TI-89 / TI-92 Plus / Voyage™ 200 Statistics with List Editor

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The Statistics with List Editor application (Stats/List Editor) adds inferential and more advanced statistics functionality to the TI‑89 / TI‑92 Plus / Voyage™ 200 PLT 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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Where to Find Installation Instructions

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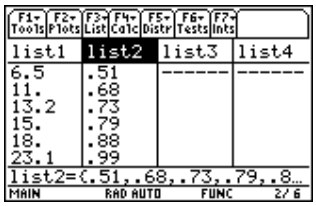
F7 Ints (Intervals) Menu

Getting Started: Read This First!

The Statistics with List Editor Application (Stats/List Editor) for the TI-89 / TI-92 Plus / Voyage™ 200 PLT 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.



Note: *You must set your TI-89 / TI-92 Plus / Voyage 200 PLT to the AUTO or APPROXIMATE mode when using the Stats/List Editor application.*

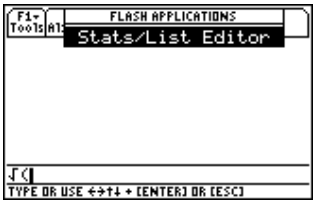
Running and Quitting Stats/List Editor

Running Stats/List Editor

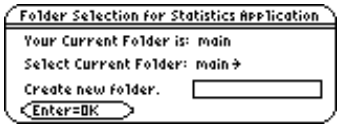
After installing Stats/List Editor:

1. Press [APPS].

2. Highlight **Stats/List Editor**.



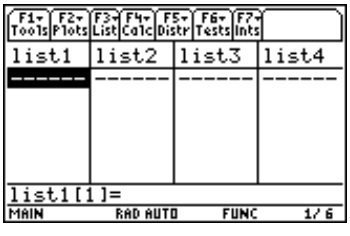
3. Press [ENTER]. The **Folder Selection for Statistics Application** dialog box appears.



4. 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 guidebook for more information on creating, setting, and deleting folders.*

5. 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.

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.

1. 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 / Voyage™ 200 PLT

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

2. Use the up and down arrow keys (▲ ▼) to move the cursor (▶) to the Stats/List Editor function that you want to use.

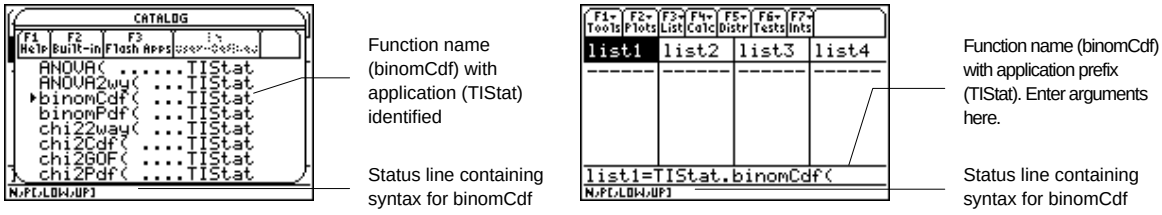
3. Press [ENTER] to paste the function or instruction to the entry line of previous screen—list editor, Home screen, program, etc.

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 (▶) moves to the first item that begins with that letter. Use ▲ and ▼ 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 **List editor with binomCdf(pasted to entry line**

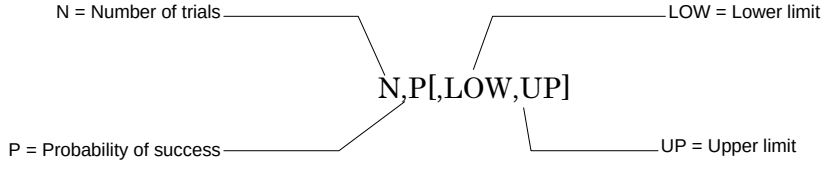


Syntax

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.*

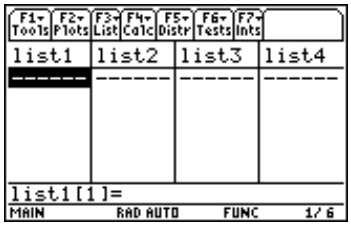
Stats/List Editor Screens

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 / Voyage™ 200 PLT are similar.*

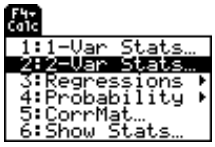
list editor



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.*

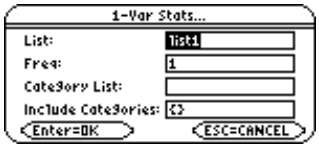
menus



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.*

dialog boxes



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

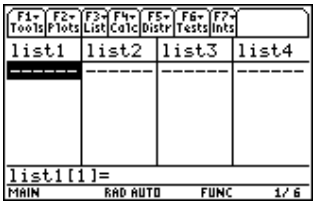
This is a fast-paced introduction to solving problems with Stats/List Editor. Read the remaining chapters for details.

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 ▶ and then select **1:Function** to set the **FUNCTION** graphing mode.

   Press ENTER to return to the list editor screen.

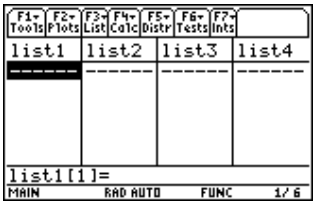
3. Press F1 (**Tools**) and select **3:Setup Editor** to display the **Setup Editor** dialog box.

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**.

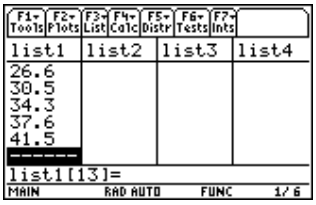
   Note: *Removing lists from the list editor does not delete them from memory. However, clearing elements from lists does delete the elements permanently from memory.*

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



Example: Entering the Data

1. Use the arrow keys (◀ ▶ ▲ ▼) to move the rectangular cursor to the first element in **list1**.



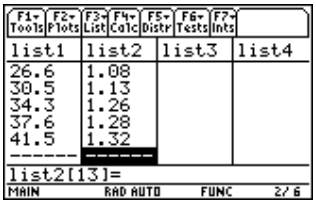
   Press **6** [.] **5** [ENTER] to store the first pendulum string length (6.5 cm) in **list1**. The rectangular cursor moves to the next row.

   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

2. 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):

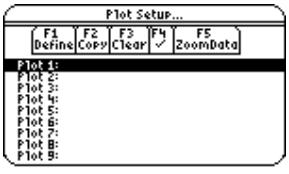
   .51
   .68
   .73
   .79
   .88
   .99
   1.01
   1.08
   1.13
   1.26
   1.28
   1.32

Example: Plotting the Data

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

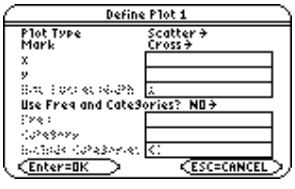
2. From the **F2 Plots** menu:
   - Select **3:PlotsOff** to turn off all plots.
   - Select **4:FnOff** to turn off all Y = functions.

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.*

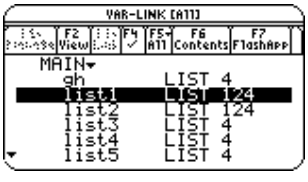
4. Highlight **Plot 1** and press F1 (**Define**) to display the **Define Plot 1** dialog box.



5. If **Scatter** is not displayed, press ▶ and select **1:Scatter**.

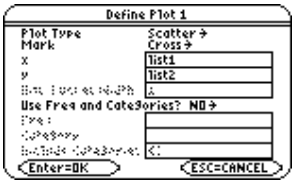
6. Press ▼. If **Cross** is not displayed, press ▶ and select **2:Cross** (**+**) for the type of mark used for each data point on the scatter plot.

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.



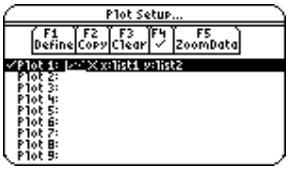
   Note*: If the contents of the MAIN folder are not displayed, highlight the MAIN folder and then press ▶ to expand it.*

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.



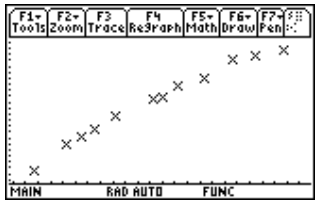
9. Press ▼ to move the cursor to the **Use Freq and Categories?** field. If **NO** is not displayed, press ▶ and set **Use Freq and Categories?** to **NO.**

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.

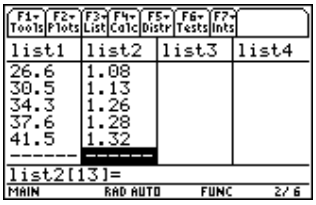


Tip: *To return to the list editor after graphing an equation or plotting data, press* 2nd [⊡].

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 [2nd] [⊞] to return to the list editor.



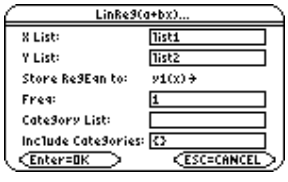
2. Press [F4] (**Calc**) and select **3:Regressions** to display the Regressions menu. Then select **1:LinReg(a+bx)** to display the **LinReg(a+bx)** input dialog box.

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

3. Press [2nd] [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight **list1** and press [ENTER] to specify **list1** for the **X List** field.

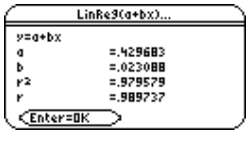
4. Press ⊙ to move the cursor to the **Y List** field. Press [2nd] [VAR-LINK] to display the **VAR-LINK [All]** menu, highlight **list2**, and press [ENTER] to specify **list2** for the **Y List**.

5. Press ⊙ to move the cursor to the **Store RegEqn to** field and press ⊙. Highlight **y1(x)** and press [ENTER] to store the regression equation (**RegEqn**) variable to the **y1(x)** equation variable.

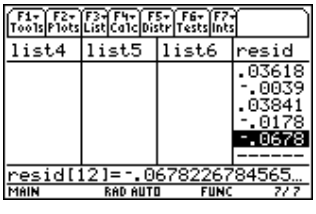


6. Leave **Freq**, **Category List**, and **Include Categories** at their defaults, as shown in the **LingReg(a+bx)** dialog box to the right.

7. Press [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**.

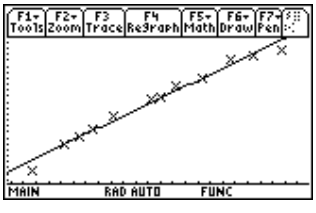


8. Press [ENTER]. The residuals are calculated and stored automatically in the **resid** list, which is then pasted in the last column of the list editor.



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

9. Press [♦] [GRAPH] to graph the data. The regression line and the scatter plot are displayed.



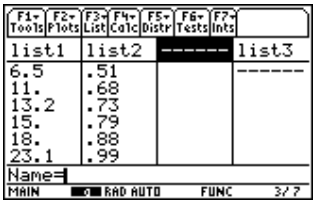
Example: Producing a Scatter Plot of the Residuals

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.

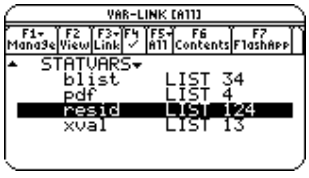
   Use the arrow keys to move the cursor onto **list3**.

   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.



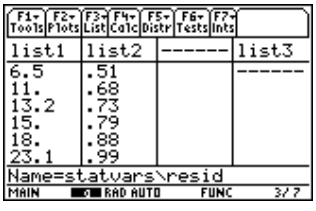
2. Press F3 (**List**) and select **1:Names** to display the **VAR-LINK [All]** menu. Highlight the **resid** variable, which is stored in the **STATVARS** folder.

   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.*

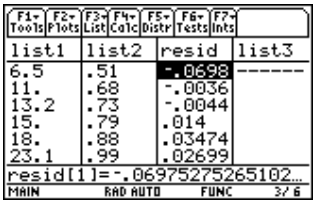


3. Press ENTER to paste **resid** to the entry line.

   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.*



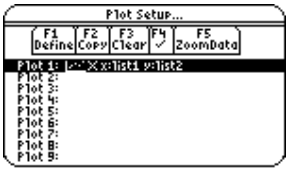
4. Press ENTER. **resid** is moved from the last column to column three of the list editor.



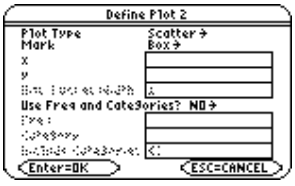
Notice that the first three residuals are negative. They correspond to the shortest pendulum string lengths in **list1**. The next five residuals are positive, and three of the last four are negative. The latter correspond to the longer string lengths in **list1**. Plotting the residuals will show this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

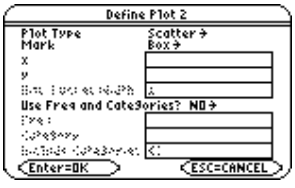


7. Highlight **Plot2** and press F1 (**Define**). The **Define Plot 2** dialog box is displayed.



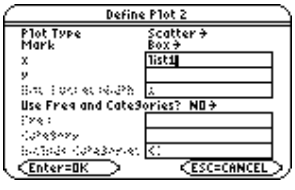
8. If **Scatter** is not already selected, press ▶ and select **1:Scatter**.

9. 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.



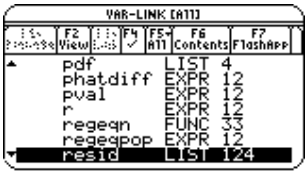
10. Press ▼ to move the cursor to the **x** field. Press 2nd [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight **list1** (in the **MAIN** folder) and press ENTER to specify **list1** for the **x** value field.

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



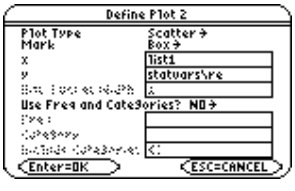
11. Press ▼ to move the cursor to the **y** field. Press 2nd [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight the **resid** list variable (in the **STATVARS** folder).

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.*



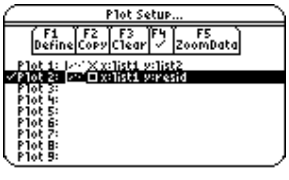
12. Press ENTER to specify the **statvars/resid** variable for the **y** field.

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



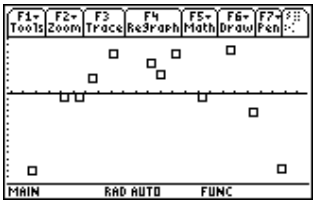
13. If necessary, press ▼ and set the **Use Freq and Categories?** option to **NO.**

14. Press ENTER to close the dialog box with the changes saved. **Plot2** is selected.



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

This is a scatter plot of the residuals.

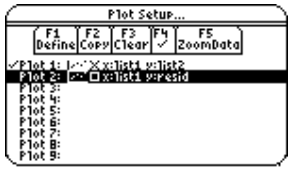


Example: Producing a Power Regression

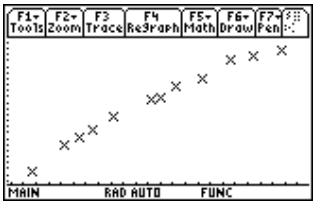
Notice the pattern of the residuals: a group of negative residuals, then a group of positive residuals, and then another group of negative residuals. The residual pattern indicates a curvature associated with this data set for which the linear model did not account. The residual plot emphasizes a downward 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**.

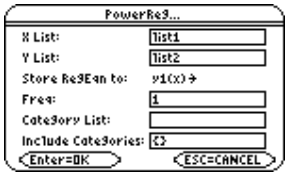


3. Press F5 (**ZoomData**). The window variables are adjusted automatically, and the original scatter plot of time-versus-length data (**Plot1**) is displayed.

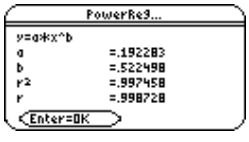


4. Press 2nd [⊣⊢] to return to the list editor.

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.)



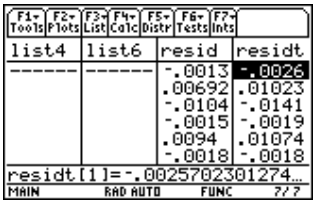
6. Press ENTER to close the dialog box and calculate the power regression.



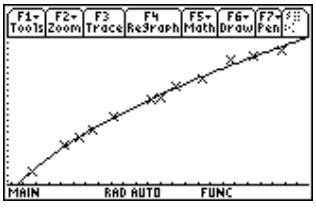
   Values for **a**, **b**, **r²**, and **r** are displayed in the **PowerReg** output dialog box. The power regression equation is stored in **Y1**. Residuals for the power regression are calculated and placed in the **resid** list. The previous contents of **resid** are overwritten by the new data. Residuals associated with the linear fit of the transformed data are calculated and placed in the **residt** 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 **residt** are pasted to the end of the list editor.*



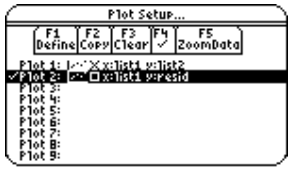
8. Press ◆ GRAPH. The regression line and the scatter plot are displayed.



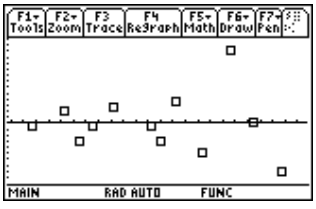
Example: Producing Another Residual Plot with the New Data

The new function **y1**=.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.



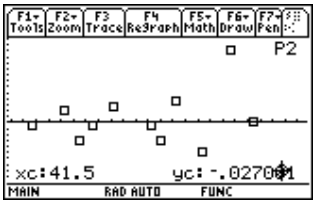
The new residual plot shows that the residuals are random in sign, with the residuals increasing in magnitude as the string length increases.

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.

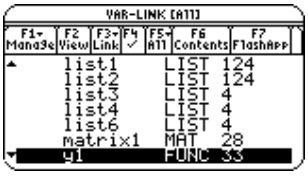
Example: Making Predictions with the Model

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.

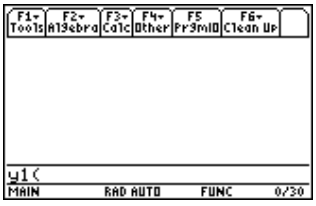
1. To display the Home screen, press:
   - Press [HOME] for the TI-89
   - Press [♦] [HOME] for the TI-92 Plus
   - Press [♦] [CALC HOME] for the Voyage™ 200 PLT

2. Press [2nd] [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight the **y1** variable.

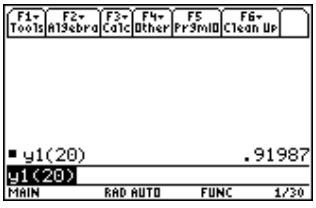
   Note: *If the contents of the MAIN folder are not displayed, highlight the MAIN folder, and then press ▶ to expand it. You can then access y1.*



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



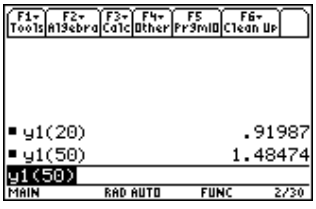
4. Type **20** and press [)] to enter a string length of 20 cm. Press [ENTER].



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.

5. Since the last entry is still highlighted, press ▶ ◀ ◀ [←] **5** to change the string length to 50 cm.

6. 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.

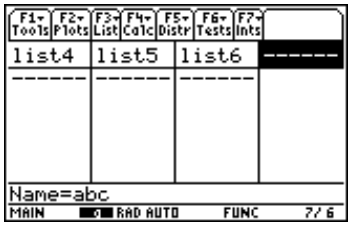
Error Messages

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

Error message	Description
Problem accessing configuration file, zzconfig, in your current folder. Variable is locked, protected, archived, or corrupted.	The **zzconfig** file variable may be locked, archived, or corrupted. This problem prevents the Stats List/Editor from accessing the configuration file. To correct this problem, unlock or unarchive the variable. If it is not locked or archived, delete **zzconfig** from the current folder. • 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.	The **shostat** function has been invoked from the F4 (**Calc**) menu or from the Home screen. The function failed to work properly. To correct this problem, delete the **shostat** variable from the **STATVARS** folder. • 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.	To correct this problem, you must clear any unnecessary plots. • Press F2 (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box. • Highlight any unnecessary plots and press F3 (**Clear**).

List Editor

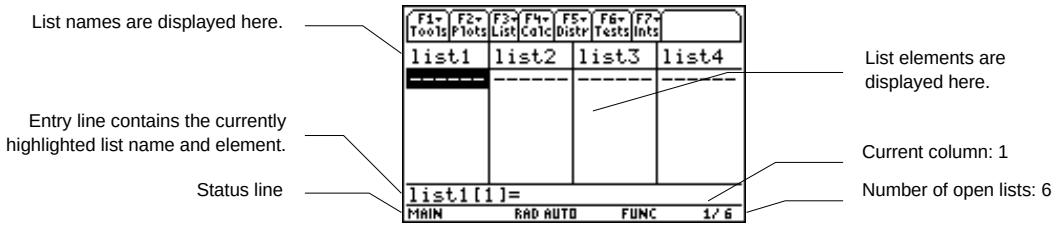
This chapter provides examples that demonstrate the Stats/List Editor application list features. You can find more information about the lists in the F3 **List Menu** chapter.



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**.



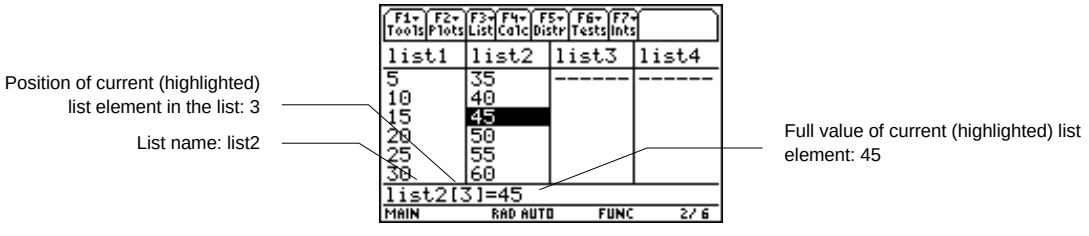
Top line — **list1** through **list6** are stored in columns **1** through **6** after a memory reset.

Center area — On the TI-89, this area displays up to six elements of up to four lists. On the T TI-92 Plus / Voyage™ 200 PLT, 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.



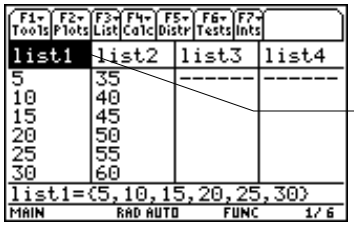
The following table shows the keystrokes for moving quickly around the list editor screen.

To:	On the TI-89 Press:	On the TI-92 Plus / Voyage 200 PLT 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 / Voyage 200 PLT.	2nd ▼	2nd ↓
Page up six elements on the TI-89 or eight on the TI-92 Plus / Voyage 200 PLT.	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.	♦ ▶	♦ →

Switching List Editor Contexts

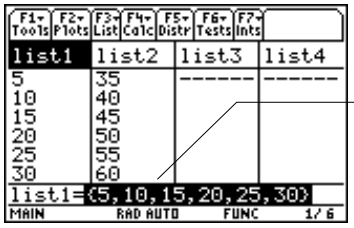
The list editor has four contexts: view elements, edit elements, view names, and enter name. The list editor is first displayed in view-elements context.

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



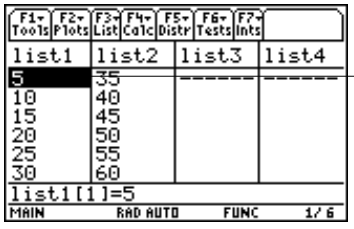
The list name is highlighted. Press ▶ and ◀ to view list names currently stored in other list editor columns.

Edit elements — Press [ENTER].



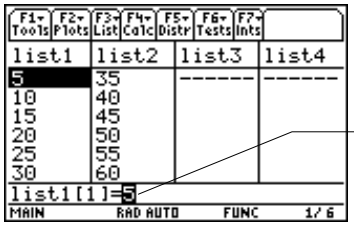
The list name is still highlighted. The elements of the list are also highlighted in the entry line. You may edit any element in a list.

View element — Press [ENTER] again.



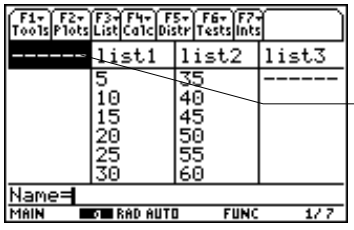
The first element of the list is highlighted. Press ▶, ◀, ▼, and ▲ to view other list elements. The current element's full value is displayed in the entry line.

Edit element — Press [ENTER] again.



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

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



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

Creating Lists

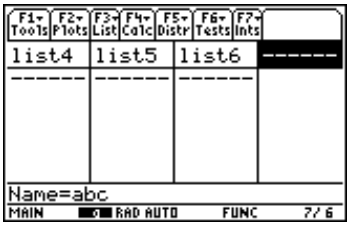
Creating a New List in the List Editor

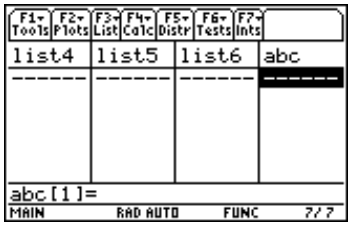
1. Display the **Name=** prompt in the entry line in either of these two ways.
   - Move the cursor onto the list name in the column where you want to insert a list and press 2nd [INS]. An unnamed column is displayed and the remaining lists shift right one column.
   - Move the cursor onto a list name 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 / Voyage™ 200 PLT. Preassigned names include built-in functions (such as **abs**), instructions (such as **LineVert**), and system variables (such as **xmin** and **xmax**.
     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.

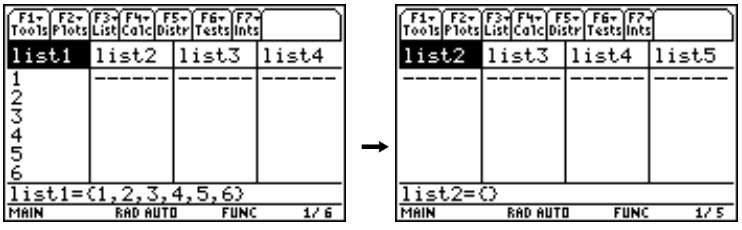




Removing Lists

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 ♦ [DEL].



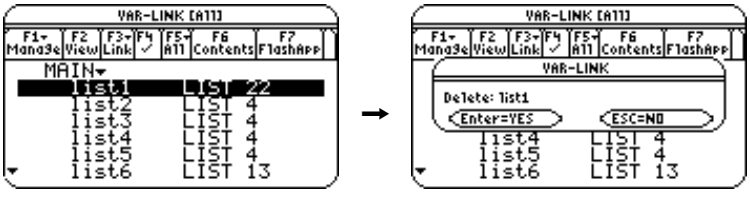
Note: *The list is not deleted from memory; it is only removed from the list editor.*

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.

  1. Press 2nd [VAR-LINK] to display the **VAR-LINK [All]** menu. Highlight the list (**list1**).

  2. 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.

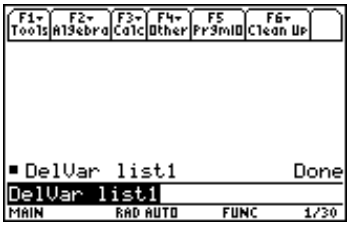
  1. To display the Home screen press,
     - HOME for the TI-89
     - ♦ [HOME] for the TI-92 Plus
     - Press ♦ [CALC HOME] for the Voyage™ 200 PLT

  2. To select the **DelVar** function from the **CATALOG** press,
     - CATALOG **D** for the TI-89
     - 2nd [CATALOG] **D** for the TI-92 Plus / Voyage 200 PLT

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

  3. Press 2nd [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.

  4. 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 All Lists and Restoring list1 through list6

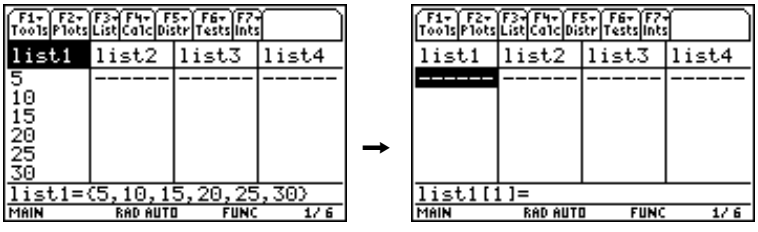
To remove all user-created lists and restore list names **list1**- **list6** to columns **1** - **6:**

- 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.

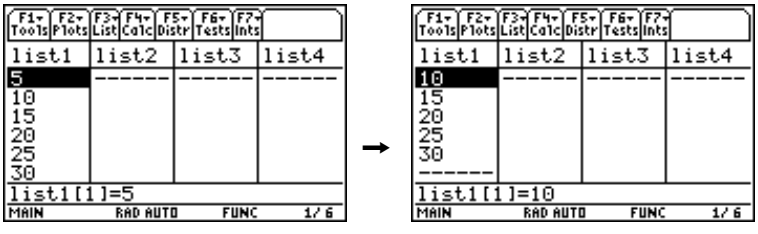
  Note: *Resetting the memory deletes all lists from memory.*

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.

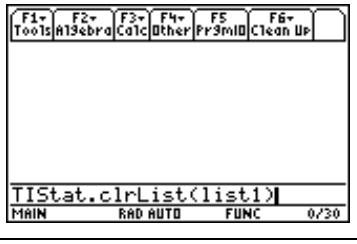


  - ← — Highlight the first element of the list (**list1**). Press ← to delete the element (**5**).



- 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
     - Press ♦ [CALC HOME] for the Voyage™ 200 PLT
  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 / Voyage 200 PLT
  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

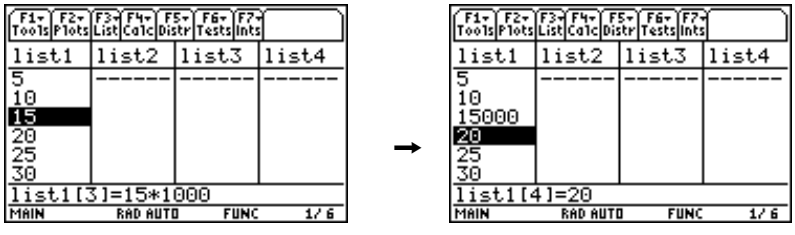
Example

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.



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

Attaching a Formula to a List Name

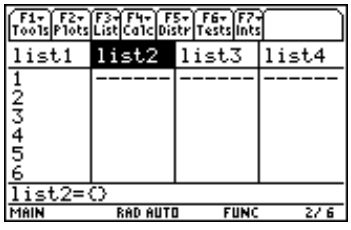
You can attach a formula to a list name so that each list element is a result of the formula. The attaching procedure must be performed inside the Stats/List Editor application.

- 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 ⊙, if necessary, to move the cursor to the top line. Press ◀ or ▶ to move the cursor onto the list name to which you want to attach the formula.



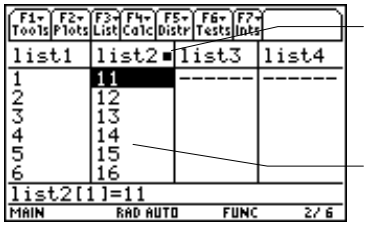
Note: *If a formula in quotation marks is displayed on the entry line, a formula is already attached to the list name. To edit the formula, press ENTER, and then edit the formula in the entry line, or press ENTER to use the Attach List Formula dialog box.*

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.

4. Press ⊙. 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.

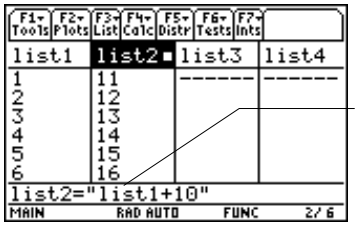
Note: *The calculator chooses "z" plus the list name as the default formula variable name. It is recommended that you accept this default naming convention. If you want to reattach this formula the calculator will only prompt for this default variable. Do not use preassigned system variable names.*

5. Press ENTER.



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).

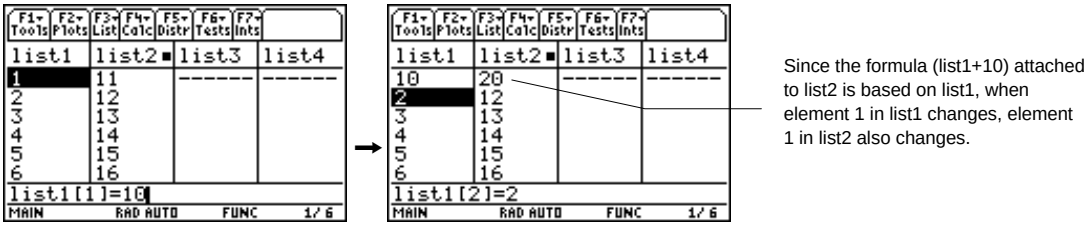


Highlight the list name (list2) to view the list name and formula in quotes in the entry line.

Using Formula-Generated Lists

When you edit an element of a list referenced in an attached formula, the TI-89 / TI-92 Plus / Voyage™ 200 PLT 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.



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 / Voyage 200 PLT takes slightly longer to accept each edit or entry. The TI-89 / TI-92 Plus / Voyage 200 PLT must recalculate the elements with each addition or edit.

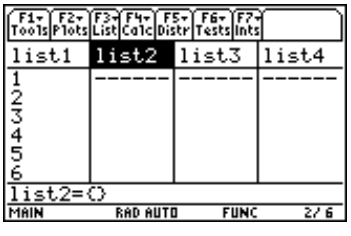
Tip: *This lag time in editing entries can be avoided by pressing ◆ I and setting Auto-calculate to NO.*

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**).



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.*

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.

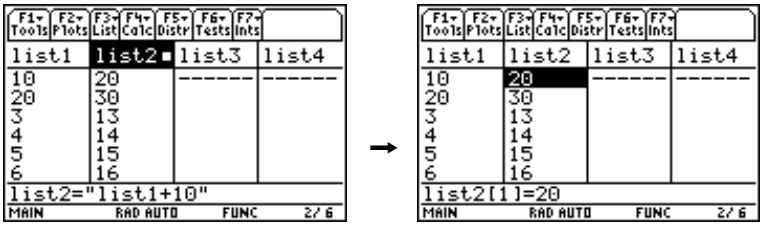
Tip: *If an error message is returned when you attempt to display a formula-generated list in the list editor, press* ESC*. Then edit the formula: 1) highlight the list name with the attached formula, 2) press* ENTER*, and 3) edit the formula in the entry line, or, press* ENTER *again and use the Attached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

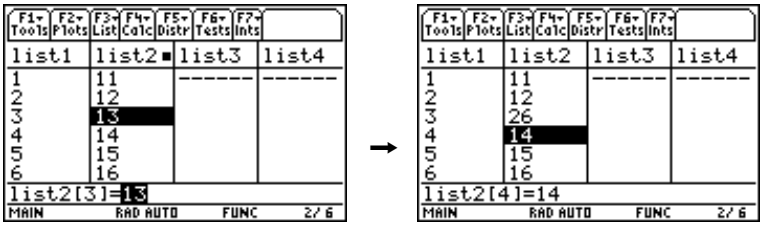
- To detach a formula using the CLEAR key:

  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.



- 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 Menu

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. 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.

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.

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**.

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

TI-92 Plus / Voyage™ 200 PLT 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.

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**. • 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 / Voyage™ 200 PLT, 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:

education.ti.com

Example

Press:

- F1 (**Tools**) alpha **A** for the TI-89
- F1 (**Tools**) **A** for the TI-92 Plus / Voyage 200 PLT

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

F2 Plots Menu

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.

Defining a Plot Using F1 Define

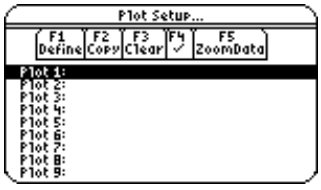
F2 (**Plots**) → **1:Plot Setup** → F1 (**Define**)

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 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**.

Example

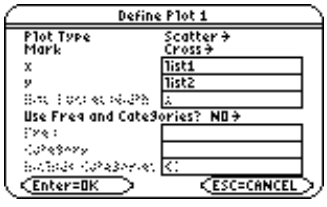
1. Press F2 (**Plots**) and select **1:Plot Setup** to display the **Plot Setup** dialog box. Initially, none of the plots are defined. However, current plot definitions may be displayed.



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

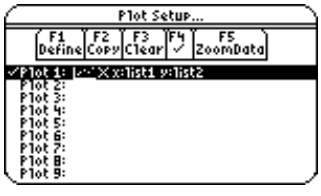
   Note: *On the calculator, items are active only if they are valid for the current settings of Plot Type and Use Freq and Categories?*

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**.

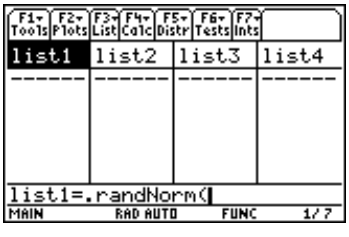
Example

Use the **.randNorm** function in the F4 (**Calc**) menu to generate and display a list of random numbers using μ = 35, σ = 2, and *NUMTRIALS*= 90.

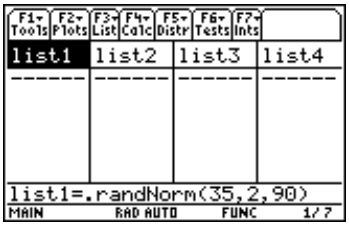
randNorm(μ, σ[,*NUMTRIALS*]**)**

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.

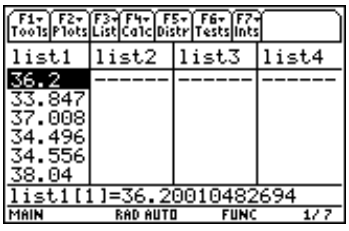


3. Enter the arguments for **.randNorm(** in the entry line as shown below.

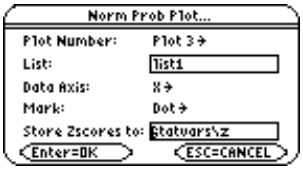


Example (continued)

4. Press ENTER to build a list of random numbers.

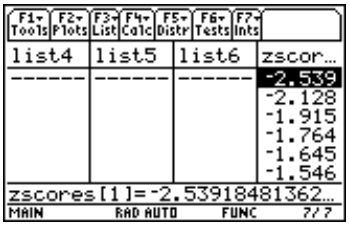


5. Press F2 (**Plots**) and select **2:Norm Prob Plot** to display the **Norm Prob Plot** dialog box. Use the arguments as shown below.



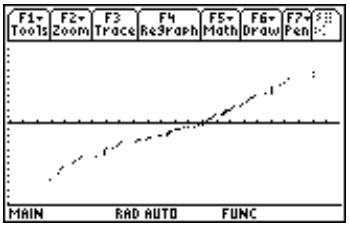
Note: *Use the default list variable name in the Store Zscores to input box. The "statvars/zscores" variable name is truncated in the screenshot above.*

6. Press ENTER to paste the **zscores** to the end of the list editor.



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

8. 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**

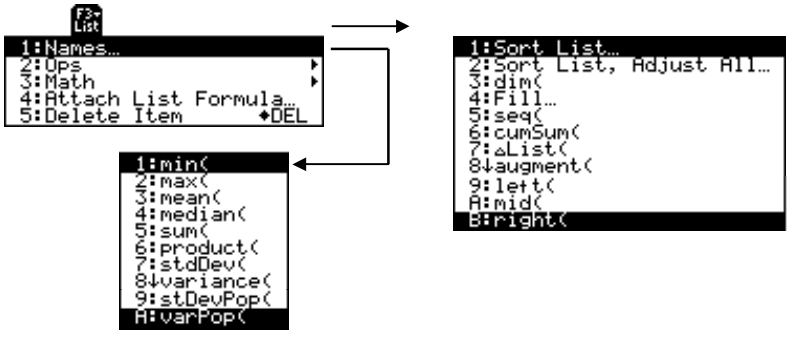
  Press F2 (**Plots**) and select **3:PlotsOff** to turn off all plots.

- **FnOff**

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

F3 List Menu

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.

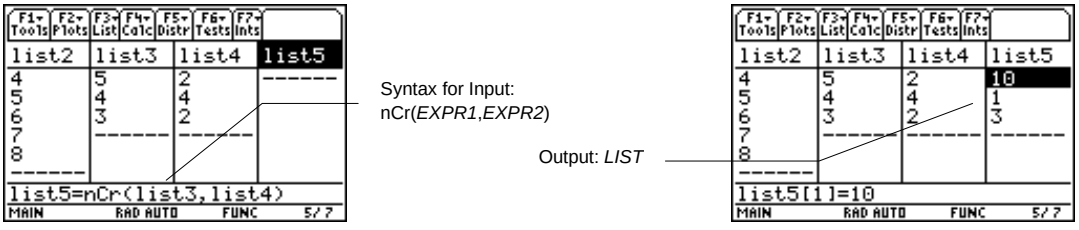


Entering Arguments for Functions and Commands

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

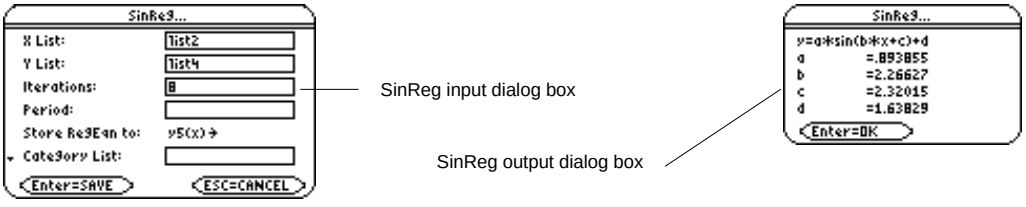
- **Functions followed by an open parenthesis** — for example, **nCr(**.

  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*.



- **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**.



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

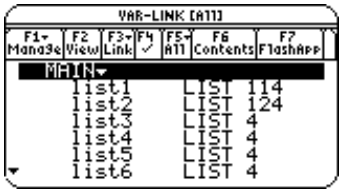
Description

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 guidebook.

Example

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



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.

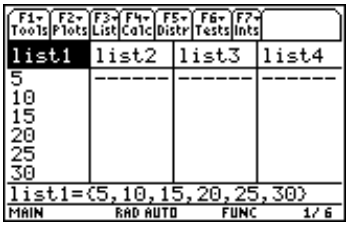
You can specify more that one list when using **Sort List**. In this case, the first list specified is the *independent* list; any following lists are *dependent*.

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}**

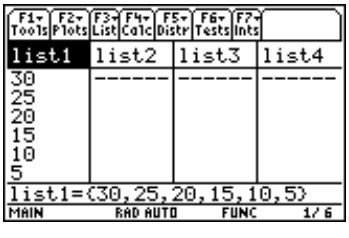
1. Highlight the list (**list1**) that you want to sort by moving the cursor to the list name.



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 ⊙ ⊙, 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.



Sort List, Adjust All

Description

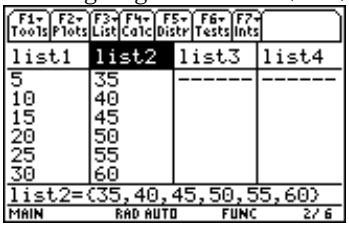
F3 (**List**) → **2:Ops** → **2:Sort List, Adjust All**

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

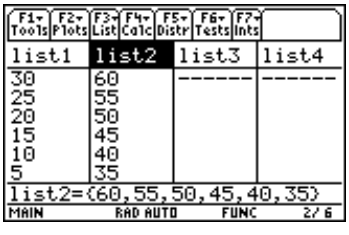
Setup: **list1={5,10,15,20,25,30}** and **list2={35,40,45,50,55,60}**

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



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**).

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



dim(

Description

F3 (**List**) → **2:Ops** → **3:dim(**

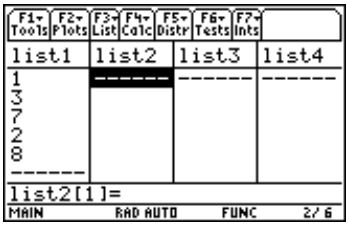
dim(returns a *LIST* with an element containing the dimension (number of elements) of *LIST1*.

dim(*LIST1*) ⇒ *LIST*

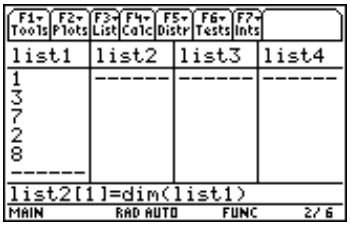
Example

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

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

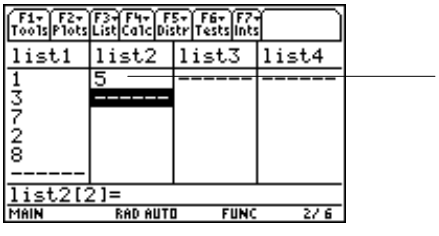


2. Press F3 (**List**) and select **2:Ops.** Then select **3:dim(.**The **dim(** command is displayed in the entry line. Enter the list (**list1**) for which you want to show the dimension. Press).



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.



Fill

Description

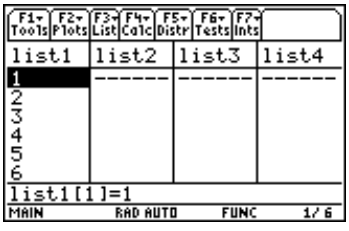
F3 (**List**) → **2:Ops** → **4:Fill**

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

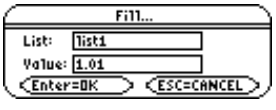
Example

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

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



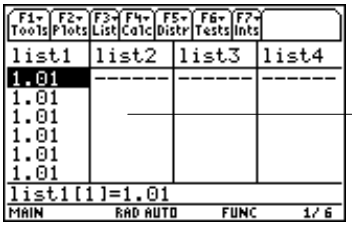
2. Press F3 (**List**) and select **2:Ops.** Then select **4:Fill** to display the **Fill** dialog box. Enter the list name (**list1**) that you want to fill in the **List** field and the value (**1.01**) that you want to fill the list with in the **Value** field as shown.



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.



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

seq(

Description

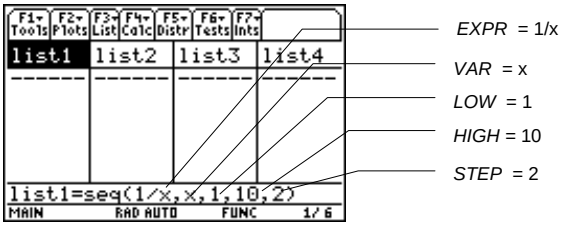
F3 (**List**) → **2:Ops** → **5:seq(**

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.

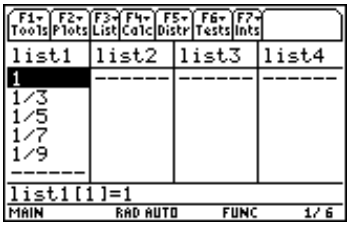
seq(*EXPR*,*VAR*,*LOW*,*HIGH*[**,***STEP*]**)** ⇒ *LIST*

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

F3 (**List**) → **2:Ops** → **6:cumSum(**

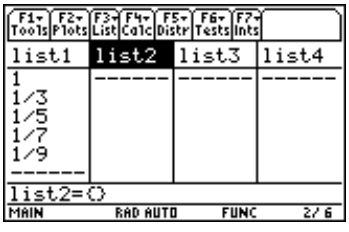
cumSum(returns a *LIST* of the cumulative sums of the elements in *LIST1*, starting at element 1.

cumSum(*LIST1*) ⇒ *LIST*

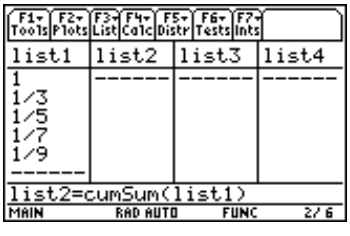
Example

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.



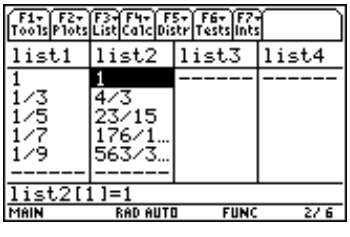
2. Press F3 (**List**) and select **2:Ops.** Then select **6:cumSum(**. The **cumSum(** command is displayed in the entry line. Enter the list (**list1**) for which you want to calculate the cumulative sums.



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 cumulative sums.



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.)*

ΔList(

Description

F3 (**List**) → **2:Ops** → **7:ΔList(**

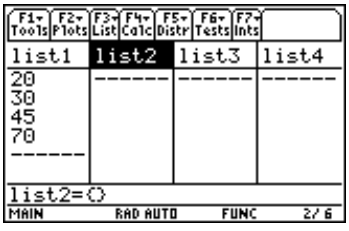
ΔList(returns a *LIST* containing the difference between consecutive elements in *LIST1*.

ΔList(*LIST1*) ⇒ *LIST*

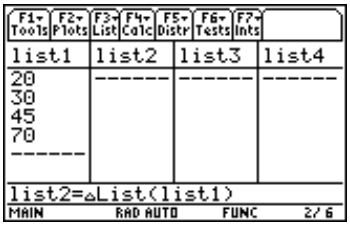
Example

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.



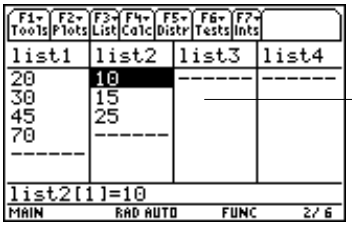
2. Press F3 (**List**) and select **2:Ops.** Then select **7:ΔList**. The **ΔList(** command is displayed in the entry line. Enter the list (**list1**) for which you want to calculate the difference between consecutive elements.



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.



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(**

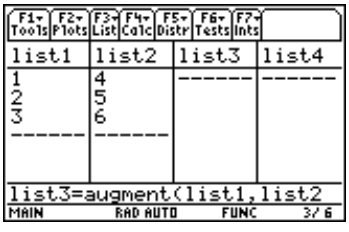
augment(returns a new *LIST* that is *LIST2* appended to the end of *LIST1*.

augment(*LIST1*,*LIST2***)** ⇒ *LIST*

Example

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

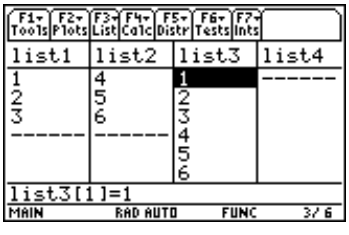
1. Highlight the list (**list3**) where you want to return the appended list.
2. Press F3 (**List**) and select **2:Ops.** Then select **8:augment(**. The **augment(** command is displayed in the entry line. Enter the lists (**list1**,**list2**) to append.



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.



left(

Description

F3 (**List**) → **2:Ops** → **9:left(**

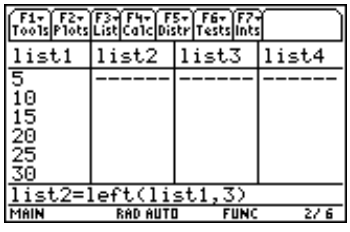
left(returns the leftmost *NUMBER* of the elements contained in *LIST1*. If you omit *NUMBER*, **left(** returns all elements in *LIST1*.

left(*LIST1*[,*NUMBER*]**)** ⇒ *LIST*

Example

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

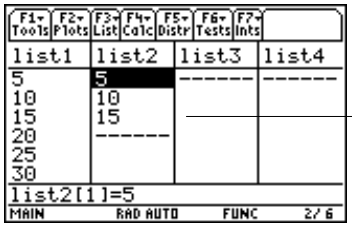
1. Highlight the list (**list2**) where you want to return the leftmost elements.
2. Press F3 (**List**) and select **2:Ops**. Then select **9:left(**. The **left(** command is displayed in the entry line. Enter the list (**list1**) from which you want to display the leftmost elements and the number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



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.



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

mid(

Description

F3 (**List**) → **2:Ops** → **A:mid(**

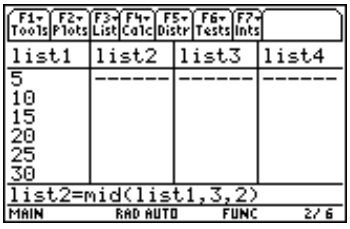
mid(returns a *LIST* containing the number of elements (*COUNT*) from *LIST1*, beginning with *START*. If *COUNT* is omitted or is greater than the dimension of *LIST1*, **mid(** returns all elements from *LIST1*, beginning with *START*. *COUNT* must be ≥ 0. If *COUNT* = 0, **mid(** returns an empty *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 / Voyage™ 200 PLT

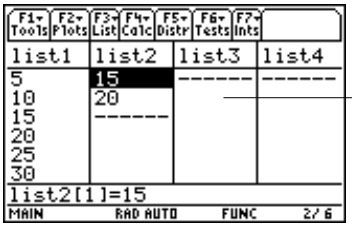
   The **mid(** command is displayed in the entry line. Enter the list (**list1**) from which you want to display the middle elements. Enter the number of elements you want to display (**2**) and the number of the element at which you want to start (**3**).



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.



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

right(

Description

F3 (**List**) → **2:Ops** → **B:right(**

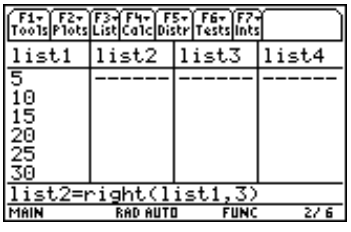
right(returns a *LIST* with the specified *NUMBER* of rightmost elements in *LIST1*. If you omit *NUMBER*, **right(** returns the total *NUMBER* of elements of *LIST*.

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 / Voyage™ 200 PLT

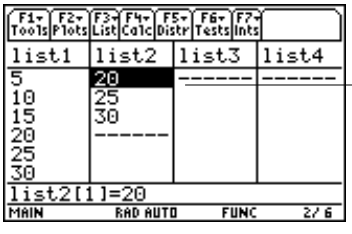
   The **right(** command is displayed in the entry line. Enter the list (**list1**) from which you want to display the rightmost elements. Enter the number of rightmost elements (**3**) that you want to display.



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.



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

F3 (**List**) → **3:Math** → **1:min(**

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

min(*LIST1*) ⇒ *VALUE*

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

min(*LIST1*,*LIST2*) ⇒ *LIST*

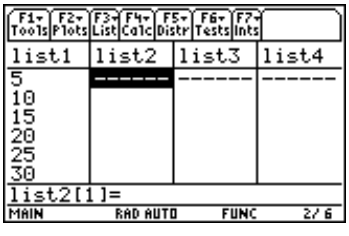
The example below shows **min(** returning the minimum element of a single list. You must highlight a single list element cell in which to return the single minimum element. If you use **min(** to find the minimum value of each pair of corresponding elements in two lists, you must highlight the list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

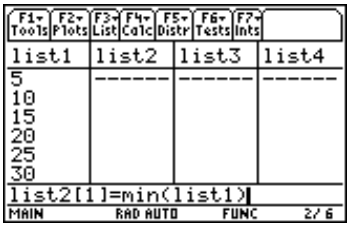
Example

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.



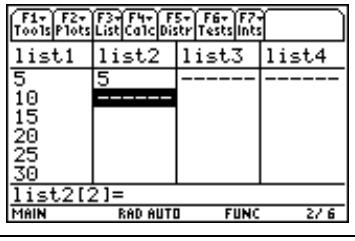
2. Press F3 (**List**) and select **3:Math**. Then select **1:min(.** The **min(** command is displayed in the entry line. Enter the list (**list1**) from which you want to return the minimum element.



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 minimum element.



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*

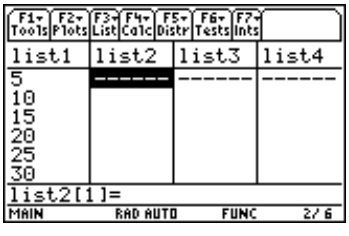
The example below shows **max(** returning the maximum element of a single list. You must highlight a single list element cell in which to return the single maximum element. If you use **max(** to find the maximum value of each pair of corresponding elements in two lists, you must highlight the list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

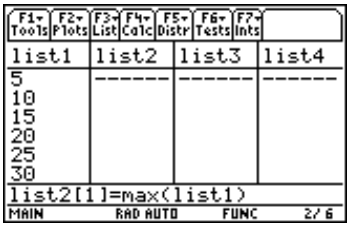
Example

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.



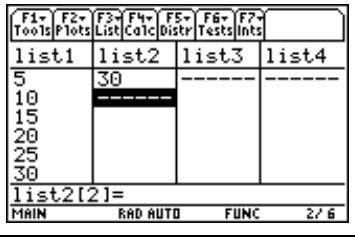
2. Press F3 (**List**) and select **3:Math.** Then select **2:max(.** The **max(** function is displayed in the entry line. Enter the list (**list1**) from which you want to display the maximum element.



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.



mean(

Description

F3 (**List**) → **3:Math** → **3:mean(**

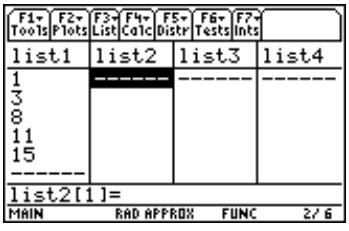
mean(returns a *VALUE* containing the mean of the elements in *LIST1*.

mean(*LIST1***)** ⇒ *VALUE*

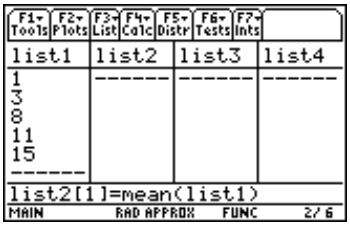
Example

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.



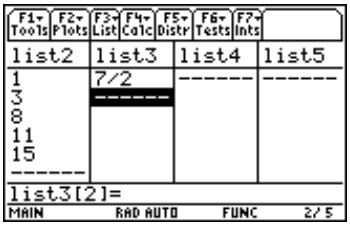
2. Press F3 (**List**) and select **3:Math**. Then select **3:mean(**. The **mean(** function is displayed in the entry line. Enter the list (**list1**) from which you want to display the mean of the elements.



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 mean.



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.)*

median(

Description

F3 (**List**) → **3:Math** → **4:median(**

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

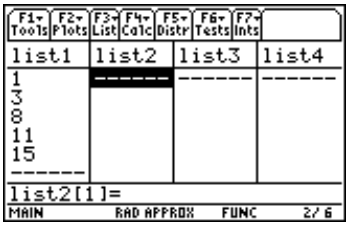
median(*LIST1***)** ⇒ *VALUE*

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

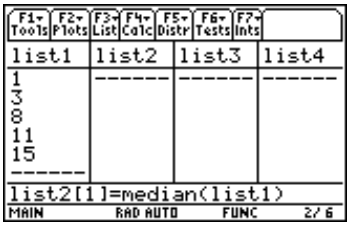
Example

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.



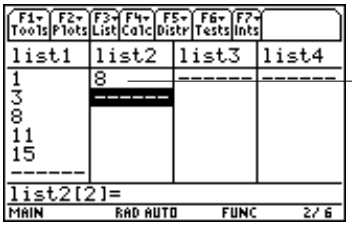
2. Press F3 (**List**) and select **3:Math**. Then select **4:median(.** The **median(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the median of the elements.



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.



sum(

Description

F3 (**List**) → **3:Math** → **5:sum(**

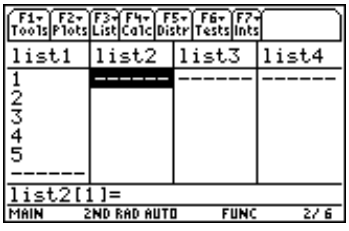
sum(returns a *VALUE* containing the sum of the elements in *LIST1*.

sum(*LIST1***)** ⇒ *VALUE*

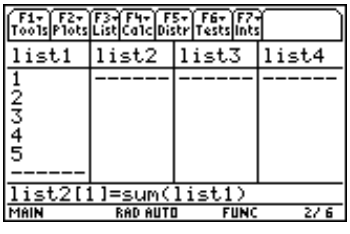
Example

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.



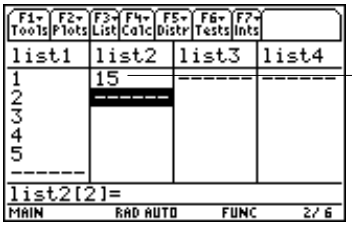
2. Press F3 (**List**) and select **3:Math**. Then select **5:sum(**. The **sum(** function is displayed in the entry line. Enter the list (**list1**) for which you want to calculate the sum of the elements.



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.



product(

Description

F3 (**List**) → **3:Math** → **6:product(**

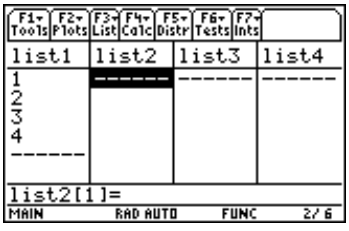
product(returns a *VALUE* containing product of the elements in *LIST1*.

product(*LIST1***)** ⇒ *VALUE*

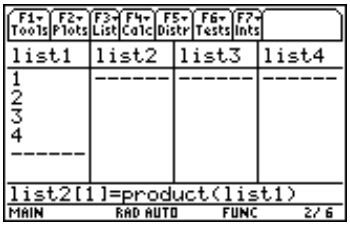
Example

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.



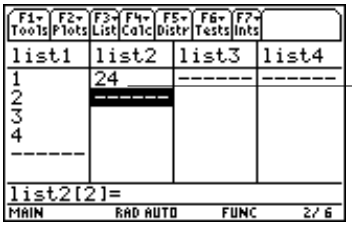
2. Press F3 (**List**) and select **3:Math**. Then select **6:product(.** The **product(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the product of the elements.



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.



stdDev(

Description

F3 (**List**) → **3:Math** → **7:stdDev(**

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

stdDev(*LIST1***)** ⇒ *VALUE*

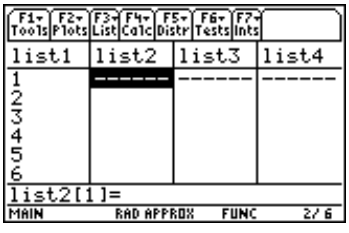
The statistics functions **stdDev(** and **stdDevPop(** calculate the standard deviation of a population differently. **StdDev(** divides by **n-1,** and **stdDevPop(** divides by **n**.

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

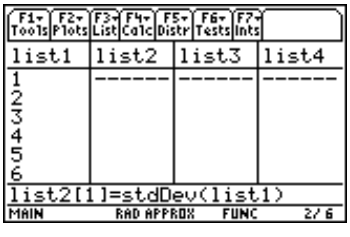
Example

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.



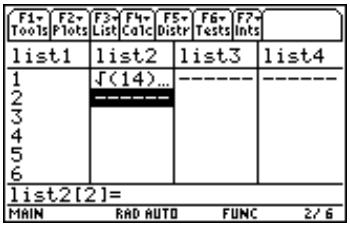
2. Press F3 (**List**) and select **3:Math.** Then select **7:stdDev.** The **stdDev(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the standard deviation of the elements.



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.



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

F3 (**List**) → **3:Math** → **8:variance(**

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

variance(*LIST1***)** ⇒ *LIST*

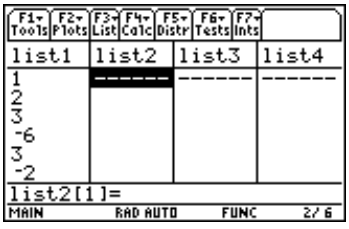
The statistics functions **variance(** and **varPop(** calculate the variance of a population differently. **variance(** divides by **n-1,** and **varPop(** divides by **n**.

Note: *LIST1 must contain at least two elements*

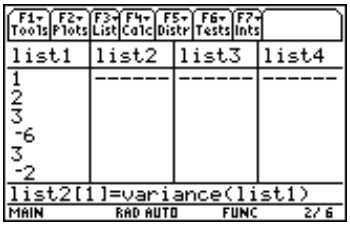
Example

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

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



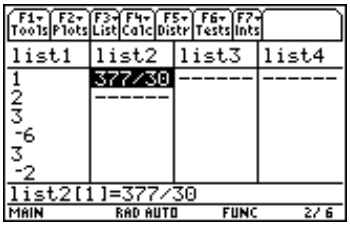
2. Press F3 (**List**) and select **3:Math**. Then select **8:variance(**. The **variance(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the variance of the elements.



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.



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.)*

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*

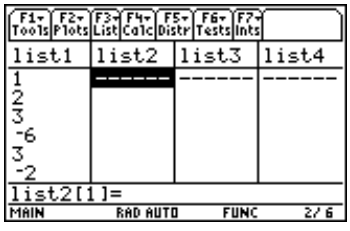
The statistics functions **stDevPop(** and **stdDev(** calculate the standard deviation of a population differently. **stDevPop(** divides by **n**, and **StdDev(** divides by **n-1**.

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

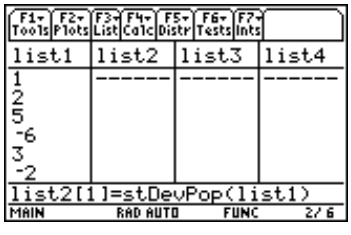
Example

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.



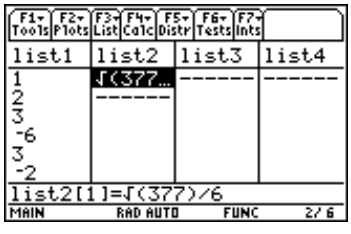
2. Press F3 (**List**) and select **3:Math**. Then select **9:stDevPop(.** The **stDevPop(** function is displayed in the entry line. Enter the list (**list1**) for which you want to display the standard deviation of a population.



***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.



***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*

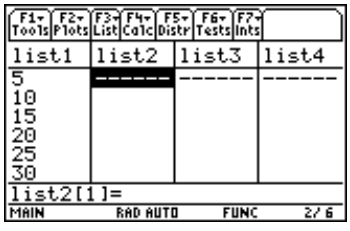
The statistics functions **varPop(** and **variance(** calculate the variance of a population differently. **varPop(** divides by **n**, and **variance(** divides by **n-1**.

Note: *LIST1 must contain at least two elements*

Example

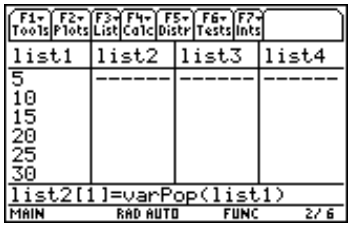
Setup: **list1={5,10,15,20,25,30}**

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



2. To select **A:varPop(** press:
   - F3 (**List**) **3** alpha **A** for the TI-89
   - F3 (**List**) **3 A** for the TI-92 Plus / Voyage™ 200 PLT

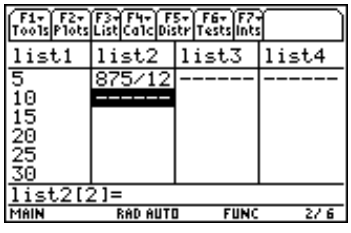
   The **varPop(** function is displayed in the entry line. Enter the list (**list1**) from which you want to return the variance of the population.



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.



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.)*

Attach List Formula

Description

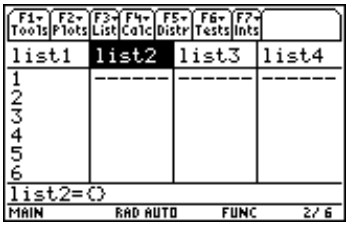
F3 (**List**) → **4:Attach List Formula**

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.

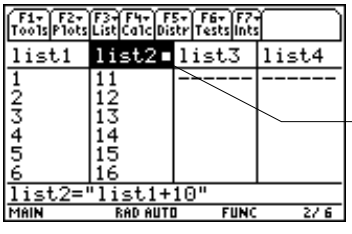


2. Press F3 (**List**) and select **4:Attach List Formula**. Enter the formula (**list1 + 10**) and the formula name (**zlist2**) as shown below.

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 display the list.



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

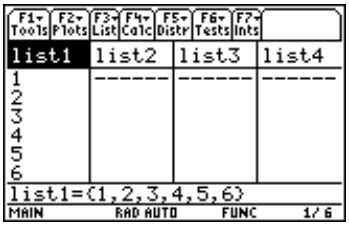
F3 (**List**) → **5:Delete Item**

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

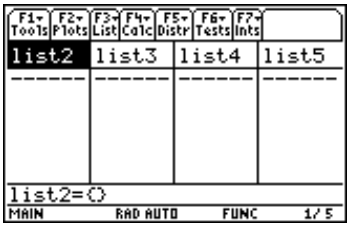
Example

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

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



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

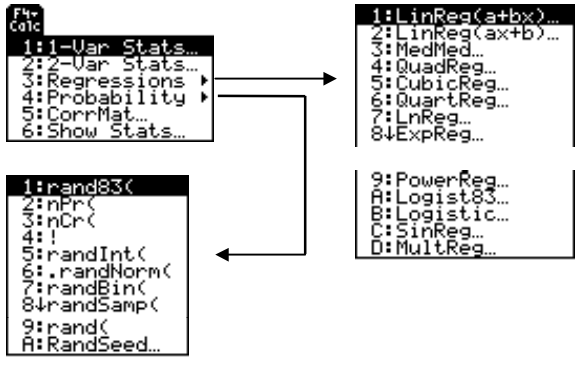


Tip: *You can press* 2nd [VAR-LINK]*, highlight a list, and then press* ENTER *to paste the list name into the list editor. Be sure to close arguments with a right parenthesis* ( )).

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

F4 Calc Menu

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

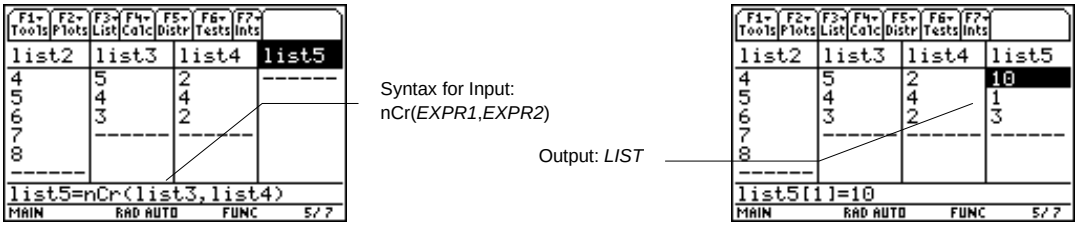


Entering Arguments for Functions and Commands

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

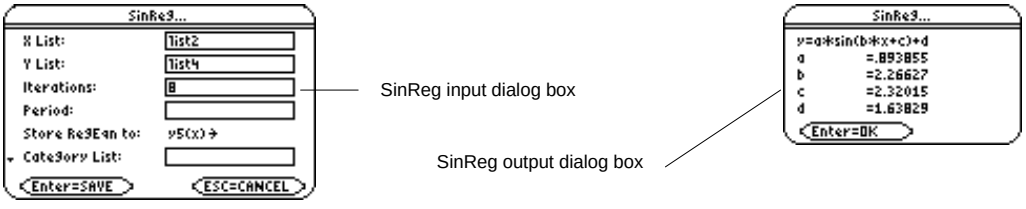
- **Functions followed by an open parenthesis** — for example, **nCr(**.

  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*.



- **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**.



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 (*optional*)	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 * (*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.

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

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.

Outputs	Stored to	Description
$\bar{x}$	**x_bar**	Mean of x values.
Σx	**sumx**	Sum of x values.
Σx²	**sumx2**	Sum of x² 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.
Σ(x-$\bar{x}$)²	**ssdevx**	Sum of squares of deviations from the mean of x.

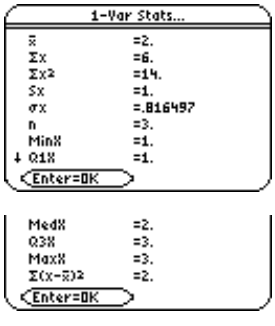
Example

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

F4 (**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 (*optional*)	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 (*optional*)	A list that can be used to categorize the entries of the specified list.
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 module.

Outputs for X List and Y List

Outputs	Stored to	Description
$\bar{x}$	**x_bar**	Mean of x values.
Σ**x**	**sumx**	Sum of x values.
Σ**x2**	**sumx2**	Sum of x2 values.
Sx	**sx_**	Sample standard deviation of x.
σ**x**	σ**x**	Population standard deviation of x.
n	**n**	Number of data points.
$\bar{y}$	**y_bar**	Mean of y values.
Σ**y**	**sumy**	Sum of y values.
Σ$\mathbf{y^2}$	**sumy2**	Sum of y2 values.
Sy	**sy_**	Sample standard deviation of y.
σ**y**	**sigmay**	Population standard deviation of y.
Σ**xy**	**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.
Σ$\mathbf{(x-\bar{x})^2}$	**ssdevx**	Sum of squares of deviations from the mean of x.
Σ$\mathbf{(y-\bar{y})^2}$	**ssdevy**	Sum of squares of deviations from the mean of y.

Example

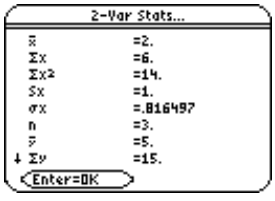
1. In the list editor, enter: **list1={1,2,3}** and **list2={4,5,6}**

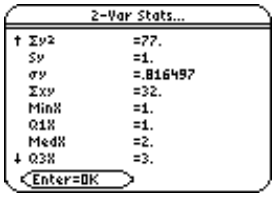
2. Press F4 (**Calc**) and select **2:2-Var Stats** to display the **2-Var Stats** input dialog box. Enter the arguments as shown below.

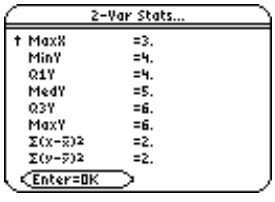
Tip: *You can press* 2nd [VAR-LINK]*, highlight a list, and then press* ENTER *to paste the list name into the list editor. Be sure to close arguments with a right parenthesis* ( )).

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

3. Press ENTER to compute the data.







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*x on lists X and Y.
LinReg(ax+b) **linear regression**	Calculates the linear regression, y = a*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*x^2+b*x+c on lists X and Y.
CubicReg **cubic regression**	Calculates the cubic polynomial regression, y=a*x^3+b*x^2+c*x+d on lists X and Y.
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.
LnReg **logarithmic regression**	Calculates the logarithmic regression, y = a+b*ln(x) on lists X and Y.
ExpReg **exponential regression**	Calculates the exponential regression, y = a*(b)^x on lists X and Y.
PowerReg **power regression**	Calculates the power regression, y = a*(x)^b on lists X and Y.
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.
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.
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.
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 module.

Outputs

Outputs	Stored to	Description
a,b	**a,b**	Regression coefficients.
r^2	**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**).

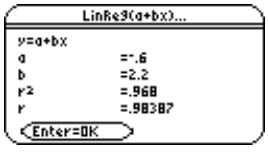
† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

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**. The select **1:LinReg(a+bx)** to display the **LinReg(a+bx)** input dialog box. Enter the arguments as shown below.

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.



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 module.

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**.

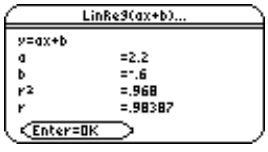
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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 **2:LinReg(ax+b)** to display the **LinReg(ax+b)** input dialog box. 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.*

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 module.

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**.

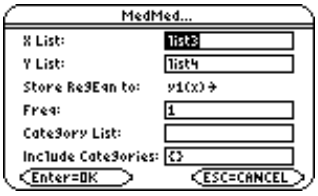
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

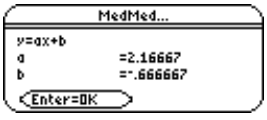
Example

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.



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.*

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 module.

Outputs

Outputs	Stored to	Description
a,b,c	**a,b,c**	Regression coefficients.
R^2	**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**.

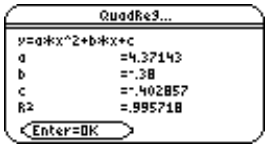
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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.

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.*

CubicReg

Description

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

CubicReg (cubic regression) calculates the cubic polynomial regression, y=a*x^3+b*x^2+c*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 module.

Outputs

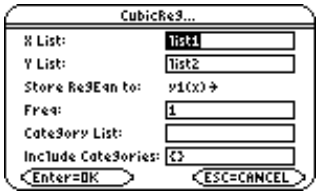
Outputs	Stored to	Description
a,b,c,d	**a,b,c,d**	Regression coefficients.
R^2	**rsq**	Coefficient of determination.
resid*	**resid**	Residuals of the curves fit = y - (a*x^3+b*x^2+c*x+d).
RegEqn	**regeqn**†	Regression equation: a*x^3+b*x^2+c*x+d.
	xout†	List of data points in the modified **X List** 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**).

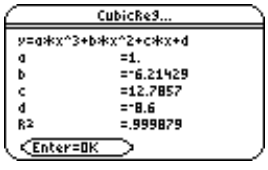
† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

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.



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.*

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 module.

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**.

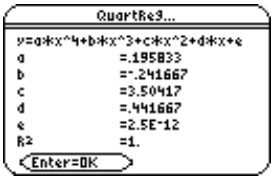
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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.

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.*

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 (*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 module.

Outputs

Outputs	Stored to	Description
a,b	**a,b**	Regression coefficients: y = a+b*ln(x).
r^2	**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**.

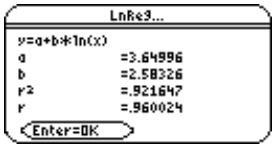
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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.

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.*

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 (*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 module.

Outputs

Outputs	Stored to	Description
a,b	**a,b**	Regression coefficients: y = a*(b)^x.
r^2	**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**.

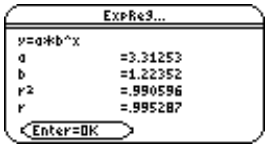
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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.

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.*

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 module.

Outputs

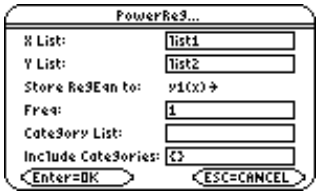
Outputs	Stored to	Description
a,b	**a,b**	Regression coefficients: y = a*(x)^b.
r²	**rsq**	Coefficient of determination.
r	**r**	Correlation coefficient for linear model.
resid*	**resid**	Residuals of the curves fit = y - a*(x)^b.
residt*	**residt**	Residuals associated with linear fit of transformed 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**).

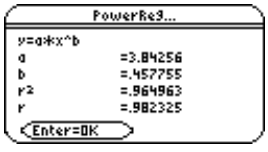
† If **RegEqn**, **Freq**, **Category List**, or **Include Categories** are used as inputs, these are also outputs.

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.



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.*

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 module.

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**.

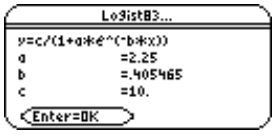
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

† 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 (*optional*)	Optional maximum number of iterations used. The default is 64.
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 module.

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**.

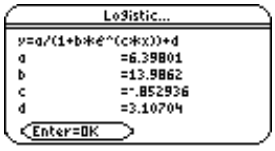
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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.

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.*

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 module.

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**.

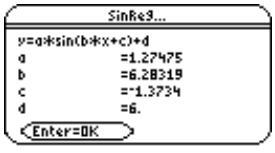
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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

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.

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.*

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_hat = B0+B1*x1+ . . .
R^2	**rsq**	Coefficient of multiple determination.
yhatlist*	**y_hat**	Y_hat = B0+B1*x1+ . . .
resid*	**resid**	y - yhatlist

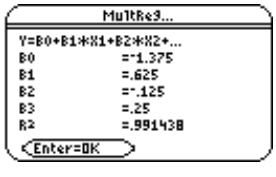
* Output variable is pasted to the end of the list editor when **Results -> Editor** option is **YES**, (located in F1 (**Tools**) **9:Format**).

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.*

Description

rand83(**random number**	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.
nPr(**permutations**	(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.
nCr(**combinations**	(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.
! **factorial**	(factorial) returns a *LIST* containing the factorial of the expression (*EXPR*) . Expressions include integers, symbolic expression, or list of these two data types.
randInt(**random integer**	(random integer) generates and displays a *LIST* of random integers within a range specified by *LOW* and *UP* integer bounds.
.randNorm(**random normal distribution**	Given the mean (μ), standard deviation (σ), and the number of trials (*NUMTRIALS*), **.randNorm(** returns a *LIST* containing the decimal numbers from the specific normal distribution.
randBin(**random binomial distribution**	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*).
randSamp(**random sample**	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.
rand(**random number**	With no parameter, **rand(** 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].
RandSeed **random seed**	If **Integer Seed** = 0, sets the seeds to the factory defaults for the random-number generator. If **Integer Seed** ≠ 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(**

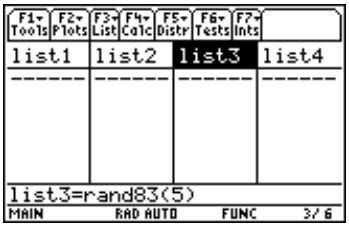
rand83([*NUMTRIALS*]) ⇒ *LIST*

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).

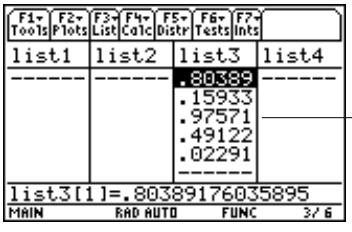
If *NUMTRIALS* is not provided, a single random number between 0 and 1 is returned.

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.



3. Press ENTER to compute the data.



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

nPr(

Description

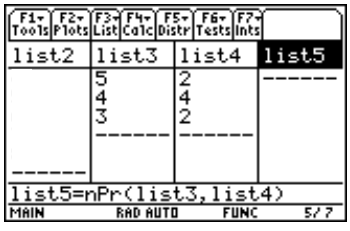
F4 (**Calc**) → **4:Probability** → **2:nPr(**

nPr(*EXPR1*,*EXPR2*) ⇒ *LIST*

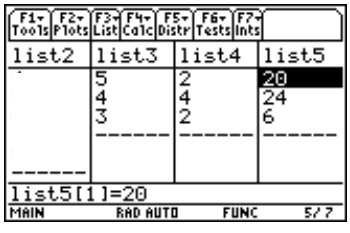
nPr (number of permutations) returns a *LIST* containing the permutations based on the input arguments, *EXPR1* and *EXPR2*, which can be integers, symbolic expression, or lists of these two data types.

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.



5. Press ENTER to compute the data.



nCr(

Description

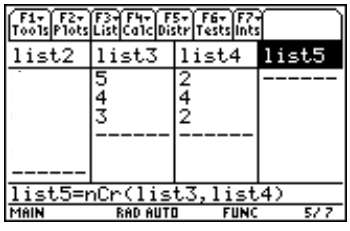
F4 (**Calc**) → **4:Probability** → **3:nCr(**

nCr(*EXPR1*,*EXPR2*) ⇒ *LIST*

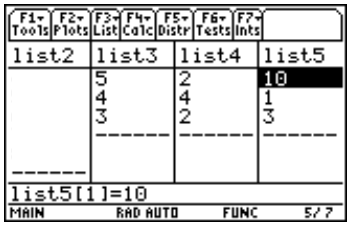
nCr (number of combinations) returns a *LIST* containing the combinations based on the input arguments, *EXPR1* and *EXPR2*, which can be integers, symbolic expression, or lists of these two data types.

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.



5. Press ENTER to compute the data.



! (factorial)

Description

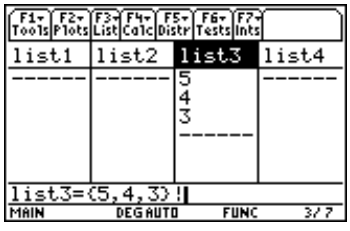
F4 (**Calc**) → **4:Probability** → **4:!**

EXPR! ⇒ *LIST*

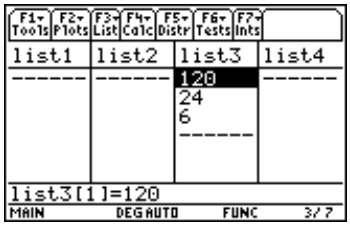
! (factorial) returns a *LIST* containing the factorial of the expression (*EXPR*) . Expressions include integers, symbolic expression, or a list of these two data types.

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.



5. Press ENTER to compute the data.



randInt(

Description

F4 (**Calc**) → **4:Probability** → **5:randInt(**

randInt(*LOW*,*UP*[,*NUMTRIALS*] ⇒ *LIST*

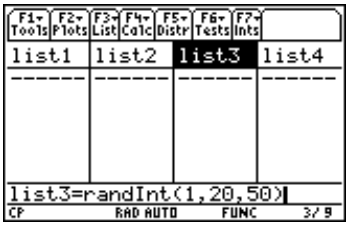
randInt((random integer) generates and displays a *LIST* of random integers within a range specified by *LOW* and *UP* integer bounds.

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.*

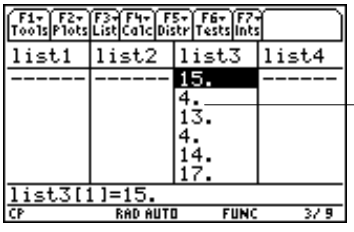
Example

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([μ,σ,*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.

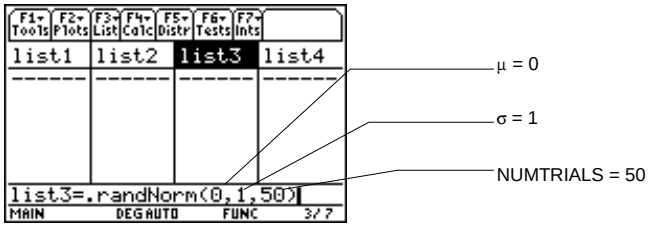
Note: *A dot has been placed before this function to distinguish it from a* randNorm() *function that exists in the operating system. If you enter* randNorm *without the dot or without the prefix, TIStat, you will access the operating system* randNorm, *which does not accept the argument for NUMTRIALS.*

Example

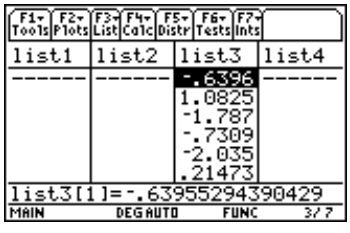
1. Move the cursor to the name of the list (**list3**) where you want to return the decimal numbers from the specified normal distribution.

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.



randBin(

Description

F4 (**Calc**) → **4:Probability** → **7:randBin(**

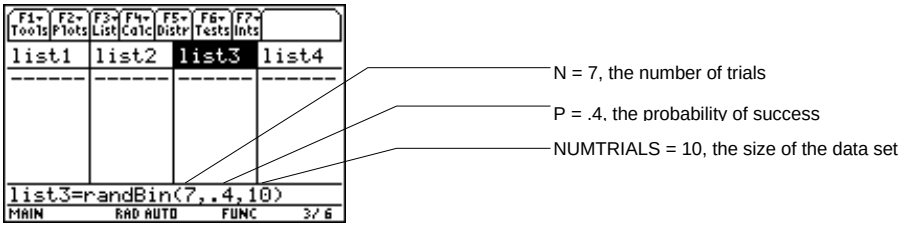
randBin(*N*,*P*[,*NUMTRIALS*]) ⇒ *LIST*

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*).

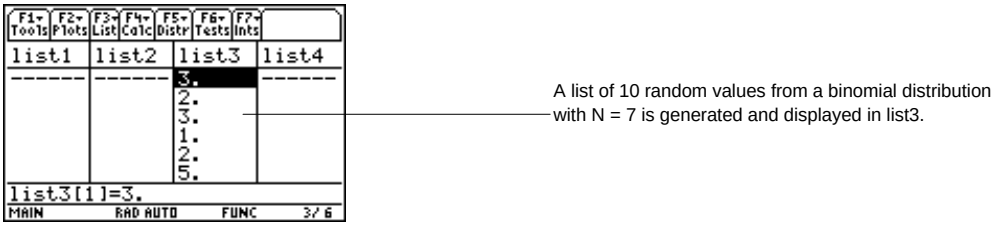
Note: *NUMTRIALS is an optional argument. If you omit NUMTRIALS, randBin(returns a scalar random value from the binomial distribution. If you include NUMTRIALS, randBin(returns a list containing the number of elements specified by NUMTRIALS.*

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*

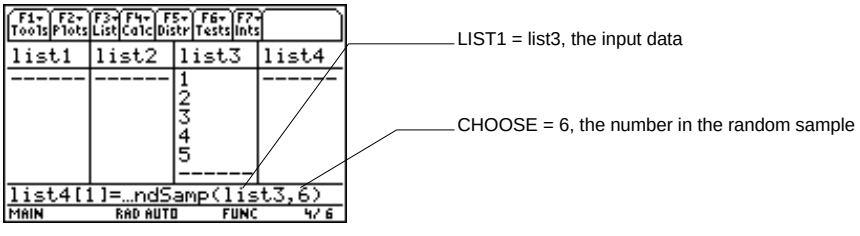
randSamp(returns a *LIST* containing a random sample of the size you *CHOOSE* from a *LIST* with an option for sample replacement (*NOREP*=0), or no sample replacement (*NOREP*=1). The default is with sample replacement.

Example

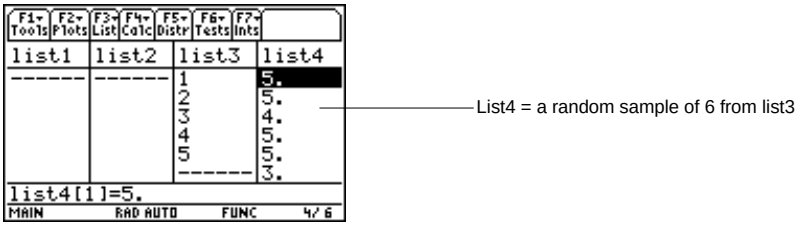
1. In the list editor, enter: **list3={1,2,3,4,5}**
2. Move the cursor to the list name of an empty list (**list4)** where you want to return the random sample.
3. Press F4 (**Calc**) and select **4:Probability.** Then select **8:randSamp(.** The **randSamp(** command is displayed in the entry line.
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*

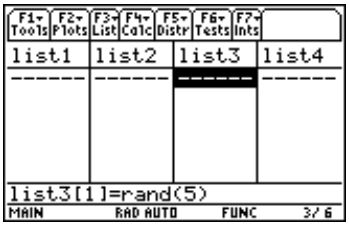
With no parameter, **rand(** (random) returns a *LIST* element containing the next random integer between 0 and 1 in the sequence.

When *INT* is positive, **rand(** returns a *LIST* element containing a random integer in the interval [1, n].

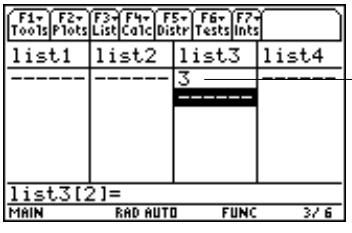
When *INT* is negative, **rand(** returns a *LIST* element containing a random integer in the interval [-n, -1].

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.



4. Press ENTER to view the random number.



A single random value between 1 and 5 is generated and displayed in list3.

RandSeed

Description

F4 (**Calc**) → **4:Probability** → **A:RandSeed**

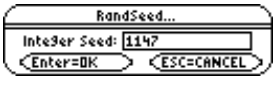
RandSeed (random seed) sets the seeds to the factory defaults for the random-number generator.

If **Integer Seed** ≠ 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:Probabilty**. 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

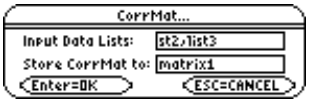
Input Data Lists	The input lists used in the correlation process.
Store CorrMat to	The designated variable for storing the output matrix.

Outputs

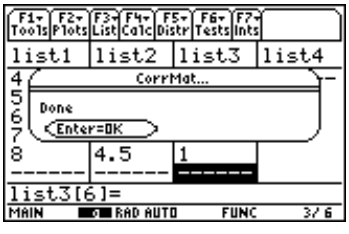
Correlation Matrix	The designated output matrix.

Example

1. 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}**
2. 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.)

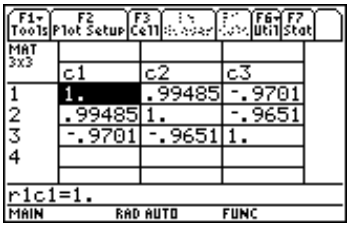


3. Press ENTER to compute the data.



4. Press ENTER to close the dialog box.
5. Press HOME (or ♦ [CALC HOME] for the Voyage™ 200 PLT) to return to the Home screen.
6. Press APPS, select **Data/Matrix Editor,** and then select **2:Open.**
7. Press ▶ and select **2:Matrix**; press ▼ and select **1:main**; press ▼ and select **matrix1**.

8. 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

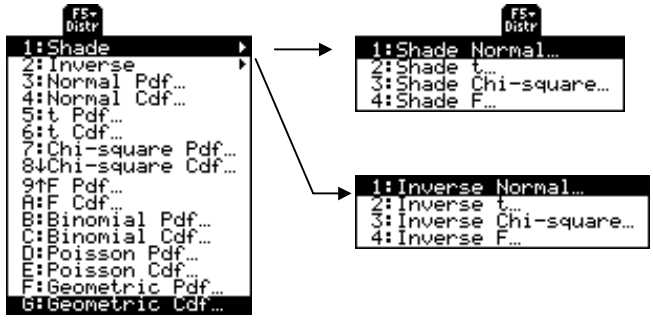
1. Press F4 (**Calc**) and select **6:Show Stats**. The results of the last statistical calculation (in this case, **SinReg**) are displayed.

2. Use ⊙ to scroll the screen, if necessary, to see all the outputs.

   Press ENTER to close the dialog box.

F5 Distr (Distribution) Menu

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 μ=0, σ=1 and **Lower Value**=-∞ **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 [⊞] *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 μ=**0**.
σ	Optional distribution standard deviation. The default is σ=1.
Auto-scale (NO, YES)	Lets you clear all drawings from the current graph and automatically optimize graphing window dimensions. The default = **YES**.

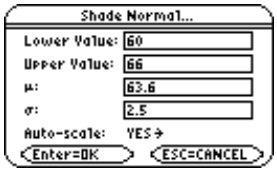
Outputs

The output for this function is a graph with the **Area** between **Lower Value** and **Upper Value** shaded.

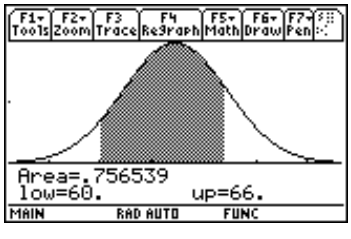
Output statistic variables are stored in the **STATVARS** folder.

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 [⊞] *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 -∞.
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**.

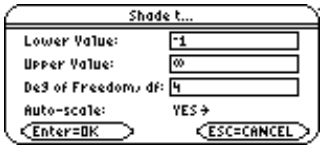
Outputs

The output for this function is a graph with the **Area** between **Lower Value** and **Upper Value shaded**.

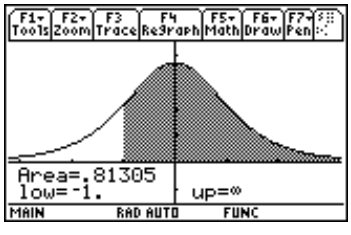
Output statistic variables are stored in the **STATVARS** folder.

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

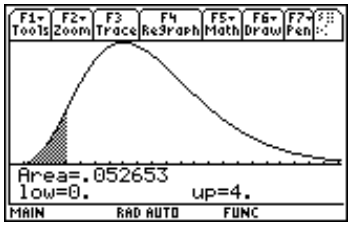
The output for this function is a graph with the area between **Lower Value** and **Upper Value shaded**.

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 -∞.
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**.

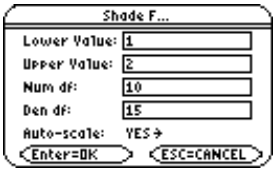
Outputs

The output for this function is a graph with the area between **Lower Value** and **Upper Value** shaded.

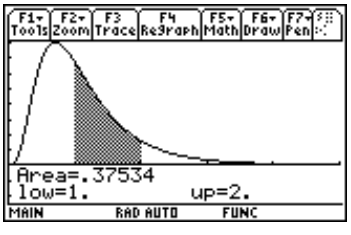
Output statistic variables are stored in the **STATVARS** folder.

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** ≤ area ≤ 1 must be true.
μ	An optional distribution mean. The default is μ=**0**.
σ	An optional distribution standard deviation. The default is σ=1.

Outputs

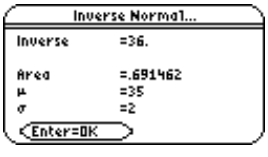
Inverse	An inverse normal value or list of values. Values are stored to **inverse**.
Area	A scalar or list of probabilities for which to evaluate the inverse normal.
μ	A distribution mean.
σ	A distribution standard deviation.

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 *t* inverse.
Deg of Freedom, df	A scalar value for degrees of freedom.

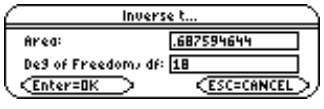
Outputs

Inverse	A *t* inverse value or list of values. Values are stored to **inverse**.
Area	A scalar or list of probabilities for which to evaluate the *t* inverse.
df	A scalar value for degrees of freedom.

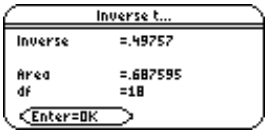
Output statistic variables are stored in the **STATVARS** folder.

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.



4. Press ENTER to compute the data.



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.

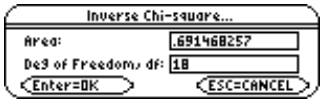
Outputs

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 F inverse.
df	A scalar value for degrees of freedom.

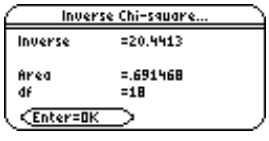
Output statistic variables are stored in the **STATVARS** folder.

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 **Dem 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.

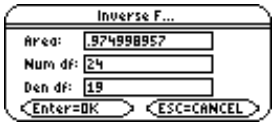
Outputs

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.

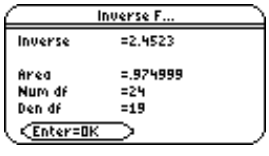
Output statistic variables are stored in the **STATVARS** folder.

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.



4. Press ENTER to compute the data.



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 μ=0.
σ	An optional distribution standard deviation. The default is σ=1.

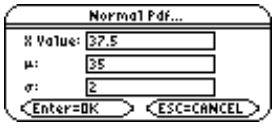
Outputs

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.

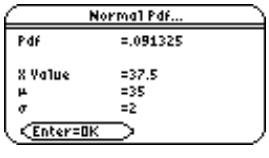
Output statistic variables are stored in the **STATVARS** folder.

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.

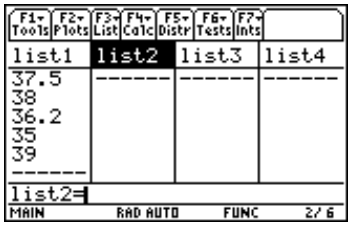


3. Press ENTER to compute the data.



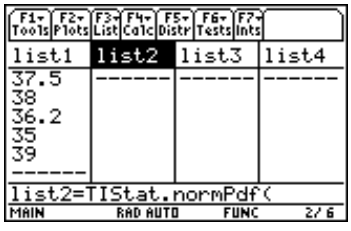
Example 2

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 .)



3. Press CATALOG F3 for the TI-89 (2nd [CATALOG] F3 for the TI-92 Plus / Voyage™ 200 PLT), 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.*

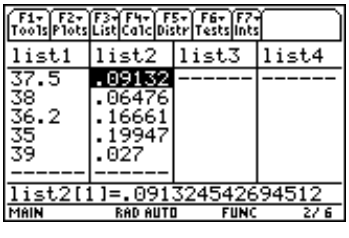


4. Use the syntax below to define **list2**.

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.



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 -∞.
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 μ=0.
σ	An optional distribution standard deviation. The default is σ=1.

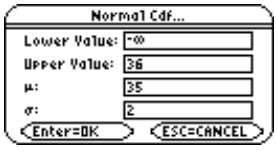
Outputs

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.

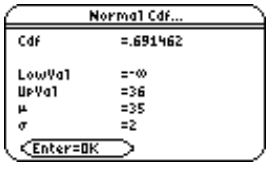
Output statistic variables are stored in the **STATVARS** folder.

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:

$$f(x) = \frac{\Gamma[(df+1)/2]}{\Gamma(df/2)} \cdot \frac{(1+x^2/df)^{-(df+1)/2}}{\sqrt{\pi df}}$$

Inputs

X Value	A scalar or list of values at which to evaluate the Student-*t* pdf.
Deg of Freedom, df	A scalar value for degrees of freedom; must be > **0**.

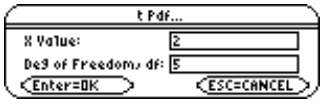
Outputs

Pdf	A Student-*t* 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.

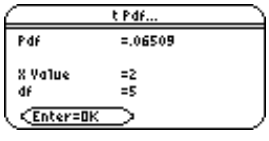
Output statistic variables are stored in the **STATVARS** folder.

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.



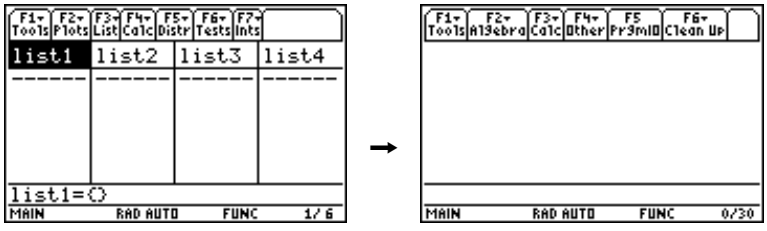
3. Press ENTER to compute the data.



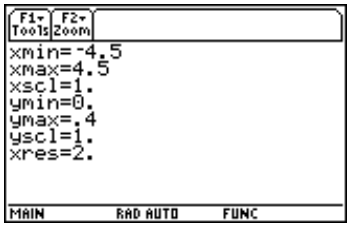
Example 2

You can use the **TIStat.tPdf(** function with the Y= editor screen.

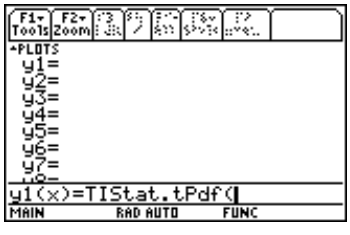
1. From within the Stats/List Editor, press [2nd] [⊞] to toggle between the list editor and the Home screen.



2. Press [◆] [WINDOW], and then set the viewing window as shown below.



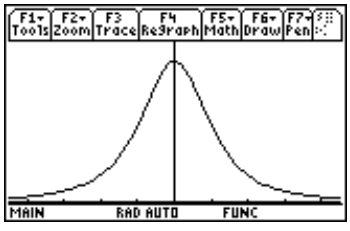
3. Press [◆] [Y=] to display the Y = editor. (If the Y = editor is not clear, press [CLEAR] [ENTER].) Press [CATALOG] [F3] **T** on the TI-89 ([2nd] [CATALOG] [F3] **T** for the TI-92 Plus / Voyage™ 200 PLT), move the ▶ indicator to the **tPdf(** command. Press [ENTER] to paste the command to the entry 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 Stats/List Editor.*

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-*t* cdf. The default is -∞.
Upper Value	An upper scalar or list of values at which to evaluate the Student-*t* cdf. The default is ∞.
Deg of Freedom, df	A scalar value for degrees of freedom; must be > **0**

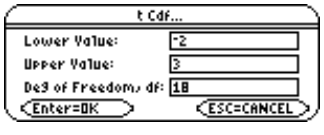
Outputs

Cdf	A Student-*t* 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.

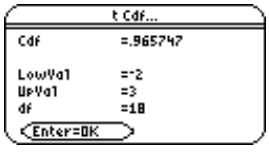
Output statistic variables are stored in the **STATVARS** folder.

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 **χ2pdf(** 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

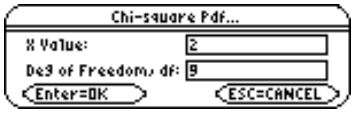
X Value	A scalar or list of values at which to evaluate the χ^2 (chi-square) pdf.
Deg of Freedom, df	A scalar value for degrees of freedom; must be an integer > **0**.

Outputs

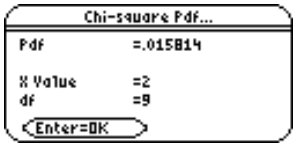
Pdf	A χ^2 (chi-square) pdf value or list of values. Values are stored to **pdf**.
X Value	A scalar or list of integer event numbers.
df	A scalar value for degrees of freedom.

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**.

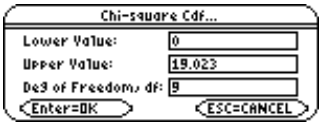
Outputs

Cdf	A χ^2 cdf value or list of values. Values are stored to **cdf**.
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.
df	A scalar value for degrees of freedom.

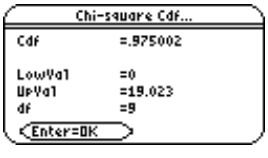
Output statistic variables are stored in the **STATVARS** folder.

Example

1. Press F5 (**Dist**) and select **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 Fpdf.
Num df	A numerator degrees of freedom; must be integers > **0**.
Den df	A denominator degrees of freedom; must be integers > **0**.

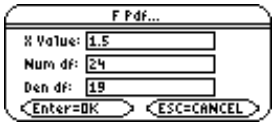
Outputs

Pdf	A Fpdf 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.

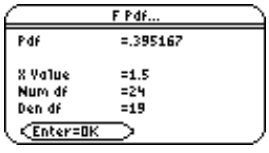
Output statistic variables are stored in the **STATVARS** folder.

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 -∞.
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.

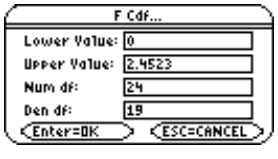
Example

1. To select **A:F Cdf**, press:

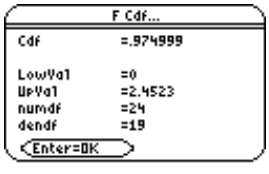
   - F5 (**Dist**) alpha **A** for the TI-89
   - F5 (**Dist**) **A** for the TI-92 Plus / Voyage™ 200 PLT

   to display the **F Cdf** input dialog box.

2. Enter the arguments as shown below.



3. 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:

$$f(x) = \binom{n}{x} p^x (1-p)^{n-x}, x = 0,1,\ldots,n$$

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 ≤ p ≤ 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.,n} or number of trials.

Outputs

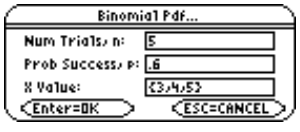
Pdf	A binomial pdf value or list of values. Values are stored to **pdf**.
X Value	A scalar or list of integer event numbers.
n	A total number of binomial events.
p	A probability of a single event success.

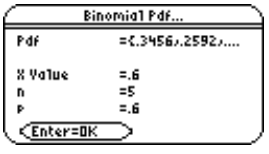
Output statistic variables are stored in the **STATVARS** folder.

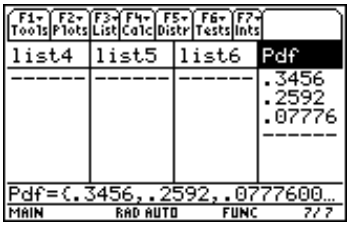
Example

1. To select **B:Binomial Pdf**, press:
   - F5 (**Dist**) alpha **B** for the TI-89
   - F5 (**Dist**) **B** for the TI-92 Plus / Voyage™ 200 PLT

   to display the input **Binomial Pdf** dialog box.
2. Enter the arguments as shown below
3. 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 ◆ I for the TI-89; press ◆ F for the TI-92 Plus / Voyage™ 200 PLT.*

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; $0 \le p \le 1$ 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 distribution cdf. The default is ∞.

Outputs

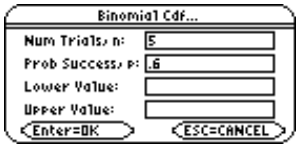
Cdf	A binomial cdf value or list of values. Values are stored to **cdf**.
n	A total number of binomial events.
p	A probability of a single event success.
LowVal	A scalar lower value or list of values.
UpVal	A scalar upper value or list of values.

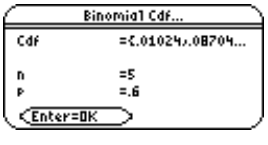
Output statistic variables are stored in the **STATVARS** folder.

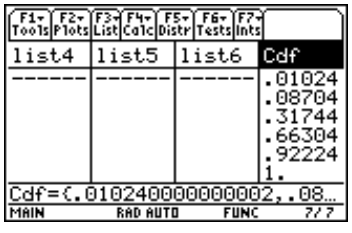
Example

1. To select **C:Binomial Cdf**, press:
   - F5 (**Dist**) alpha **C** for the TI-89
   - F5 (**Dist**) **C** for the TI-92 Plus / Voyage™ 200 PLT

   to display the **Binomial Cdf** input dialog box.
2. Enter the arguments as shown below.
3. Press ENTER to compute the data. Press ENTER again to view the **Cdf** 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 ♦ I for the TI-89; press ♦ F for the TI-92 Plus / Voyage™ 200 PLT.*

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:

$f(x) = e^{-\lambda} \lambda^x / x!$, $x = 0,1,2,...$

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.

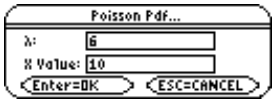
Output statistic variables are stored in the **STATVARS** folder.

Example

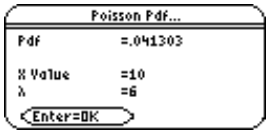
1. To select **D:Poisson Pdf**, press:

   - F5 (**Dist**) alpha **D** for the TI-89
   - F5 (**Dist**) **D** for the TI-92 Plus / Voyage™ 200 PLT

   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 -∞.
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.

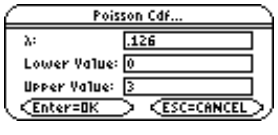
Output statistic variables are stored in the **STATVARS** folder.

Example

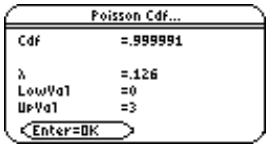
1. To select **E:Poisson Cdf**, press:

   - F5 (**Dist**) alpha **E** for the TI-89
   - F5 (**Dist**) **E** for the TI-92 Plus / Voyage™ 200 PLT

   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:

$f(x) = p(1-p)^{x-1}, x = 1,2,\ldots$

Inputs

Prob Success, p	A probability of a single event success; $0 \le p \le 1$ 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.

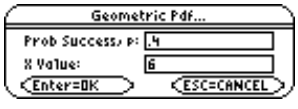
Output statistic variables are stored in the **STATVARS** folder.

Example

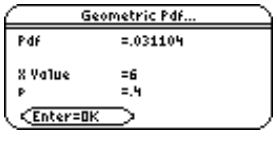
1. To select **F:Geometric Pdf**, press:

   - F5 (**Dist**) alpha **F** for the TI-89
   - F5 (**Dist**) **F** for the TI-92 Plus / Voyage™ 200 PLT

   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. $0 \le p \le 1$ 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.

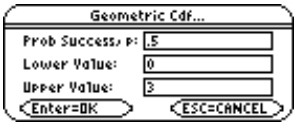
Example

1. To select **G:Geometric Cdf**, press:

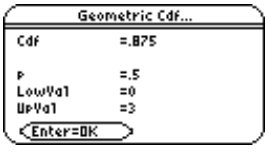
   - F5 (**Dist**) alpha **G** for the TI-89
   - F5 (**Dist**) **G** for the TI-92 Plus / Voyage™ 200 PLT

   to display the input **Geometric Cdf** dialog box.

2. Enter the arguments as shown below.



3. Press ENTER to compute the data.



F6 Tests Menu

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 / Voyage™ 200 PLT

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

μ0	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 (μ≠μ0, μ<μ0, μ>μ0)	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

μ0	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 (μ≠μ0, μ<μ0, μ>μ0)	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.

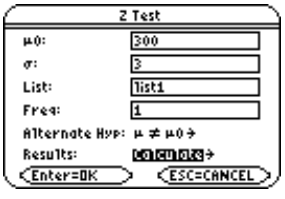
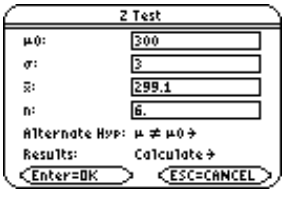
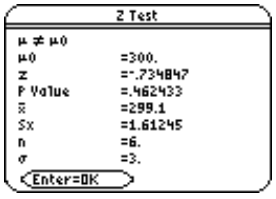
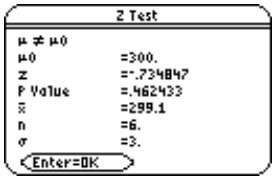
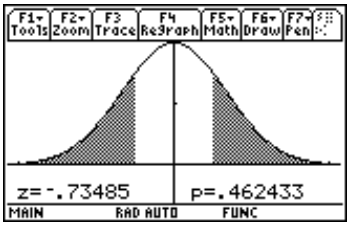
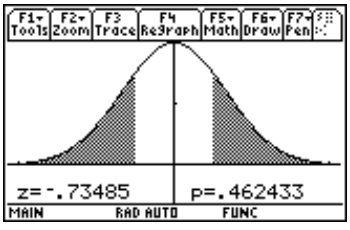
Data and Stats Outputs

Outputs	Stored to	Description
μ0	**μ0**	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.

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 / Voyage™ 200 PLT

   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 ▶ 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 ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

	Data	**Stats**
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 / Voyage™ 200 PLT

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

μ0	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 (μ≠μ0, μ<μ0, μ>μ0)	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

μ0	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 (μ≠μ0, μ<μ0, μ>μ0)	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.

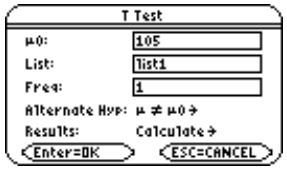
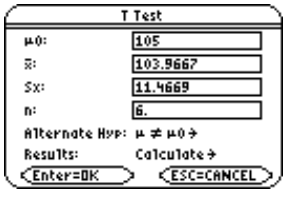
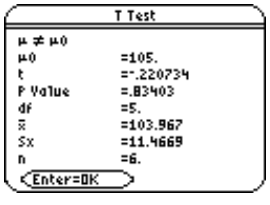
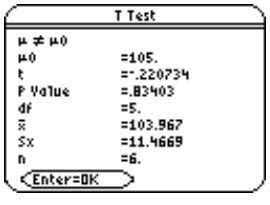
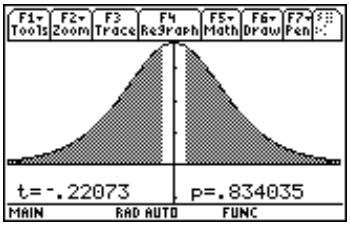
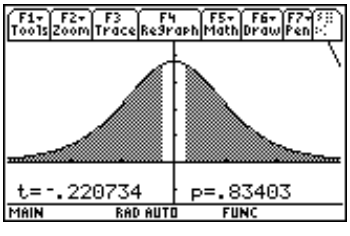
Data and Stats Outputs

Outputs	Stored to	Description
μ0	**μ0**	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.

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 / Voyage™ 200 PLT

   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 ▶ 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 ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

	Data	**Stats**
Input:		
Calculated results:		
Drawn results:		

2-SampZTest

Description

2nd [F6] (**Tests**) → **3:2-SampZTest** for the TI-89

[F6] (**Tests**) → **3:2-SampZTest** for the TI-92 Plus / Voyage™ 200 PLT

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

σ1, σ2	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

σ1, σ2	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.

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:

   - [2nd] [F6] (**Tests**) **3** for the TI-89
   - [F6] (**Tests**) **3** for the TI-92 Plus / Voyage™ 200 PLT

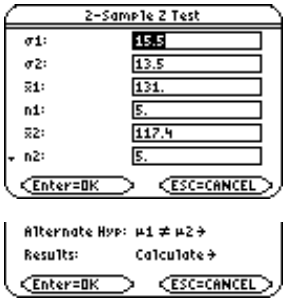
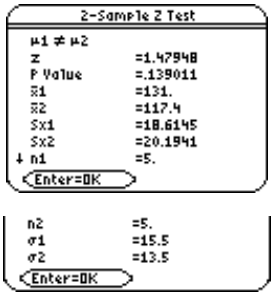
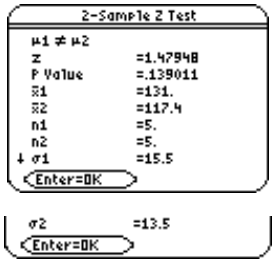
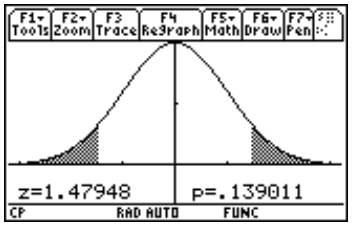
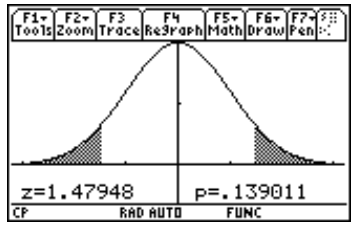
   The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press [ENTER] to display the **2-Sample Z Test** input dialog box. If not, press ▶ to display the choices (**Data** or **Stats)**, highlight one, and then press [ENTER] [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 [ENTER]. If not, press ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

Example (continued)

	Data	Stats
Input:		
Calculated results:		
Drawn results:		

2-SampTTest

Description

2nd F6 (**Tests**) → **4:2-SampTTest** for the TI-89

F6 (**Tests**) → **4:2-SampTTest** for the TI-92 Plus / Voyage™ 200 PLT

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.

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:

   - 2nd [F6] (**Tests**) **4** for the TI-89
   - [F6] (**Tests**) **4** for the TI-92 Plus / Voyage™ 200 PLT

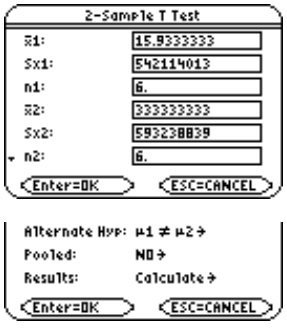
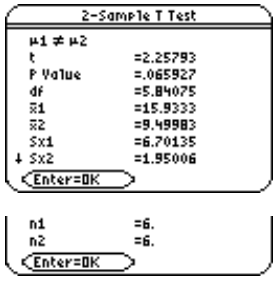
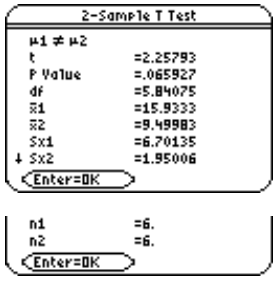
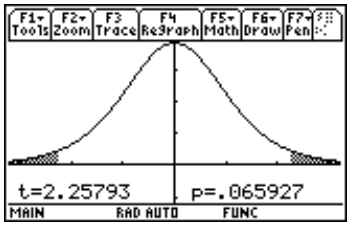
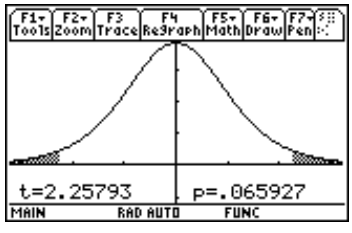
   The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press [ENTER] to display the **2-Sample T Test** input dialog box. If not, press ▶ to display the choices (**Data** or **Stats)**, highlight one, and then press [ENTER] [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 [ENTER]. If not, press ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

Example (continued)

	Data	Stats
Input:		
Calculated results:		
Drawn results:		

1-PropZTest

Description

2nd [F6] (**Tests**) → **5:1-PropZTest** for the TI-89

[F6] (**Tests**) → **5:1-PropZTest** for the TI-92 Plus / Voyage™ 200 PLT

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.

Example

1. To select **5:1-PropZTest**, press:

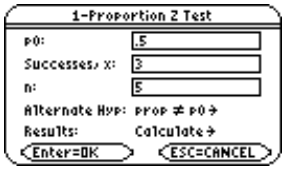
   - [2nd] [F6] (**Tests**) **5** for the TI-89
   - [F6] (**Tests**) **5** for the TI-92 Plus / Voyage™ 200 PLT

   The **1-Proportion Z Test** dialog box is displayed.

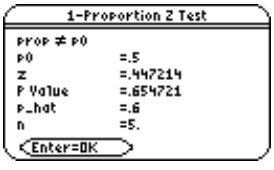
2. Enter the arguments as shown below.

3. If the **Alternate Hyp** and **Results** format that you want are displayed, press [ENTER]. If not, for each of these fields press ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

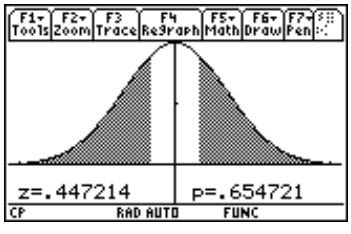
Input:



Calculated results:



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 / Voyage™ 200 PLT

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

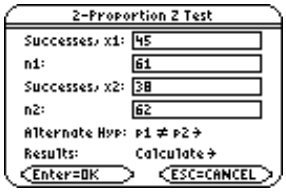
Outputs	Stored to	Description
z	**z**	Standard normal value computed for the difference of proportions.
P Value	**pval**	Least probability at which the null hypothesis can be rejected.
p1_hat	**p1_hat**	First sample proportion estimate.
p2_hat	**p2_hat**	Second sample proportion estimate.
p_hat	**p_hat**	Pooled sample proportion estimate.
n1, n2	**n1, n2**	Number of samples taken in trials 1 and 2.

Example

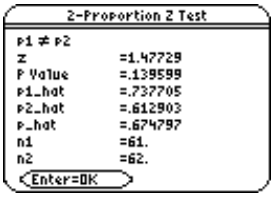
1. To select **6:2-PropZTest**, press:
   - [2nd] [F6] (**Tests**) **6** for the TI-89
   - [F6] (**Tests**) **6** for the TI-92 Plus / Voyage™ 200 PLT

   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 [ENTER]. If not, for each of these fields press ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

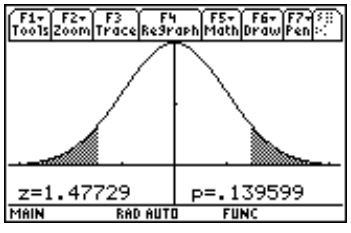
Input:



Calculated results:



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 / Voyage™ 200 PLT

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((observed - expected)^2/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*	**complist**	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**).

Example

1. In the list editor, enter:

   list1={16,25,22,8,10}
   list2={16.2,21.6,16.2,14.4,12.6}

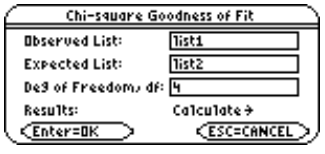
2. To select **7:Chi2 GOF**, press:

   - 2nd F6 (**Tests**) **7** for the TI-89
   - F6 (**Tests**) **7** for the TI-92 Plus / Voyage™ 200 PLT

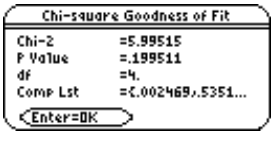
3. The **Chi-square Goodness of Fit** input dialog box is displayed. Enter the arguments as shown below.

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.

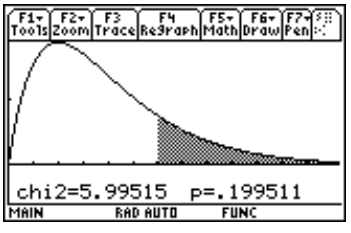
Input:



Calculated results:



Drawn results:



Chi2 2-way

Description

2nd [F6] (**Tests**) → **8:Chi2 2-way** for the TI-89

[F6] (**Tests**) → **8:Chi2 2-way** for the TI-92 Plus / Voyage™ 200 PLT

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 (observed - expected)^2/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.

Example

1. To create the matrix:

   1) To return to the Home screen, press:

      - [HOME] for the TI-89
      - [2nd] [HOME] for the TI-92 Plus / Voyage™ 200 PLT

   2) Press [APPS] and select **6:Data/Matrix Editor**. A menu is displayed.

   3) Select **3:New**. The **New** dialog box is displayed.

   4) Press ▶, highlight **2:Matrix,** and press [ENTER] to choose **Matrix** type.

   5) Press ▼, highlight **1:main**, and press [ENTER] to choose **main** folder.

   6) Press ▼, and then enter the name **matrix1** in the **Variable** field.

      - [2nd] [alpha] **M A** [T] **R I** [X] [alpha] **1** for the TI-89
      - **M A T R I X 1** for the TI-92 Plus / Voyage 200 PLT

   7) Enter **3** for **Row dimension** and **2** for **Col dimension**.

   8) Press [ENTER] to display the matrix editor.

   9) Enter **4**, **9**, **5** in **c1** and **7**, **2**, **3** in **c2**.

   10) Press [♦] [APPS] [ENTER] to close the matrix editor and return to the list editor. If you have more than one Application loaded, press [♦] [APPS], and then select **Stats/List Editor**.

2. To select **8:Chi2 2-way** and display the **Chi-square 2-Way** dialog box, press

   - [2nd] [F6] (**Tests**) **8** for the TI-89
   - [F6] (**Tests**) **8** for the TI-92 Plus / Voyage 200 PLT

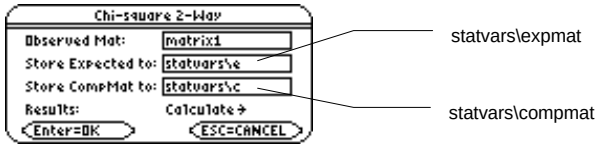
3. Enter the arguments as shown on the next page.

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.

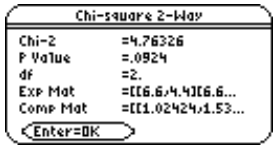
Note: *You can enter a matrix directly into the Observed Mat input box using matrix notation. Enter [[4,7][9,2][5,3]] into the 0bserved Mat input field.*

Example (continued)

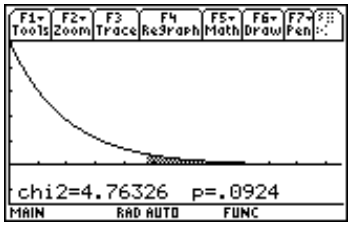
Input:



Calculated results:



Drawn results:



2-SampFTest

Description

2nd [F6] (**Tests**) → **9:2-SampFTest** for the TI-89

[F6] (**Tests**) → **9:2-SampFTest** for the TI-92 Plus / Voyage™ 200 PLT

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.

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:

   - 2nd [F6] (**Tests**) **9** for the TI-89
   - [F6] (**Tests**) **9** for the TI-92 Plus / Voyage™ 200 PLT

   The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press [ENTER] to display the **2-Sample F Test** input dialog box.

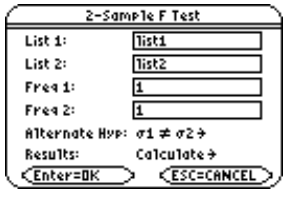
   If the **Data Input Method** you want is not displayed, press ▶ to display the choices (**Data** or **Stats)**, highlight one, and then press [ENTER] [ENTER] to select an input method and display the **2-Sample F Test** input dialog box.

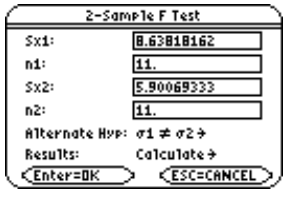
4. Enter the arguments as shown in either the **Data** or **Stats** input screen.

5. If the **Alternate Hyp** and **Results** format that you want are displayed, press [ENTER]. If not, for each press ▶, highlight your selections, and press [ENTER] [ENTER] to view the results.

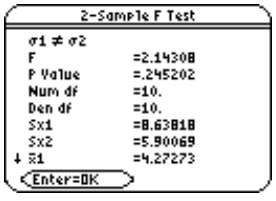
Data **Stats**

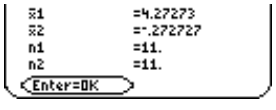
Input:

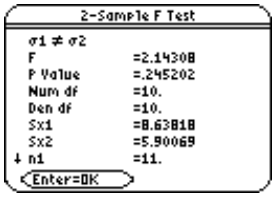


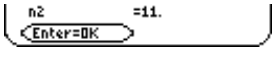


Calculated results:

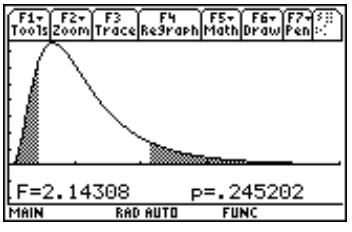


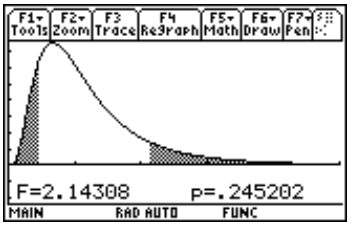






Drawn results:





LinRegTTest

Description

2nd [F6] (**Tests**) → **A:LinRegTTest** for the TI-89

[F6] (**Tests**) → **A:LinRegTTest** for the TI-92 Plus / Voyage™ 200 PLT

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: $\beta\neq0$ and $\rho\neq0$
- 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 (β&ρ≠0, β&ρ<0, β&ρ>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.

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 / Voyage™ 200 PLT

3. The **Linear Regression T Test** input dialog box is displayed.

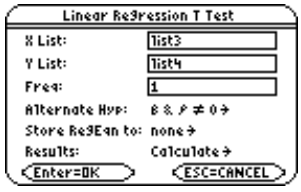
4. Enter the arguments into the fields as shown on the next page.

5. Select the options as shown on the next page for the **Alternate Hyp**, **Store RegEqn to**, and **Results** fields.

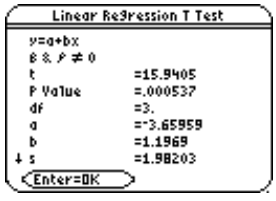
6. Press ENTER ENTER to calculate the results.

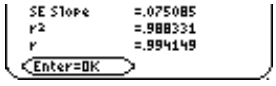
Example (continued)

Input:

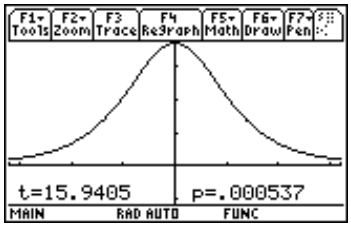


Calculated results:





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

2nd [F6] (**Tests**) → **B:MultRegTests** for the TI-89

[F6] (**Tests**) → **B:MultRegTests** for the TI-92 Plus / Voyage™ 200 PLT

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.
R^2	**rsq**	Coefficient of multiple determination.
Adj R^2	**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.

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_hat=B0+B1*x1+…
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 / Voyage™ 200 PLT

   The **Multiple Regression Tests** dialog box is displayed.

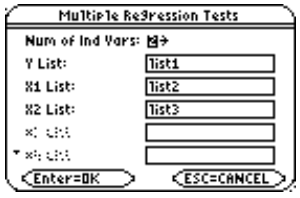
3. If the **Num of Ind Vars** you want is already displayed, press ENTER. If not, press ▶, select the correct number of independent variables, and then press ENTER.

4. Enter the arguments into the fields as shown on the next page.

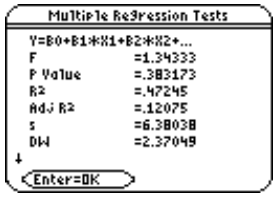
5. Press ENTER to calculate the data.

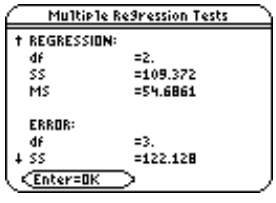
Example (continued)

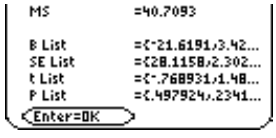
Input:



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 / Voyage™ 200 PLT

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: $\mu_1=\mu_2=\ldots=\mu_k$ is tested against the alternative H_a: not all $\mu_1 \ldots \mu_k$ 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**).

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:

   - 2nd F6 (**Tests**) alpha **C** for the TI-89
   - F6 (**Tests**) **C** for the TI-92 Plus / Voyage™ 200 PLT

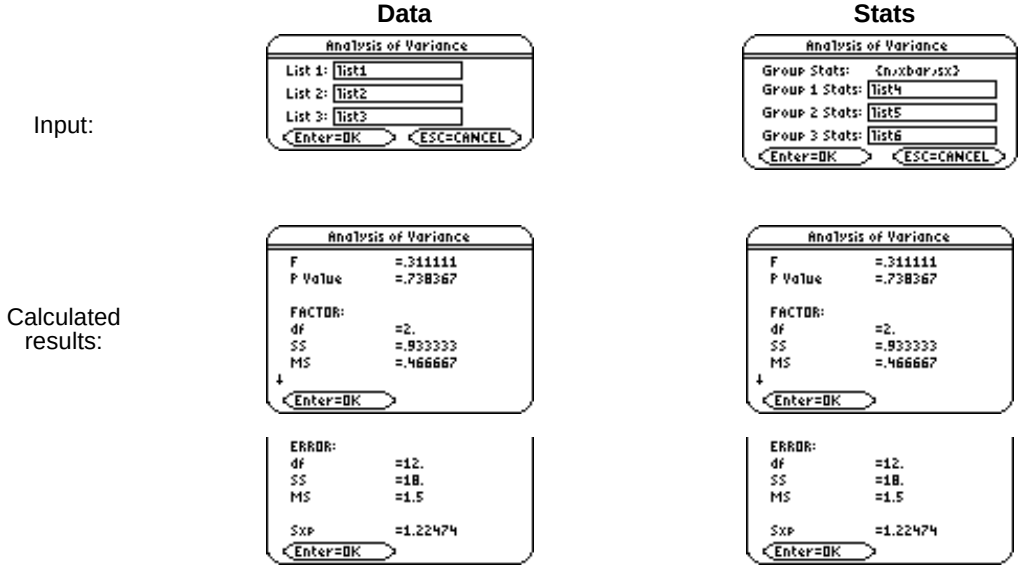
   The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want is already displayed, press ENTER. If the **Data Input Method** you want is not displayed, press ▶ to display the choices (**Data** or **Stats**), highlight one, and then press ENTER ▼.

4. If the **Number of Groups** you want is displayed, press ENTER. If not, press ▶ to display the choices, highlight one, and then press ENTER to select the number of groups. Press 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 ENTER to calculate the results or draw the results.



ANOVA2-Way

Description

2nd [F6] (**Tests**) → **D:ANOVA2-Way** for the TI-89

[F6] (**Tests**) → **D:ANOVA2-Way** for the TI-92 Plus / Voyage™ 200 PLT

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: $\mu_1=\mu_2=...=\mu_k$ is tested against the alternative hypothesis H_a: not all $\mu_1...\mu_k$ 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.

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.

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:

   - [2nd] [F6] (**Tests**) [alpha] **D** for the TI-89
   - [F6] (**Tests**) **D** for the TI-92 Plus / Voyage™ 200 PLT

   The **2-way Analysis of Variance** dialog box is displayed.

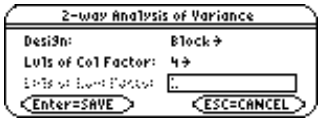
4. If the **Design** you want is displayed, press [ENTER]. If not, press ▶ to display the choices (**Block** or **2 Factor, Eq Reps**), highlight one, and then press [ENTER] ▼.

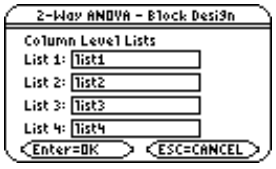
5. If the **Lvls of Col Factor** (**2 - 10**) you want is displayed, press [ENTER]. If not, press ▶ to display the choices, highlight one, and then press [ENTER] [ENTER]. If you are using the **2 Factor, Eq Reps** design you must press [ENTER] ▼. Enter the **Lvls of Row Factor** (choose **2** for this example) then press [ENTER] [ENTER].

Example (continued)

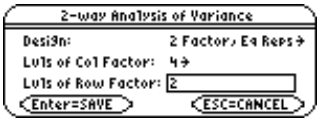
Input:

Block

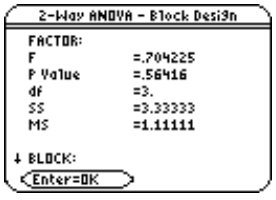


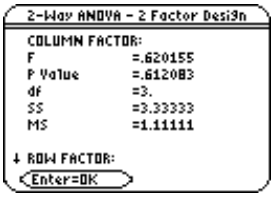


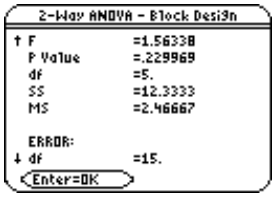
2 Factor, Eq Reps

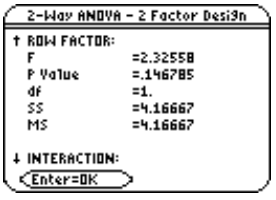


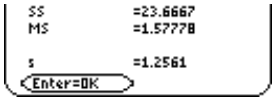
Calculated results:

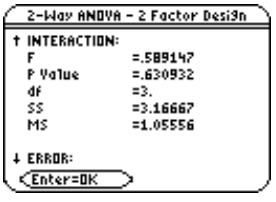


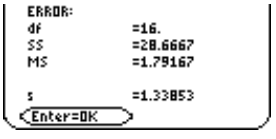












F7 Ints (Intervals) Menu

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

2nd F7 (**Ints**) →**1:ZInterval** for the TI-89

F7 (**Ints**) → **1:ZInterval** for the TI-92 Plus / Voyage™ 200 PLT

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 (*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.
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

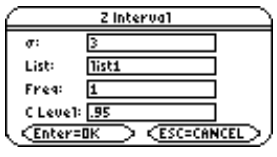
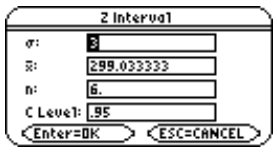
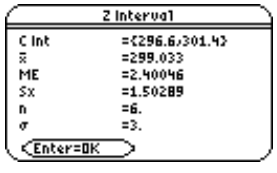
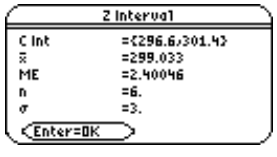
Outputs	Stored to	Description
C Int	**lower, upper**	Confidence interval for an unknown population mean.
$\bar{x}$	**x_bar**	Sample mean of the data sequence from the normal random distribution.
ME	**me**	Margin of error.
Sx	**sx_**	Sample standard deviation.
n	**n**	Length of the data sequence with sample mean.
σ	σ	Known population standard deviation for data sequence **List**.

Example

1. In the list editor, enter: **list1={299.4,297.7,301,298.9,300.2,297}**
2. To select **1:ZInterval**, press:
   - 2nd F7 (**Ints**) **1** for the TI-89
   - F7 (**Ints**) **1** for the TI-92 Plus / Voyage™ 200 PLT

   The **Choose Input Method** dialog box is displayed.
3. If the **Data Input Method** you want to use is already displayed, press ENTER to display the **Z Interval** input dialog box.

   If the **Data Input Method** you want to use is not displayed, press ▶ to display the choices (**Data** or **Stats)**, highlight one, and then press ENTER 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 ENTER to calculate the results.

	Data	**Stats**
Input:		
Calculated results:		

TInterval

Description

2nd [F7] (**Ints**) →**2:TInterval** for the TI-89

[F7] (**Ints**) → **2:TInterval** for the TI-92 Plus / Voyage™ 200 PLT

TInterval (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 (*optional*)	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

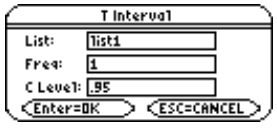
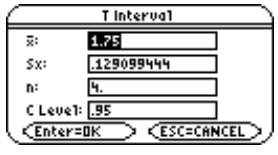
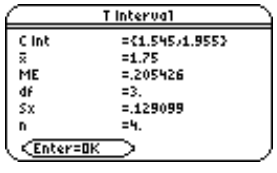
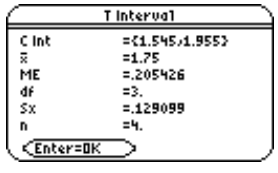
Outputs	Stored to	Description
C Int	**lower, upper**	Confidence interval for an unknown population mean.
$\bar{x}$	**x_bar**	Sample mean of the data sequence from the normal random distribution.
ME	**me**	Margin of error.
df	**df**	Degrees of freedom.
Sx	**sx_**	Sample standard deviation.
n	**n**	Length of the data sequence with sample mean.

Example

1. In the list editor, enter: **list1={1.6,1.7,1.8,1.9}**
2. To select **2:TInterval**, press:
   - 2nd [F7] (**Ints**) **2** for the TI-89
   - [F7] (**Ints**) **2** for the TI-92 Plus / Voyage™ 200 PLT

   The **Choose Input Method** dialog box is displayed.
3. If the **Data Input Method** you want to use is already displayed, press [ENTER] to display the **T Interval** input dialog box.

   If the **Data Input Method** you want to use is not displayed, press ▶ to display the choices (**Data** or **Stats**), highlight one, and then press [ENTER] [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 [ENTER] to calculate the results.

	Data	**Stats**
Input:		
Calculated results:		

2-SampZInt

Description

2nd F7 (**Ints**) →**3:2-SampZInt** for the TI-89

F7 (**Ints**) → **3:2-SampZInt** for the TI-92 Plus / Voyage™ 200 PLT

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

σ1, **σ2**	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 (*optional*)	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

σ1, **σ2**	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.
σ1, σ2	**r1, r2**	Known population standard deviations for data sequence **List 1** and **List 2**.

Example

1. In the list editor, enter:

   list1={154,109,137,115,140}
   list2={108,115,126,92,146}

2. To select **3:2-SampZInt**, press:

   - 2nd F7 (**Ints**) **3** for the TI-89
   - F7 (**Ints**) **3** for the TI-92 Plus / Voyage™ 200 PLT

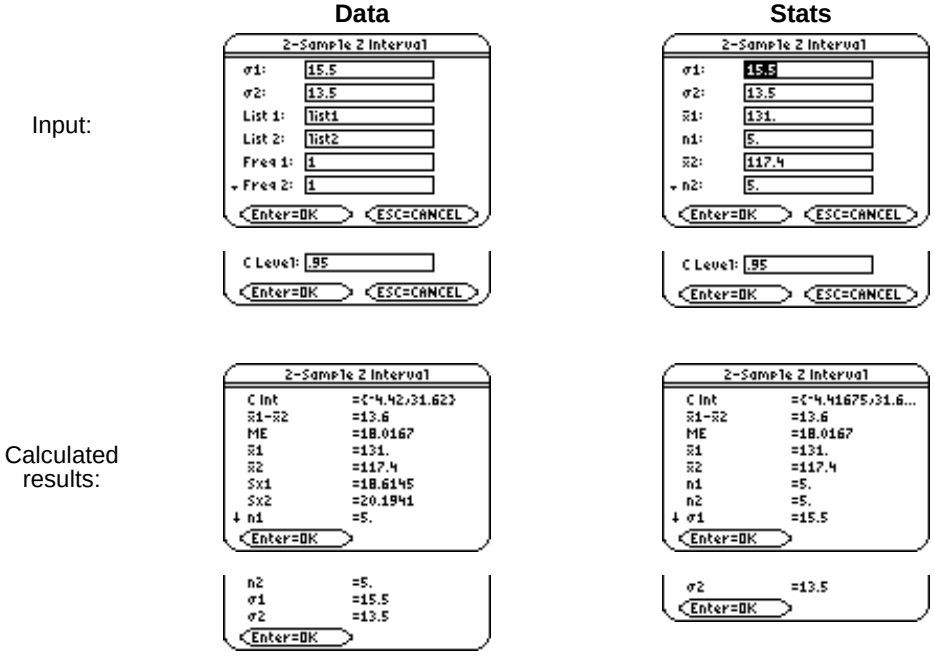
   The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want to use is already displayed, press ENTER to display the **2-Sample Z Interval** input dialog box.

   If the **Data Input Method** you want to use is not displayed, press ▶ to display the choices (**Data** or **Stats**), highlight one, and then press ENTER ENTER to select an input method and display the **2-Sample 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 ENTER to calculate the results.



2-SampTInt

Description

2nd F7 (**Ints**) →**4:2-SampTInt** for the TI-89

F7 (**Ints**) → **4:2-SampTInt** for the TI-92 Plus / Voyage™ 200 PLT

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 (*optional*)	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**.

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:

   - 2nd [F7] (**Ints**) **4** for the TI-89
   - [F7] (**Ints**) **4** for the TI-92 Plus / Voyage™ 200 PLT

   The **Choose Input Method** dialog box is displayed.

3. If the **Data Input Method** you want to use is already displayed, press [ENTER] to display the **2-Sample T Interval** input dialog box.

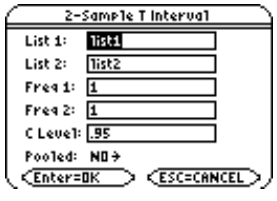
   If the **Data Input Method** you want to use is not displayed, press ▶ to display the choices (**Data** or **Stats**), highlight one, and then press [ENTER] [ENTER] to select an input method and display the **2-Sample T Interval** input dialog box.

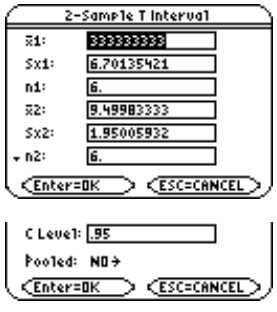
4. Based on the input method you chose, enter the arguments into the fields as shown in either the **Data** or **Stats** input screen below.

5. Press [ENTER] to calculate the results.

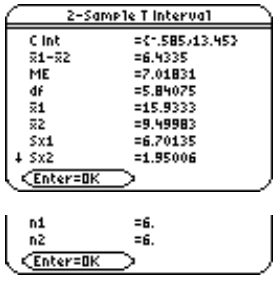
Data **Stats**

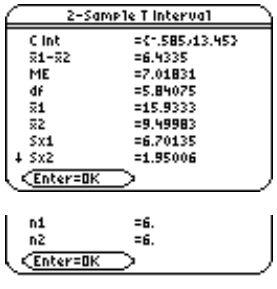
Input:





Calculated results:





1-PropZInt

Description

2nd F7 (**Ints**) →**5:1-PropZInt** for the TI-89

F7 (**Ints**) → **5:1-PropZInt** for the TI-92 Plus / Voyage™ 200 PLT

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.

Example

1. To select **5:1-PropZInt**, press:

   - 2nd F7 (**Ints**) **5** for the TI-89
   - F7 (**Ints**) **5** for the TI-92 Plus / Voyage™ 200 PLT

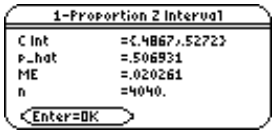
   The **1–Proportion Z Interval** input dialog box is displayed.

2. Enter the arguments into the fields as shown in the input screen below.

3. Press ENTER to calculate the results.

Input:

Calculated results:



2-PropZInt

Description

2nd F7 (**Ints**) →**6:2-PropZInt** for the TI-89

F7 (**Ints**) → **6:2-PropZInt** for the TI-92 Plus / Voyage™ 200 PLT

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 (*optional*)	Confidence level probability with default = .99

Outputs

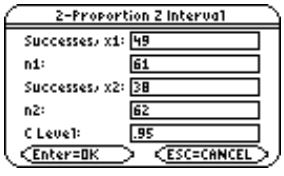
Outputs	Stored to	Description
C Int	**lower, upper**	Confidence interval containing confidence level probability of distribution.
phatdiff	**phatdiff**	The calculated difference between proportions.
ME	**me**	Margin of error.
p1_hat	**p1_hat**	First sample proportion estimate.
p2_hat	**p2_hat**	Second sample proportion estimate.
n1	**n1**	Sample size in data sequence one.
n2	**n2**	Sample size in data sequence two.

Example

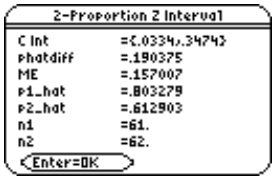
1. To select **6:2-PropZInt**, press:
   - 2nd [F7] (**Ints**) **6** for the TI-89
   - [F7] (**Ints**) **6** for the TI-92 Plus / Voyage™ 200 PLT

   The **2–Proportion Z Interval** input dialog box is displayed.
2. Enter the arguments into the fields as shown in the input screen below.
3. Press [ENTER] to calculate the results.

Input:



Calculated results:



LinRegTInt

Description

2nd F7 (**Ints**) →**7:LinRegTInt** for the TI-89

F7 (**Ints**) → **7:LinRegTInt** for the TI-92 Plus / Voyage™ 200 PLT

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 (*optional*)	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 *(optional)*	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(sum(sum(x-x_bar)^2).
a	**a**	Regression line fit offset and slope parameter estimates.
r^2	**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 F1 (**Tools**) **9:Format**).

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.
r^2	**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**)

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:

   - 2nd [F7] (**Ints**) **7** for the TI-89
   - [F7] (**Ints**) **7** for the TI-92 Plus / Voyage™ 200 PLT

   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 [ENTER] to calculate the results.

Input:

Calculated results:

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

2nd F7 (**Ints**) →**8:MultRegInt** for the TI-89

F7 (**Ints**) → **8:MultRegInt** for the TI-92 Plus / Voyage™ 200 PLT

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_hat** = B0 + B1 * xl +...
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.
B List	**blist**	List of regression coefficients, {B0,B1,...}.
X Values	**xvalist**	The input X values at which y_hat is calculated.
resid*	**resid**	Residuals of the curves fit y = B0 + B1 * x1 + B2 * x2 +...

* 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={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:

   - 2nd [F7] (**Ints**) **8** for the TI-89
   - [F7] (**Ints**) **8** for the TI-92 Plus / Voyage™ 200 PLT

   The **Mult Reg Pt Estimate & Intervals** input dialog box is displayed.

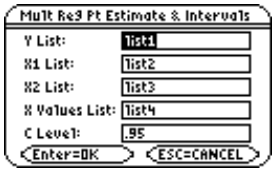
3. If the **Num of Ind Vars** you want is displayed, press [ENTER]. If not, press ▶ to display the choices, select one, and press [ENTER] to select the number of independent variables and display the **Mult Reg Pt Estimate & Intervals** dialog box. (For this example, choose **2** as the **Num of Ind Vars**)

3. Enter the list names and the **C Level** into the fields as shown in the input screen below.

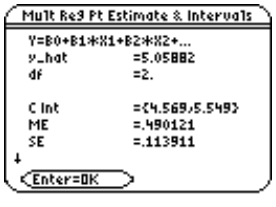
4. Press [ENTER] to calculate the results.

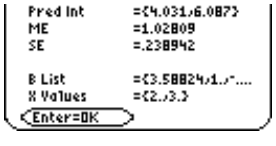
Data

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.