note: If you paste a variable name that is not in the current folder, the variable's pathname is pasted as well.



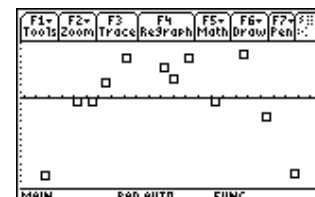
- If necessary, press **⏏** and set the **Use Freq and Categories?** option to **NO**.

- Press **[ENTER]** to close the dialog box with the changes saved. **Plot2** is selected.



- Press **[F5]** (**ZoomData**). The window variables are adjusted automatically and **Plot2** is displayed.

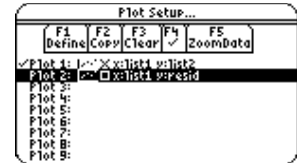
This is a scatter plot of the residuals.



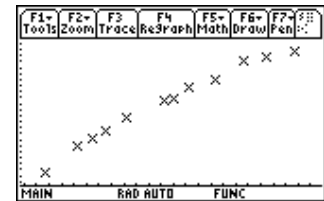
Example: Producing a Power Regression

Notice the pattern of the residuals: a group of negative residuals, then a group of positive residuals, and then another group of negative residuals. The residual pattern indicates a curvature associated with this data set for which the linear model did not account. The residual plot emphasizes a downward curvature, so a model that curves down with the data would be more accurate. Perhaps a function such as square root would fit. Try a power regression to fit a function of the form $y = a * x^b$.

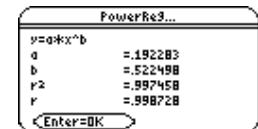
1. Press **2nd** **[=]** to return to the list editor.
2. Press **F2** (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box. Highlight **Plot 1** and press **F4** **✓** to turn it on. Press **⊖** **F4** **✓** to turn off **Plot 2**.



3. Press **F5** (**ZoomData**). The window variables are adjusted automatically, and the original scatter plot of time-versus-length data (**Plot1**) is displayed.



4. Press **2nd** **[=]** to return to the list editor.
5. Press **F4** (**Calc**) and select **3:Regressions**. Then select **9:PowerReg** to display the **PowerReg** input dialog box. **X List** and **Y List** should be prepopulated with the correct lists (**list1** and **list2**) to calculate this power regression. (See arguments as shown to the right.)
6. Press **ENTER** to close the dialog box and calculate the power regression.



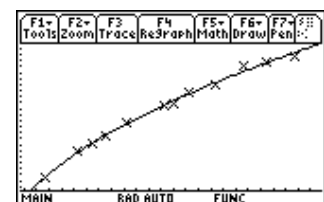
Values for **a**, **b**, r^2 , and **r** are displayed in the **PowerReg** output dialog box. The power regression equation is stored in **Y1**. Residuals for the power regression are calculated and placed in the **resid** list. The previous contents of **resid** are overwritten by the new data. Residuals associated with the linear fit of the transformed data are calculated and placed in the **resid1** list.

7. Press **ENTER** to close the dialog box and return to the list editor.

Note: If the **Results->Editor** option in the **F1** (**Formats**) dialog box is set to **ON**, **resid** and **resid1** are pasted to the end of the list editor.

list4	list6	resid	resid1
		-.0013	-.0026
		.00692	.01023
		-.0104	-.0141
		-.0015	-.0019
		.0094	.01074
		-.0018	-.0018
resid[1] = -.0025702301274...			

8. Press **♦** **[GRAPH]**. The regression line and the scatter plot are displayed.



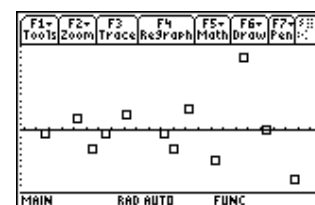
Example: Producing Another Residual Plot with the New Data

The new function $y_1 = .192283 * x^{.522498}$ appears to fit the data well. To get more information, examine a residual plot.

1. Press **[2nd]** **[☰]** to return to the list editor.
2. Turn off all plots and functions.
 - Press **[F2]** (**Plots**) and select **3:PlotsOff** to turn off all plots.
 - Press **[F2]** (**Plots**) and select **4:FnOff** to turn off all Y = functions.
3. Press **[F2]** (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box. Highlight **Plot 2** and press **[F4]** **✓** to select it.



4. Press **[F5]** (**ZoomData**). The window variables are adjusted automatically, and **Plot2** is displayed. This is a scatter plot of the residuals.

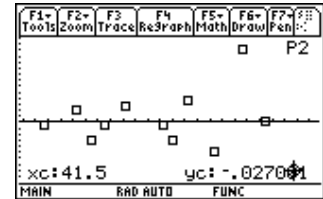


The new residual plot shows that the residuals are random in sign, with the residuals increasing in magnitude as the string length increases.

Example: Producing Magnitudes of the Residuals

To see the magnitudes of the residuals, continue with these steps.

1. Press **F3** (**Trace**).
2. Press **↓** and **↑** to trace the data. Observe the values for **y** at each point.



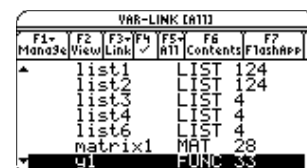
With this model, the largest positive residual is about .041 and the smallest negative residual is about -.027. All other residuals are less than .02 in magnitude.

Example: Making Predictions with the Model

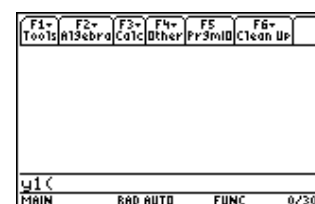
Now that you have a good model for the relationship between length and period, you can use the model to predict the period for a given string length. To predict the periods for a pendulum with string lengths of 20 cm and 50 cm, continue with these steps.

- To display the Home screen, press:
 - Press **[HOME]** for the TI-89
 - Press **[2nd] [HOME]** for the TI-92 Plus
- Press **[2nd] [VAR-LINK]** to display the **VAR-LINK [All]** menu. Highlight the **y1** variable.

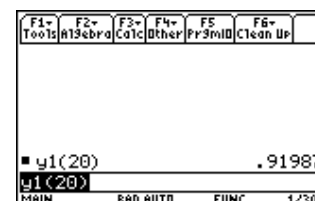
Note: If the contents of the MAIN folder are not displayed, highlight the MAIN folder, and then press **[↓]** to expand it. You can then access **y1**.



- Press **[ENTER]** to paste **y1** to the entry line in Home screen.

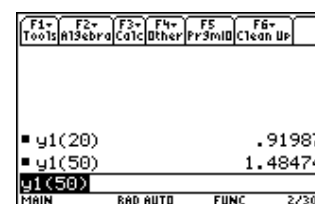


- Type **20** and press **[]** to enter a string length of 20 cm. Press **[ENTER]**.



Based on the residual analysis, we would expect the prediction of about 0.92 seconds to be within about 0.02 seconds of the actual value.

- Since the last entry is still highlighted, press **[↓] [↓] [↓] [←] 5** to change the string length to 50 cm.
- Press **[ENTER]** to calculate the predicted time of about 1.48 seconds.



Since a string length of 50 cm exceeds the lengths in the data set, and since residuals appear to be increasing as string length increases, we would expect more error with this estimate.

From the text *Contemporary Precalculus through Applications*
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 Exercise Set 6 from Chapter 1 - Data Analysis One, pages 21, 22, and 23

Error Messages

This section describes error messages that are displayed when input or internal errors are encountered by the Stats/List Editor Application.

Error messages generated from the TI-89 / TI-92 Plus may be displayed when using the Stats/List Editor Application. For further information, refer to Appendix B of the TI-89 / TI-92 Plus Guidebook.

Error message	Description
Problem accessing configuration file, zzconfig, in your current folder. Variable is locked, protected, archived, or corrupted.	<p>The zzconfig file variable may be locked, archived, or corrupted. This problem prevents the Stats List/Editor from accessing the configuration file.</p> <p>To correct this problem, unlock or unarchive the variable. If it is not locked or archived, delete zzconfig from the current folder.</p> <ul style="list-style-type: none">• Press [2nd] [VAR-LINK].• Highlight the zzconfig variable and press [F1] (Manage). Select 1:Delete to display the VAR-LINK dialog box.• Press [ENTER] to delete the variable.
Problem accessing STATVARS\shostat. Please delete the variable.	<p>The shostat function has been invoked from the [F4] (Calc) menu or from the Home screen. The function failed to work properly.</p> <p>To correct this problem, delete the shostat variable from the STATVARS folder.</p> <ul style="list-style-type: none">• Press [2nd] [VAR-LINK].• Highlight the shostat variable and press [F1] (Manage). Select 1:Delete to display the VAR-LINK dialog box.• Press [ENTER] to delete the variable.
All plot numbers are in use. Clear unnecessary plots.	<p>To correct this problem, you must clear any unnecessary plots.</p> <ul style="list-style-type: none">• Press [F2] (Plots) and select 1:Plot Setup to display the Plot Setup dialog box.• Highlight any unnecessary plots and press [F3] (Clear).

Refer to Appendix B of the TI-89 / TI-92 Plus Guidebook for more troubleshooting tips.

List Editor

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- Creating Lists 20
- Removing Lists 21
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- Formulas 24

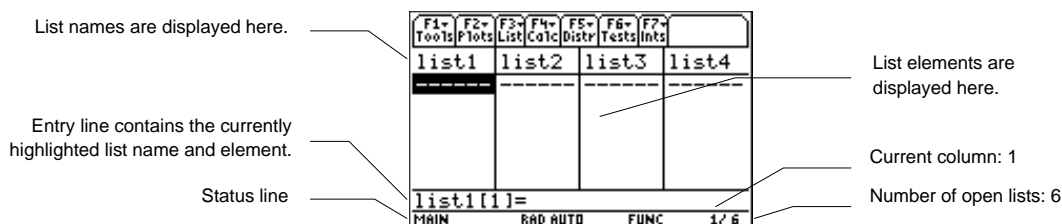
This chapter provides examples that demonstrate the Stats/List Editor application list features. You can find more information about the lists in the **F3 List Menu** chapter.

F1+ Tools	F2+ Plots	F3+ List	F4+ Calc	F5+ Distr	F6+ Tests	F7+ Ints	
list4	list5	list6	-----				
-----	-----	-----					
Name=abc							
MAIN <input checked="" type="checkbox"/> RAD AUTO FUNC ?? 6							

Using the List Editor

The List Editor Screen

Data for most statistical analyses in the Stats/List Editor application are stored in list variables. The Stats/List Editor provides six list variables in memory, **list1** through **list6**.



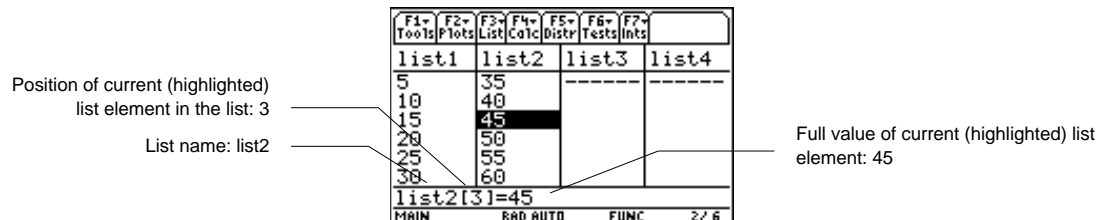
Top line — **list1** through **list6** are stored in columns 1 through 6 after a memory reset.

Center area — On the TI-89, this area displays up to six elements of up to four lists. On the TI-92 Plus, it displays up to eight elements of up to six lists.

Entry line — All data entry occurs on this line. The characteristics of the entry line change according to the current context: view elements, edit elements, view names, or enter name.

Moving Around the List Editor Screen

In view-elements context, the entry line displays the list name, the current element's place in that list, and the full value of the current element, up to 16 characters at a time for the TI-89 and up to 20 characters at a time for the TI-92 Plus. An ellipsis (...) indicates that the element continues beyond 16 characters or 20 characters.



The following table shows the keystrokes for moving quickly around the list editor screen.

To:	On the TI-89 Press:	On the TI-92 Plus Press:
Move the cursor to the bottom of a list.	◀ ▶	◀ ▶
Move the cursor to the top of a list.	◀ ▶	◀ ▶
Page down six elements on the TI-89 or eight on the TI-92 Plus.	2nd ▶	2nd ▶
Page up six elements on the TI-89 or eight on the TI-92 Plus.	2nd ▶	2nd ▶
Delete a list element.	◀ or ▶ [DEL]	◀ or ▶ [DEL]
Insert a new element. (Zero is the default value for a new element.)	2nd [INS]	2nd [INS]
Move to the first list in the list editor.	◀ ▶	◀ ▶
Move to the last list in the list editor.	◀ ▶	◀ ▶

Using the List Editor (Continued)

Switching List Editor Contexts

The list editor has four contexts: view elements, edit elements, view names, and enter name. The list editor is first displayed in view-elements context.

View names — Press \leftarrow to move the cursor onto a list name.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
5	35					
10	40					
15	45					
20	50					
25	55					
30	60					
list1={5,10,15,20,25,30}						
MAIN RAD AUTO FUNC 1/6						

The list name is highlighted. Press \leftarrow and \rightarrow to view list names currently stored in other list editor columns.

Edit elements — Press [ENTER] .

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
5	35					
10	40					
15	45					
20	50					
25	55					
30	60					
list1={5,10,15,20,25,30}						
MAIN RAD AUTO FUNC 1/6						

The list name is still highlighted. The elements of the list are also highlighted in the entry line. You may edit any element in a list.

View element — Press [ENTER] again.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
5	35					
10	40					
15	45					
20	50					
25	55					
30	60					
list1[1]=5						
MAIN RAD AUTO FUNC 1/6						

The first element of the list is highlighted. Press \leftarrow , \rightarrow , \uparrow , and \downarrow to view other list elements. The current element's full value is displayed in the entry line.

Edit element — Press [ENTER] again.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
5	35					
10	40					
15	45					
20	50					
25	55					
30	60					
list1[1]=5						
MAIN RAD AUTO FUNC 1/6						

The element is highlighted in the entry line. You may edit the current element in the entry line.

Enter name — Press \leftarrow until the cursor is on a list name, then press [2nd] [INS] . You can also press \rightarrow until you reach an unnamed column.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3				
5	35					
10	40					
15	45					
20	50					
25	55					
30	60					
Name=						
MAIN RAD AUTO FUNC 1/7						

The new list name cell is highlighted. The Name= prompt is displayed in the entry line. You may enter a list name.

Creating Lists

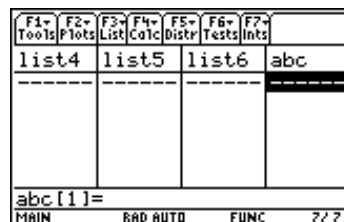
Creating a New List in the List Editor

1. Display the **Name=** prompt in the entry line in either of these two ways.
 - Move the cursor onto the list name in the column where you want to insert a list and press **[2nd] [INS]**. An unnamed column is displayed and the remaining lists shift right one column.
 - Move the cursor onto a list name and press **▶** until you reach an unnamed column. The **Name=** prompt is displayed.

Tip: After moving the cursor onto a list name, press **◀ ▶** to move to the rightmost list in the list editor.

2. Enter a valid list name in any of these three ways.
 - Press **[F3] (List)** and select **1:Names** to display the **VAR-LINK [ALL]** menu. Highlight a list name and press **[ENTER]** to select it.
 - Enter an existing user-created list name directly from the keyboard.
 - a) Follow step 1 above to display the **Name=** prompt.
 - b) Press *[letter from A to Z or θ]* to enter the first letter of the name. A variable name:
 - Can have one to eight characters consisting of letters and digits, including Greek letters (but not π), accented letters, and international letters. Do not include spaces. The first character cannot be a number.
 - Can have uppercase or lowercase letters; however, the names **AB22**, **Ab22**, **aB22**, and **ab22** all refer to the same variable.
 - Cannot be the same as a name that is preassigned by the TI-89 / TI-92 Plus. Preassigned names include built-in functions (such as **abs**), instructions (such as **LineVert**), and system variables (such as **xmin** and **xmax**. Refer to Appendix A of the TI-89 / TI-92 Plus guidebook.
 - c) Enter the remaining zero to seven characters to complete the new user-created list name.
 - d) Press **[ENTER]** or **⏏** to store the list name in the current column of the list editor.
 - Enter a new user-created list name from the keyboard at the **Name=** prompt.

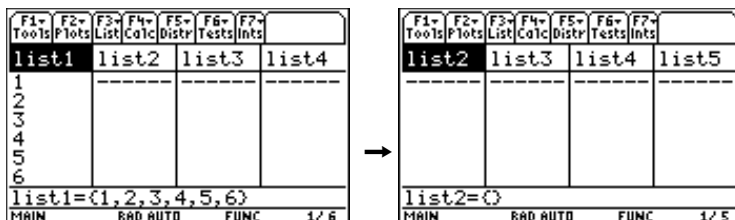
Press **[2nd] [INS]** and enter the list name (**abc**). Then press **[ENTER]** or **⏏** to store the list name (**abc**) and lists elements, if any, in the current column of the list editor. Begin entering, scrolling, or editing list elements.



Removing Lists

Removing a List Only from the List Editor

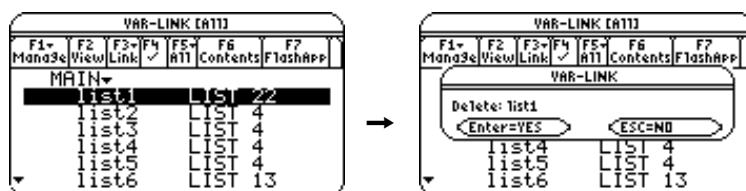
To remove a list only from the list editor, move the cursor onto the list name and press \blacklozenge [DEL].



Note: The list is not deleted from memory; it is only removed from the list editor.

Removing a List from the List Editor and from Calculator Memory

- From the Stats/List Editor, use the **VAR-LINK [All]** menu to delete specified lists.
 - Press 2^{nd} [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight the list (**list1**).
 - Press $F1$ (**Manage**) and select **1:Delete** to display the **VAR-LINK** dialog box. Press ENTER to delete the list (**list1**) from the list editor and from the calculator memory. Press ESC to retain the list.



- From the Home screen, use the **DelVar** command to delete specified lists.
 - To display the Home screen press,
 - HOME for the TI-89
 - \blacklozenge [HOME] for the TI-92 Plus.
 - To select the **DelVar** function from the **CATALOG** press,
 - CATALOG **D** for the TI-89
 - 2^{nd} [CATALOG] **D** for the TI-92 Plus.

Then move the \blacktriangleright indicator to the **DelVar** command. Press ENTER to paste the **DelVar** command to the entry line.

- Press 2^{nd} [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight the list (**list1**) and press ENTER to paste the list (**list1**) in the entry line.
- Press ENTER to remove the list (**list1**) from the list editor and from the calculator memory.



Note: If you archive a list, the Stats/List Editor lets you open and view the list. You cannot store values to this archived list. You must unarchive an archived list before you can delete it.

Removing Lists (continued)

Removing All Lists and Restoring list1 through list6

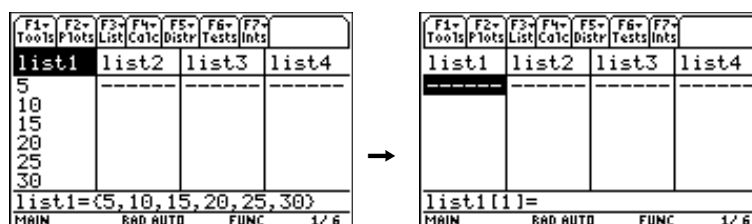
To remove all user-created lists and restore list names **list1- list6** to columns 1 - 6:

- Press **[F1]** (**Tools**) and select **3:Setup Editor** to display the **Setup Editor** dialog box. Then press **[ENTER]** to close the **Setup Editor** dialog box without entering any list names in the **Lists To View** dialog box.
- Reset all memory (see Chapter 21 of the TI-89 / TI-92 Plus Guidebook).

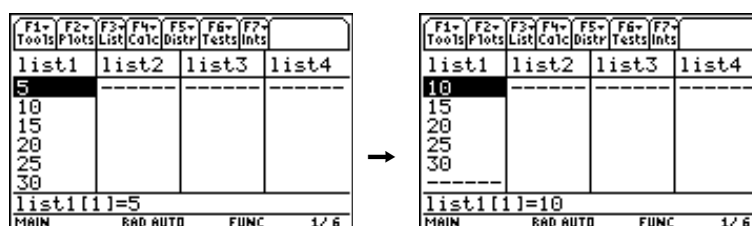
Note: Resetting the TI-89 / TI-92 Plus memory deletes all lists from memory.

Clearing Elements from a List

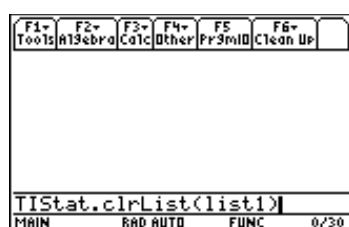
- To clear list elements from the Stats/List Editor, use either of these two methods:
 - **[CLEAR]** — Highlight the list (**list1**). Press **[CLEAR]** **[ENTER]** or **[CLEAR]** **[◀]** or **[▶]**. Or, press **[CLEAR]** **[⏴]** to clear the elements.



- **[←]** — Highlight the first element of the list (**list1**). Press **[←]** to delete the element (**5**).



- To clear list elements of a specified list from the Home screen, use the **clrList(** command.
 1. To display the Home screen press,
 - **[HOME]** for the TI-89.
 - **[▶] [HOME]** for the TI-92 Plus.
 2. To select the **clrList(** function from the **[F3]** (**Flash Apps**) catalog press,
 - **[CATALOG] [F3] (List) C** for the TI-89.
 - **[2nd] [CATALOG] [F3] (List) C** for the TI-92 Plus.
 3. Move the **▶** indicator to the **clrList(** function, press **[ENTER]** to paste **clrList(** to the entry line, enter the list name (**list1**), press **[)]**, then and press **[ENTER]** to clear the elements in the list.



Note: TIStat.clrList(list1) and the Done message are displayed when the list is cleared.

Editing a List Element

Example

To edit a list element, follow these steps.

1. Move the rectangular cursor onto the element you want to edit.
2. Press **[ENTER]** to highlight the element in the entry line.

Tip: If you want to replace the current value, you can enter a new value without first pressing **[ENTER]**. When you enter the first character, the current value is cleared automatically.

3. Edit the element in the entry line in any of three ways:
 - Press one or more keys to enter the new value. When you enter the first character, the current value is cleared automatically.
 - Press **[▶]** to move the cursor to the character before which you want to insert, and then enter one or more characters.
 - Press **[◀]** to move the cursor just after the character you want to delete, and then press **[←]** to delete the character.

Note: To cancel any editing and restore the original element at the rectangular cursor, press **[ESC]**.

4. Press **[ENTER]**, **[◀]**, or **[▶]** to update the list. If you entered an expression, it is evaluated. If you entered only a variable, the stored value is displayed as a list element. When you edit a list element in the list editor, the list is updated in memory immediately.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list1[3]=15*1000							
MAIN RAD AUTO FUNC 1/6							

→

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15000							
20							
25							
30							
list1[4]=20							
MAIN RAD AUTO FUNC 1/6							

Note: You can enter expressions (as shown above) and variables for list elements, but they must resolve to a single value.

Formulas

Attaching a Formula to a List Name

You can attach a formula to a list name so that each list element is a result of the formula. The attaching procedure must be performed inside the Stats/List Editor application.

- When executed, the calculation resulting from the attached formula must resolve to a list.
- When anything in the attached formula changes, the list to which the formula is attached is updated automatically.
- When you edit an element of a list that is referenced in the formula, the corresponding element in the list to which the formula is attached is updated.
- When you edit the formula itself, all elements in the list to which the formula is attached are updated.

Note: To view a formula that is attached to a list name, highlight the name of the list to which a formula is attached. The list will have an attached formula symbol (▪) next to the name.

Example

1. In the list editor, enter: `list1={1,2,3,4,5,6}`
2. Press \uparrow , if necessary, to move the cursor to the top line. Press \leftarrow or \rightarrow to move the cursor onto the list name to which you want to attach the formula.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
1						
2						
3						
4						
5						
6						
list2=						
MAIN		RAD AUTO		FUNC		2/6

Note: If a formula in quotation marks is displayed on the entry line, a formula is already attached to the list name. To edit the formula, press `ENTER`, and then edit the formula in the entry line, or press `ENTER` to use the Attach List Formula dialog box.

3. Press `F3` (**List**) and select **4:Attach List Formula**. The **Attach List Formula** dialog box is displayed. The list you indicated (`list2`) is in the **List** field. Enter the formula (`list1+10`) in the **Formula** field.

Attach List Formula...

List: list2

Formula: list1+10

Formula Name: zlist2

4. Press \downarrow . If the variable name to which you want to store the formula to is not displayed in the **Formula Name** field, enter a new variable name.

Note: The calculator chooses “z” plus the list name as the default formula variable name. It is recommended that you accept this default naming convention. If you want to reattach this formula the calculator will only prompt for this default variable. Do not use preassigned system variable names.

5. Press `ENTER`.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2▪	list3	list4			
1	11					
2	12					
3	13					
4	14					
5	15					
6	16					
list2[list1]=11						
MAIN		RAD AUTO		FUNC		2/6

The ▪ after the list name indicates that a formula is attached.

The calculator calculates each element according to the formula (`list1+10`) and stores it to the target list (`list2`).

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2▪	list3	list4			
1	11					
2	12					
3	13					
4	14					
5	15					
6	16					
list2="list1+10"						
MAIN		RAD AUTO		FUNC		2/6

Highlight the list name (`list2`) to view the list name and formula in quotes in the entry line.

Formulas (Continued)

Using Formula-Generated Lists

When you edit an element of a list referenced in an attached formula, the TI-89 / TI-92 Plus updates the corresponding element in the list to which the formula is attached.

1. Highlight the first element (1) in the list (**list1**).
2. Enter the new value (10) for the element and press **ENTER**.

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints
list1	list2	list3	list4			
1	11					
2	12					
3	13					
4	14					
5	15					
6	16					
list1[1]=10						
MAIN	RAD AUTO	FUNC	1/6			

→

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints
list1	list2	list3	list4			
10	20					
2	12					
3	13					
4	14					
5	15					
6	16					
list1[2]=2						
MAIN	RAD AUTO	FUNC	1/6			

Since the formula (list1+10) attached to list2 is based on list1, when element 1 in list1 changes, element 1 in list2 also changes.

When a list with an attached formula is displayed and you edit or enter elements of another displayed list, the TI-89 / TI-92 Plus takes slightly longer to accept each edit or entry. The TI-89 / TI-92 Plus must recalculate the elements with each addition or edit.

Tip: This lag time in editing entries can be avoided by pressing **□** **□** and setting Auto-calculate to NO.

Using a Formula without Attaching It to a List

You can use a formula or expression to create or edit a list without attaching it to the list. The resulting list is simply a function of an existing list.

To use a formula or expression to create or edit a list:

1. Highlight the target list name (**list2**) where you want place the new list elements and press **ENTER**. The list (**list2**) is highlighted in the entry line.
2. Enter the expression (**list1+10**) containing the source list and the calculation and press **ENTER**. The calculated values are pasted into the target list (**list2**).

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints
list1	list2	list3	list4			
1						
2						
3						
4						
5						
6						
list2=						
MAIN	RAD AUTO	FUNC	2/6			

Note: The target list will not have the attach symbol (■), and the formula (or expression) used to calculate the target list will not be in quotation marks.

Note: When you use a formula (or expression) to generate or update a list, the resulting calculations must resolve to a list.

Formulas (Continued)

Handling Errors Resulting from Attached Formulas

You can use an expression to create or edit a list element. If the expression does not resolve to a single value, a **Data type** error message is displayed.

You can also use an expression to create or edit a list. If the expression does not result in a list, a **Data type** error message is displayed.

You can use a formula that generates a different result each time, or example, a formula that includes a random function or one that refers back to the list the formula is attached to. The Stats/List Editor evaluates the formula and displays the results, but it does not attach the formula. You must use **F3 (List) 4:Attach List Formula** to attach a formula to a list.

On the Home screen, you can view a list with an attached formula; however, you cannot edit the attached formula. You can only view and edit attached formulas from within the Stats/List Editor.

You cannot sort a list with an attached formula. If you try to sort a list with an attached formula, no error message is displayed; however, the sort function is not executed.

Tip: If an error message is returned when you attempt to display a formula-generated list in the list editor, press **[ESC]**. Then edit the formula: 1) highlight the list name with the attached formula, 2) press **[ENTER]**, and 3) edit the formula in the entry line, or, press **[ENTER]** again and use the Attached List Formula dialog box to edit the formula.

Detaching a Formula from a List Name

You can detach (clear) a formula from a list name by using the **[CLEAR]** key or by editing an element in a list to which a formula is attached.

- To detach a formula using the **[CLEAR]** key:

Move the cursor onto the name of the list (**list2**) to which a formula is attached. Press **[CLEAR]** **[ENTER]**. All list elements remain; however the formula is detached and the attached formula symbol (■) disappears.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Intz
list1	list2 ■	list3	list4			
10	20					
20	30					
3	13					
4	14					
5	15					
6	16					
list2="list1+10"						
MAIN	RAD	AUTO	FUNC	2/6		

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Intz
list1	list2	list3	list4			
10	20					
20	30					
3	13					
4	14					
5	15					
6	16					
list2[1]=20						
MAIN	RAD	AUTO	FUNC	2/6		

- To detach a formula by editing a list element:

Move the cursor onto an element (**13**) of the list (**list2**) to which a formula is attached. Press **[ENTER]**. Enter the new element value (**26**) and press **[ENTER]**. The element changes, the formula is detached, and the attached formula symbol (■) disappears.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Intz
list1	list2 ■	list3	list4			
1	11					
2	12					
3	13					
4	14					
5	15					
6	16					
list2[3]=13						
MAIN	RAD	AUTO	FUNC	2/6		

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Intz
list1	list2	list3	list4			
1	11					
2	12					
3	26					
4	14					
5	15					
6	16					
list2[4]=14						
MAIN	RAD	AUTO	FUNC	2/6		

F1 Tools Menu

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The **F1** (**Tools**) menu lets you set up the Stats/List Editor. It includes the **Copy** and **Paste** command, which let you share data between different editors and applications. These commands use the clipboard of the TI-89 / TI-92 Plus. It also includes several format options that let you decide how your application interface will work, as well as several commands that help you with management and cleanup.



Setup Editor

Description

[F1] (Tools) → **3:Setup Editor**

Using **Setup Editor**, you can:

- Place lists in the Stats/List Editor.
- Enter one or more list names to place in the Stats/List Editor columns, beginning in column 1, in the order that you enter them. All list names currently in the Stats/List Editor are removed.
- Remove all user-created lists from the Stats/List Editor and restore the list names list1 through list6 to columns 1 through 6.
- Enter and view list names that are archived; however you cannot edit these archived lists in the list editor.

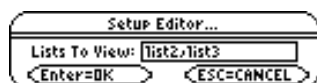
Note: If you enter a list name that is not already stored in memory, the list name is created and stored in memory; it becomes an item on the VAR-LINK [All] menu. Press **[F3]** (List) and select 1:Names to access this menu.

Example

1. Press **[F1]** (Tools) and select **3:Setup Editor** to display the **Setup Editor** dialog box.



2. Insert the list names (**list2,list3**) into the **Lists To View** field as shown below.



Tip: You can press **[2nd]** [VAR-LINK], highlight a list name, and then press **[ENTER]** to paste a list name into this field. Be sure to separate the arguments with a comma (,).

3. Press **[ENTER]** to view the lists.

F1+ Tools	F2+ Plots	F3+ List	F4+ Calc	F5+ Distr	F6+ Tests	F7+ Ints	
list2	list3						
78	87						
89	99						
92	44						
67	89						
77	62						
82	74						
list2={78,89,92,67,77,82}							
MAIN		RAD AUTO		FUNC		1/2	

Copy and Paste

Description

[F1] (Tools) → **5:Copy** or **6:Paste**

Copy lets you copy cell contents, list formulas, and list names into the calculator clipboard. The **Copy** command leaves information in its current location.

Paste places a copy of the clipboard contents into the current screen.

Note: When copying information to the clipboard, hold **[↑]** and press **[←]** or **[→]** to highlight characters to the left or right of the cursor.

Example

1. Press **[←]** until the list name (**list1**) is highlighted and then press **[ENTER]**.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
5							
6							
list1={1,2,3,4,5,6}							
MAIN		RAD AUTO		FUNC		1/6	

2. Press **[F1]** (Tools), select **5:Copy**, and then press **[ENTER]** to copy the contents of **list1** to the calculator clipboard.
3. Highlight **list2** and then press **[ENTER]**.
4. Press **[F1]** (Tools), select **6:Paste**, and then press **[ENTER]** to paste the contents of **list1** into **list2**.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1	1						
2	2						
3	3						
4	4						
5	5						
6	6						
list2[1]=1							
MAIN		RAD AUTO		FUNC		2/6	

TI-89 Tip: You can press **[♦]** [COPY] to copy or **[♦]** [PASTE] to paste without having to use the **[F1]** toolbar menu.

TI-92 Plus Tip: You can press **[♦]** C to copy or **[♦]** V to paste without having to use the **[F1]** toolbar menu.

Clear a-z

Description

[F1] (Tools) → 7:Clear a-z

Clear a-z deletes from calculator memory all single-character variable names (a-z) in the current folder, unless the variables are locked or archived.

Single-character variable names are often used in symbolic calculations such as:

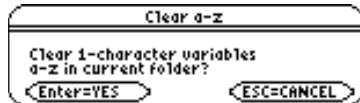
solve(a · x² + b · x + c = 0, x)

Note: If variables have already been assigned a value, the calculation may produce misleading results. To prevent this, select 1:Clear a-z before starting the calculation.

Tip: You can make sure that a variable you want to keep is not inadvertently deleted by 7:Clear a-z. Simply name any variable that you want to retain using multiple characters.

Example

1. Press **[F1] (Tools)** and select **7:Clear a-z** to display the **Clear a-z** dialog box.



2. Press **[ENTER]** to clear all single-character variable names (a-z). Press **[ESC]** to abort the action.

Note: You cannot use the Clear a-z command in a program; instead, use the DelVar command.

Clear Editor

Description

[F1] (Tools) → 8:Clear Editor

Clear Editor clears all list values and list names from the Stats/List Editor. This function removes the lists from the editor only. **Clear Editor** does not delete list names from memory.

Example

From the Stats/List Editor, press **[F1]** (Tools) and select **8:Clear Editor**. All lists are cleared from the list editor, but not from memory.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list1	list2	list3	list4			
1	7	13				
2	8	14				
3	9	15				
4	10	16				
5	11	17				
6	12	18				
list1=e						
MAIN RAD AUTO FUNC 1/6						

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
Name=						
MAIN RAD AUTO FUNC						

Note: You can restore list1, list2, and list3 using Setup Editor.

1. Press **[F1]** (Tools) and select 3:Setup Editor. The Setup Editor dialog box is displayed.
2. Enter the list names you want to display. Be sure to separate each list name with a comma.
3. Press **[ENTER]** to restore the specified lists.

Note: The Clear Editor command is not available under the CATALOG. In programs, you must use SetupEd, ClrList, or DelVar commands.

Format

Description

F1 (Tools) → **9:Format**

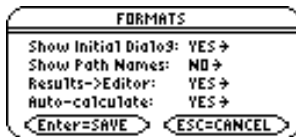
The four **Format** settings are shown below.

Settings

Show Initial Dialog (YES, NO)	Shows or hides the initial help folder selection dialog box. By default, Show Initial Dialog = YES .
Show Path Names (YES, NO)	Shows or hides path names to a variable. Use Show Path Names to aid in working with lists from multiple folders. By default, Show Path Names = No .
Results>Editor (YES, NO)	Sets up the application to automatically append certain statistics calculations produced by statistics functions to the Stats/List Editor. By default, Results>Editor = YES .
Auto-Calculate (YES, NO)	Sets the Auto-calculate feature for list and data variables. By default, Auto-calculate = YES . <ul style="list-style-type: none">• When Auto-calculate is set to YES, the elements in a list to which a formula is attached, are automatically updated when you update the corresponding elements in a list that is referenced by the attached formula.• When Auto-calculate is set to YES, the elements in a list to which a formula is attached, are automatically updated when you edit the formula.

Example

Press **F1** (Tools) and select **9:Format** to display the **FORMATS** dialog box. The defaults are shown here.



About

Description

F1 (Tools) → A>About

Displays the **About** dialog box, which contains the Stats/List Editor application version and copyright information. Press **ENTER** or **ESC** to close the dialog box.

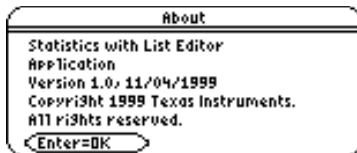
You may need information about the TI-89 / TI-92 Plus, particularly the software version. Future software versions will include maintenance upgrades, as well as new applications and major software upgrades available from the TI web site:

<http://www.ti.com/calc>

Example

Press:

- **F1** (Tools) **alpha** **A** for the TI-89
- **F1** (Tools) **A** for the TI-92 Plus



Note: The About dialog box will not look exactly like the one shown here.

F2 Plots Menu

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The **F2** (**Plots**) menu allows you to produce plots of your data. Plots are graphical representations of data that have been stored in lists. Before you can define plots, you must create the lists. Stat/List Editor application plot types include Scatter, xyline, Box Plot, Histogram, Modified Box Plot, and Normal Probability Plot.



Note: This chapter assumes that you know how to create lists using the Stats/List Editor application. If necessary, review the information on creating lists in the Lists and **F3** List Menu chapters in this user guide.

Plot Setup

Description

F2 (Plots) → 1:Plot Setup

Use **Plot Setup** to define and manage plots.

Plot Setup Menu

From the **Plot Setup** menu, you can access the commands by pressing the calculator function keys **F1** (**Define**), **F2** (**Copy**), **F3** (**Clear**), **F4** (**✓ (Select)**), and **F5** (**ZoomData**).

F1 Define	Lets you define a plot using applicable plot types, plot symbols (marks), lists, frequencies, and categories.
F2 Copy	Lets you copy a plot to another plot.
F3 Clear	Lets you clear a plot.
F4 ✓ (Select)	Lets you select a plot for graphing and then toggle it on or off.
F5 ZoomData	Lets you redefine the viewing window to display all statistical data points and go to the graph automatically.

Note: See Chapter 16 of the TI-89 / TI-92 Plus Guidebook for more information.

Defining a Plot Using **F1** Define

F2 (Plots) → 1:Plot Setup → **F1** (Define)

In the **Plot Setup** dialog box, you select the plot type (**Scatter**, **xyline**, **Box Plot**, **Histogram**, **Modified Box Plot**) and specify the options.

Plot Type	Choose one of five plot types: Scatter , xyline , Box Plot , Histogram , Mod Box Plot . The type you choose affects the remaining options. Options that are not applicable to a plot type are grayed out.
Mark	Select the symbol used to plot the data points: Box (□), Cross (x), Plus (+), Square (■), or Dot (•).
x	Type or insert the list name (list1 , list2 , etc.) used for x values, the independent variable.
y	Type or insert the list name used for y values, the dependent variable. This option is active only for Plot Type = Scatter or xyline .
Hist. Bucket Width	Specify the width of each bar in a histogram. For more information, refer to the TI-89 / TI-92 Plus guidebook.
Use Freq and Categories?	Select NO or YES . Freq , Category , and Include Categories are active only when Use Freq and Categories? = YES . Freq is active only for Plot Type = Box Plot , Histogram , or Mod Box Plot .
Freq	Type or insert the list name that contains a “weight” value for each data point. If you do not enter a list, all data points are assumed to have the same weight (1).
Category	Type or insert the list name that contains a category value for each data point.
Include Categories	If you specify a Category list, you can use this field to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

Plot Setup

Example

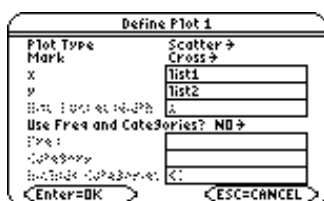
1. Press **[F2]** (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box. Initially, none of the plots are defined. However, current plot definitions may be displayed.



2. Highlight the plot number that you want to define, and then press **[F1]** (**Define**) to define the plot.

Note: On the calculator, items are active only if they are valid for the current settings of Plot Type and Use Freq and Categories?

3. Specify applicable settings for the active items.



Note: The Stats/List Editor lets you paste a list into either the X value or Y value field. Press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste a list name into the field.

4. Press **[ENTER]**. The **Plot Setup** screen is redisplayed, and the plot you defined is automatically selected for graphing.



Note: The Stats/List Editor displays the **[F5]** (ZoomData) in the Plot Setup menu. Selecting **[F5]** (ZoomData) lets you set the viewing window to display all statistical data points without having to access this function in the Y= Editor, Window Editor, or Graph Screen.

Norm Prob Plot (Normal Probability Plot)

Description

[F2] (Plots) → 2:Norm Prob Plot

Norm Prob Plot plots each observation **X** in a list versus the corresponding quantile **z** of the standard normal distribution. If the plotted points lie close to a straight line, the plot indicates that the data are normal.

Plot Number	Select the plot number. Only the available (not already defined) plot numbers are displayed. (Plot 1...9)
List	Enter a valid list name in the List field.
Data Axis	Select X or Y for the Data Axis field. If you select X , the calculator plots the data on the x-axis and the z-values on the y-axis. If you select Y , the calculator plots the data on the y-axis and the z-values on the x-axis.
Mark	Select the Mark you want to use for the plot: Box (□), Cross (x), Plus (+), Square (■), or Dot (·).
Store Zscores to	Enter a list variable name where you want to store the zscores.

Example

Use the **.randNorm** function in the **[F4] (Calc)** menu to generate and display a list of random numbers using $\mu = 35$, $\sigma = 2$, and **NUMTRIALS**= 90.

randNorm(μ , σ [,NUMTRIALS])

Store the results to **list1**, and then use the **Norm Prob Plot** function to plot each observation of **X** in a list versus the corresponding quantile **z** of the standard normal distribution.

1. Press **[F2] (Plots)** and select **3:PlotsOff** to turn off all plots for graphing. Press **[F2] (Plots)** and select **4:FnOff** to deselect all Y = functions.
2. Highlight **list1**, press **[F4] (Calc)** and select **4:Probability**. Then select **6:.randNorm(** to paste the **.randNorm(** function to the entry line.



3. Enter the arguments for **.randNorm(** in the entry line as shown below.



Norm Prob Plot (Normal Probability Plot) (continued)

Example (continued)

- Press **[ENTER]** to build a list of random numbers.

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints
list1	list2	list3	list4			
36.2						
33.847						
37.008						
34.496						
34.556						
38.04						
list1[1]=36.20010482694						
MAIN RAD AUTO FUNC 1/7						

- Press **[F2]** (**Plots**) and select **2:Norm Prob Plot** to display the **Norm Prob Plot** dialog box. Use the arguments as shown below.

Norm Prob Plot...	
Plot Number:	Plot 2
List:	list1
Data Axis:	X
Mark:	Dot
Store Zscores to:	statvars/z
<input type="button" value="Enter=OK"/> <input type="button" value="ESC=CANCEL"/>	

Note: Use the default list variable name in the Store Zscores to input box. The "statvars/zscores" variable name is truncated in the screenshot above.

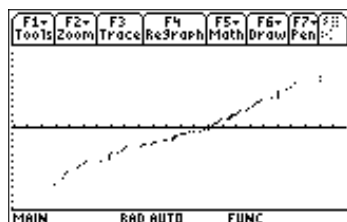
- Press **[ENTER]** to paste the **zscores** to the end of the list editor.

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints
list4	list5	list6	zscor...			
			-2.539			
			-2.128			
			-1.915			
			-1.764			
			-1.645			
			-1.546			
zscores[1]=-2.53918481362...						
MAIN RAD AUTO FUNC 7/7						

- Press **[F2]** (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box.

Plot Setup...				
F1 Define	F2 Copy	F3 Clear	F4 Zoom	F5 ZoomData
Plot 1:	<input type="checkbox"/>	X: list4	Y: list4	
Plot 2:	<input type="checkbox"/>	X: list5	Y: list5	
Plot 3:	<input checked="" type="checkbox"/>	X: list6	Y: list6	
Plot 4:	<input type="checkbox"/>	X: list	Y: zscores	
Plot 5:				
Plot 6:				
Plot 7:				
Plot 8:				
Plot 9:				

- Press **[F5]** (**ZoomData**) to display the **Norm Prob Plot** (Normal Probability Plot).



PlotsOff (Plots Off) and FnOff (Functions Off)

Description

- **PlotsOff**

F2 (Plots) → **3:PlotsOff**

PlotsOff turns off all plots for graphing, but leaves the plot definitions intact. When in 2-graph mode, it only affects the active graph.

- **FnOff**

F2 (Plots) → **4:FnOff**

Deselects all Y= functions for the current graphing mode.

Examples

- **PlotsOff**

Press **F2** (Plots) and select **3:PlotsOff** to turn off all plots.

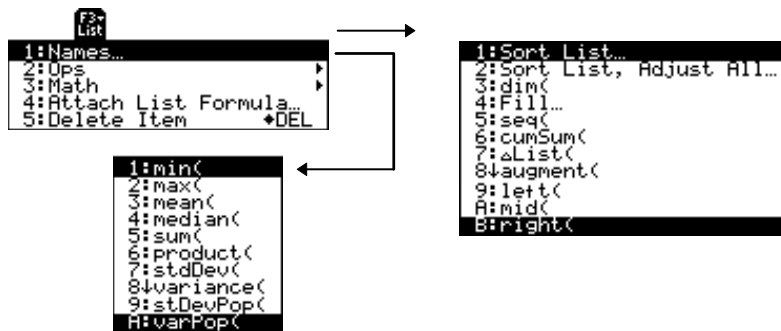
- **FnOff**

Press **F2** (Plots) and select **4:FnOff** to deselect all Y= functions.

F3 List Menu

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The **F3** (List) menu provides functions for creating, displaying, sorting editing, inserting, moving, and deleting lists. Functions are also provided for attaching formulas to lists and performing various statistical analyses with list data. The Stats/List Editor Application lets you create up to 99 lists with up to 999 elements each, limited only by the amount of memory in the calculator.



Introduction

Entering Arguments for Functions and Commands

This chapter shows functions for which the arguments are entered in two different ways.

- **Functions followed by an open parenthesis** — for example, `nCr(`.

You enter the arguments for these functions in the entry line of the current screen. You must separate the arguments with commas, and you must close the function with a close parenthesis. The arguments (or inputs) for these functions are described in terms of a syntax statement — for example, `nCr(EXPR1,EXPR2) ⇒ LIST`.

The first screenshot shows the calculator's function menu with `list5=nCr(list3,list4)` entered in the entry line. The second screenshot shows the result `list5(1)=10` displayed in the entry line.

Syntax for Input:
`nCr(EXPR1,EXPR2)`

Output: `LIST`

- **Functions that are *not* followed by an open parenthesis** — for example, `SinReg`.

You enter the arguments for these functions by placing the arguments in the fields displayed in a dialog box. The arguments (or inputs) for these functions are described in a table called **Inputs**. The results (or outputs) are shown also displayed in a dialog box. These outputs are described in a table called **Outputs**.

The first screenshot shows the SinReg input dialog box with the following fields: X List: list2, Y List: list4, Iterations: 8, Period: (empty), Store RegEqn to: y5(x) →, Category List: (empty). The second screenshot shows the SinReg output dialog box with the following fields: a: -.893855, b: =2.26627, c: =2.32015, d: =1.63829.

SinReg input dialog box

SinReg output dialog box

Using the CATALOG to Access Functions and Commands

Many of the functions and commands used in the Stats/List Editor can also be used from the Home screen.

To display a statistics function or command on the Home screen, simply copy it from the **CATALOG** and paste it into the entry line.

For more information about the **CATALOG** and about syntax, see page 3 of Getting Started.

Names Menu

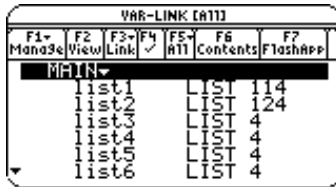
Description

[F3] (List) → 1:Names

The **Names** menu displays the **VAR-LINK [All]** menu containing all the lists in all folders. The current folder is expanded (indicated by ▼) and all other folders are collapsed (indicated by ►). This menu lets you manage, view, link, and select lists. For more information about the **VAR-LINK [All]** menu, see the TI-89 / TI-92 Plus guidebook.

Example

Press **[F3]** (**List**) and select **1:Names** to view all lists.



The screenshot shows the VAR-LINK [All] menu. The menu is titled "VAR-LINK [All]" and has a header row with function keys: F1- Manage, F2- View, F3- Link, F4- [checkmark], F5- All, F6- Contents, and F7- FlashAPP. Below the header, the "VAR-LINK" menu is expanded, showing a list of variables:

Variable Name	Type	Value
list1	LIST	114
list2	LIST	124
list3	LIST	4
list4	LIST	4
list5	LIST	4
list6	LIST	4

You can also view lists by pressing **[2nd]** [VAR-LINK].

Note: When you select 1:Names from the **[F3]** (List) menu, only list names are displayed, but when you press **[2nd]** [VAR-LINK], all variable types, including lists, are displayed.

Ops (Operations) Menu

Description

F3 (List) → **2:Ops**

The options on the **Ops** menu are summarized in the table below. Details about each function or instruction follow.

Ops Menu

Sort List	Sorts elements in specified list(s) in ascending or descending order.
Sort List, Adjust All	Sorts elements in all lists based on a specified key list.
dim(Returns the dimension (number of elements) of a list.
Fill	Replaces each element in a list with a specified value.
seq(Returns a list in which each element is the result of the evaluation of an expression with regard to a variable.
cumSum(Returns the cumulative sum, element by element, of all elements in a specified list.
ΔList(Returns the difference between consecutive elements of a list.
augment(Appends a new list to an existing one.
left(Returns the leftmost specified elements in a list.
mid(Returns the middle specified elements in a list.
right(Returns the rightmost specified elements in a list.

Sort List

Description

[F3] (List) → 2:Ops → 1:Sort List

Sort List sorts the elements of a specified list in ascending or descending order.

You can specify more than one list when using **Sort List**. In this case, the first list specified is the *independent* list; any following lists are *dependent*.

The calculator sorts the *independent* list first, and then sorts all the *dependent* lists by placing their elements in the same order as their corresponding elements in the *independent* list. This lets you keep sets of related data in the same order when you sort lists. All arguments must be names of lists. When more than one list is specified, all lists must have equal dimensions.

Example

Setup: list1={5,10,15,20,25,30}

1. Highlight the list (**list1**) that you want to sort by moving the cursor to the list name.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list1={5,10,15,20,25,30}							
MAIN		RAD AUTO		FUNC		1/6	

2. Press **[F3]** (List) and select **2:Ops**. Then select **1:Sort List**. The **Sort List** dialog box is displayed. The list (**list1**) that you highlighted on the list editor screen is pasted into the **List** field. Press **[Down Arrow]**, and select the **Sort Order (Descending)**.



Note: If you want to sort more than one list, you can specify additional lists by typing the list names into the **List** field or, for each list, you can press **[2nd]** [VAR-LINK], highlight the list name, and press **[ENTER]** to paste the list name into the **List** field. Separate each list name with a comma (,).

3. Press **[ENTER]** to sort the list.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
30							
25							
20							
15							
10							
5							
list1={30,25,20,15,10,5}							
MAIN		RAD AUTO		FUNC		1/6	

Sort List, Adjust All

Description

[F3] (List) → 2:Ops → 2:Sort List, Adjust All

Sort List, Adjust All is identical to **Sort List**, except this command sorts all other lists in the editor in the same order as the **Key** (*independent*) **List**.

Example

Setup: **list1**={5,10,15,20,25,30} and **list2**={35,40,45,50,55,60}

1. Highlight the list (**list2**) that you want to sort by (the *independent* list).

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5	35						
10	40						
15	45						
20	50						
25	55						
30	60						
list2={35,40,45,50,55,60}							
MAIN		RAD AUTO		FUNC		2/6	

2. Press **[F3]** (List) and select **2:Ops**. Then select **2:Sort List, Adjust All**. The **Sort List, Adjust All** dialog box is displayed. The list that you highlighted, the key (or *independent*) list (**list2**), is pasted into the **Key List** field. Press **⏏** and select the **Sort Order (Descending)**.

Sort List, Adjust All...

Key List: list2

Sort Order: Ascending

Enter=OK Descending

3. Press **[ENTER]**. All lists are now in descending order, using the specified **Key List**.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
30	60						
25	55						
20	50						
15	45						
10	40						
5	35						
list2={60,55,50,45,40,35}							
MAIN		RAD AUTO		FUNC		2/6	

dim(

Description

[F3] (List) → 2:Ops → 3:dim(

dim(returns a *LIST* with an element containing the dimension (number of elements) of *LIST1*.

dim(LIST1) ⇒ *LIST*

Example

Setup: **list1={1,3,7,2,8}**

1. Highlight the first element of the list (**list2**) where you want to display the dimension.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1							
3							
7							
2							
8							

list2[1]=							
MAIN		RAD AUTO		FUNC		2/6	

2. Press **[F3]** (List) and select **2:Ops**. Then select **3:dim(**. The **dim(** command is displayed in the entry line. Enter the list (**list1**) for which you want to show the dimension. Press **[]**.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1							
3							
7							
2							
8							

list2[1]=dim(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis **[]**.

3. Press **[ENTER]** to display the dimension.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1	5						
3							
7							
2							
8							

list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

The dimension of list1 is 5.

Fill

Description

F3 (List) → 2:Ops → 4:Fill

Fill replaces each element in a List with a specified Value. (See the Fill dialog box below.)

Example

Setup: list1={1,2,3,4,5,6}

1. Highlight a list name or any element (1) in a list.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
1						
2						
3						
4						
5						
6						
list1[[1]=1						
MAIN		RAD AUTO		FUNC		1/6

2. Press **F3** (List) and select 2:Ops. Then select 4:Fill to display the Fill dialog box. Enter the list name (list1) that you want to fill in the List field and the value (1.01) that you want to fill the list with in the Value field as shown.

Fill...	
List:	list1
Value:	1.01
<input type="button" value="Enter=OK"/> <input type="button" value="ESC=CANCEL"/>	

Tip: You can press **2nd** [VAR-LINK], highlight a list, and then press **ENTER** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (]).

You can also press **F3** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **ENTER** to display the fill values.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
1.01						
1.01						
1.01						
1.01						
1.01						
1.01						
list1[[1]=1.01						
MAIN		RAD AUTO		FUNC		1/6

All of the elements in list1 are replaced with the fill value 1.01

seq(

Description

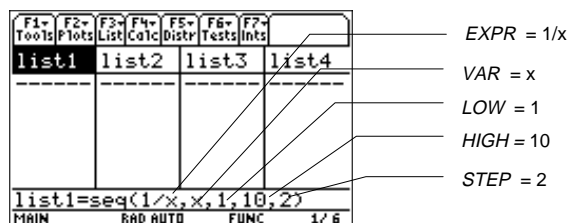
[F3] (List) → 2:Ops → 5:seq(

seq(increments *VAR* from *LOW* through *HIGH* by an increment of *STEP*, evaluates *EXPR*, and returns the results as a *LIST*. The original contents of *VAR* are in tact after the **seq(** function is completed. *VAR* cannot be a system variable. The default value for *STEP* is 1.

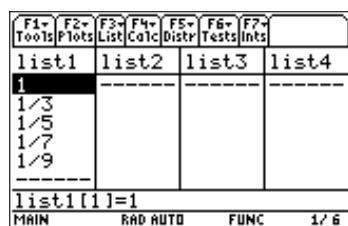
seq(EXPR,VAR,LOW,HIGH[,STEP]) ⇒ LIST

Example

1. Highlight the list name (**list1**) where you want to generate the sequence.
2. Press **[F3]** (**List**) and select **2:Ops**. Then select **5:seq(**. The **seq(** command is displayed in the entry line. Use the arguments for **seq(** as shown below.



3. Press **[ENTER]** to calculate and display the sequence.



Note: To generate a decimal approximation of list1, press **[♦]** **[ENTER]** for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press **[ENTER]** to highlight it on the entry line, and then press **[♦]** **[ENTER]**.

You can also set the calculator to APPROXIMATE mode. (Press **[MODE]** **[F2]** and then set Exact/Approx to APPROXIMATE.)

cumSum(

Description

$\boxed{\text{F3}}$ (List) \rightarrow 2:Ops \rightarrow 6:cumSum(

cumSum(returns a *LIST* of the cumulative sums of the elements in *LIST1*, starting at element 1.

cumSum(LIST1) \Rightarrow *LIST*

Example

Setup: list1={1,1/3,1/5,1/7,1/9}

1. Highlight the list (**list2**) where you want to return the cumulative sums of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
1/3							
1/5							
1/7							
1/9							
list2=							
MAIN		RAD AUTO		FUNC		2/6	

2. Press $\boxed{\text{F3}}$ (List) and select 2:Ops. Then select 6:cumSum(. The **cumSum(** command is displayed in the entry line. Enter the list (**list1**) for which you want to calculate the cumulative sums.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
1/3							
1/5							
1/7							
1/9							
list2=cumSum(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press $\boxed{2\text{nd}}$ [VAR-LINK], highlight a list, and then press $\boxed{\text{ENTER}}$ to paste the list name into the list editor. Be sure to close arguments with a right parenthesis ($\boxed{)}$).

You can also press $\boxed{\text{F3}}$ (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press $\boxed{\text{ENTER}}$ to calculate and display the cumulative sums.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1	1						
1/3	4/3						
1/5	23/15						
1/7	176/1...						
1/9	563/3...						
list2[1]=1							
MAIN		RAD AUTO		FUNC		2/6	

Note: To generate a decimal approximation of *list1*, press \blacklozenge $\boxed{\text{ENTER}}$ for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press $\boxed{\text{ENTER}}$ to highlight it on the entry line, and then press \blacklozenge $\boxed{\text{ENTER}}$.

You can also set the calculator to APPROXIMATE mode. (Press $\boxed{\text{MODE}}$ $\boxed{\text{F2}}$ and then set Exact/Approx to APPROXIMATE.)

ΔList(

Description

[F3] (List) → 2:Ops → 7:ΔList(

ΔList(returns a *LIST* containing the difference between consecutive elements in *LIST1*.

ΔList(*LIST1*) ⇒ *LIST*

Example

Setup: list1={20,30,45,70}

1. Highlight the list (**list2**) where you want to return the difference between two consecutive elements in a list.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
20							
30							
45							
70							
list2=							
MAIN		RAD AUTO		FUNC		2/6	

2. Press **[F3]** (List) and select **2:Ops**. Then select **7:ΔList**. The **ΔList(** command is displayed in the entry line. Enter the list (**list1**) for which you want to calculate the difference between consecutive elements.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
20							
30							
45							
70							
list2=ΔList(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select **1:Names** to display the **VAR-LINK [All]** menu.

3. Press **[ENTER]** to calculate and display the difference between consecutive elements.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
20	10						
30	15						
45	25						
70							
list2[1]=10							
MAIN		RAD AUTO		FUNC		2/6	

The difference between element 1 and element 2 is 10; the difference between element 2 and element 3 is 15, etc.

augment(

Description

[F3] (List) → 2:Ops → 8:augment(

augment(returns a new *LIST* that is *LIST2* appended to the end of *LIST1*.

augment(LIST1,LIST2) ⇒ *LIST*

Example

Setup: **list1={1,2,3}** and **list2={4,5,6}**

1. Highlight the list (**list3**) where you want to return the appended list.
2. Press **[F3]** (List) and select **2:Ops**. Then select **8:augment(**. The **augment(** command is displayed in the entry line. Enter the lists (**list1,list2**) to append.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1		list2		list3		list4	
1		4					
2		5					
3		6					
list3=augment(list1,list2)							
MAIN		RAD AUTO		FUNC		3/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **[ENTER]**.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1		list2		list3		list4	
1		4		1			
2		5		2			
3		6		3			
				4			
				5			
				6			
list3[1]=1							
MAIN		RAD AUTO		FUNC		3/6	

left(

Description

[F3] (List) → 2:Ops → 9:left(

left(returns the leftmost *NUMBER* of the elements contained in *LIST1*. If you omit *NUMBER*, **left(** returns all elements in *LIST1*.

left(LIST1[,NUMBER]) ⇒ *LIST*

Example

Setup: **list={5,10,15,20,25,30}**

1. Highlight the list (**list2**) where you want to return the leftmost elements.
2. Press **[F3]** (List) and select **2:Ops**. Then select **9:left(**. The **left(** command is displayed in the entry line. Enter the list (**list1**) from which you want to display the leftmost elements and the number of leftmost elements (**3**) you want to display.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2=left(list1,3)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to display the specified number of leftmost elements.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5	5						
10	10						
15	15						
20							
25							
30							
list2[1]=5							
MAIN		RAD AUTO		FUNC		2/6	

The 3 leftmost elements in list1 are 5, 10, and 15.

mid(

Description

[F3] (List) → 2:Ops → A:mid(

mid(returns a *LIST* containing the number of elements (*COUNT*) from *LIST1*, beginning with *START*. If *COUNT* is omitted or is greater than the dimension of *LIST1*, **mid(** returns all elements from *LIST1*, beginning with *START*. *COUNT* must be ≥ 0 . If *COUNT* = 0, **mid(** returns an empty *LIST*.

mid(LIST1,START[,COUNT]) ⇒ *LIST*

Example

1. Highlight the list (**list2**) where you want to return the elements.
2. To select **A:mid(** press:
 - **[F3] (List) 2 [alpha] A** for the TI-89.
 - **[F3] (List) 2 A** for the TI-92 Plus.

The **mid(** command is displayed in the entry line. Enter the list (**list1**) from which you want to display the middle elements. Enter the number of elements you want to display (**2**) and the number of the element at which you want to start (**3**).

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2=mid(list1,3,2)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd] [VAR-LINK]**, highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3] (List)** and select 1:Names to display the **VAR-LINK [All]** menu.

3. Press **[ENTER]** to display the specified number of mid elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5	15						
10	20						
15							
20							
25							
30							
list2[1]=15							
MAIN		RAD AUTO		FUNC		2/6	

Beginning with the third element in list1, the two middle elements are 15 and 20.

right(

Description

[F3] (List) → 2:Ops → B:right(

right(returns a *LIST* with the specified *NUMBER* of rightmost elements in *LIST1*. If you omit *NUMBER*, **right(** returns the total *NUMBER* of elements of *LIST*.

right(LIST1[,NUMBER]) ⇒ *LIST*

Example

1. Highlight the list (**list2**) where you want to return the rightmost elements.
2. To select **B:right(** press:
 - **[F3]** (List) 2 **[alpha]** **B** for the TI-89.
 - **[F3]** (List) 2 **B** for the TI-92 Plus.

The **right(** command is displayed in the entry line. Enter the list (**list1**) from which you want to display the rightmost elements. Enter the number of rightmost elements (**3**) that you want to display.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2=right(list1,3)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to display the specified number of rightmost elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5	20						
10	25						
15	30						
20							
25							
30							
list2[1]=20							
MAIN		RAD AUTO		FUNC		2/6	

The 3 rightmost elements in list1 are 20, 25, 30.

Math Menu

Description

F3 (List) → **3:Math**

The options on the **Math** menu are summarized in the table below. Details about each function or instruction follow.

Math Menu

min()	Returns the minimum value of each pair of corresponding elements in two lists.
max()	Returns the maximum value of each pair of corresponding elements in two lists.
mean()	Returns the mean of the elements in a list.
median()	Returns the median of the elements in a list.
sum()	Returns the sum of the elements in a list.
product()	Returns the product of the elements in a list.
stdDev()	Returns the standard deviation of the elements in a list.
variance()	Returns the variance of a list.
stDevPop()	Returns the standard deviation of a population based on the sample contained in the list.
varPop()	Returns the variance of a population based on the sample contained in a list.

min(

Description

$\boxed{F3}$ (List) \rightarrow 3:Math \rightarrow 1:min(

If the argument is one list (*LIST1*), **min(** returns *VALUE*, which is the minimum element of *LIST1*.

$\text{min}(\text{LIST1}) \Rightarrow \text{VALUE}$

If the arguments are two lists (*LIST1* and *LIST2*), **min(** returns a *LIST* containing the minimum value of each pair of corresponding elements.

$\text{min}(\text{LIST1}, \text{LIST2}) \Rightarrow \text{LIST}$

The example below shows **min(** returning the minimum element of a single list. You must highlight a single list element cell in which to return the single minimum element. If you use **min(** to find the minimum value of each pair of corresponding elements in two lists, you must highlight the list name where you want to return the list of minimum elements.

Note: If you highlight a list name to return a single value to, or if you highlight a single cell to return a list to, a Data type error is displayed.

Example

Setup: list1={5,10,15,20,25,30}

1. Highlight the first cell of the list (**list2**) where you want to display the minimum element in the list.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2[1]=							
MAIN		RAD AUTO		FUNC		2/6	

2. Press $\boxed{F3}$ (List) and select 3:Math. Then select 1:min(. The **min(** command is displayed in the entry line. Enter the list (**list1**) from which you want to return the minimum element.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2[1]=min(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press $\boxed{2nd}$ [VAR-LINK], highlight a list, and then press \boxed{ENTER} to paste the list name into the list editor. Be sure to close arguments with a right parenthesis ($\boxed{)}$).

You can also press $\boxed{F3}$ (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press \boxed{ENTER} to display the minimum element.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
5	5						
10							
15							
20							
25							
30							
list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

max(

Description

[F3] (List) → 3:Math → 2:max(

If the argument is one list (*LIST1*), **max(** returns *VALUE*, which is the maximum element of *LIST1*.

max(LIST1) ⇒ *VALUE*

If the arguments are two lists (*LIST1* and *LIST2*), **max(** returns a *LIST* containing the maximum value of each pair of corresponding elements.

max(LIST1,LIST2) ⇒ *LIST*

The example below shows **max(** returning the maximum element of a single list. You must highlight a single list element cell in which to return the single maximum element. If you use **max(** to find the maximum value of each pair of corresponding elements in two lists, you must highlight the list name where you want to return the list of maximum elements.

Note: If you highlight a list name to return a single value to, or if you highlight a single cell to return a list to, a Data type error is displayed.

Example

Setup: list1={5,10,15,20,25,30}

1. Highlight the first cell of the list (**list2**) where you want to return the maximum of the list.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2[1]=							
MAIN		RAD AUTO		FUNC		Z/6	

2. Press **[F3]** (List) and select 3:Math. Then select 2:max(. The **max(** function is displayed in the entry line. Enter the list (**list1**) from which you want to display the maximum element.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2[1]=max(list1)							
MAIN		RAD AUTO		FUNC		Z/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**[)]**).

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to display the maximum of the argument.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5	30						
10							
15							
20							
25							
30							
list2[2]=							
MAIN		RAD AUTO		FUNC		Z/6	

mean(

Description

$\boxed{F3}$ (List) \rightarrow 3:Math \rightarrow 3:mean(

mean(returns a *VALUE* containing the mean of the elements in *LIST1*.

mean(*LIST1*) \Rightarrow *VALUE*

Example

Setup: list1={1,3,8,11,15}

1. Highlight the first cell of a list (list2) where you want to return the mean of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
3							
8							
11							
15							
list2[1]=							
MAIN		RAD APPROX		FUNC		2/6	

2. Press $\boxed{F3}$ (List) and select 3:Math. Then select 3:mean(. The mean(function is displayed in the entry line. Enter the list (list1) from which you want to display the mean of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
3							
8							
11							
15							
list2[1]=mean(list1)							
MAIN		RAD APPROX		FUNC		2/6	

Tip: You can press $\boxed{2nd}$ [VAR-LINK], highlight a list, and then press \boxed{ENTER} to paste the list name into the list editor. Be sure to close arguments with a right parenthesis ($\boxed{)}$).

You can also press $\boxed{F3}$ (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press \boxed{ENTER} to calculate and display the mean.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list2	list3	list4	list5				
1							
3							
8							
11							
15							
list3[2]=							
MAIN		RAD AUTO		FUNC		2/5	

Note: To generate a decimal approximation press \blacklozenge \boxed{ENTER} for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press \boxed{ENTER} to highlight it on the entry line, and then press \blacklozenge \boxed{ENTER} .

You can also set the calculator to APPROXIMATE mode. (Press \boxed{MODE} $\boxed{F2}$ and then set Exact/Approx to APPROXIMATE.)

median(

Description

F3 (List) → 3:Math → 4:median(

median(returns a *VALUE* containing the median of the elements in *LIST1*.

median(*LIST1*) ⇒ *VALUE*

Note: All entries in *LIST1* must simplify to numbers.

Example

Setup: **list1**={1,3,8,11,15}

1. Highlight the first cell of the list (**list2**) where you want to return the median of the elements.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1							
3							
8							
11							
15							

list2[1]=							
MAIN		RAD APPROX		FUNC		2/6	

2. Press **F3** (List) and select 3:Math. Then select 4:median(. The **median**(function is displayed in the entry line. Enter the list (**list1**) for which you want to display the median of the elements.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1							
3							
8							
11							
15							

list2[1]=median(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **2nd** [VAR-LINK], highlight a list, and then press **ENTER** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (]).

You can also press **F3** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **ENTER** to calculate and display the median.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
1	8						
3							
8							
11							
15							

list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

The median of the elements is 8.

sum(

Description

[F3] (List) → **3:Math** → **5:sum(**

sum(returns a *VALUE* containing the sum of the elements in *LIST1*.

sum(LIST1) ⇒ *VALUE*

Example

Setup: **list1={1,2,3,4,5}**

1. Highlight the first cell of a list (**list2**) where you want to return the sum of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
5							
list2[1]=							
MAIN		2ND RAD AUTO		FUNC		2/6	

2. Press **[F3]** (**List**) and select **3:Math**. Then select **5:sum(**. The **sum(** function is displayed in the entry line. Enter the list (**list1**) for which you want to calculate the sum of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
5							
list2[1]=sum(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select **1:Names** to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to calculate and display the sum.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1	15						
2							
3							
4							
5							
list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

The sum of the elements is 15

product(

Description

[F3] (List) → 3:Math → 6:product(

product(returns a *VALUE* containing product of the elements in *LIST1*.

product(*LIST1*) ⇒ *VALUE*

Example

Setup: list1={1,2,3,4}

1. Highlight the first cell of the list (**list2**) where you want to return the product of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
list2[1]=							
MAIN		RAD AUTO		FUNC		2/6	

2. Press **[F3]** (List) and select **3:Math**. Then select **6:product(**. The **product(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the product of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
list2[1]=product(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select **1:Names** to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to calculate and display the product.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1	24						
2							
3							
4							
list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

The product of the elements is 24.

stdDev(

Description

F3 (List) → 3:Math → 7:stdDev(

stdDev(returns a *VALUE* containing the standard deviation of the elements in *LIST1*.

stdDev(LIST1) ⇒ *VALUE*

The statistics functions **stdDev(** and **stDevPop(** calculate the standard deviation of a population differently. **StdDev(** divides by *n-1*, and **stDevPop(** divides by *n*.

Note: *LIST1* must have at least two elements.

Example

Setup: **list1={1,2,3,4,5,6}**

1. Highlight the first cell of a list (**list2**) where you want to return the standard deviation.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
5							
6							
list2[1]=							
MAIN		RAD APPROX		FUNC		2/6	

2. Press **F3** (List) and select **3:Math**. Then select **7:stdDev**. The **stdDev(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the standard deviation of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
5							
6							
list2[1]=stdDev(list1)							
MAIN		RAD APPROX		FUNC		2/6	

Tip: You can press **2nd** [VAR-LINK], highlight a list, and then press **ENTER** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (]).

You can also press **F3** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **ENTER** to calculate and display the standard deviation.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1		√(14)...					
2							
3							
4							
5							
6							
list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

Note: To generate a decimal approximation press **♦** **ENTER** for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press **ENTER** to highlight it on the entry line, and then press **♦** **ENTER**.

You can also set the calculator to APPROXIMATE mode. (Press **MODE** **F2** and then set Exact/Approx to APPROXIMATE.)

variance(

Description

$\boxed{\text{F3}}$ (List) \rightarrow 3:Math \rightarrow 8:variance(

variance(returns a *LIST* containing the variance of *LIST1*.

variance(*LIST1*) \Rightarrow *LIST*

The statistics functions **variance(** and **varPop(** calculate the variance of a population differently. **variance(** divides by *n-1*, and **varPop(** divides by *n*.

Note: *LIST1* must contain at least two elements

Example

Setup: list1={1,2,3,-6,3,-2}

1. Highlight the first cell of a list (**list2**) where you want to return the variance.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
-6							
3							
-2							
list2[1]=							
MAIN		RAD AUTO		FUNC		2/6	

2. Press $\boxed{\text{F3}}$ (List) and select 3:Math. Then select 8:variance(. The **variance(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the variance of the elements.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
-6							
3							
-2							
list2[1]=variance(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press $\boxed{2\text{nd}}$ [VAR-LINK], highlight a list, and then press $\boxed{\text{ENTER}}$ to paste the list name into the list editor. Be sure to close arguments with a right parenthesis ($\boxed{)}$).

You can also press $\boxed{\text{F3}}$ (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press $\boxed{\text{ENTER}}$ to calculate and display the variance.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
-6							
3							
-2							
list2[1]=377/30							
MAIN		RAD AUTO		FUNC		2/6	

Note: To generate a decimal approximation press $\boxed{\blacklozenge}$ $\boxed{\text{ENTER}}$ for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press $\boxed{\text{ENTER}}$ to highlight it on the entry line, and then press $\boxed{\blacklozenge}$ $\boxed{\text{ENTER}}$.

You can also set the calculator to APPROXIMATE mode. (Press $\boxed{\text{MODE}}$ $\boxed{\text{F2}}$ and then set Exact/Approx to APPROXIMATE.)

stDevPop(

Description

[F3] (List) → 3:Math → 9:stDevPop(

stDevPop(returns a *VALUE* containing the standard deviation of a population based on the sample contained in LIST1.

stDevPop(LIST1) ⇒ *VALUE*

The statistics functions **stDevPop(** and **stdDev(** calculate the standard deviation of a population differently. **stDevPop(** divides by *n*, and **StdDev(** divides by *n-1*.

Note: LIST1 must have at least two elements.

Example

Setup: list1={1,2,3,-6,3,-2}

1. Highlight the first cell of a list (**list2**) where you want to return the standard deviation of a population.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list1	list2	list3	list4			
1						
2						
3						
-6						
3						
-2						
list2[1]=						
MAIN		RAD AUTO		FUNC		2/6

2. Press **[F3]** (List) and select 3:Math. Then select 9:stDevPop(. The **stDevPop(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the standard deviation of a population.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list1	list2	list3	list4			
1						
2						
5						
-6						
3						
-2						
list2[1]=stDevPop(list1)						
MAIN		RAD AUTO		FUNC		2/6

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to calculate and display the standard deviation of a population.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list1	list2	list3	list4			
1						
2						
3						
-6						
3						
-2						
list2[1]=f(377)/6						
MAIN		RAD AUTO		FUNC		2/6

Note: To generate a decimal approximation press **[♦]** **[ENTER]** for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press **[ENTER]** to highlight it on the entry line, and then press **[♦]** **[ENTER]**.

You can also set the calculator to APPROXIMATE mode. (Press **[MODE]** **[F2]** and then set Exact/Approx to APPROXIMATE.)

varPop(

Description

[F3] (List) → 3:Math → A:varPop(

varPop(returns a *VALUE* containing the variance of a population based on the sample contained in *LIST1*.

varPop(LIST1) ⇒ *VALUE*

The statistics functions **varPop(** and **variance(** calculate the variance of a population differently. **varPop(** divides by *n*, and **variance(** divides by *n-1*.

Note: *LIST1* must contain at least two elements

Example

Setup: list1={5,10,15,20,25,30}

1. Highlight the first cell of a list (**list2**) where you want to return the variance of the population.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2[1]=							
MAIN		RAD AUTO		FUNC		2/6	

2. To select **A:varPop(** press:
 - **[F3]** (List) 3 **[alpha]** **A** for the TI-89.
 - **[F3]** (List) 3 **A** for the TI-92 Plus.

The **varPop(** function is displayed in the entry line. Enter the list (**list1**) from which you want to return the variance of the population.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5							
10							
15							
20							
25							
30							
list2[1]=varPop(list1)							
MAIN		RAD AUTO		FUNC		2/6	

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to calculate and display the variance of the population.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
5	875/12						
10							
15							
20							
25							
30							
list2[2]=							
MAIN		RAD AUTO		FUNC		2/6	

Note: To generate a decimal approximation press **[2nd]** **[ENTER]** for step 3. To generate a decimal approximation for a single-element value, move the cursor to the fraction for which you want the approximate decimal, press **[ENTER]** to highlight it on the entry line, and then press **[2nd]** **[ENTER]**.

You can also set the calculator to APPROXIMATE mode. (Press **[MODE]** **[F2]** and then set Exact/Approx to APPROXIMATE.)

Attach List Formula

Description

F3 (List) → 4:Attach List Formula

Attach List Formula attaches a formula to a specified list so that each list element is a result of the formula, which resolves to a list when executed.

Example

Setup: **list1**={1,2,3,4,5,6}

1. Highlight the list (**list2**) to which you want to attach a formula.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
1						
2						
3						
4						
5						
6						
list2=						
MAIN		RAD AUTO		FUNC		Z/6

2. Press **F3** (List) and select 4:Attach List Formula. Enter the formula (**list1 + 10**) and the formula name (**zlist2**) as shown below.

Attach List Formula...

List: list2

Formula: list1+10

Formula Name: zlist2

Tip: You can press **2nd** [VAR-LINK], highlight a list, and then press **ENTER** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (]).

You can also press **F3** (List) and select 1:Names to display the VAR-LINK [All] menu.

3. Press **ENTER** to display the list.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
1	11					
2	12					
3	13					
4	14					
5	15					
6	16					
list2="list1+10"						
MAIN		RAD AUTO		FUNC		Z/6

The square symbol next to the list name means that the formula is attached. If list1 changes, list2 is updated.

You can create **list2** using **list1+10**, but without attaching the formula.

1. With **list2** name highlighted, enter the formula in the entry line (**list2=list1+10**).
2. Press **ENTER**. The elements in **list2** are updated.

The formula is not attached to **list2**; therefore, **list2** is updated using **list1+10** when you press **ENTER**, but **list2** will not be updated whenever **list1** is updated.

Note: In this case, the formula will not be in quotation marks in the entry line, and the lock symbol (•) will not display next to list2.

For more information about attaching a formula to a list, see Formulas in the List chapter.

Delete Item

Description

F3 (List) → 5:Delete Item

Delete Item deletes a specified list from the list editor but not from memory.

Example

Setup: list1={1,2,3,4,5,6}

1. Highlight the list (**list1**) that you want to delete.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
1							
2							
3							
4							
5							
6							
list1={1,2,3,4,5,6}							
MAIN		RAD AUTO		FUNC		1/6	

2. Press **F3** (List) and select 5:Delete Item to delete the highlighted list.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list2	list3	list4	list5				
list2=							
MAIN		RAD AUTO		FUNC		1/5	

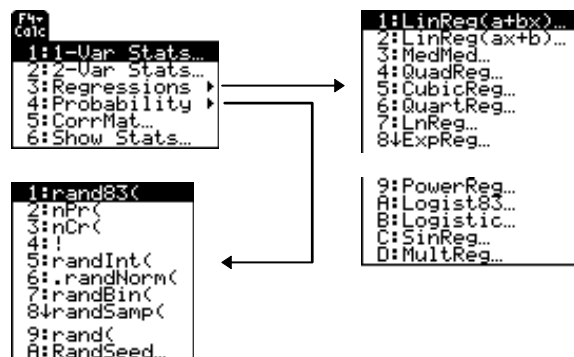
Tip: You can press **2nd** [VAR-LINK], highlight a list, and then press **ENTER** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (]).

You can also press **F3** (List) and select 1:Names to display the VAR-LINK [All] menu.

F4 Calc Menu

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The **F4** (Calc) menu provides functions for calculating numerous regressions (including multiple regression), random number generators, permutations, combinations, factorials, and correlation matrices.



Introduction

Entering Arguments for Functions and Commands

This chapter shows functions for which the arguments are entered in two different ways.

- **Functions followed by an open parenthesis** — for example, `nCr(`.

You enter the arguments for these functions in the entry line of the current screen. You must separate the arguments with commas, and you must close the function with a close parenthesis. The arguments (or inputs) for these functions are described in terms of a syntax statement — for example, `nCr(EXPR1,EXPR2) ⇒ LIST`.

The first screenshot shows the calculator's function menu with 'list5' selected. The entry line at the bottom displays `list5=nCr(list3,list4)`. The second screenshot shows the same menu with 'list5' selected, and the entry line displays `list5(1)=10`. Labels with arrows point to the entry line in both screenshots: 'Syntax for Input: nCr(EXPR1,EXPR2)' points to the first screenshot, and 'Output: LIST' points to the second screenshot.

- **Functions that are *not* followed by an open parenthesis** — for example, `SinReg`.

You enter the arguments for these functions by placing the arguments in the fields displayed in a dialog box. The arguments (or inputs) for these functions are described in a table called **Inputs**. The results (or outputs) are shown also displayed in a dialog box. These outputs are described in a table called **Outputs**.

The first screenshot shows the 'SinReg...' dialog box with fields for X List (list2), Y List (list4), Iterations (B), and Store RegEqn to (y5(x) →). The second screenshot shows the same dialog box with calculated values for a, b, c, and d. Labels with arrows point to the dialog boxes: 'SinReg input dialog box' points to the first screenshot, and 'SinReg output dialog box' points to the second screenshot.

Using the CATALOG to Access Functions and Commands

Many of the functions and commands used in the Stats/List Editor can also be used from the Home screen.

To display a statistics function or command on the Home screen, simply copy it from the **CATALOG** and paste it into the entry line.

For more information about the **CATALOG** and about syntax, see page 3 of Getting Started.

1-Var Stats (One-Variable Statistics)

Description

[F4] (Calc) → 1:1-Var Stats

1-Var Stats produces statistics for one data list.

Inputs

List	The name of list containing data for calculations. You can also key in the elements of the list, enclosed in brackets, (e.g., {1,2,3,4,5}) in this field.
Freq (<i>optional</i>)	The name of the list containing the frequency values for the data in List . The default is 1, which means that all values in List have equal weight or importance. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List * (<i>optional</i>)	A list that can be used to categorize the entries of the list specified in the List field.
Include Categories * (<i>optional</i>)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

* For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Tip: In any field that requires a list, such as List, Freq, Category List, Include Categories, etc., you can enter a list name or the list elements themselves. To enter the list elements in the field, simply key in the elements inside the pair of braces ({}) in the field.

Outputs for List

All the statistics outputs are stored to the variable **mat1var** in the **STATVARS** folder. **mat1var** is a matrix. The first column (**c1**) contains the descriptor (\bar{x} , Σx , etc.). The second column (**c2**) contains the calculations. Each additional column of the matrix contains the output statistics for each corresponding input list. The output statistics are arranged in the same order as they appear in the output dialog box (the same order as shown in the table).

See page 113, Correlation Matrix, for an example of how to access the data matrix.

1-Var Stats (continued)

Outputs	Stored to	Description
\bar{x}	x_bar	Mean of x values.
Σx	sumx	Sum of x values.
Σx^2	sumx2	Sum of x^2 values.
Sx	sx_	Sample standard deviation of x.
σx	σx	Population standard deviation of x.
n	n	Number of data points.
MinX	min_x	Minimum of x values.
Q1X	q1_x	1st Quartile of x.
MedX	med_x	Median of x.
Q3X	q3_x	3rd Quartile of x.
MaxX	max_x	Maximum of x values.
$\Sigma(x-\bar{x})^2$	ssdevx	Sum of squares of deviations from the mean of x.

Example

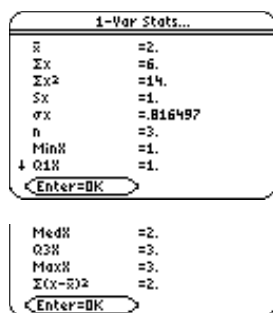
1. In the list editor, enter: **list1={1,2,3}**
2. Press **[F4]** (**Calc**) and select **1:1-Var Stats** to display the **1-Var Stats** input dialog box. Enter the arguments as shown below.



Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3]** (List) and select **1:Names** to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to compute the data.



2-Var Stats (Two-Variable Statistics)

Description

2nd (Calc) → **2:2-Var Stats**

2-Var Stats (two-variable statistics) analyzes paired data.

Inputs

X List	The independent variable.
Y List	The dependent variable.
Freq (<i>optional</i>)	The name of the list containing the frequency values. The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (<i>optional</i>)	A list that can be used to categorize the entries of the specified list.
Include Categories (<i>optional</i>)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example *Studying Statistics: Filtering Data by Categories* in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

2-Var Stats (continued)

Outputs for X List and Y List

Outputs	Stored to	Description
\bar{x}	x_bar	Mean of x values.
Σx	sumx	Sum of x values.
Σx^2	sumx2	Sum of x ² values.
Sx	sx_	Sample standard deviation of x.
σx	ox	Population standard deviation of x.
n	n	Number of data points.
\bar{y}	y_bar	Mean of y values.
Σy	sumy	Sum of y values.
Σy^2	sumy2	Sum of y ² values.
Sy	sy_	Sample standard deviation of y.
σy	sigmay	Population standard deviation of y.
Σxy	sumxy	Sum of x*y values.
MinX	min_x	Minimum of x values.
Q1X	q1_x	1st Quartile of x.
MedX	med_x	Median of x.
Q3X	q3_x	3rd Quartile of x.
MaxX	max_x	Maximum of x values.
MinY	min_y	Minimum of y values.
Q1Y	q1_y	1st Quartile of y.
MedY	med_y	Median of y.
Q3Y	q3_y	3rd Quartile of y.
MaxY	max_y	Maximum of y values.
$\Sigma(x-\bar{x})^2$	ssdevx	Sum of squares of deviations from the mean of x.
$\Sigma(y-\bar{y})^2$	ssdevy	Sum of squares of deviations from the mean of y.

2-Var Stats (continued)

Example

1. In the list editor, enter: **list1={1,2,3}** and **list2={4,5,6}**
2. Press **[F4] (Calc)** and select **2:2-Var Stats** to display the **2-Var Stats** input dialog box. Enter the arguments as shown below.

2-Var Stats...	
X List:	list1
Y List:	list2
Freq:	1
Category List:	
Include Categories:	\checkmark
Enter=OK ESC=CANCEL	

Tip: You can press **[2nd] [VAR-LINK]**, highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**.

You can also press **[F3] (List)** and select **1:Names** to display the VAR-LINK [All] menu.

3. Press **[ENTER]** to compute the data.

2-Var Stats...	
\bar{x}	=2.
Σx	=6.
Σx^2	=14.
Sx	=1.
σx	=.816497
n	=3.
\bar{y}	=5.
$\downarrow \Sigma y$	=15.
Enter=OK	

2-Var Stats...	
$\uparrow \Sigma y^2$	=77.
Sy	=1.
σy	=.816497
Σxy	=32.
MinX	=1.
Q1X	=1.
MedX	=2.
\downarrow Q3X	=3.
Enter=OK	

2-Var Stats...	
\uparrow MaxY	=6.
MinY	=4.
Q1Y	=4.
MedY	=5.
Q3Y	=6.
MaxY	=6.
$\Sigma(x-\bar{x})^2$	=2.
$\Sigma(y-\bar{y})^2$	=2.
Enter=OK	

Regressions Menu

Description

F4 (Calc) → 3:Regressions

The options in the **Regressions** menu are summarized in the table below. Details about each option follow.

LinReg(a+bx) linear regression	Calculates the linear regression, $y = a + b \cdot x$ on lists X and Y.
LinReg(ax+b) linear regression	Calculates the linear regression, $y = a \cdot x + b$ on lists X and Y.
MedMed median-median	Fits the data to the model $y = ax + b$ (where a is the slope, and b is the y-intercept) using the median-median line, which is part of the resistant line technique.
QuadReg quadratic regression	Calculates the quadratic polynomial regression, $y = a \cdot x^2 + b \cdot x + c$ on lists X and Y.
CubicReg cubic regression	Calculates the cubic polynomial regression, $y = a \cdot x^3 + b \cdot x^2 + c \cdot x + d$ on lists X and Y.
QuartReg quartic regression	Calculates the quartic polynomial regression, $y = a \cdot x^4 + b \cdot x^3 + c \cdot x^2 + d \cdot x + e$ on lists X and Y.
LnReg logarithmic regression	Calculates the logarithmic regression, $y = a + b \cdot \ln(x)$ on lists X and Y.
ExpReg exponential regression	Calculates the power regression, $y = a \cdot (b)^x$ on lists X and Y.
PowerReg power regression	Calculates the exponential regression, $y = a \cdot (x)^b$ on lists X and Y.
Logist83	Fits the model equation $y = c / (1 + a \cdot e^{-bx})$ to the data in lists X and Y using an iterative least-squares fit. It displays values for a, b, and c.
Logistic logistic regression	Fits the data in lists X and Y to the model equation $y = a / (1 + b \cdot e^{c \cdot x}) + d$. It displays values for a, b, and c.
SinReg sinusoidal regression	Fits the model equation $y = a \cdot \sin(bx + c) + d$ to the data in lists X and Y using an iterative least-squares fit. It displays values a, b, c, and d. At least four data points are required. At least two data points per cycle are required in order to avoid aliased frequency estimates.
MultReg multiple regression	Calculates multiple linear regression of Y list on X1, X2, . . . , X10 lists.

LinReg(a+bx)

Description

F4 (Calc) → 3:Regressions → 1:LinReg(a+bx)

LinReg(a+bx) (linear regression) calculates the linear regression, $y = a+b*x$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	A list that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

Note: For more information on using *Freq*, *Category List*, and *Include Categories* inputs, see the example *Studying Statistics: Filtering Data by Categories* in the Applications chapter of the *TI-89 or TI-92 Plus* guidebook.

Outputs

Outputs	Stored to	Description
a,b	a,b	Regression coefficients.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient for linear model.
resid*	resid	Residuals of the curves fit: $y - (a+b*x)$.
RegEqn	regeqn [†]	Regression Equation: $a+b*x$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **F1** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

LinReg(a+bx) (continued)

Example

1. In the list editor, enter: **list3={1,2,3,4, 5}** and **list4={2,4,5,8,11}**
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **1:LinReg(a+bx)** to display the **LinReg(a+bx)** input dialog box. Enter the arguments as shown below.

LinReg(a+bx)...

X List: list3

Y List: list4

Store RegEqn to: Y1(X)→

Freq: 1

Category List:

Include Categories: [X]

Enter=OK ESC=CANCEL

Note: You do not have to specify a Freq (frequency list), Category List, Include Categories list, or Store RegEqn to function.

3. Press **[ENTER]** to compute the data.

LinReg(a+bx)...

y=a+bx

a =-1.6

b =2.2

r² =.968

r =.98387

Enter=OK

Note: When the Results->Editor option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

LinReg(ax+b)

Description

[F4] (Calc) → 3:Regressions → 2:LinReg(ax+b)

LinReg(ax+b) (linear regression) calculates the linear regression, $y = a*x+b$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b	a,b	Regression coefficients: $y = a*x+b$.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient for linear model.
resid*	resid	Residuals of the curves fit: $y - (a*x+b)$.
RegEqn	regeqn [†]	Regression Equation: $a*x+b$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1]** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

LinReg(ax+b) (continued)

Example

1. In the list editor, enter: $\text{list3}=\{1,2,3,4,5\}$ and $\text{list4}=\{2,4,5,8,11\}$
2. Press $\boxed{\text{F4}}$ (Calc) and select **3:Regressions**. Then select **2:LinReg(ax+b)** to display the **LinReg(ax+b)** input dialog box. Enter the arguments as shown below.

LinReg(ax+b)...

X List: list3

Y List: list4

Store ResEqn to: Y1(x)→

Freq: 1

Category List:

Include Categories: D

Enter=OK ESC=CANCEL

3. Press $\boxed{\text{ENTER}}$ to compute the data.

LinReg(ax+b)...

$y=ax+b$

a =2.2

b =-.6

r^2 =.9688

r =.984387

Enter=OK

Note: When the Results->Editor option is YES (located in $\boxed{\text{F1}}$ (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press $\boxed{\text{F1}}$ (Tools) and select 9:Format to display the FORMATS dialog box. Change the Results->Editor setting to NO and press $\boxed{\text{ENTER}}$.

MedMed

Description

F4 (Calc) → 3:Regressions → 3:MedMed

MedMed (median-median) fits the data to the model $y=ax+b$ (where a is the slope, and b is the y -intercept) using the median-median line, which is part of the resistant line technique.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b	a,b	Regression coefficients: $y = a*x+b$.
resid*	resid	Residuals of the curves fit = $y - (a*x+b)$.
RegEqn	regeqn [†]	Regression Equation: $a*x+b$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **F1** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

MedMed (continued)

Example

1. In the list editor, enter: `list3={1,2,3,4,5}` and `list4={2,4,5,8,11}`
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **3:MedMed** to display the **MedMed** input dialog box. Enter the arguments as shown below.

MedMed...

X List: list3

Y List: list4

Store ResEan to: y1(x) →

Freq: 1

Category List:

Include Categories: C

Enter=OK <ESC=CANCEL

3. Press **[ENTER]** to compute the data.

MedMed...

y=ax+b

a =2.16667

b =-.666667

Enter=OK

Note: When the Results->Editor option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the FORMATS dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

QuadReg

Description

[F4] (Calc) → 3:Regressions → 4:QuadReg

QuadReg (quadratic regression) calculates the quadratic polynomial regression, $y=a*x^2+b*x+c$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b,c	a,b,c	Regression coefficients.
R²	rsq	Coefficient of determination.
resid*	resid	Residuals of the curves fit = $y - (a*x^2+b*x+c)$.
RegEqn	regeqn [†]	Regression equation: $a*x^2+b*x+c$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .


* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1]** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

QuadReg (continued)

Example

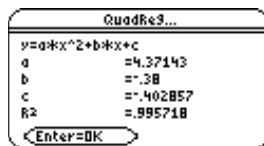
1. In the list editor, enter: **list1**={-2,-1,0,1,2} and **list2**={18.2,3.5,0,3.9,16.1}
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **4:QuadReg** to display the **QuadReg** input dialog box. Enter the arguments as shown below.



The image shows the QuadReg dialog box with the following fields and values:

X List:	list1
Y List:	list2
Store ResEqn to:	none
Freq:	1
Category List:	
Include Categories:	[X]
[Enter]=OK [ESC]=CANCEL	

3. Press **[ENTER]** to compute the data.



The image shows the QuadReg results dialog box with the following output:

```
y=a*x^2+b*x+c
a      =4.37143
b      =-.38
c      =-.402857
R2    =.995718
```

[Enter]=OK

Note: When the Results->Editor option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the FORMATS dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

CubicReg

Description

F4 (Calc) → 3:Regressions → 5:CubicReg

CubicReg (cubic regression) calculates the cubic polynomial regression, $y = a \cdot x^3 + b \cdot x^2 + c \cdot x + d$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b,c,d	a,b,c,d	Regression coefficients.
R²	rsq	Coefficient of determination.
resid*	resid	Residuals of the curves fit $= y - (a \cdot x^3 + b \cdot x^2 + c \cdot x + d)$.
RegEqn	regeqn [†]	Regression equation: $a \cdot x^3 + b \cdot x^2 + c \cdot x + d$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **F1** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

CubicReg (continued)

Example

1. In the list editor, enter: **list1={1,2,3,4,5}** and **list2={-1,0,1,7,25}**
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **5:CubicReg** to display the **CubicReg** input dialog box. Enter the arguments as shown below.

CubicReg...

X List: list1

Y List: list2

Store RegEqn to: Y1(x)→

Freq: 1

Category List:

Include Categories: C_1

Enter=OK $\langle ESC \rangle$ =CANCEL

3. Press **[ENTER]** to compute the data.

CubicReg...

$y=a*x^3+b*x^2+c*x+d$

a = 1.

b = -6.21429

c = 12.7857

d = 8.6

R² = .999879

Enter=OK

Note: When the Results->Editor option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the FORMATS dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

QuartReg

Description

[F4] (Calc) → 3:Regressions → 6:QuartReg

QuartReg (quartic regression) calculates the quartic polynomial regression, $y = a*x^4 + b*x^3 + c*x^2 + d*x + e$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b,c,d,e	a,b,c,d,e	Regression coefficients.
R2	rsq	Coefficient of determination.
resid*	resid	Residuals of the curves fit $= y - (a*x^4 + b*x^3 + c*x^2 + d*x + e)$.
RegEqn	regeqn [†]	Regression equation: $a*x^4 + b*x^3 + c*x^2 + d*x + e$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1]** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

QuartReg (continued)

Example

1. In the list editor, enter: **list1={-2,-1,0,1,2}** and **list2={18.2,3.5,0,3.9,16.1}**
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **6:QuartReg** to display the **QuartReg** input dialog box. Enter the arguments as shown below.

QuartReg...

X List: list1

Y List: list2

Store ResEqn to: $y^4(x) \rightarrow$

Freq: 1

Include Categories: {

Enter=OK \leftarrow ESC=CANCEL

3. Press **[ENTER]** to compute the data.

QuartReg...

$y=a*x^4+b*x^3+c*x^2+d*x+e$

a =.195833

b =-.241667

c =3.50417

d =.441667

e =2.5E-12

R² =1.

Enter=OK

Note: When the Results->Editor option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

LnReg

Description

[F4] (Calc) → 3:Regressions → 7:LnReg

LnReg (logarithmic regression) calculates the logarithmic regression, $y = a+b*\ln(x)$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to <i>(optional)</i>	Designated variable for storing the Regression Equation.
Freq <i>(optional)</i>	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List <i>(optional)</i>	List that can be used to categorize the entries of the list specified in the List field.
Include Categories <i>(optional)</i>	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example *Studying Statistics: Filtering Data by Categories* in the Applications chapter of the guidebook.

Outputs

Outputs	Stored to	Description
a,b	a,b	Regression coefficients: $y = a+b*\ln(x)$.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient for linear model.
resid*	resid	Residuals of the curves fit = $y-(a+b*\ln(x))$.
residt*	residt	Residuals associated with linear fit of transformed data.
RegEqn	regeqn [†]	Regression equation: $a+b*\ln(x)$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1] (Tools) 9:Format**).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

LnReg (continued)

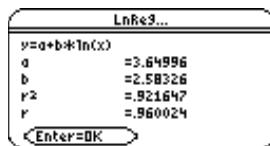
Example

1. In the list editor, enter: **list1={1,2,3,3.5,4.5}** and **list2={4,5,6,7,8}**
2. Press **[F4] (Calc)** and select **3:Regressions**. Then select **7:LnReg** to display the **LnReg** input dialog box. Enter the arguments as shown below.



The image shows the 'LnReg3...' dialog box. It has several input fields: 'X List' with 'list1', 'Y List' with 'list2', 'Store ResEan to:' with 'y1(x) →', 'Freq:' with '1', 'Cate3ory List:' (empty), and 'Include Cate3ories:' with '↵'. At the bottom are 'Enter=OK' and '<ESC=CANCEL' buttons.

3. Press **[ENTER]** to compute the data.



The image shows the 'LnReg3...' dialog box displaying results. It lists the equation $y=a+b*\ln(x)$ and the values for a , b , r^2 , and r . At the bottom is an 'Enter=OK' button.

Parameter	Value
a	=3.64996
b	=2.58326
r^2	=.921647
r	=.960024

Note: When the Results->Editor option is YES (located in **[F1] (Tools) 9:Format**), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1] (Tools)** and select **9:Format** to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

ExpReg

Description

[F4] (Calc) → 3:Regressions → 8:ExpReg

ExpReg (exponential regression) calculates the exponential regression, $y = a^*(b)^x$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to <i>(optional)</i>	Designated variable for storing the Regression Equation.
Freq <i>(optional)</i>	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List <i>(optional)</i>	List that can be used to categorize the entries of the list specified in the List field.
Include Categories <i>(optional)</i>	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b	a,b	Regression coefficients: $y = a^*(b)^x$.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient for linear model.
resid*	resid	Residuals of the curves fit = $y - a^*(b)^x$.
residt*	residt	Residuals associated with linear fit of transformed data.
RegEqn	regeqn [†]	Regression equation: $a^*(b)^x$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1] (Tools) 9:Format**).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

ExpReg (continued)

Example

1. In the list editor, enter: **list1={1,2,3,3.5,4.5}** and **list2={4,5,6,7,8}**
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **8:ExpReg** to display the **ExpReg** input dialog box. Enter the arguments as shown below.

ExpReg...

X List: list1

Y List: list2

Store ResEan to: y1(x) →

Freq: 1

Category List:

Include Categories: C_1

Enter=OK \leftarrow ESC=CANCEL

3. Press **[ENTER]** to compute the data.

ExpReg...

$y=a*b^x$

a =3.31253

b =1.22352

r^2 =.990596

r =.995287

Enter=OK

Note: When the Results->Editor option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

PowerReg

Description

[F4] (Calc) → 3:Regressions → 9:PowerReg

PowerReg (power regression) calculates the power regression, $y = a^*(x)^b$ on lists X and Y.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b	a,b	Regression coefficients: $y = a^*(x)^b$.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient for linear model.
resid*	resid	Residuals of the curves fit $= y - a^*(x)^b$.
residt*	residt	Residuals associated with linear fit of transformed data.
RegEqn	regeqn [†]	Regression equation: $a^*(x)^b$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1]** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

PowerReg (continued)

Example

1. In the list editor, enter: **list1={1,2,3,3.5,4.5}** and **list2={4,5,6,7,8}**
2. Press **[F4] (Calc)** and select **3:Regressions**. Then select **9:PowerReg**. The **PowerReg** input dialog box is displayed. Enter the arguments as shown below.

PowerReg...

X List: list1

Y List: list2

Store ResEan to: y1(x) →

Freq: 1

Category List:

Include Categories: (empty)

Enter=OK ESC=CANCEL

3. Press **[ENTER]** to compute the data.

PowerReg...

$y=a*x^b$

a = 3.84256

b = .457755

r² = .964963

r = .982325

Enter=OK

Note: When the Results->Editor option is YES (located in **[F1] (Tools) 9:Format**), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1] (Tools)** and select 9:Format to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

Logist83

Description

[F4] (Calc) → 3:Regressions → A:Logist83

Logist83 fits the model equation $y=c/(1+a*e^{-bx})$ to the data in lists X and Y using an iterative least-squares fit. It displays values for **a**, **b**, and **c**.

Inputs

X List, Y List	Independent and dependent variable lists.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Freq (optional)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b,c	a,b,c	Regression coefficients.
resid*	resid	Residuals of the curves fit = $y - (c/(1+a*e^{-bx}))$.
RegEqn	regeqn [†]	Regression equation: $c/(1+a*e^{-bx})$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1]** (Tools) 9:Format).

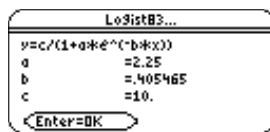
† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

Example

1. In the list editor, enter: **list5={1,2,3}** and **list6={4,5,6}**
2. Press **[F4] (Calc)** and select **3:Regressions**. Then select **A:Logist83**. The **Logist83** input dialog box is displayed. Enter the arguments as shown below.



3. Press **[ENTER]** to compute the data.



Note: When the Results->Editor option is YES (located in **[F1] (Tools) 9:Format**), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1] (Tools)** and select **9:Format** to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **[ENTER]**.

Logistic

Description

F4 (Calc) → 3:Regressions → B:Logistic

Logistic (logistic regression) fits the data in lists **X** and **Y** to the model equation $y = a / (1 + b * e^{(c * x)}) + d$. It displays values for **a**, **b**, and **c**.

Inputs

X List, Y List	Independent and dependent variable lists.
Iterations <i>(optional)</i>	Optional maximum number of iterations used. The default is 64.
Store RegEqn to <i>(optional)</i>	Designated variable for storing the Regression Equation.
Freq <i>(optional)</i>	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Category List <i>(optional)</i>	List that can be used to categorize the entries of the list specified in the List field.
Include Categories <i>(optional)</i>	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using these inputs, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b,c,d	a,b,c,d	Regression coefficients.
resid*	resid	Residuals of the curves fit $y = a / (1 + b * e^{(c * x)}) + d$.
RegEqn	regeqn [†]	Regression equation: $a / (1 + b * e^{(c * x)}) + d$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **F1** (Tools) 9:Format).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

Logistic (continued)

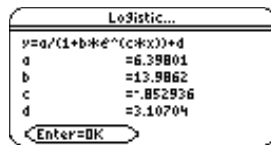
Example

1. In the list editor, enter: **list1={1,2,3,3.5,4.5}** and **list2={4,5,6,7,8}**
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **B:Logistic**. The **Logistic** input dialog box is displayed. Enter the arguments as shown below.



The image shows two screenshots of the 'Logistic...' dialog box. The first screenshot shows the input fields: X List: list1, Y List: list2, Iterations: 5, Store ResEan to: y1(x) →, Freq: 1, and Category List: (empty). Below these are buttons for 'Enter=SAVE' and 'ESC=CANCEL'. The second screenshot shows the 'Include Categories:' field with 'C2' entered, and the same 'Enter=SAVE' and 'ESC=CANCEL' buttons.

3. Press **[ENTER]** to compute the data.



The image shows the 'Logistic...' dialog box displaying the results of the calculation. The equation is $y = a / (1 + b * e^{(c * x)}) + d$. The parameters are: a = 6.39801, b = 13.9862, c = -.852936, and d = 3.10704. There is an 'Enter=OK' button at the bottom.

Note: When the *Results->Editor* option is YES (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the *FORMATS* dialog box. Change the *Results->Editor* setting to NO and press **[ENTER]**.

SinReg

Description

[F4] (Calc) → **3:Regressions** → **C:SinReg**

SinReg (sinusoidal regression) fits the model equation $y=a*\sin(bx+c)+d$ to the data in lists X and Y using an iterative least-squares fit. It displays values a, b, c, and d. At least four data points are required. At least two data points per cycle are required in order to avoid aliased frequency estimates.

Note: The output of SinReg is always in radians, regardless of the angle mode setting.

Inputs

X List, Y List	Independent and dependent variable lists.
Iterations (optional)	Iterations specifies the maximum number of times a solution will be attempted. If omitted, 8 is used. Typically, larger values result in better accuracy but longer execution times, and vice versa.
Period (optional)	Period specifies an estimated period. If omitted, the difference between values in list1 should be equal and in sequential order. If you specify period, the differences between x values can be unequal.
Store RegEqn to (optional)	Designated variable for storing the Regression Equation.
Category List (optional)	List that can be used to categorize the entries of the list specified in the List field.
Include Categories (optional)	If you input a Category List , you can use this item to limit the calculation to specified category values. For example, if you specify {1,4}, the calculation uses only data points with a category value of 1 or 4.

For more information on using **Category List**, see the example Studying Statistics: Filtering Data by Categories in the Applications chapter of the TI-89 or TI-92 Plus guidebook.

Outputs

Outputs	Stored to	Description
a,b,c,d	a,b,c,d	Regression coefficients.
resid*	resid	Residuals of the curves fit = $y - a*\sin(bx+c)+d$.
RegEqn	regeqn [†]	Regression Equation: $a*\sin(bx+c)+d$.
	xout [†]	List of data points in the modified X List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	yout [†]	List of data points in the modified Y List actually used in the regression based on restrictions of Freq , Category List , and Include Categories .
	freqout [†]	List of frequencies corresponding to xout and yout .

* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **[F1]** (Tools) **9:Format**).

† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

SinReg (continued)

Example

1. In the list editor, enter: **list1={1,2,3,3.5,4.5}** and **list2={4,5,6,7,8}**
2. Press **[F4]** (**Calc**) and select **3:Regressions**. Then select **C:SinReg**. The **SinReg** input dialog box is displayed. Enter the arguments as shown below.

SinReg...

X List: list1

Y List: list2

Iterations: 6

Period: 1

Store ResEan to: y5(x)→

Category List:

Include Categories: C3

Enter=SAVE ESC=CANCEL

3. Press **[ENTER]** to compute the data.

SinReg...

$y = a * \sin(b * x + c) + d$

a =1.27475

b =6.28319

c =-1.3734

d =6.

Enter=OK

Note: When the *Results->Editor* option is **YES** (located in **[F1]** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **[F1]** (Tools) and select 9:Format to display the **FORMATS** dialog box. Change the *Results->Editor* setting to **NO** and press **[ENTER]**.

MultReg

Description

F4 (Calc) → 3:Regressions → D:MultReg

MultReg (multiple regressions) calculates multiple linear regression of Y list on X1, X2, . . . , X10 lists.

Inputs

Number of Ind Vars	Number of independent x lists.
Y List	Dependent variable vector.
X1 List - X10 List	Independent variables.

Outputs

Outputs	Stored to	Description
blist	blist	{B0,B1, . . . } List of Coefficients of the regression equation $Y_{\text{hat}} = B0 + B1 * x1 + \dots$
R²	rsq	Coefficient of multiple determination.
yhatlist*	y_hat	$Y_{\text{hat}} = B0 + B1 * x1 + \dots$
resid*	resid	y - yhatlist

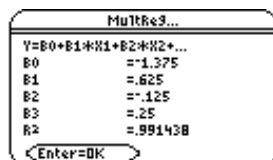
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in **F1** (Tools) 9:Format).

Example

1. In the list editor, enter: **list1={1,2,3,3.5,4.5}** and **list2={4,5,6,7,8}** and **list3={4,3,2,1,1}** and **list4={2,2,3,3,4}**
2. Press **F4** (Calc) and select **3:Regressions**. Then select **D:MultReg**. The **MultReg** input dialog box is displayed. Enter the arguments as shown below.



3. Press **ENTER** to compute the data.



Note: When the Results->Editor option is YES (located in **F1** (Tools) 9:Format), the residuals (resid) list is pasted to the end of the list editor after you close the output dialog box. To prevent the resid list from being pasted to the end of the list editor, press **F1** (Tools) and select 9:Format to display the **FORMATS** dialog box. Change the Results->Editor setting to NO and press **ENTER**.

Probability Menu

Description

rand83(random number	Generates and displays a <i>LIST</i> containing one or more random numbers > 0 and < 1 for a specified number of trials (<i>NUMTRIALS</i>). Returns random values (0,1). If <i>NUMTRIALS</i> is not provided, a single random number between 0 and 1 is returned.
nPr(permutations	(number of permutations) returns a <i>LIST</i> containing the permutations based on the input arguments, <i>EXPR1</i> and <i>EXPR2</i> , which can be integers, symbolic expression, or lists of these two data types.
nCr(combinations	(number of combinations) returns a <i>LIST</i> containing the combinations based on the input arguments, <i>EXPR1</i> and <i>EXPR2</i> , which can be integers, symbolic expression, or lists of these two data types.
! factorial	(factorial) returns a <i>LIST</i> containing the factorial of the expression (<i>EXPR</i>). Expressions include integers, symbolic expression, or list of these two data types.
randInt(random integer	(random integer) generates and displays a <i>LIST</i> of random integers within a range specified by <i>LOW</i> and <i>UP</i> integer bounds.
.randNorm(random normal distribution	Given the mean (μ), standard deviation (σ), and the number of trials (<i>NUMTRIALS</i>), .randNorm() returns a <i>LIST</i> containing the decimal numbers from the specific normal distribution.
randBin(random binomial distribution	Generates and displays a <i>LIST</i> containing random real numbers from a specified binomial distribution with the probability of success (<i>P</i>) and with a specified number of trials (<i>N</i>).
randSamp(random sample	Returns a <i>LIST</i> containing a random sample of the size you <i>CHOOSE</i> from a <i>LIST</i> with an option for sample replacement (<i>NOREP</i> =0), or no sample replacement (<i>NOREP</i> =1). The default is with sample replacement.
rand(random number	With no parameter, rand() returns a <i>LIST</i> element containing the next random integer between 0 and 1 in the sequence. When <i>INT</i> is positive, rand() returns a <i>LIST</i> element containing a random integer in the interval [1, n]. When <i>INT</i> is negative, rand() returns a <i>LIST</i> element containing a random integer in the interval [-n, -1].
RandSeed random seed	If Integer Seed = 0, sets the seeds to the factory defaults for the random-number generator. If Integer Seed \neq 0, it is used to generate two seeds, which are stored in system variables seed1 and seed2 .

rand83(

Description

[F4] (Calc) → 4:Probability → 1:rand83(

rand83([NUMTRIALS]) ⇒ LIST

rand83(generates and displays a LIST containing one or more random numbers > 0 and < 1 for a specified number of trials (NUMTRIALS). Returns random values (0,1).

If NUMTRIALS is not provided, a single random number between 0 and 1 is returned.

Example

1. Move the cursor to the name (list3) where you want to return the random numbers.
2. Press **[F4]** (Calc) and select 4:Probability. Then select 1:rand83(. The rand83(command is displayed in the entry line.
2. Enter the number of trials (5) to complete the function.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
list3=rand83(5)							
MAIN		RAD AUTO		FUNC		3/6	

3. Press **[ENTER]** to compute the data.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints	
list1	list2	list3	list4				
		.80389					
		.15933					
		.97571					
		.49122					
		.02291					
list3[1]=.80389176035895							
MAIN		RAD AUTO		FUNC		3/6	

Five values that are all between 0 and 1 are pasted into list3.

nPr(

Description

[F4] (Calc) → 4:Probability → 2:nPr(

$nPr(EXPR1,EXPR2) \Rightarrow LIST$

nPr (number of permutations) returns a *LIST* containing the permutations based on the input arguments, *EXPR1* and *EXPR2*, which can be integers, symbolic expression, or lists of these two data types.

Example

1. In the list editor, enter: **list3={5,4,3}** and **list4={2,4,2}**
2. Move the cursor to the list name (**list5**) where you want to return the permutation.
3. Press **[F4]** (**Calc**) and select **4:Probability**. Then select **2:nPr(**. The **nPr(** function is displayed in the entry line.
4. Enter the lists (**list3,list4**) containing the data to complete the function.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list2		list3		list4		list5
		5		2		
		4		4		
		3		2		

list5=nPr(list3,list4)						
MAIN RAD AUTO FUNC 5/7						

5. Press **[ENTER]** to compute the data.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list2		list3		list4		list5
		5		2		20
		4		4		24
		3		2		6

list5[1]=20						
MAIN RAD AUTO FUNC 5/7						

nCr(

Description

[F4] (Calc) → 4:Probability → 3:nCr(

$nCr(EXPR1,EXPR2) \Rightarrow LIST$

nCr (number of combinations) returns a *LIST* containing the combinations based on the input arguments, *EXPR1* and *EXPR2*, which can be integers, symbolic expression, or lists of these two data types.

Example

1. In the list editor, enter: **list3={5,4,3}** and **list4={2,4,2}**
2. Move the cursor to the list name (**list5**) where you want to return the combination.
3. Press **[F4]** (**Calc**) and select **4:Probability**. Then select **3:nCr(**. The **nCr(** function is displayed in the entry line.
4. Enter the lists (**list3,list4**) containing the data to complete the function.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list2		list3		list4		list5
		5		2		
		4		4		
		3		2		

list5=nCr(list3,list4)						
MAIN RAD AUTO FUNC 5/7						

5. Press **[ENTER]** to compute the data.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints
list2		list3		list4		list5
		5		2		10
		4		4		1
		3		2		3

list5[1]=10						
MAIN RAD AUTO FUNC 5/7						

! (factorial)


Description

[F4] (Calc) → 4:Probability → 4:!

$EXPR! \Rightarrow LIST$

! (factorial) returns a *LIST* containing the factorial of the expression (*EXPR*). Expressions include integers, symbolic expression, or a list of these two data types.

Example

1. In the list editor, enter: **list3={5,4,3}**
2. Highlight the list name (**list3**) containing the numbers for which you want to return factorials. The factorials will replace the original numbers.
3. Press **[ENTER]**  to position the cursor at the end of the entry line.
4. Press **[F4]** (Calc) and select 4:Probability. Then select 4:!. The ! command is displayed in the entry line.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
		5				
		4				
		3				
list3={5,4,3}!						
MAIN		DEGRAUTO		FUNC		3/7

5. Press **[ENTER]** to compute the data.

F1- Tools	F2- Plots	F3- List	F4- Calc	F5- Distr	F6- Tests	F7- Ints
list1	list2	list3	list4			
		120				
		24				
		6				
list3[1]=120						
MAIN		DEGRAUTO		FUNC		3/7

randInt(

Description

[F4] (Calc) → 4:Probability → 5:randInt(

`randInt(LOW,UP[,NUMTRIALS]) ⇒ LIST`

`randInt(` (random integer) generates and displays a *LIST* of random integers within a range specified by *LOW* and *UP* integer bounds.

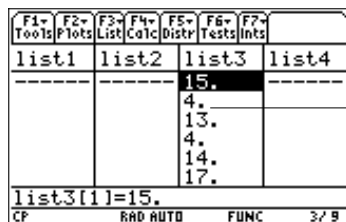
Note: If *NUMTRIALS* is omitted, this function returns a scalar value. If *NUMTRIALS* is provided, it must be in the range {1,2, . . . ,999} and the function returns a list of length *NUMTRIALS*. If *NUMTRIALS* = 1, a list with 1 element is returned.

Example

1. With the cursor in the name cell of an empty list (**list3**), press **[F4]** (Calc) and select **4:Probability**. Then select **5:randInt(**. The **5:randInt(** function is displayed in the entry line.
2. Enter the lower and upper bounds and the number of trials (**1,20,50**).



3. Press **[ENTER]** to compute the data.



A list of 50 random integers with values between 1 and 20 is generated and displayed in list3.

.randNorm(

Description

[F4] (Calc) → 4:Probability → 6:.randNorm(

.randNorm($[\mu, \sigma, NUMTRIALS]$) ⇒ LIST

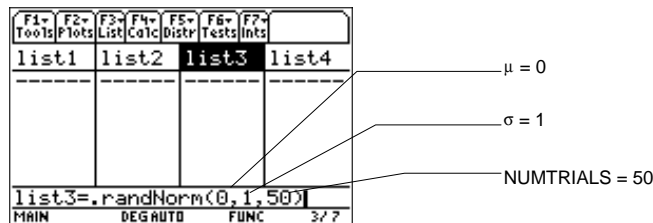
Given the mean (μ), standard deviation (σ), and the number of trials ($NUMTRIALS$), .randNorm((random normal) returns a LIST containing the decimal numbers from the specific normal distribution.

The default for $NUMTRIALS$ is 1. If $NUMTRIALS$ is not included with .randNorm(, a scalar random value from the specific normal distribution is returned.

Note: A dot has been placed before this function to distinguish it from a randNorm() function that exists in the operating system of the TI-89 and TI-92 Plus. If you enter randNorm without the dot or without the prefix, TIStat, you will access the operating system randNorm, which does not accept the argument for $NUMTRIALS$.

Example

1. Move the cursor to the name of the list (**list3**) where you want to return the decimal numbers from the specified normal distribution.
2. Press **[F4]** (Calc) and select **4:Probability**. Then select **6:.randNorm(**. The .randNorm(function is displayed in the entry line.
3. Enter the mean, standard deviation, and number of trials (**0,1,50**). Separate the arguments with commas and close the expression with a close parenthesis.



4. Press **[ENTER]** to compute the data.

The image shows the same TI-89 calculator screen after pressing [ENTER]. The list3 column now contains a list of five decimal values: -.6396, 1.0825, -1.787, -.7309, and -2.035. The bottom row shows list3[1]=-.63955294390429. The bottom status bar shows MAIN, DEGRAUTO, FUNC, and 3/7.

list1	list2	list3	list4
		-.6396	
		1.0825	
		-1.787	
		-.7309	
		-2.035	
		.21473	
list3[1]=		-.63955294390429	

randBin(

Description

[F4] (Calc) → 4:Probability → 7:randBin(

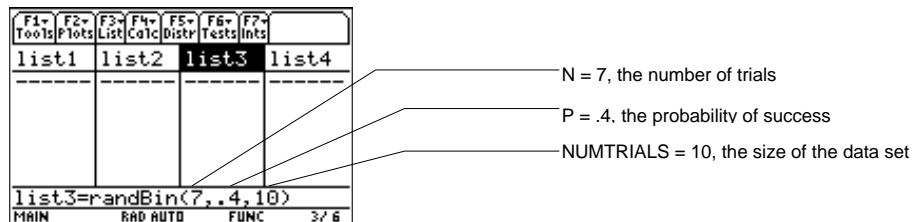
randBin($N,P[,NUMTRIALS]$) ⇒ *LIST*

randBin((random binomial) generates and displays a *LIST* containing random real numbers from a specified binomial distribution with the probability of success (P) and with a specified number of trials (N).

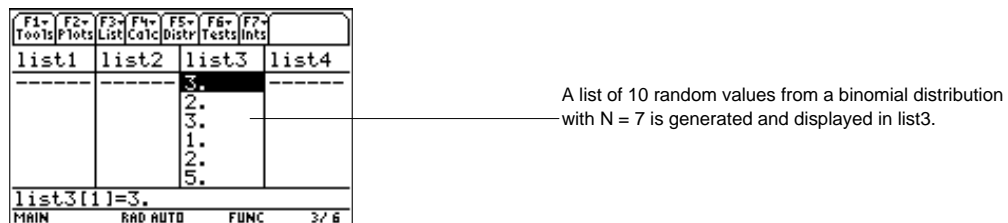
Note: *NUMTRIALS* is an optional argument. If you omit *NUMTRIALS*, **randBin**(returns a scalar random value from the binomial distribution. If you include *NUMTRIALS*, **randBin**(returns a list containing the number of elements specified by *NUMTRIALS*.

Example

1. Move the cursor to the name of the list (**list3**) where you to return the random real numbers.
2. Press **[F4]** (Calc) and select **4:Probability**. Then select **7:randBin**(. The **randBin**(function is displayed in the entry line.
3. Enter the arguments shown (**7,.4,10**).



4. Press **[ENTER]** to compute the data.



randSamp(

Description

[F4] (Calc) → 4:Probability → 8:randSamp(

randSamp(LIST1,CHOOSE[,NOREP=1]) ⇒ LIST

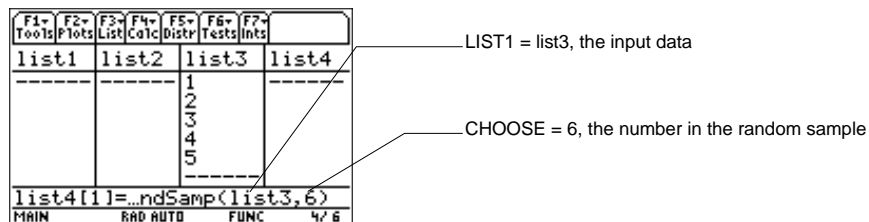
randSamp(returns a LIST containing a random sample of the size you CHOOSE from a LIST with an option for sample replacement (NOREP=0), or no sample replacement (NOREP=1). The default is with sample replacement.

Example

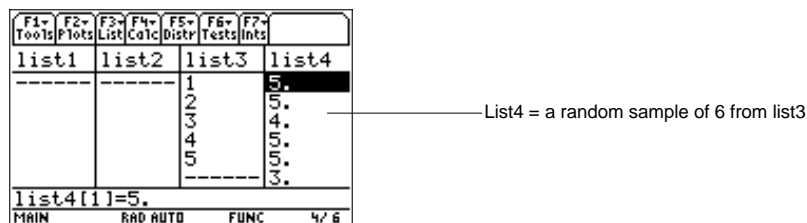
1. In the list editor, enter: **list3={1,2,3,4,5}**
2. Move the cursor to the list name of an empty list (**list4**) where you want to return the random sample.
3. Press **[F4]** (Calc) and select **4:Probability**. Then select **8:randSamp**(. The **randSamp**(command is displayed in the entry line.
4. Enter the list (**list3**) from which you want to return the random sample. Enter the number of the sample (**6**). Separate the list name from the sample number with a comma. Close the expression with a close parenthesis.

Tip: You can press **[2nd]** [VAR-LINK], highlight a list, and then press **[ENTER]** to paste the list name into the list editor. Be sure to close arguments with a right parenthesis (**)**).

You can also press **[F3]** (List) and select 1:Names to display the VAR-LINK [All] menu.



5. Press **[ENTER]** to generate and display the random sample.



rand(

Description

[F4] (Calc) → 4:Probability → 9:rand(

rand(*INT*) ⇒ *LIST*

With no parameter, **rand(** (random) returns a *LIST* element containing the next random integer between 0 and 1 in the sequence.

When *INT* is positive, **rand(** returns a *LIST* element containing a random integer in the interval [1, *n*].

When *INT* is negative, **rand(** returns a *LIST* element containing a random integer in the interval [*-n*, -1].

Example

1. Move the cursor to the cell where you want to return the random integer.
2. Press **[F4]** (Calc) and select **4:Probability**. Then select **9:rand(**. The **rand(** command is displayed in the entry line.
3. Enter the argument (**5**) and press **[]** to complete the function.

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints	
list1	list2	list3	list4				
list3[1]=rand(5)							
MAIN		RAD AUTO		FUNC		3/6	

4. Press **[ENTER]** to view the random number.

F1 Tools	F2 Plots	F3 List	F4 Calc	F5 Distr	F6 Tests	F7 Ints	
list1	list2	list3	list4				
list3[2]=							
MAIN		RAD AUTO		FUNC		3/6	

A single random value between 1 and 5 is generated and displayed in list3.

RandSeed

Description

[F4] (Calc) → 4:Probability → A:RandSeed

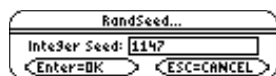
RandSeed (random seed) sets the seeds to the factory defaults for the random-number generator.

If **Integer Seed** $\neq 0$, it is used to generate two seeds, which are stored in system variables **seed1** and **seed2**.

If **Integer Seed** is not provided, a scalar random value is returned. If Integer Seed is provided, a list of random values is returned.

Example

1. Press **[F4] (Calc)** and select **4:Probability**. Then select **A:RandSeed**. The **RandSeed** dialog box is displayed.
2. Enter **1147** in the input dialog box.



3. Press **[ENTER]**.

CorrMat (Correlation Matrix)

Description

[F4] (Calc) → 5:CorrMat

CorrMat (correlation matrix) computes the correlation matrix for the augmented matrix [List1 List2 . . . List20].

Inputs

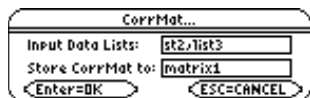
Input Data Lists	The input lists used in the correlation process.
Store CorrMat to	The designated variable for storing the output matrix.

Outputs

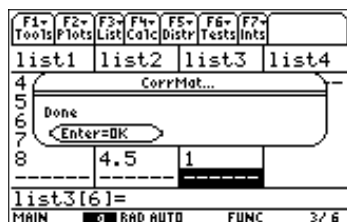
Correlation Matrix	The designated output matrix.
---------------------------	-------------------------------

Example

- In the list editor, enter: **list1={4,5,6,7,8}** and **list2={1,2,3,3.5,4.5}** and **list3={4,3,2,1,1}**
- Press **[F4] (Calc)** and select **5:CorrMat**. The **CorrMat** input dialog box is displayed. Enter the arguments as shown below. (Separate list names with commas.)



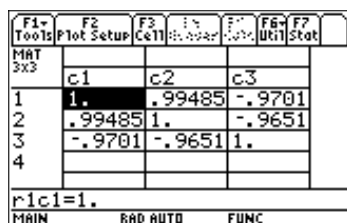
- Press **[ENTER]** to compute the data.



- Press **[ENTER]** to close the dialog box.
- Press **[HOME]** (or **[HOME]** for the TI-92 Plus) to return to the Home screen.
- Press **[APPS]**, select **6:Data/Matrix Editor**, and then select **2:Open**.
- Press **[DOWN]** and select **2:Matrix**; press **[LEFT]** and select **1:main**; press **[DOWN]** and select **matrix1**.



- Press **[ENTER]** to display the matrix.



Note: You can also view the matrix from the Home screen.

Show Stats

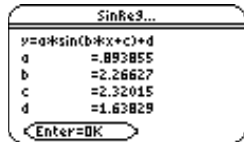
Description

[F4] (**Calc**) → **6:Show Stats**

Show Stats displays a dialog box containing the last computed statistics results.

Procedure

1. Press **[F4]** (**Calc**) and select **6:Show Stats**. The results of the last statistical calculation (in this case, **SinReg**) are displayed.

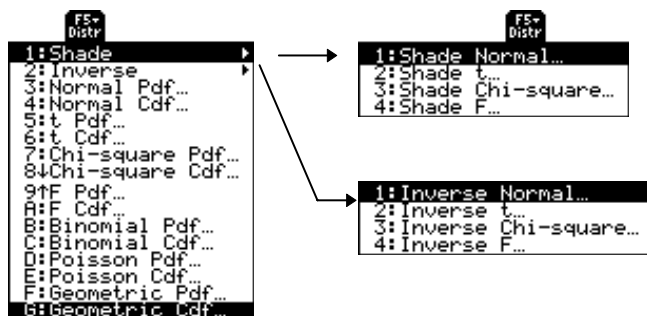


2. Use **⏴** to scroll the screen, if necessary, to see all the outputs.
Press **[ENTER]** to close the dialog box.

F5 Distr (Distribution) Menu

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The **F5 Distr** menu lets you compute density functions for various distributions and distribution probabilities. You can also draw density functions and shade in areas between the lower bounds and upper bounds of distributions. You can graph distributions in the Y= editor using the pdf, cdf, and inverse functions from the **Flash Apps CATALOG**.



Shade Menu

Description

F5 (Distr) → 1:Shade

The options on the **Shade** menu are summarized in the table below. Details about each option follow.

Ops Menu

Shade Normal	Draws the normal density function specified by mean (μ) and standard deviation (σ) and shades the area between Lower Value and Upper Value . The defaults are $\mu=0$, $\sigma=1$ and Lower Value = $-\infty$ Upper Value = ∞ .
Shade t	Draws the density function for the Student t distribution specified by Deg (degrees) of Freedom, df and shades the Area between Lower Value and Upper Value .
Shade Chi-square	Draws the density function for the χ^2 (chi-square) distribution specified by Deg (degrees) of freedom, df and shades the Area between Lower Value and Upper Value .
Shade F	Draws the density function for the F distribution specified by Num df (numerator degrees of freedom) and Den df (denominator degrees of freedom) and shades the area between Lower Value and Upper Value .

Shade Normal

Description

[F5] (Distr) → 1:Shade → 1:Shade Normal

Shade Normal draws the normal density function specified by mean (μ) and standard deviation (σ) and shades the area between **Lower Value** and **Upper Value**.

Note: When using Shade functions, if the Upper Value is not greater than the Lower Value, you will get a Domain Error message.

Tip: Press **[2nd]** **[\pm]** to toggle between an application and normal calculator functionality.

Inputs

Lower Value	A scalar lower value.
Upper Value	A scalar upper value.
μ	Optional distribution mean. The default is $\mu=0$.
σ	Optional distribution standard deviation. The default is $\sigma=1$.
Auto-scale (NO, YES)	Lets you clear all drawings from the current graph and automatically optimize graphing window dimensions. The default = YES .

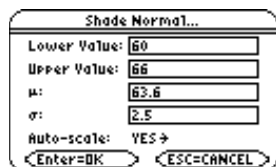
Outputs

The output for this function is a graph with the **Area** between **Lower Value** and **Upper Value** shaded.

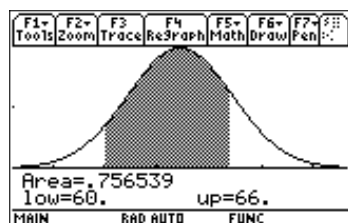
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **[F5]** (Distr) and select 1:Shade to display the **Shade** menu.
2. Select 1:Shade Normal to display the **Shade Normal** input dialog box.
3. Enter the arguments as shown below.



4. Press **[ENTER]** to compute the data.



Note: After completing a Shade function and viewing the graph, press **[2nd]** **[\pm]** to return to the Stats/List Editor.

Shade t

Description

[F5] (Distr) → 1:Shade → 2:Shade t

Shade t draws the density function for the Student- t distribution specified by **Deg of Freedom, df** and shades the **Area** between **Lower Value** and **Upper Value**.

Inputs

Lower Value	A scalar lower value. The default is $-\infty$.
Upper Value	A scalar upper value. The default is ∞ .
Deg of Freedom, df	A scalar value for degrees of freedom.
Auto-scale (NO, YES)	Lets you clear all drawings from the current graph and automatically optimizes graphing window dimensions. The default = YES .

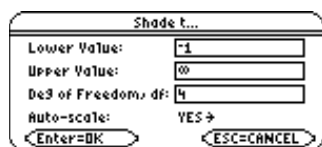
Outputs

The output for this function is a graph with the **Area** between **Lower Value** and **Upper Value** shaded.

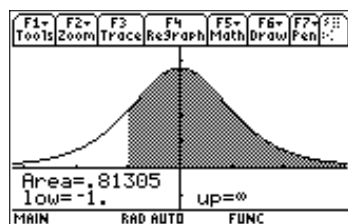
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **[F5]** (Distr) and select **1:Shade** to display the **Shade** menu.
2. Select **2:Shade t** to display the **Shade t** dialog box.
3. Enter the arguments as shown below.



4. Press **[ENTER]** to compute the data.



Note: After completing a Shade function and viewing the graph, press **[2nd]** **[+]** to return to the Stats/List Editor.

Shade Chi-square

Description

[F5] (Distr) → 1:Shade → 3:Shade Chi-square

Shade Chi-square draws the density function for the χ^2 (chi-square) distribution specified by Deg of Freedom, df and shades the area between **Lower Value** and **Upper Value**.

Inputs

Lower Value	A scalar lower value. The default is $-\infty$.
Upper Value	A scalar upper value. The default is ∞ .
Deg of Freedom, df	A scalar value for degrees of freedom.
Auto-scale (NO, YES)	Lets you clear all drawings from the current graph and automatically optimizes graphing window dimensions. The default = YES .

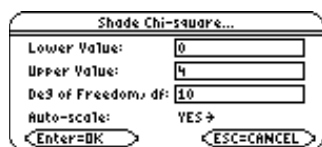
Outputs

The output for this function is a graph with the area between **Lower Value** and **Upper Value** shaded.

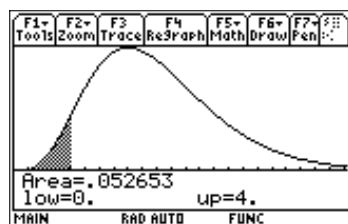
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **[F5]** (Distr) and select 1:Shade to display the **Shade** menu.
2. Select 3:Shade Chi-square to display the **Shade Chi-square** input dialog box.
3. Enter the arguments as shown below.



4. Press **[ENTER]** to compute the data.



Note: After completing a Shade function and viewing the graph, press **2nd** **[+]** to return to the Stats/List Editor.

Shade F

Description

F5 (Distr) → 1:Shade → 4:Shade F

Shade F draws the density function for the F distribution specified by **Num df** and **Den df** and shades the area between **Lower Value** and **Upper Value**.

Inputs

Lower Value	A scalar lower value. The default is $-\infty$.
Upper Value	A scalar upper value. The default is ∞ .
Num df	A numerator degrees of freedom.
Den df	A denominator degrees of freedom.
Auto-scale (NO, YES)	Lets you clear all drawings from the current graph and automatically optimizes graphing window dimensions. The default = YES .

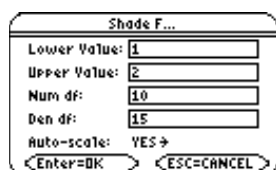
Outputs

The output for this function is a graph with the area between **Lower Value** and **Upper Value** shaded.

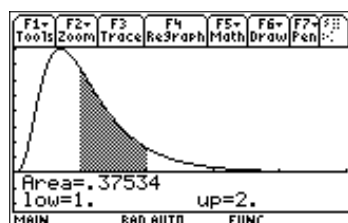
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (Distr) and select 1:Shade to display the **Shade** menu.
2. Select 4:Shade F to display the **Shade F** input dialog box.
3. Enter the arguments as shown below.



4. Press **ENTER** to compute the data.



Note: After completing a Shade function and viewing the graph, press **2nd** **[+]** to return to the Stats/List Editor.

Inverse Menu

Description

F5 (Distr) → 2:Inverse

The options on the **Inverse** menu are summarized in the table below. Details about each option follow.

Ops Menu

Inverse Normal	Computes the Inverse cumulative normal distribution function for a given Area under the normal density curve specified by mean (μ) and standard deviation (σ).
Inverse t	Computes the Inverse cumulative Student- t probability function for a given Area under the curve and the Deg of Freedom, df .
Inverse Chi-square	Computes the Inverse cumulative χ^2 (chi-square) probability function specified by Deg of Freedom for a given Area under the curve.
Inverse F	Computes the Inverse cumulative F distribution function specified by Deg of Freedom for a given area under the curve.

Inverse Normal

Description

F5 (Distr) → 2:Inverse → 1:Inverse Normal

Inverse Normal computes the **Inverse** cumulative normal distribution function for a given **Area** under the normal density curve specified by mean (μ) and standard deviation (σ).

Inputs

Area	A scalar or list of values at which to evaluate the inverse normal. $0 \leq \text{area} \leq 1$ must be true.
μ	An optional distribution mean. The default is $\mu=0$.
σ	An optional distribution standard deviation. The default is $\sigma=1$.

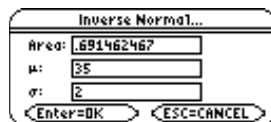
Outputs

Inverse	An inverse normal value or list of values. Values are stored to inverse .
Area	A scalar or list of probabilities for which to evaluate the inverse normal.
μ	A distribution mean.
σ	A distribution standard deviation.

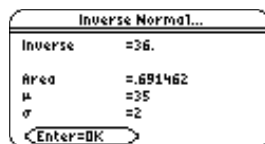
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (**Dist**) and select **2:Inverse** to display the **Inverse** menu.
2. Select **1:Inverse Normal** to display the **Inverse Normal** input dialog box.
3. Enter the arguments as shown below.



3. Press **ENTER** to compute the data.



Inverse t

Description

F5 (Distr) → 2:Inverse → 2:Inverse t

Inverse t computes the **Inverse** cumulative Student-*t* probability function specified by **Deg of Freedom, df** for a given **Area** under the curve.

Inputs

Area	A scalar or list of values at which to evaluate the <i>t</i> inverse.
Deg of Freedom, df	A scalar value for degrees of freedom.

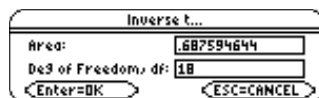
Outputs

Inverse	A <i>t</i> inverse value or list of values. Values are stored to inverse .
Area	A scalar or list of probabilities for which to evaluate the <i>t</i> inverse.
df	A scalar value for degrees of freedom.

Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (**Dist**) and select **2:Inverse** to display the **Inverse** menu.
2. Select **2:Inverse t** to display the **Inverse t** input dialog box.
3. Enter the arguments as shown below.



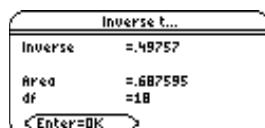
Inverse t...

Area: .687594644

Deg of Freedom, df: 18

Enter=OK ESC=CANCEL

4. Press **ENTER** to compute the data.



Inverse t...

Inverse =.49757

Area =.687595

df =18

Enter=OK

Inverse Chi-square

Description

F5 (Distr) → 2:Inverse → 3:Inverse Chi-square

Inverse Chi-square computes the **Inverse** cumulative χ^2 (chi-square) probability function specified by **Deg of Freedom, df** for a given **Area** under the curve.

Inputs

Area	A scalar or list of values at which to evaluate the χ^2 inverse.
Deg of Freedom, df	A scalar value for degrees of freedom.

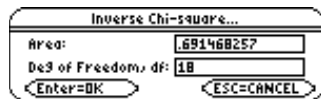
Outputs

Inverse	An inverse χ^2 (chi-square) value or list of values. Values are stored to inverse .
Area	A scalar or list of probabilities for which to evaluate the χ^2 inverse.
df	A scalar value for degrees of freedom.

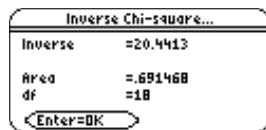
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (**Dist**) and select **2:Inverse** to display the **Inverse** menu.
2. Select **3:Inverse Chi-square** to display the **Inverse Chi-square** input dialog box.
3. Enter the arguments as shown below.



4. Press **ENTER** to compute the data.



Inverse F

Description

F5 (Distr) → 2:Inverse → 4:Inverse F

Inverse F computes the **Inverse** cumulative F distribution function specified by **Num df** and **Den df** for a given **Area** under the curve.

Inputs

Area	A scalar or list of probabilities for which to evaluate the F inverse.
Num df	A numerator degrees of freedom.
Den df	A denominator degrees of freedom.

Outputs

Inverse	A F inverse value or list of values. Values are stored to inverse .
Area	A scalar or list of probabilities for which to evaluate the F inverse.
Num df	A numerator degrees of freedom.
Den df	A denominator df degrees of freedom.

Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (**Dist**) and select **2:Inverse** to display the **Inverse** menu.
2. Select **4:Inverse F** to display the **Inverse F** input dialog box.
3. Enter the arguments as shown below.



Inverse F...

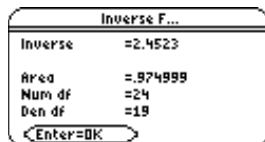
Area: .974998857

Num df: 24

Den df: 19

<Enter>=OK <ESC>=CANCEL

4. Press **ENTER** to compute the data.



Inverse F...

Inverse =2.4523

Area =.974999

Num df =24

Den df =19

<Enter>=OK

Normal Pdf

Description

F5 (Distr) → **3:Normal Pdf**

Normal Pdf computes the probability density function for the normal distribution at a specified **X Value**.

The probability density function (pdf) is:

$$f(x) = \frac{1}{\sqrt{2\pi} \sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}, \sigma > 0$$

Inputs

X Value	A scalar or list of values at which to evaluate the normal pdf.
μ	An optional distribution mean. The default is $\mu=0$.
σ	An optional distribution standard deviation. The default is $\sigma=1$.

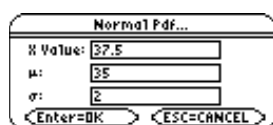
Outputs

Pdf	A normal pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of values at which to evaluate the normal pdf.
μ	A distribution mean.
σ	A distribution standard deviation.

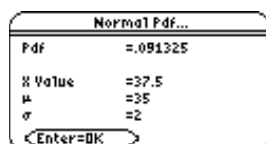
Output statistic variables are stored in the **STATVARS** folder.

Example 1

1. Press **F5** (**Dist**) and select **3:Normal Pdf** to display the **Normal Pdf** input dialog box.
2. Enter the arguments as shown below.



3. Press **ENTER** to compute the data.



Example 2

1. In the list editor, enter: `list1={37.5,38,36.2,35,39}`
2. Highlight `list2`. (If `list2` is not clear, press `[CLEAR]` `[ENTER]` .)

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
37.5							
38							
36.2							
35							
39							

list2=							
MAIN		RAD AUTO		FUNC		2/6	

3. Press `[CATALOG]` `[F3]` for the TI-89 (`[2nd]` `[CATALOG]` `[F3]` for the TI-92 Plus), move the ► indicator to the `normPdf` command, and press `[ENTER]` to paste the command to the entry line.

Tip: To move the ► indicator to the first command that begins with a specified letter, press the letter key.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
37.5							
38							
36.2							
35							
39							

list2=TIStat.normPdf(
MAIN		RAD AUTO		FUNC		2/6	

4. Use the syntax below to define `list2`.

`TIStat.normPdf(list1,35,2)`

Tip: You can press `[2nd]` `[VAR-LINK]`, highlight a list, then press `[ENTER]` to paste a list name into the entry line of the list editor. Be sure to separate all arguments with commas and close arguments with a right parenthesis `()`.

5. Press `[ENTER]`.

F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list1	list2	list3	list4				
37.5	.09132						
38	.06476						
36.2	.16661						
35	.19947						
39	.027						

list2[1]=.091324542694512							
MAIN		RAD AUTO		FUNC		2/6	

Tip: For plotting the normal distribution, you can set window variables `Xmin` and `Xmax` so that the mean (μ) falls between them and then select `A:ZoomFit` from the `ZOOM` menu.

Normal Cdf

Description

F5 (Distr) → 4:Normal Cdf

Normal Cdf computes the normal distribution probability between **Lower Value** and **Upper Value** for the specified mean (μ) and standard deviation (σ).

Inputs

Lower Value	A lower scalar or list of values at which to evaluate the normal cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the normal cdf. The default is ∞ .
μ	An optional distribution mean. The default is $\mu=0$.
σ	An optional distribution standard deviation. The default is $\sigma=1$.

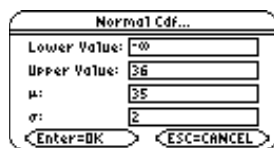
Outputs

Cdf	A normal cdf value or list of values. Values are stored to cdf .
LowVal	A scalar lower value.
UpVal	A scalar upper value or list of values.
μ	A distribution mean.
σ	A distribution standard deviation.

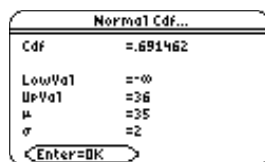
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (**Dist**) and select **4:Normal Cdf** to display the **Normal Cdf** input dialog box.
2. Enter the arguments as shown below.



2. Press **ENTER** to compute the data.



t Pdf

Description

F5 (Distr) → **5:t Pdf**

t Pdf computes the probability density function for the Student-*t* distribution at a specified **X Value**.

The probability density function (pdf) is:

$$f(x) = \frac{\Gamma[(df+1)/2]}{\Gamma(df/2)} \frac{(1+x^2/df)^{-(df+1)/2}}{\sqrt{\pi df}}$$

Inputs

X Value	A scalar or list of values at which to evaluate the Student <i>t</i> pdf.
Deg of Freedom, df	A scalar value for degrees of freedom; must be > 0.

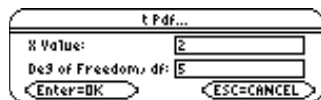
Outputs

Pdf	A Student- <i>t</i> pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of integer event numbers.
df	A scalar value for degrees of freedom.

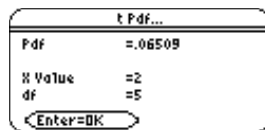
Output statistic variables are stored in the **STATVARS** folder.

Example 1

1. Press **F5** (**Dist**) and select **5:t Pdf** to display the **t Pdf** input dialog box.
2. Enter the arguments as shown below.



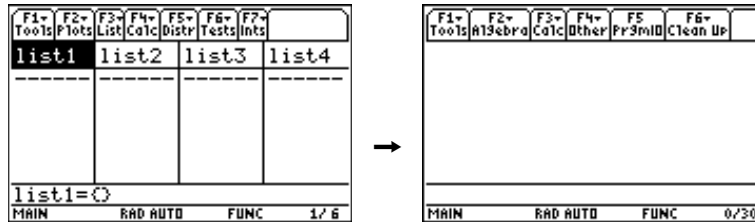
3. Press **ENTER** to compute the data.



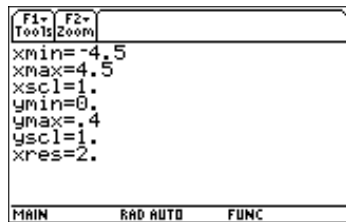
Example 2

You can use the **TIStat.tPdf**(function with the Y= editor screen.

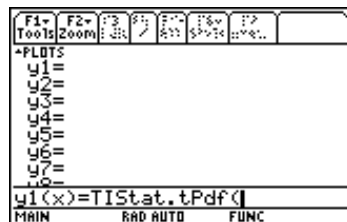
1. From within the Stats/List Editor, press **[2nd]** **[⇄]** to toggle between the list editor and the Home screen.



2. Press **[◀]** **[WINDOW]**, and then set the viewing window as shown below.

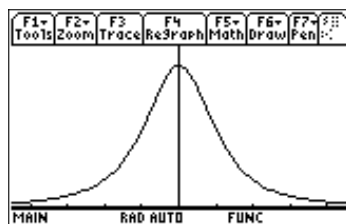


3. Press **[◀]** **[Y=]** to display the Y = editor. (If the Y = editor is not clear, press **[CLEAR]** **[ENTER]**.) Press **[CATALOG]** **[F3]** **T** on the TI-89 (**[2nd]** **[CATALOG]** **[F3]** **T** for the TI-92 Plus), move the ► indicator to the **tPdf**(command. Press **[ENTER]** to paste the command to the entry line.



Tip: To move the ► indicator to the first command that begins with a specified letter, press the letter key.

4. Press **[X]** **[.]** **[2]** **[)]** after **TIStat.tPdf**(in the entry line and press **[ENTER]** to define **y1**.
5. Press **[◀]** **[GRAPH]**.



Note: To return to the Stats/List Editor, you must press **[APPS]** then select 1:FlashApps. You must then select Stats/List Editor from the FLASH APPLICATIONS menu.

t Cdf

Description

F5 (Distr) → **6:t Cdf**

t Cdf computes the Student-*t* distribution probability between **Lower Value** and **Upper Value** for the specified **Deg of Freedom, df**.

Inputs

Lower Value	A lower scalar or list of values at which to evaluate the Student- <i>t</i> cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the Student- <i>t</i> cdf. The default is ∞ .
Deg of Freedom, df	A scalar value for degrees of freedom; must be > 0

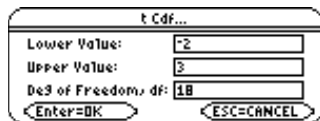
Outputs

Cdf	A Student- <i>t</i> cdf value or list of values. Values are stored to cdf .
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.
df	A scalar value for degrees of freedom.

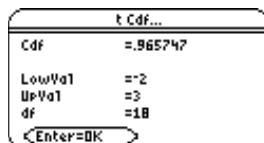
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (Dist) and select **6:t Cdf** to display the **t Cdf** input dialog box.
2. Enter the arguments as shown below.



3. Press **ENTER** to compute the data.



Chi-square Pdf

Description

F5 (Distr) → 7:Chi-square Pdf

Chi-square Pdf computes the probability density function for the χ^2 (chi-square) distribution at a specified **X Value** for the specified **Deg of Freedom, df**.

To plot the χ^2 distribution, paste χ^2 **pdf**(to the Y= editor.

The probability density function (pdf) is:

$$f(x) = \frac{1}{\Gamma(df/2)} (1/2)^{df/2} x^{df/2-1} e^{-x/2}, x \geq 0$$

Inputs

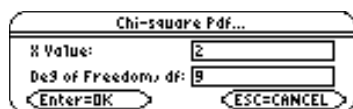
X Value	A scalar or list of values at which to evaluate the χ^2 (chi-square) pdf.
Deg of Freedom, df	A scalar value for degrees of freedom; must be an integer >0.

Outputs

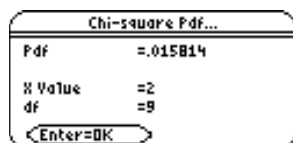
Pdf	A χ^2 (chi-square) pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of integer event numbers.
df	A scalar value for degrees of freedom.

Example

1. Press **F5** (**Dist**) and select **7:Chi-square Pdf** to display the **Chi-square Pdf** input dialog box.
2. Enter the arguments as shown below.



3. Press **ENTER** to compute the data.



Chi-square Cdf

Description

F5 (Distr) → 8:Chi-square Cdf

Chi-square Cdf computes the χ^2 (chi-square) distribution probability between **Lower Value** and **Upper Value** for the specified **Deg of Freedom, df**.

Inputs

Lower Value	A lower scalar or list of values at which to evaluate the χ^2 cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the χ^2 cdf. The default is ∞ .
Deg of Freedom, df	A scalar value for degrees of freedom; must be an integer > 0 .

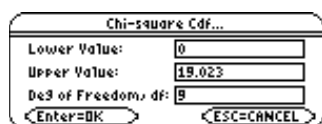
Outputs

Cdf	A χ^2 cdf value or list of values. Values are stored to cdf .
LowVal	A scalar lower value.
UpVal	A scalar upper value or list of values.
df	A scalar value for degrees of freedom.

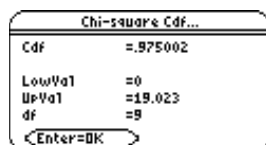
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (Dist) and select **8:Chi-square Cdf** to display the **Chi-square Cdf** input dialog box.
2. Enter the arguments as shown below.



3. Press **ENTER** to compute the data.



F Pdf

Description

F5 (Distr) → 9:F Pdf

F Pdf computes the probability density function for the **F** distribution at a specified **X Value**.

The probability density function (pdf) is:

$$f(x) = \frac{\Gamma[(n+d)/2]}{\Gamma(n/2)\Gamma(d/2)} \left(\frac{n}{d}\right)^{n/2} x^{n/2-1} (1+nx/d)^{-(n+d)/2}, x \geq 0$$

where n = numerator degrees of freedom
 d = denominator degrees of freedom

Inputs

X Value	A scalar or list of values at which to evaluate the F pdf.
Num df	A numerator degrees of freedom; must be integers > 0.
Den df	A denominator degrees of freedom; must be integers > 0.

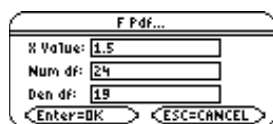
Outputs

Pdf	A F pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of integer event numbers.
Num df	A numerator degrees of freedom.
Den df	A denominator degrees of freedom.

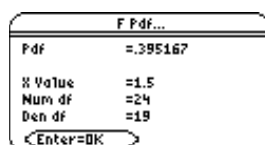
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press **F5** (**Dist**) and select **9:F Pdf** to display the **F Pdf** input dialog box.
2. Enter the arguments as shown below.



2. Press **ENTER** to compute the data.



F Cdf

Description

F5 (Distr) → A:F Cdf

F Cdf computes the **F** cumulative distribution probability between **Lower Value** and **Upper Value** for the specified **Num df** and **Den df**.

Inputs

Lower Value	A lower scalar or list of values at which to evaluate the F distribution cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the F distribution cdf. The default is ∞ .
Num df	A numerator df (degrees of freedom); must be integers > 0 .
Den df	A denominator df (degrees of freedom); must be integers > 0 .


Outputs

Cdf	A F cdf value or list of values. Values are stored to cdf .
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.
numdf	A numerator df (degrees of freedom).
dendf	A denominator df (degrees of freedom).

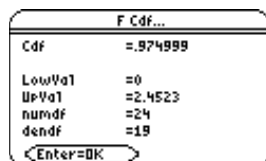
Output statistic variables are stored in the **STATVARS** folder.

Example

- To select **A:F Cdf**, press:
 - F5**(Dist) **alpha** **A** for the TI-89
 - F5**(Dist) **A** for the TI-92 Plusto display the **F Cdf** input dialog box.
- Enter the arguments as shown below.



- Press **ENTER** to compute the data.



Binomial Pdf

Description

F5 (Distr) → **B:Binomial Pdf**

Binomial Pdf computes a probability at **X Value** for the discrete binomial distribution with the specified **Num Trials, n** and **Prob Success, p** on each trial.

The probability density function (pdf) is:

$$f(x) = \binom{n}{x} p^x (1-p)^{n-x}, x = 0, 1, \dots, n$$

where n = number of trials

Inputs

Num Trials, n	A total number of binomial events; must be an integer > 0.
Prob Success, p	A probability of success of a single event. $0 \leq p \leq 1$ must be true.
X Value	An optional scalar or list of integer event numbers. If X is not provided, then $X = \{0, 1, 2, 3, \dots, n\}$ or number of trials.

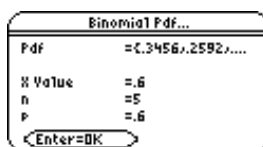
Outputs

Pdf	A binomial pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of integer event numbers.
n	A total number of binomial events.
p	A probability of a single event success.

Output statistic variables are stored in the **STATVARS** folder.

Example

- To select **B:Binomial Pdf**, press:
 - F5** (Dist) **alpha** **B** for the TI-89
 - F5** (Dist) **B** for the TI-92 Plus
 to display the input **Binomial Pdf** dialog box.
- Enter the arguments as shown below
- Press **ENTER** to compute the data. Press **ENTER** again to view the **Pdf** values in the list editor.



Note: The Results→Editor must be ON in order to automatically append results to the list editor. To enter the FORMATS dialog box press **2nd** **1** for the TI-89; press **2nd** **F** for the TI-92 Plus.

Binomial Cdf

Description

F5 (Distr) → C:Binomial Cdf

Binomial Cdf computes a cumulative probability for the discrete binomial distribution with the specified **Num Trials, n** and **Prob Success, p** on each trial.

Inputs

Num Trials, n	A total number of binomial events; must be an integer >0.
Prob Success, p	A probability of success of a single event; $0 \leq p \leq 1$ must be true.
Lower Value	A lower scalar or list of values at which to evaluate the binomial distribution cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the binomial distributor cdf. The default is ∞ .

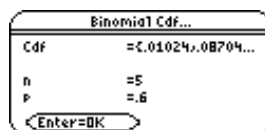
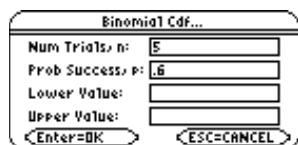
Outputs

Cdf	A binomial cdf value or list of values. Values are stored to cdf .
n	A total number of binomial events.
p	A probability of a single event success.
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.

Output statistic variables are stored in the **STATVARS** folder.

Example

- To select **C:Binomial Cdf**, press:
 - F5**(Dist) **alpha** **C** for the TI-89
 - F5**(Dist) **C** for the TI-92 Plus
 to display the **Binomial Cdf** input dialog box.
- Enter the arguments as shown below.
- Press **ENTER** to compute the data. Press **ENTER** again to view the **Cdf** values in the list editor.



F1→ Tools	F2→ Plots	F3→ List	F4→ Calc	F5→ Distr	F6→ Tests	F7→ Ints	
list4	list5	list6	Cdf				
			.01024				
			.08704				
			.31744				
			.66304				
			.92224				
			1.				
Cdf=C.0102400000000002,.08...							
MAIN		RAD AUTO		FUNC		???	

Note: The Results→Editor must be ON in order to automatically append results to the list editor. To enter the FORMATS dialog box press **2nd** **1** for the TI-89; press **2nd** **F** for the TI-92 Plus.

Poisson Pdf

Description

F5 (Distr) → **D:Poisson Pdf**

Poisson Pdf computes a probability (pdf) at **X Value** for the discrete Poisson distribution with the specified mean (λ).

The probability density function (pdf) is:

$$f(x) = e^{-\mu} \mu^x / x!, x = 0, 1, 2, \dots$$

Inputs

λ	A Poisson process mean; must be a real number > 0 .
X Value	A scalar or list of integer event numbers; must be ≥ 0 .

Outputs

Pdf	A Poisson pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of integer event numbers.
λ	A Poisson process mean.

Output statistic variables are stored in the **STATVARS** folder.

Example

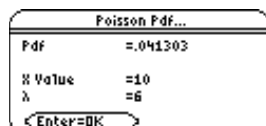
1. To select **D:Poisson Pdf**, press:

- **F5**(Dist) **alpha** **D** for the TI-89
- **F5**(Dist) **D** for the TI-92 Plus

to display the **Poisson Pdf** input dialog box. Enter the arguments as shown below.



2. Press **ENTER** to compute the data.



Poisson Cdf

Description

[F5] (Distr) → **E:Poisson Cdf**

Poisson Cdf computes a cumulative probability for the discrete Poisson distribution with the specified mean (λ).

Inputs

λ	A Poisson process mean; must be a real number > 0
Lower Value	A lower scalar or list of values at which to evaluate the Poisson distribution cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the Poisson distribution cdf. The default is ∞ .

Outputs

Cdf	A Poisson cdf value or list of values. Values are stored to cdf .
λ	A Poisson process mean.
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.

Output statistic variables are stored in the **STATVARS** folder.

Example

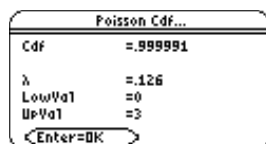
1. To select **E:Poisson Cdf**, press:

- **[F5]** (Dist) **[alpha]** **E** for the TI-89
- **[F5]** (Dist) **E** for the TI-92 Plus

to display the input dialog box. Enter the arguments as shown below.



2. Press **[ENTER]** to compute the data.



Geometric Pdf

Description

F5 (Distr) → **F:Geometric Pdf**

Geometric Pdf computes a probability at **X Value**, the number of the trial on which the first success occurs, for the discrete geometric distribution with the specified **Prob Success, p**.

The probability density function (pdf) is:

$$f(x) = p(1 - p)^{x-1}, x = 1, 2, \dots$$

Inputs

Prob Success, p	A probability of a single event success; $0 \leq p \leq 1$ must be true.
X Value	A scalar or list of integer event numbers; must be ≥ 0 .

Outputs

Pdf	A geometric pdf value or list of values. Values are stored to pdf .
X Value	A scalar or list of integer event numbers.
p	A probability of a single event success.

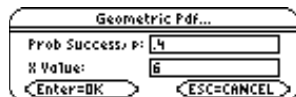
Output statistic variables are stored in the **STATVARS** folder.

Example

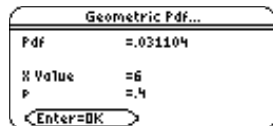
1. To select **F:Geometric Pdf**, press:

- **F5**(Dist) **alpha** **F** for the TI-89
- **F5**(Dist) **F** for the TI-92 Plus

to display the input **Geometric Pdf** dialog box. Enter the arguments as shown below.



2. Press **ENTER** to compute the data.



Geometric Cdf

Description

F5 (Distr) → **G:Geometric Cdf**

Geometric Cdf computes a cumulative probability at x , the number of the trial on which the first success occurs, for the discrete geometric distribution with the specified **Prob Success, p**.

Inputs

Prob Success, p	A probability of a single event success. $0 \leq p \leq 1$ must be true.
Lower Value	A lower scalar or list of values at which to evaluate the discrete geometric distribution cdf. The default is $-\infty$.
Upper Value	An upper scalar or list of values at which to evaluate the discrete geometric distribution cdf. The default is ∞ .

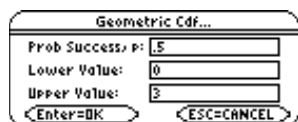
Outputs

Cdf	A geometric cdf value or list of values. Values are stored to cdf .
p	A probability of a single event success.
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.

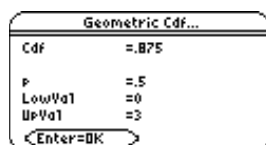
Output statistic variables are stored in the **STATVARS** folder.

Example

- To select **G:Geometric Cdf**, press:
 - F5** (Dist) **alpha** **G** for the TI-89
 - F5** (Dist) **G** for the TI-92 Plusto display the input **Geometric Cdf** dialog box.
- Enter the arguments as shown below.



- Press **ENTER** to compute the data.



F6 Tests Menu

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The **F6 Tests** menu lets you perform hypothesis tests for population means μ , equality of the means of two populations, unknown portions of successes of two populations. It lets you compare two normal standard deviations of populations, compute chi-square tests for associations in matrices, compare proportions of successes from two populations, compute linear regressions, and compute one-way and two-way analyses of variances to compare the means of populations.



Note: All output variables are stored in the **STATVARS** folder.

Z-Test

Description

- 2nd** **[F6]** (**Tests**) → **1:Z-Test** for the TI-89
[F6] (**Tests**) → **1:Z-Test** for the TI-92 Plus

Z-Test (one-sample z test) performs a hypothesis test for a single unknown population mean μ when the population standard deviation σ is known. It tests the null hypothesis $H_0: \mu = \mu_0$ against one of the alternatives below.

- $H_a: \mu \neq \mu_0$
- $H_a: \mu < \mu_0$
- $H_a: \mu > \mu_0$

Data Inputs

μ_0	Hypothesized population mean for data sequence in List .
σ	Population standard deviation for data sequence in List .
List	List containing the data used in the calculations.
Freq	Frequency values for the data in List . The default is 1. All elements must be integers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Alternate Hyp ($\mu \neq \mu_0$, $\mu < \mu_0$, $\mu > \mu_0$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu = \mu_0$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Stats Inputs

μ_0	Known population mean for data sequence in List .
σ	Known population standard deviation for data sequence in List .
\bar{x}	Sample mean of the data sequence in List .
n	Size of the sample.
Alternate Hyp ($\mu \neq \mu_0$, $\mu < \mu_0$, $\mu > \mu_0$)	Three alternate hypotheses against which the null hypothesis may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Data and Stats Outputs

Outputs	Stored to	Description
μ_0	μ_0	Known population mean for data sequence x .
z	z	$(\bar{x} - \mu_0) / (\sigma / \sqrt{n})$
P Value	P Value	Least probability at which the null hypothesis can be rejected.
\bar{x}	x_bar	Sample mean of the data sequence in List .
Sx	sx_	Sample standard deviation of the data sequence. Only returned for Data input.
n	n	Size of the sample.
σ	σ	Population standard deviation of the data sequence.

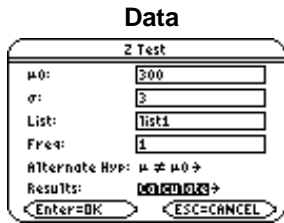
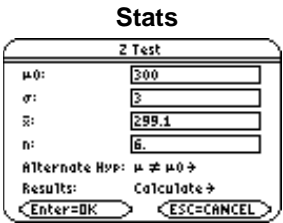
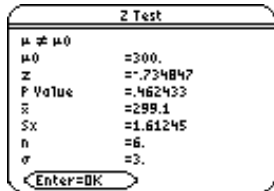
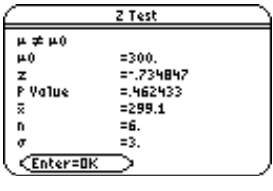
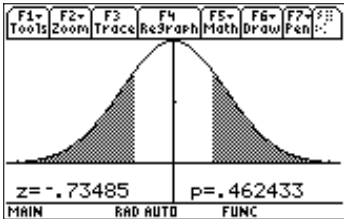
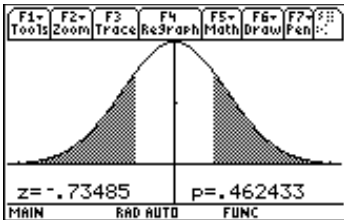
Z-Test (continued)

Example

1. In the list editor, enter: `list1={299.4,297.7,301.4,298.9,300.2,297}`
2. To select **1:Z-Test**, press:
 - `[2nd] [F6] (Tests) 1` for the TI-89
 - `[F6] (Tests) 1` for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press `[ENTER]` to display the **Z Test** input dialog box. If not, press `[D]` to display the choices (**Data** or **Stats**), highlight one, and then press `[ENTER] [ENTER]` to select an input method and display the **Z Test** input dialog box.
4. Enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.
5. If the **Alternate Hyp** and **Results** format that you want are displayed, press `[ENTER]`. If not, press `[D]`, highlight your selections, and press `[ENTER] [ENTER]` to view the results.

Input:		
Calculated results:		
Drawn results:		

T-Test

Description

- 2nd** **[F6]** (Tests) → **2:T-Test** for the TI-89
[F6] (Tests) → **2:T-Test** for the TI-92 Plus

T-Test (one-sample t test) performs a hypothesis test for a single unknown population mean μ when the population standard deviation σ is unknown. It tests the null hypothesis $H_0: \mu = \mu_0$ against one of the alternatives below.

- $H_a: \mu \neq \mu_0$
- $H_a: \mu < \mu_0$
- $H_a: \mu > \mu_0$

Data Inputs

μ_0	Hypothesized population mean for data sequence in List .
List	List containing the data used in the calculations.
Freq	Frequency values for the data in List . The default is 1. All elements must be integers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Alternate Hyp ($\mu \neq \mu_0$, $\mu < \mu_0$, $\mu > \mu_0$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu = \mu_0$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Stats Inputs

μ_0	Known population mean for data sequence in List .
\bar{x}	Sample mean of the data sequence x .
Sx	Sample standard deviation of the data sequence x .
n	Size of the sample.
Alternate Hyp ($\mu \neq \mu_0$, $\mu < \mu_0$, $\mu > \mu_0$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu = \mu_0$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Data and Stats Outputs

Outputs	Stored to	Description
μ_0	μ_0	Known population mean for data sequence x .
t	t	$(\bar{x} - \mu_0) / (\text{stdev} / \sqrt{n})$
P Value	pval	Least probability at which the null hypothesis can be rejected.
df	df	Degrees of freedom.
\bar{x}	x_bar	Sample mean of the data sequence in List .
Sx	sx_	Sample standard deviation of the data sequence.
n	n	Size of the sample.

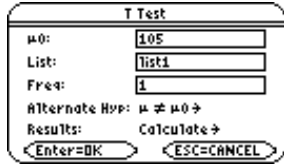
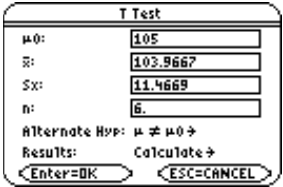
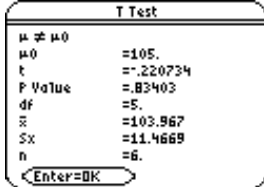
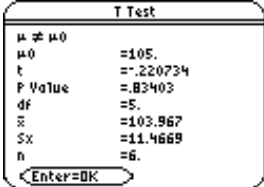
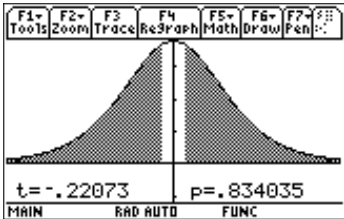
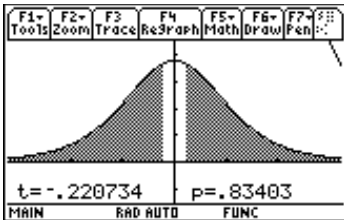
T-Test (continued)

Example

1. In the list editor, enter: `list1={91.9,97.8,111.4,122.3,105.4,95}`
2. To select **2:T-Test**, press:
 - `[2nd] [F6] (Tests) 2` for the TI-89
 - `[F6] (Tests) 2` for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press `[ENTER]` to display the **T Test** input dialog box. If not, press `[D]` to display the choices (**Data** or **Stats**), highlight one, and then press `[ENTER] [ENTER]` to select an input method and display the **T Test** input dialog box.
4. Enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.
5. If the **Alternate Hyp** and **Results** format that you want are displayed, press `[ENTER]`. If not, press `[D]`, highlight your selections, and press `[ENTER] [ENTER]` to view the results.

Input:	 <p>Data</p> <p>T Test</p> <p>μ_0: 105</p> <p>List: list1</p> <p>Freq: 1</p> <p>Alternate Hyp: $\mu \neq \mu_0$</p> <p>Results: Calculate \rightarrow</p> <p><code>[Enter]=OK</code> <code>[ESC]=CANCEL</code></p>	 <p>Stats</p> <p>T Test</p> <p>μ_0: 105</p> <p>Σ: 103.9667</p> <p>Sx: 11.4669</p> <p>n: 6</p> <p>Alternate Hyp: $\mu \neq \mu_0$</p> <p>Results: Calculate \rightarrow</p> <p><code>[Enter]=OK</code> <code>[ESC]=CANCEL</code></p>
Calculated results:	 <p>T Test</p> <p>$\mu \neq \mu_0$</p> <p>μ_0 = 105</p> <p>t = -.220734</p> <p>P Value = .83403</p> <p>df = 5</p> <p>Σ = 103.967</p> <p>Sx = 11.4669</p> <p>n = 6</p> <p><code>[Enter]=OK</code></p>	 <p>T Test</p> <p>$\mu \neq \mu_0$</p> <p>μ_0 = 105</p> <p>t = -.220734</p> <p>P Value = .83403</p> <p>df = 5</p> <p>Σ = 103.967</p> <p>Sx = 11.4669</p> <p>n = 6</p> <p><code>[Enter]=OK</code></p>
Drawn results:	 <p>Graph showing a normal distribution curve with a vertical line at the mean. The t-value is -.22073 and the p-value is .834035.</p> <p>t = -.22073 p = .834035</p> <p>MAIN RAD AUTO FUNC</p>	 <p>Graph showing a normal distribution curve with a vertical line at the mean. The t-value is -.220734 and the p-value is .83403.</p> <p>t = -.220734 p = .83403</p> <p>MAIN RAD AUTO FUNC</p>

2-SampZTest

Description

$\boxed{2\text{nd}}$ $\boxed{\text{F6}}$ (Tests) \rightarrow **3:2-SampZTest** for the TI-89
 $\boxed{\text{F6}}$ (Tests) \rightarrow **3:2-SampZTest** for the TI-92 Plus

2-SampZTest (two-sample z test) tests the equality of the means of two populations (μ_1 and μ_2) based on independent samples when both population standard deviations (σ_1 and σ_2) are known. The null hypothesis $H_0: \mu_1 = \mu_2$ is tested against one of the alternatives below.

- $H_a: \mu_1 \neq \mu_2$
- $H_a: \mu_1 < \mu_2$
- $H_a: \mu_1 > \mu_2$

Data Inputs

σ_1, σ_2	Known population standard deviations for data sequences in List 1 and List 2 .
List 1, List 2	List containing the data used in the calculations.
Freq 1, Freq 2	Frequency values for the data in List 1 and List 2 . The defaults are 1. All elements must be integers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Alternate Hyp ($\mu_1 \neq \mu_2, \mu_1 < \mu_2, \mu_1 > \mu_2$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu_1 = \mu_2$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Stats Inputs

σ_1, σ_2	Known population standard deviations for data sequences in List .
\bar{x}_1	The sample mean of List 1 .
n1	Size of the sample.
\bar{x}_2	The sample mean of List 2 .
n2	Size of the sample.
Alternate Hyp ($\mu_1 \neq \mu_2, \mu_1 < \mu_2, \mu_1 > \mu_2$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu_1 = \mu_2$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

2-SampZTest (continued)

Data and Stats Outputs

Outputs	Stored to	Description
z	z	Standard normal value computed for the difference of means.
P Value	pval	Least probability at which the null hypothesis can be rejected.
\bar{x}_1, \bar{x}_2	x1_bar, x2_bar	Sample means of the data sequences in List 1 and List 2 .
Sx1, Sx2	sx1, sx2	Sample standard deviations of the data sequences in List 1 and List 2 .
n1, n2	n1, n2	Size of the samples.
σ_1, σ_2	σ_1, σ_2	Population standard deviations of List 1 and List 2 .

Example

1. In the list editor, enter:

```
list3={154,109,137,115,140}
```

```
list4={108,115,126,92,146}
```

2. To select **3:2-SampZTest**, press:

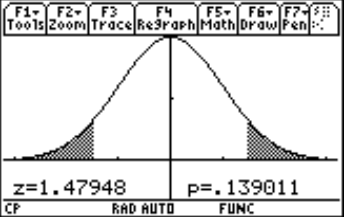
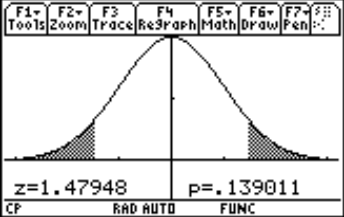
- $\boxed{2nd}$ $\boxed{F6}$ (**Tests**) **3** for the TI-89
- $\boxed{F6}$ (**Tests**) **3** for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press \boxed{ENTER} to display the **2-Sample Z Test** input dialog box. If not, press \odot to display the choices (**Data** or **Stats**), highlight one, and then press \boxed{ENTER} \boxed{ENTER} to select an input method and display the **2-Sample Z Test** input dialog box.
4. Enter the arguments into the fields as shown in either the **Data** or **Stats** input screen on the next page.
5. If the **Alternate Hyp** and **Results** format that you want are displayed, press \boxed{ENTER} . If not, press \odot , highlight your selections, and press \boxed{ENTER} \boxed{ENTER} to view the results.

2-SampZTest (continued)

Example (continued)

Input:	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">Data</p> <p style="text-align: center;">2-Sample Z Test</p> <p>σ_1: <input type="text" value="15.5"/></p> <p>σ_2: <input type="text" value="13.5"/></p> <p>List 1: <input type="text" value="list3"/></p> <p>List 2: <input type="text" value="list4"/></p> <p>Freq 1: <input type="text" value="1"/></p> <p>Freq 2: <input type="text" value="1"/></p> <p style="text-align: center;">Enter=OK ESC=CANCEL</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Alternate Hyp: $\mu_1 \neq \mu_2$</p> <p>Results: Calculate</p> <p style="text-align: center;">Enter=OK ESC=CANCEL</p> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">Stats</p> <p style="text-align: center;">2-Sample Z Test</p> <p>σ_1: <input type="text" value="15.5"/></p> <p>σ_2: <input type="text" value="13.5"/></p> <p>S1: <input type="text" value="131"/></p> <p>n1: <input type="text" value="5"/></p> <p>S2: <input type="text" value="117.4"/></p> <p>n2: <input type="text" value="5"/></p> <p style="text-align: center;">Enter=OK ESC=CANCEL</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Alternate Hyp: $\mu_1 \neq \mu_2$</p> <p>Results: Calculate</p> <p style="text-align: center;">Enter=OK ESC=CANCEL</p> </div>
Calculated results:	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Sample Z Test</p> <p>$\mu_1 \neq \mu_2$</p> <p>Z = 1.47948</p> <p>P Value = .139011</p> <p>S1 = 131</p> <p>S2 = 117.4</p> <p>Sx1 = 18.6145</p> <p>Sx2 = 20.1941</p> <p>n1 = 5</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>n2 = 5</p> <p>σ_1 = 15.5</p> <p>σ_2 = 13.5</p> <p style="text-align: center;">Enter=OK</p> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Sample Z Test</p> <p>$\mu_1 \neq \mu_2$</p> <p>Z = 1.47948</p> <p>P Value = .139011</p> <p>S1 = 131</p> <p>S2 = 117.4</p> <p>n1 = 5</p> <p>n2 = 5</p> <p>σ_1 = 15.5</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>σ_2 = 13.5</p> <p style="text-align: center;">Enter=OK</p> </div>
Drawn results:		

2-SampTTest

Description

$\boxed{2\text{nd}}$ $\boxed{F6}$ (Tests) \rightarrow 4:2-SampTTest for the TI-89
 $\boxed{F6}$ (Tests) \rightarrow 4:2-SampTTest for the TI-92 Plus

2-SampTTest (two-sample t test) tests the equality of the means of two populations (μ_1 and μ_2) based on independent samples when neither population standard deviation (σ_1 or σ_2) is known. The null hypothesis $H_0: \mu_1 = \mu_2$ is tested against one of the alternatives below.

- $H_a: \mu_1 \neq \mu_2$
- $H_a: \mu_1 < \mu_2$
- $H_a: \mu_1 > \mu_2$

Data Inputs

List 1, List 2	Lists containing the data used in the calculations.
Freq 1, Freq 2	Frequency values for the data in List 1 and List 2 . The default is 1. All elements must be integers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Alternate Hyp ($\mu_1 \neq \mu_2, \mu_1 < \mu_2, \mu_1 > \mu_2$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu_1 = \mu_2$) may be tested.
Pooled (YES, NO)	Specifies whether or not the variances are to be pooled for the calculation. YES = variances pooled. Population variances are assumed to be equal. Select NO = variances not pooled. Population variances can be unequal.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Stats Inputs

$\bar{x}1, \bar{x}2$	The sample mean of the data sequences.
Sx1, Sx2	Sample standard deviations of the data sequences.
n1	Size of the sample one.
n2	Size of the sample two.
Alternate Hyp ($\mu_1 \neq \mu_2, \mu_1 < \mu_2, \mu_1 > \mu_2$)	Three alternate hypotheses against which the null hypothesis ($H_0: \mu_1 = \mu_2$) may be tested.
Pooled (YES, NO)	Specifies whether or not the variances are to be pooled for the calculation. YES = variances pooled. Population variances are assumed to be equal. Select NO = variances not pooled. Population variances can be unequal.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

2-SampTTest (continued)

Data and Stats Outputs

Outputs	Stored to	Description
t	t	The Student-t value computed for the difference of means.
P Value	pval	Least probability at which the null hypothesis can be rejected.
df	df	Degrees of freedom for the t-statistic.
\bar{x}_1, \bar{x}_2	x1_bar x2_bar	Sample means of the data sequences in List 1 and List 2 .
Sx1, Sx2	sx1, sx2	Sample standard deviations of the data sequences in List 1 and List 2 .
n1, n2	n1, n2	Size of the samples.
Sxp	Sxp	The pooled standard deviation. Calculated when Pooled = YES .

Example

1. In the list editor:

```
list5={12.207,16.869,25.05,22.429,8.456,10.589}
```

```
list6={11.074,9.686,12.064,9.351,8.182,6.642}
```

2. To select **4:2-SampTTest**, press:

- $\boxed{2nd}$ $\boxed{F6}$ (**Tests**) 4 for the TI-89
- $\boxed{F6}$ (**Tests**) 4 for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press \boxed{ENTER} to display the **2-Sample T Test** input dialog box. If not, press \odot to display the choices (**Data** or **Stats**), highlight one, and then press \boxed{ENTER} \boxed{ENTER} to select an input method and display the **2-Sample T Test** input dialog box.
4. Enter the arguments into the fields as shown in either the **Data** or **Stats** input screen on the next page.
5. If the **Alternate Hyp** and **Results** format that you want are displayed, press \boxed{ENTER} . If not, press \odot , highlight your selections, and press \boxed{ENTER} \boxed{ENTER} to view the results.

2-SampTTest (continued)

Example (continued)

Input:

Data

2-Sample T Test

List 1: List5

List 2: List6

Freq 1: 1

Freq 2: 1

Alternate Hyp: $\mu_1 \neq \mu_2$

Pooled: NO

Enter=OK ESC=CANCEL

Stats

2-Sample T Test

\bar{x}_1 : 15.933333

s_{x1} : 542114013

n_1 : 6

\bar{x}_2 : 9.499999

s_{x2} : 593238839

n_2 : 6

Enter=OK ESC=CANCEL

Calculated results:

2-Sample T Test

$\mu_1 \neq \mu_2$

t = 2.25793

P Value = .065927

df = 5.84075

\bar{x}_1 = 15.9333

\bar{x}_2 = 9.499983

s_{x1} = 6.70135

s_{x2} = 1.95006

Enter=OK

2-Sample T Test

$\mu_1 \neq \mu_2$

t = 2.25793

P Value = .065927

df = 5.84075

\bar{x}_1 = 15.9333

\bar{x}_2 = 9.499983

s_{x1} = 6.70135

s_{x2} = 1.95006

Enter=OK

Drawn results:

t=2.25793 p=.065927

t=2.25793 p=.065927

1-PropZTest

Description

$\boxed{2\text{nd}}$ $\boxed{F6}$ (Tests) \rightarrow **5:1-PropZTest** for the TI-89

$\boxed{F6}$ (Tests) \rightarrow **5:1-PropZTest** for the TI-92 Plus

1-PropZTest (one-proportion z test) computes a test for an unknown proportion of successes (prop). **1-PropZTest** tests the null hypothesis $H_0: p=p_0$ against one of the alternatives below.

- $H_a: p \neq p_0$
- $H_a: p < p_0$
- $H_a: p > p_0$

Inputs

p0	The hypothesized population proportion for 1-PropZTest . Must be a real number, such that $0 < p_0 < 1$.
Successes, x	Count of successes in the sample for the 1-PropZTest . Must be an integer ≥ 0 .
n	Count of observations in the sample for the 1-PropZTest . Must be an integer > 0 .
Alternate Hyp (p≠p0, p<p0, p>p0)	Three alternate hypotheses against which the null hypothesis ($H_0: p=p_0$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Outputs

Outputs	Stored to	Description
p0	p0	Hypothesized population proportion.
z	z	Standard normal value computed for the proportion.
P Value	pval	Least probability at which the null hypothesis can be rejected.
p_hat	p_hat	Estimated sample proportion.
n	n	Size of the sample.

1-PropZTest (continued)

Example

1. To select **5:1-PropZTest**, press:

- $\boxed{2\text{nd}} \boxed{F6}$ (**Tests**) **5** for the TI-89
- $\boxed{F6}$ (**Tests**) **5** for the TI-92 Plus

The **1-Proportion Z Test** dialog box is displayed.

2. Enter the arguments as shown below.

3. If the **Alternate Hyp** and **Results** format that you want are displayed, press $\boxed{\text{ENTER}}$. If not, for each of these fields press \uparrow , highlight your selections, and press $\boxed{\text{ENTER}}$ $\boxed{\text{ENTER}}$ to view the results.

Input:

1-Proportion Z Test

p0:

Successes, x:

n:

Alternate Hyp: PROP ≠ P0

Results: Calculate

Enter=OK ESC=CANCEL

Calculated results:

1-Proportion Z Test

PROP ≠ P0

p0 = .5

z = .447214

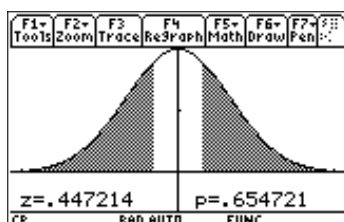
P Value = .654721

p-hat = .6

n = 5

Enter=OK

Drawn results:



2-PropZTest

Description

2nd **[F6]** (Tests) → **6:2-PropZTest** for the TI-89
F6 (Tests) → **6:2-PropZTest** for the TI-92 Plus

2-PropZTest (two-proportion z test) computes a test to compare the proportion of successes (p_1 and p_2) from two populations. It takes as input the count of successes in each sample (**x1** and **x2**) and the count of observations in each sample (**n1** and **n2**). **2-PropZTest** tests the null hypothesis $H_0: p_1=p_2$ (using the pooled sample proportion \hat{p}) against one of the alternatives below.

- $H_a: p_1 \neq p_2$
- $H_a: p_1 < p_2$
- $H_a: p_1 > p_2$

Inputs

Successes, x1 Successes, x2	Count of successes in the samples x1 and x2.
n1, n2	Count of observations in the samples n1 and n2.
Alternate Hyp (p1≠p2, p1<p2, p1>p2)	Three alternate hypotheses against which the null hypothesis ($H_0: p_1=p_2$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Outputs

Outputs	Stored to	Description
z	z	Standard normal value computed for the difference of proportions.
P Value	pval	Least probability at which the null hypothesis can be rejected.
p1_hat	p1_hat	First sample proportion estimate.
p2_hat	p2_hat	Second sample proportion estimate.
p_hat	p_hat	Pooled sample proportion estimate.
n1, n2	n1, n2	Number of samples taken in trials 1 and 2.

2-PropZTest (continued)

Example

1. To select **6:2-PropZTest**, press:

- $\boxed{2\text{nd}} \boxed{F6}$ (**Tests**) **6** for the TI-89
- $\boxed{F6}$ (**Tests**) **6** for the TI-92 Plus

The **2-Proportion Z Test** dialog box is displayed.

2. Enter the arguments as shown below.

3. If the **Alternate Hyp** and **Results** format that you want are displayed, press $\boxed{\text{ENTER}}$. If not, for each of these fields press \downarrow , highlight your selections, and press $\boxed{\text{ENTER}}$ $\boxed{\text{ENTER}}$ to view the results.

Input:

2-Proportion Z Test

Successes, x1:	45
n1:	61
Successes, x2:	38
n2:	62
Alternate Hyp:	$p_1 \neq p_2$
Results:	Calculate

$\boxed{\text{Enter=OK}}$ $\boxed{\text{ESC=CANCEL}}$

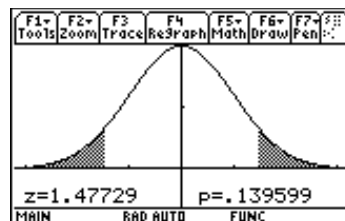
Calculated results:

2-Proportion Z Test

$p_1 \neq p_2$	
Z	=1.47729
P Value	=.139599
\hat{p}_1	=.737705
\hat{p}_2	=.612903
\hat{p}	=.674797
n1	=61.
n2	=62.

$\boxed{\text{Enter=OK}}$

Drawn results:



Chi2 GOF

Description

2nd **[F6]** (Tests) → 7:Chi2 GOF for the TI-89
[F6] (Tests) → 7:Chi2 GOF for the TI-92 Plus

Chi2 GOF performs the chi square goodness of fit test to confirm that sample data is from a population that conforms to a specified distribution. For example, **Chi2 GOF** can confirm that the sample data came from a normal distribution.

Inputs

Observed List	List of observed sample values.
Expected List	List of expected sample values from a specified distribution.
Deg of Freedom, df	Count of sample categories minus sample restrictions.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Outputs

Outputs	Stored to	Description
Chi-2	chi2	Chi square stat: $\sum((\text{observed} - \text{expected})^2/\text{expected})$
P Value	pval	Least probability at which the null hypothesis can be rejected.
df	df	Degrees of freedom for the chi square statistics.
Comp Lst*	complst	Elemental chi square statistic contributions.

* The output variable is pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in **[F1]** (Tools) 9:Format).

Chi2 GOF (continued)

Example

1. In the list editor, enter:

list1={16,25,22,8,10}

list2={16.2,21.6,16.2,14.4,12.6}

2. To select **7:Chi2 GOF**, press:

- **[2nd] [F6] (Tests) 7** for the TI-89
- **[F6] (Tests) 7** for the TI-92 Plus

3. The **Chi-square Goodness of Fit** input dialog box is displayed. Enter the arguments as shown below.
4. If the **Results** format that you want is displayed, press **[ENTER]**. If not, press **⤷**, highlight your selection, and press **[ENTER] [ENTER]** to view the results.

Input:

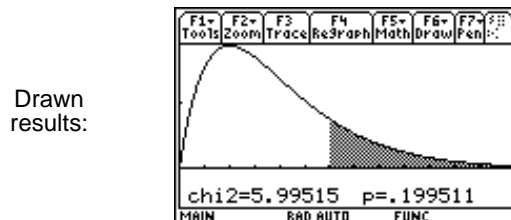


The dialog box is titled "Chi-square Goodness of Fit". It contains four input fields: "Observed List:" with "list1" entered, "Expected List:" with "list2" entered, "De3 of Freedom, df:" with "4" entered, and "Results:" with "Calculate" selected. At the bottom are two buttons: "Enter=OK" and "ESC=CANCEL".

Calculated results:



The dialog box is titled "Chi-square Goodness of Fit" and displays the following results: "Chi-2 = 5.99515", "P Value = .199511", "df = 4", and "Comp Lst = (.002469, .5351...". There is an "Enter=OK" button at the bottom.



Chi2 2-way

Description

$\boxed{2\text{nd}} \boxed{F6}$ (Tests) → 8:Chi2 2-way for the TI-89
 $\boxed{F6}$ (Tests) → 8:Chi2 2-way for the TI-92 Plus

χ^2 -Test (chi-square test) computes a chi-square test for association on the two-way table of counts in the specified **Observed Mat**. The null hypothesis H_0 for a two-way table is: no association exists between row variables and column variables. The alternative hypothesis is: the variables are related.

Inputs

Observed Mat	The matrix of observed values.
Store Expected to	The computed matrix of expected values.
Store CompMat to	The computed matrix of contributions.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Outputs

Outputs	Stored to	Description
Chi-2	chi2	Chi square stat: $\sum (\text{observed} - \text{expected})^2 / \text{expected}$
P Value	pval	Least probability at which the null hypothesis can be rejected.
df	df	Degrees of freedom for the chi square statistics.
Exp Mat	expmat	Matrix of expected elemental count table, assuming null hypothesis.
Comp Mat	compmat	Matrix of elemental chi square statistic contributions.

Chi2 2-way (continued)

Example

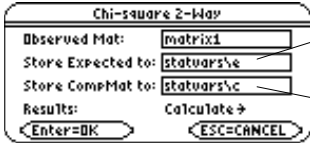
1. To create the matrix:
 - 1) To return to the Home screen, press:
 - $\boxed{\text{HOME}}$ for the TI-89
 - $\boxed{2\text{nd}} \boxed{\text{HOME}}$ for the TI-92 Plus
 - 2) Press $\boxed{\text{APPS}}$ and select **6:Data/Matrix Editor**. A menu is displayed.
 - 3) Select **3:New**. The **New** dialog box is displayed.
 - 4) Press \blacktriangleright , highlight **2:Matrix**, and press $\boxed{\text{ENTER}}$ to choose **Matrix** type.
 - 5) Press \blacktriangleleft , highlight **1:main**, and press $\boxed{\text{ENTER}}$ to choose **main** folder.
 - 6) Press \blacktriangleleft , and then enter the name **matrix1** in the **Variable** field.
 - $\boxed{2\text{nd}} \boxed{\alpha} \text{ M A T R I X } \boxed{\alpha} \text{ 1}$ for the TI-89
 - **M A T R I X 1** for the TI-92 Plus
 - 7) Enter **3** for **Row dimension** and **2** for **Col dimension**.
 - 8) Press $\boxed{\text{ENTER}}$ to display the matrix editor.
 - 9) Enter **4, 9, 5** in **c1** and **7, 2, 3** in **c2**.
 - 10) Press $\blacklozenge \boxed{\text{APPS}} \boxed{\text{ENTER}}$ to close the matrix editor and return to the list editor. If you have more than one Application loaded, press $\blacklozenge \boxed{\text{APPS}}$, and then select **Stats/List Editor**.
2. To select **8:Chi2 2-way** and display the **Chi-square 2-Way** dialog box, press
 - $\boxed{2\text{nd}} \boxed{\text{F6}} \text{ (Tests) 8}$ for the TI-89
 - $\boxed{\text{F6}} \text{ (Tests) 8}$ for the TI-92 Plus
3. Enter the arguments as shown on the next page.
4. If the **Results** format that you want is displayed, press $\boxed{\text{ENTER}}$. If not, press \blacktriangleright , highlight your selection, and press $\boxed{\text{ENTER}} \boxed{\text{ENTER}}$ to view the results.

Note: You can enter a matrix directly into the Observed Mat input box using matrix notation. Enter $[[4,7][9,2][5,3]]$ into the Observed Mat input field.

Chi2 2-way (continued)

Example (continued)

Input:

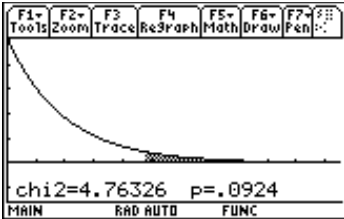


statvars\expmat
statvars\compmat

Calculated results:



Drawn results:



2-SampFTest

Description

- $\boxed{2\text{nd}}$ $\boxed{F6}$ (Tests) → 9:2-SampFTest for the TI-89
 $\boxed{F6}$ (Tests) → 9:2-SampFTest for the TI-92 Plus

2-SampFTest (two-sample F-test) computes an F-test to compare two normal population standard deviations (σ_1 and σ_2). The population means and standard deviations are all unknown. **2-SampFTest**, which uses the ratio of sample variances $Sx1^2/Sx2^2$, tests the null hypothesis $H_0: \sigma_1 = \sigma_2$ against one of the alternatives below.

- $H_a: \sigma_1 \neq \sigma_2$
- $H_a: \sigma_1 < \sigma_2$
- $H_a: \sigma_1 > \sigma_2$

Data Inputs

List 1, List 2	Lists containing the data used in the calculations.
Freq 1, Freq 2	Frequency values for the data in List 1 and List 2 . The default is 1. All elements must be integers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Alternate Hyp ($\sigma_1 \neq \sigma_2, \sigma_1 < \sigma_2, \sigma_1 > \sigma_2$)	Three alternate hypotheses against which the null hypothesis ($H_0: \sigma_1 = \sigma_2$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Stats Inputs

Sx1, Sx2	Known standard deviations for data sequences in List 1 and List 2 .
n1, n2	Size of the samples.
Alternate Hyp ($\sigma_1 \neq \sigma_2, \sigma_1 < \sigma_2, \sigma_1 > \sigma_2$)	Three alternate hypotheses against which the null hypothesis ($H_0: \sigma_1 = \sigma_2$) may be tested.
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

Data and Stats Outputs

Outputs	Stored to	Description
F	f	Calculated F statistic for the data sequence.
P Value	pval	Least probability at which the null hypothesis can be rejected.
Num df	numdf	numerator degrees of freedom = $n1 - 1$.
Den df	dendf	denominator degrees of freedom = $n2 - 1$.
Sx1, Sx2	sx1, sx2	Sample standard deviations of the data sequences in List 1 and List 2 .
$\bar{x}1, \bar{x}2$	x1_bar x2_bar	Sample means of the data sequences in List 1 and List 2 .
n1, n2	n1, n2	Size of the samples.

2-SampFTest (continued)

Example

1. In the list editor, enter:

```
list1={7-4,18,17,-3,-5,1,10,11,-2,-3}
list2={-1,12,-1,-3,3,-5,5,2,-11,-1,-3}
```

2. To select **9:2-SampFTest**, press:

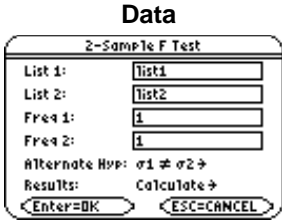
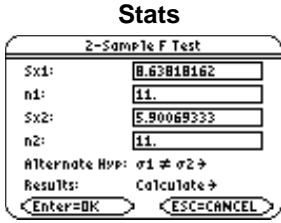
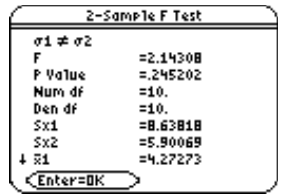
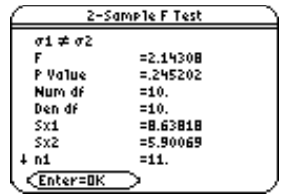
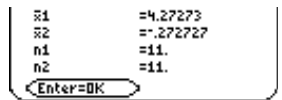
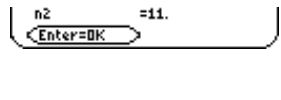
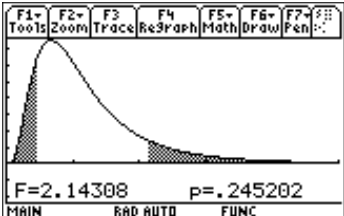
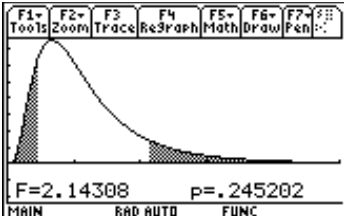
- $\boxed{2\text{nd}} \boxed{[F6]}$ (**Tests**) **9** for the TI-89
- $\boxed{[F6]}$ (**Tests**) **9** for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press $\boxed{[ENTER]}$ to display the **2-Sample F Test** input dialog box.

If the **Data Input Method** you want is not displayed, press \blacktriangleright to display the choices (**Data** or **Stats**), highlight one, and then press $\boxed{[ENTER]}$ $\boxed{[ENTER]}$ to select an input method and display the **2-Sample F Test** input dialog box.

4. Enter the arguments as shown in either the **Data** or **Stats** input screen.
5. If the **Alternate Hyp** and **Results** format that you want are displayed, press $\boxed{[ENTER]}$. If not, for each press \blacktriangleright , highlight your selections, and press $\boxed{[ENTER]}$ $\boxed{[ENTER]}$ to view the results.

Input:		
Calculated results:		
		
Drawn results:		

LinRegTTest

Description

$\boxed{2\text{nd}}$ $\boxed{\text{F6}}$ (Tests) \rightarrow A:LinRegTTest for the TI-89

$\boxed{\text{F6}}$ (Tests) \rightarrow A:LinRegTTest for the TI-92 Plus

LinRegTTest (linear regression t test) computes a linear regression on the given data and a t test on the value of slope β and the correlation coefficient ρ for the equation $y=\alpha+\beta x$. It tests the null hypothesis $H_0: \beta=0$ (equivalently, $\rho=0$) against one of the alternatives below.

- $H_a: \beta \neq 0$ and $\rho \neq 0$
- $H_a: \beta < 0$ and $\rho < 0$
- $H_a: \beta > 0$ and $\rho > 0$

The regression equation is automatically stored to the **RegEqn** variable in the **STATVARS** folder. If you enter a Y= variable name at the **Store RegEqn to** prompt, the calculated regression equation is automatically stored to the specified Y= equation.

Inputs

X List, Y List	Lists of independent and dependent variables.
Freq	Frequency value for the data in List 1 and List 2 . The default is 1. All elements must be integers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Alternate Hyp ($\beta \neq 0$, $\beta < 0$, $\beta > 0$)	Three alternate hypotheses against which the null hypothesis ($H_0: \beta = \rho = 0$) may be tested.
Store RegEqn to	Regression equation: $y=a+b*x$
Results (Calculate or Draw)	Calculate: Display numerical and symbolic test results in a dialog box. Draw: Draw a graph of the test results.

LinRegTTest (continued)

Outputs

Outputs	Stored to	Description
t	t	t -Statistic for slope significance.
P Value	pval	Least probability at which the null hypothesis can be rejected.
df	df	Degrees of freedom.
a, b	a, b	Regression line fit offset and slope parameter estimates.
s	s	Fit error standard deviation for $y = a + bx$.
SE Slope	se	Standard error of slope.
r^2	rsq	Coefficient of determination.
r	r	Linear regression correlation coefficient.
resid*	resid	Residuals of linear fit.

* The output variables are pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in **F1 (Tools) 9:Format**).

Example

1. In the list editor, enter:

```
list3={38,56,59,64,74}
```

```
list4={41,63,70,72,84}
```

2. To select **A:LinRegTTest**, press:

- **2nd** **F6** (**Tests**) **alpha** **A** for the TI-89
- **F6** (**Tests**) **A** for the TI-92 Plus

3. The **Linear Regression T Test** input dialog box is displayed.
4. Enter the arguments into the fields as shown on the next page.
5. Select the options as shown on the next page for the **Alternate Hyp**, **Store RegEqn to**, and **Results** fields.
6. Press **ENTER** **ENTER** to calculate the results.

LinRegTTest (continued)

Example (continued)

Input:

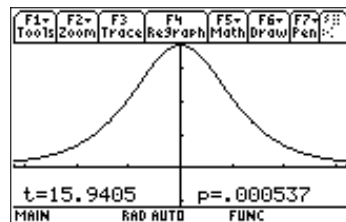
Linear Regression T Test	
X List:	List3
Y List:	List4
Freq:	1
Alternate Hyp:	$\beta \neq 0$
Store ResEqn to:	none
Results:	Calculate
<input type="button" value="Enter=OK"/> <input type="button" value="ESC=CANCEL"/>	

Calculated results:

Linear Regression T Test	
$y=a+bx$	
$\beta \neq 0$	
t	=15.9405
P Value	=.000537
df	=3
a	=-3.65959
b	=1.1969
s	=1.98203
<input type="button" value="Enter=OK"/>	

SE Slope	=.075085
r ²	=.988331
r	=.994148
<input type="button" value="Enter=OK"/>	

Drawn results:



When **LinRegTTest** is executed, the list of residuals is created and stored to the list name **resid** in the **STATVARS** folder. **resid** is placed on the list names menu.

Note: For the regression equation, you can use the fix-decimal mode setting to control the number of digits stored after the decimal point (Chapter 1). However, limiting the number of digits to a small number could affect the accuracy of the fit.

MultRegTests

Description

$\boxed{2\text{nd}}$ $\boxed{\text{F6}}$ (Tests) → **B:MultRegTests** for the TI-89

$\boxed{\text{F6}}$ (Tests) → **B:MultRegTests** for the TI-92 Plus

MultRegTests (Multiple linear regression t test) computes a linear regression on the given data, and provides the F -test statistic for linearity.

Inputs

Num of Ind Var	Number of independent variable lists.
Y List	List containing the dependent variable vector.
X1 List, X2 List, . . .	Lists containing the independent variables.

Outputs

Outputs	Stored to	Description
F	f	Global F test statistic.
P Value	pval	Least probability at which the null hypothesis can be rejected.
R²	rsq	Coefficient of multiple determination.
Adj R²	adjrsq	Adjusted coefficient of multiple determination.
s	s	Standard deviation of the error.
DW	dw	Durbin-Watson statistic; used to determine whether first-order auto correlation is present in the model.

REGRESSION Outputs

Outputs	Stored to	Description
df	dfreg	Regression degrees of freedom.
SS	ssreg	Regression sum of squares.
MS	msreg	Regression mean square.

MultRegTests (continued)

Outputs	Stored to	Description
ERROR		
df	dferr	Degrees of freedom of the errors.
SS	sserr	Sum of squares of the errors.
MS	mserr	Mean squares for the errors.
B List*	blist	List of coefficients of the regression equation $Y_{\text{hat}}=B_0+B_1*x_1+\dots$
SE List*	selist	List of standard errors of each coefficient in Y_{hat} (B List).
t List*	tlist	List of t statistics for each coefficient in Y_{hat} (B List).
P List*	plist	List of probability values for each t statistic.
resid*	resid	Difference between the observed value of the dependent variable and the value predicted by using the estimated regression equation.
leverage*	leverage	Measure of how far the values of the independent variable are from their mean values.
cookd*	cookd	Cook's distance; measure of the influence of an observation based on the residual and leverage.
sresid*	sresid	Standardized residuals; value obtained by dividing a residual by its standard deviation.
yhatlist*	yhatlist	Values predicted by using the estimated regression equation.

* The output variables are pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in **F1 (Tools) 9:Format**).

Example

1. In the list editor, enter:

```
list1={12,16,25,22,8,10}
```

```
list2={11,9,12,9,8,7}
```

```
list3={1,2,3,4,5,6}
```

2. To select **B:MultRegTests**, press:

- **2nd [F6] (Tests) alpha B** for the TI-89
- **[F6] (Tests) B** for the TI-92 Plus

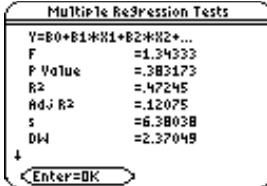
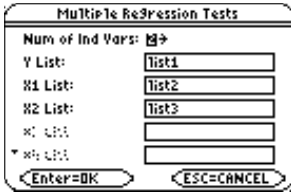
The **Multiple Regression Tests** dialog box is displayed.

3. If the **Num of Ind Vars** you want is already displayed, press **ENTER**. If not, press **⏏**, select the correct number of independent variables, and then press **ENTER**.
4. Enter the arguments into the fields as shown on the next page.
5. Press **ENTER** to calculate the data.

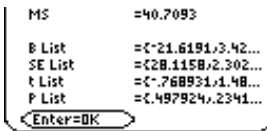
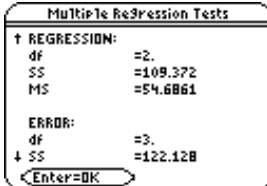
MultRegTests (continued)

Example (continued)

Input:



Calculated results:



When **MultRegTests** is executed, the list of residuals is created and stored to the list name **resid** in the **STATVARS** folder. **resid** is placed on the list names menu.

Note: For the regression equation, you can use the fix-decimal mode setting to control the number of digits stored after the decimal point. However, limiting the number of digits to a small number could affect the accuracy of the fit.

ANOVA

Description

2nd [F6] (Tests) → **C:ANOVA** for the TI-89

F6 (Tests) → **C:ANOVA** for the TI-92 Plus

ANOVA (one-way analysis of variance) computes a one-way analysis of variance for comparing the means of two to 20 populations. The **ANOVA** procedure for comparing these means involves analysis of the variation in the sample data. The null hypothesis $H_0: \mu_1 = \mu_2 = \dots = \mu_k$ is tested against the alternative H_a : not all $\mu_1 \dots \mu_k$ are equal.

Data Inputs

List 1, List 2, . . .	The names of the lists containing sample data.
-----------------------	--

Stats Inputs

Group1 Stats, Group2 Stats, . . .	The names of the lists containing sample statistics for data sequences from the normal random distribution. Each List x consists of {n,x_bar, sx} where n is the length of some data sequence, x_bar is the sample mean, and sx is the sample standard deviation.
--------------------------------------	---

Data and Stats Outputs

Outputs	Stored to	Description
F	f	Value of the F statistic.
P Value	pval	Least probability at which the null hypothesis can be rejected.
FACTOR		
df	df	Degrees of freedom of the groups.
SS	ss	Sum of squares of the groups.
MS	ms	Mean squares for the groups.
ERROR		
df	dferr	Degrees of freedom of the errors.
SS	sserr	Sum of squares of the errors.
MS	mserr	Mean square for the errors.
Sxp	sxp	Pooled standard deviation.
xbarlist*	xbarlist	Mean of the input of the lists.
lowlist*	lowlist	95% confidence intervals for the mean of each input list.
uplist*	uplist	95% confidence intervals for the mean of each input list.

* The output variables are pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in **F1** (Tools) **9:Format**).

ANOVA (continued)

Example

1. In the list editor:

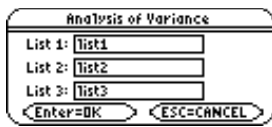
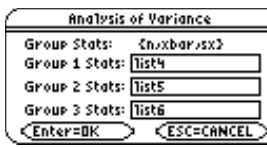
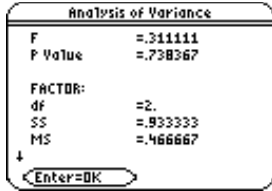
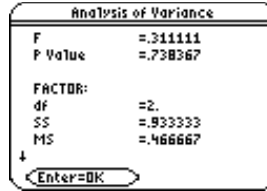
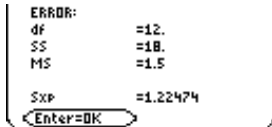
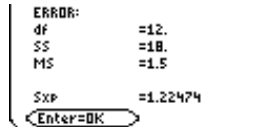
Data List	Stats List
list1={7,4,6,6,5}	list4={5,5.6,1.14018}
list2={6,5,5,8,7}	list5={5,6.2,1.30384}
list3={4,7,6,7,6}	list6={5,6.0,1.22474}

2. To select **C:ANOVA**, press:

- $\boxed{2nd}$ $\boxed{F6}$ (**Tests**) $\boxed{\alpha}$ **C** for the TI-89
- $\boxed{F6}$ (**Tests**) **C** for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press \boxed{ENTER} . If the **Data Input Method** you want is not displayed, press \blacktriangleright to display the choices (**Data** or **Stats**), highlight one, and then press \boxed{ENTER} \blacktriangledown .
4. If the **Number of Groups** you want is displayed, press \boxed{ENTER} . If not, press \blacktriangleright to display the choices, highlight one, and then press \boxed{ENTER} to select the number of groups. Press \boxed{ENTER} to display the **Analysis of Variance** input dialog box.
5. Enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.
6. Press \boxed{ENTER} to calculate the results or draw the results.

Input:		
Calculated results:		
		

ANOVA2-Way

Description

[2nd] [F6] (Tests) → D:ANOVA2-Way for the TI-89

[F6] (Tests) → D:ANOVA2-Way for the TI-92 Plus

ANOVA2-Way computes a two-way analysis of variance for comparing the means of two to twenty populations (levels of factor A called **Lvls of Col Factor**). In the **2 Factor, Eq Reps** design, each of the considered populations has an equal number of levels of factor B (**Lvls of Row Factor**). In the **Block** design, the levels of factor B are equal to the block.

The **ANOVA2-Way** procedure compares the means of the experimental factors, factor A, factor B, and factor AB (the interaction effect). For each of the experimental factors, the null hypothesis $H_0: \mu_1 = \mu_2 = \dots = \mu_k$ is tested against the alternative hypothesis H_a : not all μ_1, \dots, μ_k are equal. In the case of the **Block** design, there is no interaction effect.

Inputs

Design Block	In the Block design, each treatment (column factor) must be applied to each kind of experimental material called a block.
Design 2 Factor, Eq Reps	In the 2 Factor, Eq Reps design, each input list (column factor) is divided into the levels of the other experimental factor, where each level contains repetitions.
Lvls of Col Factor (2...10)	Number of column lists. In the 2 Factor, Eq Reps design there are both row factors and column factors, allowing them to be studied simultaneously.
Lvls of Row Factor	Number of rows the columns are divided into.

Outputs Block Design

Outputs	Stored to	Description
F	f	F statistic of the column factor.
P Value	pval	Least probability at which the null hypothesis can be rejected.
df	df	Degrees of freedom of the column factor.
SS	ss	Sum of squares of the column factor.
MS	ms	Mean squares for column factor.
BLOCK		
F	fb	F statistic for factor.
P Value	pvalb	Least probability at which the null hypothesis can be rejected.
df	dfb	Degrees of freedom for factor.
SS	ssb	Sum of squares for factor.
MS	msb	Mean squares for factor.
ERROR		
df	dferr	Degrees of freedom of the errors.
SS	sserr	Sum of squares of the errors.
MS	mserr	Mean squares for the errors.
s	s	Standard deviation of the error.

ANOVA2-Way (continued)

2 Factor, Eq Reps Design

COLUMN FACTOR Outputs

Outputs	Stored to	Description
F	fcol	F statistic of the column factor.
P Value	pvalcol	Probability value of the column factor.
df	dfcol	Degrees of freedom of the column factor.
SS	sscol	Sum of squares of the column factor.
MS	mscol	Mean squares for column factor.

ROW FACTOR Outputs

Outputs	Stored to	Description
F	frow	F statistic of the row factor.
P Value	pvalrow	Probability value of the row factor.
df	dfrow	Degrees of freedom of the row factor.
SS	ssrow	Sum of squares of the row factor.
MS	msrow	Mean squares for row factor.

INTERACTION Outputs

Outputs	Stored to	Description
F	fint	F statistic of the interaction.
P Value	pvalint	Probability value of the interaction.
df	dfint	Degrees of freedom of the interaction.
SS	ssint	Sum of squares of the interaction.
MS	msint	Mean squares for interaction.

ERROR Outputs

Outputs	Stored to	Description
df	dferr	Degrees of freedom of the errors.
SS	sserr	Sum of squares of the errors.
MS	mserr	Mean squares for the errors.
s	s	Standard deviation of the error.

ANOVA2-Way (continued)

Example

1. In the list editor, enter:

list1={7,4,6,6,5,6}

list2={6,5,5,8,7,7}

list3={4,7,6,7,6,6}

list4={4,7,8,9,5,7}

2. To select **D:ANOVA2-Way**, press:

- $\boxed{2nd}$ $\boxed{F6}$ (**Tests**) $\boxed{\alpha}$ **D** for the TI-89
- $\boxed{F6}$ (**Tests**) **D** for the TI-92 Plus

The **2-way Analysis of Variance** dialog box is displayed.

4. If the **Design** you want is displayed, press \boxed{ENTER} . If not, press \blacktriangleright to display the choices (**Block** or **2 Factor, Eq Reps**), highlight one, and then press \boxed{ENTER} \blacktriangledown .
5. If the **Lvls of Col Factor (2 - 10)** you want is displayed, press \boxed{ENTER} . If not, press \blacktriangleright to display the choices, highlight one, and then press \boxed{ENTER} \boxed{ENTER} . If you are using the **2 Factor, Eq Reps** design you must press \boxed{ENTER} \blacktriangledown . Enter the **Lvls of Row Factor** (choose **2** for this example) then press \boxed{ENTER} \boxed{ENTER} .

ANOVA2-Way (continued)

Example (continued)

	Block	2 Factor, Eq Reps
Input:	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-way Analysis of Variance</p> <p>Design: Block →</p> <p>Lvs of Col Factor: 4 →</p> <p>Lvs of Row Factor: 2 →</p> <p style="text-align: center;">Enter=SAVE ESC=CANCEL</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - Block Design</p> <p>Column Level Lists</p> <p>List 1: List1</p> <p>List 2: List2</p> <p>List 3: List3</p> <p>List 4: List4</p> <p style="text-align: center;">Enter=OK ESC=CANCEL</p> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-way Analysis of Variance</p> <p>Design: 2 Factor, Eq Reps →</p> <p>Lvs of Col Factor: 4 →</p> <p>Lvs of Row Factor: 2 →</p> <p style="text-align: center;">Enter=SAVE ESC=CANCEL</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - 2 Factor Design</p> <p>Column Level Lists</p> <p>List 1: List1</p> <p>List 2: List2</p> <p>List 3: List3</p> <p>List 4: List4</p> <p style="text-align: center;">Enter=OK ESC=CANCEL</p> </div>
Calculated results:	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - Block Design</p> <p>FACTOR:</p> <p>F =.704225</p> <p>P Value =.56416</p> <p>df =3.</p> <p>SS =3.33333</p> <p>MS =1.11111</p> <p>↓ BLOCK:</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - Block Design</p> <p>↑ F =1.56238</p> <p>P Value =.229969</p> <p>df =5.</p> <p>SS =12.3333</p> <p>MS =2.46667</p> <p>ERROR:</p> <p>↓ df =15.</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>SS =23.6667</p> <p>MS =1.57778</p> <p>s =1.2561</p> <p style="text-align: center;">Enter=OK</p> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - 2 Factor Design</p> <p>COLUMN FACTOR:</p> <p>F =.620155</p> <p>P Value =.612083</p> <p>df =3.</p> <p>SS =3.33333</p> <p>MS =1.11111</p> <p>↓ ROW FACTOR:</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - 2 Factor Design</p> <p>↑ ROW FACTOR:</p> <p>F =2.32558</p> <p>P Value =.146785</p> <p>df =1.</p> <p>SS =4.16667</p> <p>MS =4.16667</p> <p>↓ INTERACTION:</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">2-Way ANOVA - 2 Factor Design</p> <p>↑ INTERACTION:</p> <p>F =.589147</p> <p>P Value =.630932</p> <p>df =3.</p> <p>SS =3.16667</p> <p>MS =1.05556</p> <p>↓ ERROR:</p> <p style="text-align: center;">Enter=OK</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>ERROR:</p> <p>df =16.</p> <p>SS =28.6667</p> <p>MS =1.79167</p> <p>s =1.33853</p> <p style="text-align: center;">Enter=OK</p> </div>

F7 Ints (Intervals) Menu

ZInterval	178
TInterval	180
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2-SampTInt.....	184
1-PropZInt	186
2-PropZInt	188
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MultRegInt	193

The **F7 Ints** menu lets you compute one- and two-sample z and t confidence intervals, one- and two-proportion z confidence intervals, linear regression t confidence intervals, and multiple regression point estimates and intervals.



Notes:

Some of the statistics functions described in this chapter let you use either **Data** or **Stats** inputs for calculations. If you work an example with **Data** inputs first, and then **immediately** work the same example with **Stats** inputs, you do not have to re-enter the values. You can then select the alternate hypothesis and the way you want to display results (**Calculate** or **Draw**), if applicable.

The output variables are stored in the **STATVARS** folder.

ZInterval

Description

$\boxed{2\text{nd}} \boxed{F7}$ (Ints) → 1:ZInterval for the TI-89
 $\boxed{F7}$ (Ints) → 1:ZInterval for the TI-92 Plus

ZInterval (one-sample z confidence interval) computes a confidence interval for an unknown population mean (μ) when the population standard deviation (σ) is known. The computed confidence interval depends on the user-specified confidence level probability.

Data Inputs

σ	Known standard deviation for data sequence in List .
List	The name of the list containing the data.
Freq (<i>optional</i>)	The name of the list containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
C Level	Confidence level probability with default = .95

Stats Inputs

σ	Known standard deviation for data sequence in List . The default is 1.
\bar{x}	Sample mean of a data sequence from the normal random distribution.
n	Length of the data sequence with sample mean.
C Level	Confidence level probability with default = .95

Data and Stats Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval for an unknown population mean.
\bar{x}	x_bar	Sample mean of the data sequence from the normal random distribution.
ME	me	Margin of error.
Sx	sx_	Sample standard deviation.
n	n	Length of the data sequence with sample mean.
σ	σ	Known population standard deviation for data sequence List .

ZInterval (continued)

Example

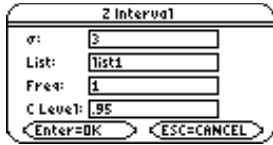
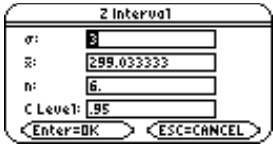
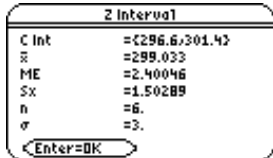
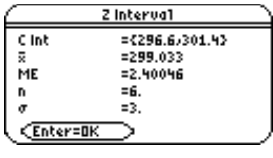
1. In the list editor, enter: `list1={299.4,297.7,301,298.9,300.2,297}`
2. To select **1:ZInterval**, press:
 - $\boxed{2nd}$ $\boxed{F7}$ (Ints) 1 for the TI-89
 - $\boxed{F7}$ (Ints) 1 for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want to use is already displayed, press \boxed{ENTER} to display the **Z Interval** input dialog box.

If the **Data Input Method** you want to use is not displayed, press \odot to display the choices (**Data** or **Stats**), highlight one, and then press \boxed{ENTER} \boxed{ENTER} to select an input method and display the **Z Interval** input dialog box.

4. Based on the input method you chose, enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.
5. Press \boxed{ENTER} to calculate the results.

	Data	Stats
Input:		
Calculated results:		

Interval

Description

$\boxed{2\text{nd}}$ $\boxed{F7}$ (Ints) → 2:TIInterval for the TI-89
 $\boxed{F7}$ (Ints) → 2:TIInterval for the TI-92 Plus

Interval (one-sample t confidence interval) computes a confidence interval for an unknown population mean (μ) when the population standard deviation (σ) is unknown. The computed confidence interval depends on the user-specified confidence level probability.

Data Inputs

List	List containing the data sequence.
Freq (<i>optional</i>)	List containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
C Level	Confidence level probability with default = .95

Stats Inputs

\bar{x}	Sample mean of the data sequence from the normal random distribution.
Sx	Sample standard deviation.
n	Length of the data sequence with sample mean.
C Level	Confidence level probability with default = .95

Data and Stats Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval for an unknown population mean.
\bar{x}	x_bar	Sample mean of the data sequence from the normal random distribution.
ME	me	Margin of error.
df	df	Degrees of freedom.
Sx	sx_	Sample standard deviation.
n	n	Length of the data sequence with sample mean.

TInterval (continued)

Example

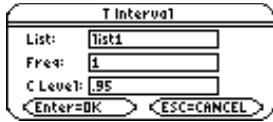
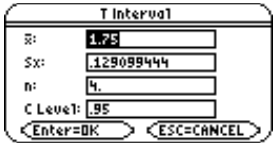
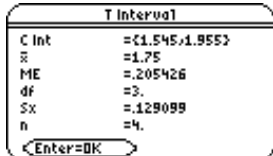
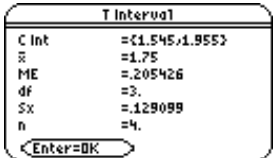
1. In the list editor, enter: **list1={1.6,1.7,1.8,1.9}**
2. To select **2:TInterval**, press:
 - $\boxed{2nd}$ $\boxed{F7}$ (Ints) 2 for the TI-89
 - $\boxed{F7}$ (Ints) 2 for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want to use is already displayed, press \boxed{ENTER} to display the **T Interval** input dialog box.

If the **Data Input Method** you want to use is not displayed, press \odot to display the choices (**Data** or **Stats**), highlight one, and then press \boxed{ENTER} \boxed{ENTER} to select an input method and display the **T Interval** input dialog box.

4. Based on the input method you chose, enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.
5. Press \boxed{ENTER} to calculate the results.

	Data	Stats
Input:	 <p>T Interval List: list1 Freq: 1 C Level: .95 Enter=OK ESC=CANCEL</p>	 <p>T Interval x̄: 1.75 Sx: .129099444 n: 4 C Level: .95 Enter=OK ESC=CANCEL</p>
Calculated results:	 <p>T Interval C Int =(-1.545,1.955) x̄ =1.75 ME =.205426 df =3 Sx =.129099 n =4 Enter=OK</p>	 <p>T Interval C Int =(-1.545,1.955) x̄ =1.75 ME =.205426 df =3 Sx =.129099 n =4 Enter=OK</p>

2-SampZInt

Description

$\boxed{2\text{nd}}$ $\boxed{[F7]}$ (Ints) → **3:2-SampZInt** for the TI-89

$\boxed{F7}$ (Ints) → **3:2-SampZInt** for the TI-92 Plus

2-SampZInt (two-sample z confidence interval) computes a confidence interval for the difference between two population means ($\mu_1 - \mu_2$) when both population standard deviations (σ_1 and σ_2) are known. The computed confidence interval depends on the user-specified confidence level probability.

Data Inputs

σ_1, σ_2	Known standard deviations for data sequence List 1 and List 2 .
List 1, List 2	Sample data sequences from the normal random distribution.
Freq 1, Freq 2 (<i>optional</i>)	The name of the lists containing the frequency values for the data in List 1 and List 2 . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) lists is the frequency of occurrence for each corresponding data point in the input list specified in the List fields.
C Level	Confidence level probability with default = .95

Stats Inputs

σ_1, σ_2	Known standard deviations for data sequence List 1 and List 2 .
\bar{x}_1, \bar{x}_2	Means for sample sequences from normal random distributions.
n1, n2	Length of the data sequences with means \bar{x}_1 and \bar{x}_2 .
C Level	Confidence level probability with default = .95

Data and Stats Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval containing confidence level probability of distribution.
$\bar{x}_1 - \bar{x}_2$	xbardiff	Sample means of the data sequences from the normal random distribution.
ME	me	Margin of error.
\bar{x}_1, \bar{x}_2	x1_bar, x2_bar	Sample means of the data sequences from the normal random distribution.
Sx1, Sx2	sx1, sx2	Sample standard deviations for List 1 and List 2 .
n1, n2	n1, n2	Number of samples in data sequences.
σ_1, σ_2	r1, r2	Known population standard deviations for data sequence List 1 and List 2 .

2-SampZInt (continued)

Example

- In the list editor, enter:

```
list1={154,109,137,115,140}
list2={108,115,126,92,146}
```

- To select **3:2-SampZInt**, press:

- $\boxed{2\text{nd}} \boxed{[F7]}$ (Ints) 3 for the TI-89
- $\boxed{[F7]}$ (Ints) 3 for the TI-92 Plus

The **Choose Input Method** dialog box is displayed.

- If the **Data Input Method** you want to use is already displayed, press $\boxed{\text{ENTER}}$ to display the **2-Sample Z Interval** input dialog box.

If the **Data Input Method** you want to use is not displayed, press $\boxed{\downarrow}$ to display the choices (**Data** or **Stats**), highlight one, and then press $\boxed{\text{ENTER}}$ $\boxed{\text{ENTER}}$ to select an input method and display the **2-Sample Z Interval** input dialog box.

- Based on the input method you chose, enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.

- Press $\boxed{\text{ENTER}}$ to calculate the results.

Input:	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center;">Data</p> <p style="text-align: center;">2-Sample Z Interval</p> <p>σ_1: 15.5</p> <p>σ_2: 13.5</p> <p>List 1: list1</p> <p>List 2: list2</p> <p>Freq 1: 1</p> <p>Freq 2: 1</p> <p style="text-align: center;">\leftarrow Enter=OK ESC=CANCEL \rightarrow</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center;">Stats</p> <p style="text-align: center;">2-Sample Z Interval</p> <p>σ_1: 15.5</p> <p>σ_2: 13.5</p> <p>\bar{x}_1: 131.</p> <p>\bar{x}_2: 117.4</p> <p>n1: 5.</p> <p>n2: 5.</p> <p style="text-align: center;">\leftarrow Enter=OK ESC=CANCEL \rightarrow</p> </div> </div>
Calculated results:	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center;">2-Sample Z Interval</p> <p>C Int =(-4.42,31.62)</p> <p>$\bar{x}_1 - \bar{x}_2$ =13.6</p> <p>ME =18.0167</p> <p>\bar{x}_1 =131.</p> <p>\bar{x}_2 =117.4</p> <p>Sx1 =18.6145</p> <p>Sx2 =20.1941</p> <p>n1 =5.</p> <p style="text-align: center;">\leftarrow Enter=OK \rightarrow</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center;">2-Sample Z Interval</p> <p>C Int =(-4.41675,31.6...</p> <p>$\bar{x}_1 - \bar{x}_2$ =13.6</p> <p>ME =18.0167</p> <p>\bar{x}_1 =131.</p> <p>\bar{x}_2 =117.4</p> <p>n1 =5.</p> <p>n2 =5.</p> <p>σ_1 =15.5</p> <p style="text-align: center;">\leftarrow Enter=OK \rightarrow</p> </div> </div>
	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>n2 =5.</p> <p>σ_1 =15.5</p> <p>σ_2 =13.5</p> <p style="text-align: center;">\leftarrow Enter=OK \rightarrow</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>σ_2 =13.5</p> <p style="text-align: center;">\leftarrow Enter=OK \rightarrow</p> </div> </div>

2-SampTInt

Description

$\boxed{2\text{nd}}$ $\boxed{F7}$ (Ints) → 4:2-SampTInt for the TI-89

$\boxed{F7}$ (Ints) → 4:2-SampTInt for the TI-92 Plus

2-SampTInt (two-sample t confidence interval) computes a confidence interval for the difference between two population means ($\mu_1 - \mu_2$) when both population standard deviations (σ_1 and σ_2) are unknown. The computed confidence interval depends on the user-specified confidence level probability.

Data Inputs

List 1, List 2	Sample data sequences from the normal random distribution.
Freq 1, Freq 2 (<i>optional</i>)	The name of the lists containing the frequency values for the data in List 1 and List 2 . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) lists is the frequency of occurrence for each corresponding data point in the input list specified in the List fields.
C Level	Confidence level probability with default = .95
Pooled (NO,YES)	Specifies whether or not the variances are to be pooled for the calculation. YES = variances pooled. Population variances are assumed to be equal. Select NO = variances not pooled. Population variances can be unequal.

Stats Inputs

Sx1, Sx2	Standard deviation for sample 1 and sample 2.
$\bar{x}1, \bar{x}2$	Means for sample sequences from normal random distributions.
n1, n2	Length of the data sequences with means $\bar{x}1$ and $\bar{x}2$.
C Level	Confidence level probability with default = .95
Pooled (NO,YES)	Specifies whether or not the variances are to be pooled for the calculation. YES = variances pooled. Population variances are assumed to be equal. Select NO = variances not pooled. Population variances can be unequal.

Data and Stats Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval containing confidence level probability of distribution.
$\bar{x}1 - \bar{x}2$	xbardiff	Sample means of the data sequences from the normal random distribution.
ME	me	Margin of error.
df	df	Degrees of freedom.
$\bar{x}1, \bar{x}2$	x1_bar, x2_bar	Sample means of the data sequences from the normal random distribution.
Sx1, Sx2	sx1, sx2	Sample standard deviations for List 1 and List 2 .
n1, n2	n1, n2	Number of samples in data sequences.
Sxp	Sxp	The pooled standard deviation. Calculated when Pooled = YES .

2-SampTInt (continued)

Example

1. In the list editor, enter:

```
list1={12.207,16.869,25.05,22.429,8.456,10.589}
list2={11.074,9.686,12.064,9.351,8.182,6.642}
```

2. To select **4:2-SampTInt**, press:

- $\boxed{2\text{nd}} \boxed{[F7]}$ (Ints) 4 for the TI-89
- $\boxed{[F7]}$ (Ints) 4 for the TI-92 Plus

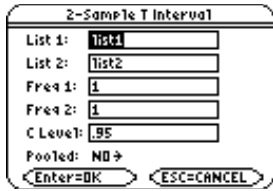
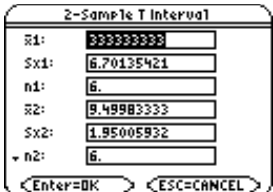
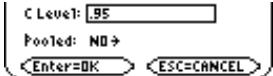
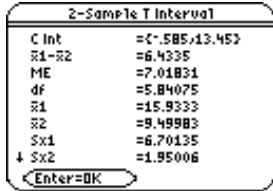
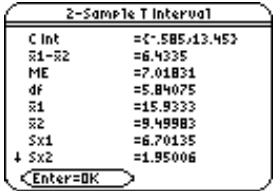
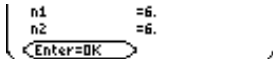
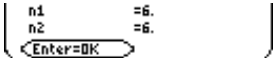
The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want to use is already displayed, press $\boxed{\text{ENTER}}$ to display the **2-Sample T Interval** input dialog box.

If the **Data Input Method** you want to use is not displayed, press $\boxed{\downarrow}$ to display the choices (**Data** or **Stats**), highlight one, and then press $\boxed{\text{ENTER}}$ $\boxed{\text{ENTER}}$ to select an input method and display the **2-Sample T Interval** input dialog box.

4. Based on the input method you chose, enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.

5. Press $\boxed{\text{ENTER}}$ to calculate the results.

	Data	Stats
Input:	 <p>2-Sample T Interval</p> <p>List 1: list1</p> <p>List 2: list2</p> <p>Freq 1: 1</p> <p>Freq 2: 1</p> <p>C Level: .95</p> <p>Pooled: NO \rightarrow</p> <p>\leftarrow Enter=OK \leftarrow ESC=CANCEL</p>	 <p>2-Sample T Interval</p> <p>X1: 15.93333</p> <p>Sx1: 6.70135421</p> <p>n1: 6</p> <p>X2: 9.49983333</p> <p>Sx2: 1.95005932</p> <p>n2: 6</p> <p>\leftarrow Enter=OK \leftarrow ESC=CANCEL</p>
		 <p>C Level: .95</p> <p>Pooled: NO \rightarrow</p> <p>\leftarrow Enter=OK \leftarrow ESC=CANCEL</p>
Calculated results:	 <p>2-Sample T Interval</p> <p>C Int =\bar{c}.585,13.453</p> <p>X1-X2 =6.4335</p> <p>ME =7.01831</p> <p>df =5.84075</p> <p>X1 =15.9333</p> <p>X2 =9.49983</p> <p>Sx1 =6.70135</p> <p>Sx2 =1.95006</p> <p>\leftarrow Enter=OK</p>	 <p>2-Sample T Interval</p> <p>C Int =\bar{c}.585,13.453</p> <p>X1-X2 =6.4335</p> <p>ME =7.01831</p> <p>df =5.84075</p> <p>X1 =15.9333</p> <p>X2 =9.49983</p> <p>Sx1 =6.70135</p> <p>Sx2 =1.95006</p> <p>\leftarrow Enter=OK</p>
	 <p>n1 =6</p> <p>n2 =6</p> <p>\leftarrow Enter=OK</p>	 <p>n1 =6</p> <p>n2 =6</p> <p>\leftarrow Enter=OK</p>

1-PropZInt

Description

$\boxed{2\text{nd}}$ $\boxed{F7}$ (Ints) → **5:1-PropZInt** for the TI-89

$\boxed{F7}$ (Ints) → **5:1-PropZInt** for the TI-92 Plus

1-PropZInt (one-proportion z confidence interval) computes a confidence interval for an unknown proportion of successes. It takes as input the count of successes in the sample x and the count of observations in the sample n . The computed confidence interval depends on the user-specified confidence level probability.

Inputs

Successes, x	Number of positive sample results from trial.
n	Number of samples taken in trial.
C Level	Confidence level probability with default = .99

Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval containing confidence level probability of distribution.
p_hat	p_hat	The calculated proportion of successes.
ME	me	Margin of error.
n	n	Number of samples in data sequence.

1-PropZInt (continued)

Example

1. To select **5:1-PropZInt**, press:
 - $\boxed{2\text{nd}} \boxed{F7}$ (Ints) 5 for the TI-89
 - $\boxed{F7}$ (Ints) 5 for the TI-92 Plus

The **1-Proportion Z Interval** input dialog box is displayed.

2. Enter the arguments into the fields as shown in the input screen below.
3. Press $\boxed{\text{ENTER}}$ to calculate the results.

Input:

1-Proportion Z Interval	
Successes, x:	2048
n:	4040
C Level:	.99
Enter=OK ESC=CANCEL	

Calculated results:

1-Proportion Z Interval	
C Int	= 0.4867, 52723
p_hat	= .506931
ME	= .020261
n	= 4040.
Enter=OK	

2-PropZInt

Description

2nd **[F7]** (Ints) → **6:2-PropZInt** for the TI-89
[F7] (Ints) → **6:2-PropZInt** for the TI-92 Plus

2-PropZInt (two-proportion z confidence interval) computes a confidence interval for the difference between the proportion of successes in two populations ($p_1 - p_2$). It takes as input the count of successes in each sample (**x1** and **x2**) and the count of observations in each sample (**n1** and **n2**). The computed confidence interval depends on the user-specified confidence level probability.

Inputs

Successes, x1	Number of positive sample results from trial one.
n1	Sample size in trial one.
Successes, x2	Number of positive sample results from trial two.
n2	Sample size in trial two.
C Level (<i>optional</i>)	Confidence level probability with default = .99

Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval containing confidence level probability of distribution.
phatdiff	phatdiff	The calculated difference between proportions.
ME	me	Margin of error.
p1_hat	p1_hat	First sample proportion estimate.
p2_hat	p2_hat	Second sample proportion estimate.
n1	n1	Sample size in data sequence one.
n2	n2	Sample size in data sequence two.

2-PropZInt (continued)

Example

- To select **6:2-PropZInt**, press:
 - $\boxed{2\text{nd}} \boxed{F7}$ (Ints) 6 for the TI-89
 - $\boxed{F7}$ (Ints) 6 for the TI-92 Plus

The **2-Proportion Z Interval** input dialog box is displayed.

- Enter the arguments into the fields as shown in the input screen below.
- Press $\boxed{\text{ENTER}}$ to calculate the results.

Input:

2-Proportion Z Interval	
Successes, x1:	49
n1:	61
Successes, x2:	38
n2:	62
C Level:	.95
$\boxed{\leftarrow}$ Enter=OK $\boxed{\rightarrow}$ ESC=CANCEL	

Calculated results:

2-Proportion Z Interval	
C Int	=(.0334, .3474)
phatdiff	=.190375
ME	=.157007
p1_hat	=.803279
p2_hat	=.612903
n1	=61.
n2	=62.
$\boxed{\leftarrow}$ Enter=OK	

LinRegTInt

Description

$\boxed{2\text{nd}}$ $\boxed{F7}$ (Ints) → 7:LinRegTInt for the TI-89

$\boxed{F7}$ (Ints) → 7:LinRegTInt for the TI-92 Plus

In the response case, an **X Value** is required to determine a calculated y value, y_{hat} , at which point a prediction confidence interval around y_{hat} is determined, as well as a confidence interval for the mean.

In the slope case, **LinRegTInt** computes a linear regression T confidence interval for the slope coefficient b. If the confidence interval contains 0 this is insufficient evidence to indicate that the data exhibits a linear relationship.

Data Inputs

X List, Y List	The lists of independent and dependent variables.
Freq (<i>optional</i>)	List containing the frequency values for the data in List . The default is 1. All elements must be real numbers ≥ 0 . Each element in the frequency (Freq) list is the frequency of occurrence for each corresponding data point in the input list specified in the List field.
Store RegEqn to (<i>optional</i>)	Designated variable for storing the Regression Equation.
Interval	Optional interval type. 0 = slope (default). 1 = predict.
X Value	The input X value at which y_{hat} is calculated.
C Level	Confidence level probability with default = .95

Slope Outputs

Outputs	Stored to	Description
C Int	lower, upper	Confidence interval on the slope containing confidence level probability of distribution.
b	b	Regression line fit offset and slope parameter estimates.
ME	me	Margin of error.
df	df	Degrees of freedom.
s	s	Fit error standard deviation for $y-(a+b*x)$.
SE Slope	se	SE Slope = $s/\sqrt{\text{sum}(\text{sum}(x-x_{\text{bar}})^2)}$.
a	a	Regression line fit offset and slope parameter estimates.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient.
resid*	resid	Residuals of the curves fit $y = a+bx$.

* The output variables are pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in $\boxed{F1}$ (**Tools**) **9:Format**).

LinRegTInt (continued)

Response Outputs

Outputs	Stored to	Description
y_hat	y_hat	A point estimate: $y_hat = a + b * x$
df	dferr	Error degrees of freedom.
C Int	lower, upper	The confidence interval for a mean y_hat .
ME	me	Confidence interval margin of error.
SE	se	Standard error for confidence interval.
Pred Int	lowerprd upperrpd	Prediction interval for y_hat .
ME	meprd	Interval margin of error that you can predict.
SE	seprd	Standard error for an interval that you can predict.
a	a	The Y intercept.
b	b	The slope.
r²	rsq	Coefficient of determination.
r	r	Correlation coefficient.
X Value	xlist	The x value at which y_hat is calculated.
resid*	resid	Residuals of the curves fit $y = a+bx$.

* The output variables are pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in **F1 (Tools) 9:Format**)

LinRegTInt (continued)

Example

1. In the list editor, enter:

list1={4,5,6,7,8}

list2={1,2,3,3.5,4.5}

2. To select **7:LinRegTInt**, press:

- $\boxed{2nd}$ $\boxed{F7}$ (Ints) 7 for the TI-89
- $\boxed{F7}$ (Ints) 7 for the TI-92 Plus

The **Linear Regression T Interval** input dialog box is displayed.

3. Enter the arguments into the fields as shown in the input screen below.
4. Press \boxed{ENTER} to calculate the results.

Input:

Linear Regression T Interval

X List: list1

Y List: list2

Freq: 1

Store RegEqn to: y1(x) →

Interval: Slope →

x Value: .018

Enter=OK <ESC=CANCEL

C Level: .95

Enter=OK <ESC=CANCEL

Calculated results:

Lin Reg T Interval - Slope

$y=a+bx$

C Int = -6.6909, 1.0092

b = .85

ME = .159122

df = 3

s = .158114

SE Slope = .05

a = -2.3

Enter=OK

$r^2 = .989726$

$r = .99485$

Enter=OK

When **LinRegTInt** is executed, the list of residuals is created and stored to the list name **resid** in the **STATVARS** folder. **resid** is placed on the list names menu.

MultRegInt

Description

$\boxed{2\text{nd}} \boxed{F7}$ (Ints) → **8:MultRegInt** for the TI-89

$\boxed{F7}$ (Ints) → **8:MultRegInt** for the TI-92 Plus

Computes multiple regression prediction confidence interval for the calculated y_{hat} and a confidence for \bar{y} .

Inputs

Num of Ind Vars	Number of independent x lists.
Y List	Dependent variable (a list).
X1 List	Sample data of independent variable List 1 .
X2 List	Sample data of independent variable List 2 .
X Values List	The list of x values used to evaluate the computed y value y_{hat} . There must be an x value for each independent variable.
C Level (optional)	Confidence level probability with default = .95

Outputs

Outputs	Stored to	Description
y_hat	y_hat	A point estimate: $y_{\text{hat}} = B_0 + B_1 * x_1 + \dots$
df	dferr	Error degrees of freedom.
C Int	lower, upper	The confidence interval for a mean y_{hat} .
ME	me	Confidence interval margin of error.
SE	se	Standard error for confidence interval.
Pred Int	lowerprd upperprd	Prediction interval for y_{hat} .
ME	meprd	Interval margin of error that you can predict.
SE	seprd	Standard error for an interval that you can predict.
B List	blist	List of regression coefficients, $\{B_0, B_1, \dots\}$.
X Values	xvalist	The input X values at which y_{hat} is calculated.
resid*	resid	Residuals of the curves fit $y = B_0 + B_1 * x_1 + B_2 * x_2 + \dots$

* The output variables are pasted to the end of the list editor when **Results>Editor** option is **YES**, (located in $\boxed{F1}$ (**Tools**) **9:Format**).

MultRegInt (continued)

Example

1. In the list editor, enter:

list1={4,5,6,7,8}

list2={1,2,3,3.5,4.5}

list3={4,3,2,1,1}

list4={2,3}

2. To select **8:MultRegInt**, press:


- $\boxed{2\text{nd}}$ $\boxed{F7}$ (Ints) **8** for the TI-89
- $\boxed{F7}$ (Ints) **8** for the TI-92 Plus

The **Mult Reg Pt Estimate & Intervals** input dialog box is displayed.


3. If the **Num of Ind Vars** you want is displayed, press $\boxed{\text{ENTER}}$. If not, press \blacktriangleright to display the choices, select one, and press $\boxed{\text{ENTER}}$ to select the number of independent variables and display the **Mult Reg Pt Estimate & Intervals** dialog box. (For this example, choose **2** as the **Num of Ind Vars**)
3. Enter the list names and the **C Level** into the fields as shown in the input screen below.
4. Press $\boxed{\text{ENTER}}$ to calculate the results.

Data

Input:



Calculated results:



When **MultRegInt** is executed, the list of residuals is created and stored to the list name **resid** in the **STATVARS** folder. **resid** is placed on the list names menu.