



Reference Guide for the TI-84 Plus CE Graphing Calculator

**Catalog, Commands and Functions, Error Messages
Arithmetic Operations, Test Relations, and Symbols**

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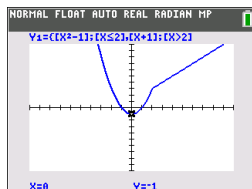
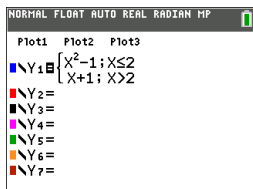
What's New

What's New in the TI-84 Plus CE Reference Guide:

All items listed are new or updated entries in the Reference Guide for the TI-84 Plus CE Graphing Calculator.

Piecewise

- New piecewise function to support entry of functions as they are seen in textbook. This command can be found in $\boxed{\text{math}}$ MATH **B**:**piecewise**(.



- New CONDITIONS submenu in $\boxed{2nd}$ [test] supports faster entry of intervals for piecewise functions.
- Available for use in all function graphing modes and all split screen modes.

Introduction

In this Reference Guide you will find the following information:

- [CATALOG, Strings, Hyperbolic Functions](#) - Includes instructions on browsing, using, entering strings, and other functions in the CATALOG.
- [Commands and Functions Listing](#) - Includes an [alphabetical listing](#) of all CATALOG items, referencing:
 - Function or Instruction/Arguments
 - Results
 - Key or Keys/Menu or Screen/Item
- [Arithmetic Operations, Test Relations, and Symbols](#) - Items whose names are not alphabetic (such as +, !, and >).
- [Error Messages](#) - Includes a listing of error types with possible causes and suggested remedies.

CATALOG, Strings, Hyperbolic Functions

What Is the CATALOG?

The CATALOG is an alphabetical list of all functions and instructions on the TI-84 Plus CE. You also can access each CATALOG item from a menu or the keyboard, except:

- The six string functions
- The six hyperbolic functions
- The **solve(** instruction without the equation solver editor
- The inferential stat functions without the inferential stat editors

Note: The only CATALOG programming commands you can execute from the home screen are **GetCalc(**, **Get(**, and **Send(**.

Browsing the TI-84 Plus CE Catalog

Selecting an Item from the CATALOG

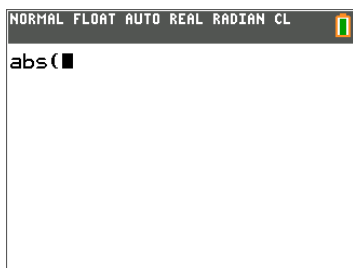
To browse and select a **CATALOG** item, follow these steps.

1. Press $\boxed{2\text{nd}}$ $\boxed{[\text{catalog}]}$ to display the **CATALOG**.



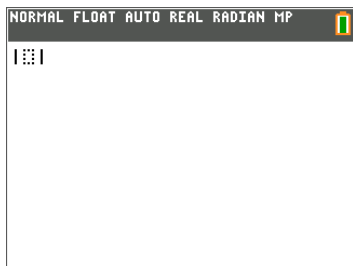
The \blacktriangleright in the first column is the selection cursor.

2. Press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ to scroll the **CATALOG** until the selection cursor points to the item you want.
 - To jump to the first item beginning with a particular letter, press that letter; alpha-lock is on.
 - Items that begin with a number are in alphabetical order according to the first letter after the number. For example, **2-PropZTest**(is among the items that begin with the letter **P**.
 - Functions that appear as symbols, such as $+$, $^{-1}$, $<$, and $\sqrt{\quad}$, follow the last item that begins with **Z**. To jump to the first symbol, **I**, press $\boxed{[0]}$.
3. Press $\boxed{\text{enter}}$ to paste the item to the current screen.

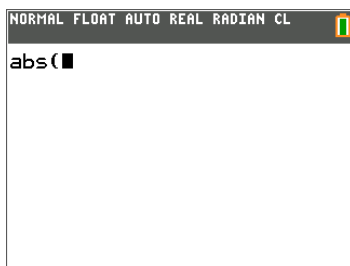


Note:

- From the top of the **CATALOG** menu, press $\boxed{\uparrow}$ to move to the bottom. From the bottom, press $\boxed{\downarrow}$ to move to the top.
- When your TI-84 Plus CE is in MathPrint™ mode, many functions will paste the MathPrint™ template on the home screen. For example, **abs**(pastes the absolute value template on the home screen instead of **abs**(.



MathPrint™



Classic

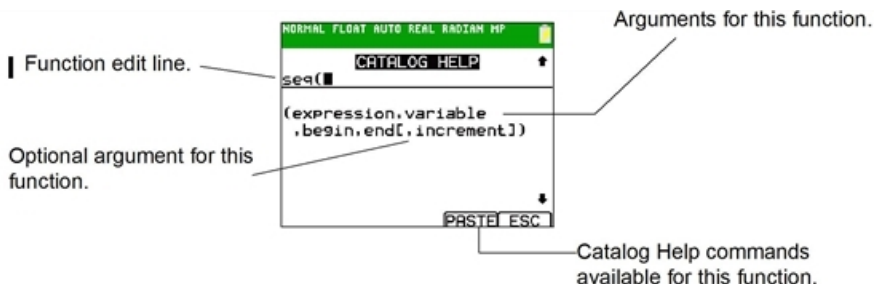
Using Catalog Help

Displaying Catalog Help

You can display Catalog Help arguments for functions in two ways:

- Using an alpha/numeric function listing in the catalog (e.g., $\boxed{2nd}$ [catalog]).
- Using the functions listed in certain menus (e.g., \boxed{math}).

Catalog Help lists the valid arguments for the function under the edit line. Arguments in brackets are optional.




1. Display the menu that contains the function.
2. Use $\boxed{\uparrow}$ and/or $\boxed{\downarrow}$ to move the cursor to the function.
3. Press $\boxed{+}$ to display arguments for the function. The cursor is on the function edit line.

Note:

- The catalog ($\boxed{2nd}$ [catalog]) is displayed in alphabetical order. When you display the catalog, the alpha-lock is turned on. Press the first letter of the function name to skip function names that come before it alphabetically. Use $\boxed{\uparrow}$ and/or $\boxed{\downarrow}$ to move the cursor to the function.
- Not all catalog functions have associated arguments. If the function does not require an argument, Catalog Help displays the message ***"No arguments required for this item."***

Catalog Help Commands

- Select **MORE** (if available) to display more arguments for the function.

NORMAL FLOAT AUTO REAL RADIAN MP 

CATALOG HELP ↑


dim(

(listname)

(matrixname)

↓

MORE | PASTE| ESC |

NORMAL FLOAT AUTO REAL RADIAN MP 

CATALOG HELP ↑

Disp ■


[valueA,valueB,valueC,....
value n]

no arguments

↓

PASTE| ESC |

- Use shortcut menus α [f1] through [f4] through for argument values if available.

NORMAL FLOAT AUTO REAL RADIAN MP 

CATALOG HELP ↑

LinReg(a+bx) L1,L2,

[Xlistname,Ylistname
,frealist,regesq]


1:	Y1	6:	Y6
2:	Y2	7:	Y7
3:	Y3	8:	Y8
4:	Y4	9:	Y9
5:	Y5	0:	Y0

↓

FRAC|FUNC| **VAR**

- Enter your argument values on the function edit line, and then select **PASTE** to paste the function and the argument values you entered.

Note: You can paste to most cursor locations.

NORMAL FLOAT AUTO REAL RADIAN MP 

CATALOG HELP ↑

LinReg(a+bx) L1,L2,Y3 ■

[Xlistname,Ylistname
,frealist,regesq]

↓

PASTE| ESC |

- Select **ESC** to exit the Catalog Help screen.

Entering and Using Strings

What Is a String?

A string is a sequence of characters that you enclose within quotation marks. On the TI-84 Plus CE, a string has two primary applications.

- It defines text to be displayed in a program.
- It accepts input from the keyboard in a program.

Characters are the units that you combine to form a string.

- Each number, letter, and space counts as one character.
- Each instruction or function name, such as **sin**(or **cos**(, counts as one character; the TI-84 Plus CE interprets each instruction or function name as one character.

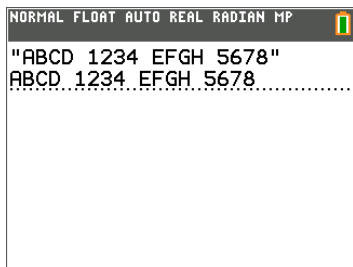
Entering a String

To enter a string on a blank line on the home screen or in a program, follow these steps.

1. Press $\boxed{\text{alpha}}$ $\boxed{[]}$ to indicate the beginning of the string.
2. Enter the characters that comprise the string.
 - Use any combination of numbers, letters, function names, or instruction names to create the string.
 - To enter a blank space, press $\boxed{\text{alpha}}$ $\boxed{[_]}$.
 - To enter several alpha characters in a row, press $\boxed{\text{alpha}}$ $\boxed{[A\text{-lock}]}$ to activate alpha-lock.
3. Press $\boxed{\text{alpha}}$ $\boxed{[]}$ to indicate the end of the string.

"string"

4. Press $\boxed{\text{enter}}$. On the home screen, the string is displayed on the next line without quotations. An ellipsis (...) indicates that the string continues beyond the screen. To scroll to see the entire string, press $\boxed{\blacktriangleright}$ and $\boxed{\blacktriangleleft}$.



Note: A string must be enclosed in quotation marks. The quotation marks do not count as string characters.

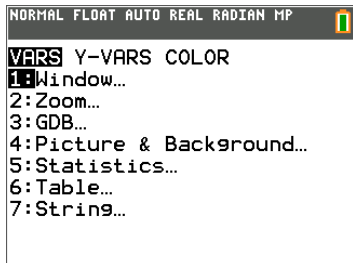
Storing Strings to String Variables

String Variables

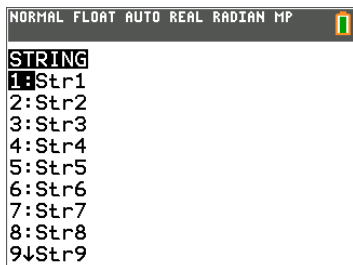
The TI-84 Plus CE, has 10 variables to which you can store strings. You can use string variables with string functions and instructions.

To display the **VAR** **STRING** menu, follow these steps.

1. Press **[vars]** to display the **VAR** menu. Move the cursor to **7:String**.



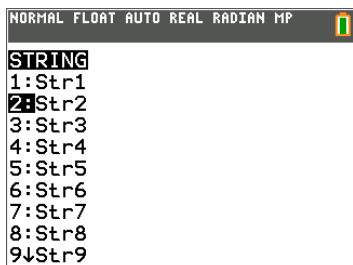
2. Press **[enter]** to display the **STRING** secondary menu.



Storing a String to a String Variable

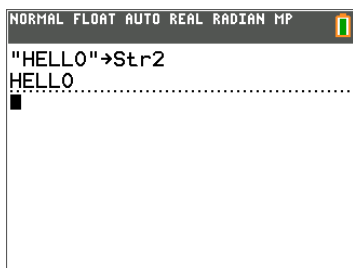
To store a string to a string variable, follow these steps.

1. Press **[alpha]** **["]**, enter the string, and press **[alpha]** **["]**.
2. Press **[sto→]**.
3. Press **[vars]** **7** to display the **VAR** **STRING** menu.
4. Select the string variable (from **Str1** to **Str9**, or **Str0**) to which you want to store the string.



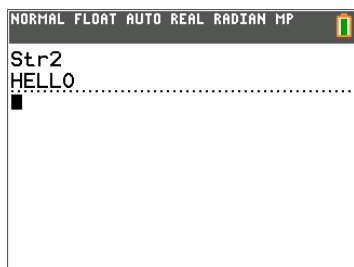
The string variable is pasted to the current cursor location, next to the store symbol (→).

5. Press `enter` to store the string to the string variable. On the home screen, the stored string is displayed on the next line without quotation marks.



Displaying the Contents of a String Variable

To display the contents of a string variable on the home screen, select the string variable from the **VARS STRING** menu, and then press `enter`. The string is displayed.



String Functions and Instructions in the CATALOG

Displaying String Functions and Instructions in the CATALOG

String functions and instructions are available only from the CATALOG. The table below lists the string functions and instructions in the order in which they appear among the other CATALOG menu items. The ellipses in the table indicate the presence of additional CATALOG items.

CATALOG	
...	
Equ►String(Converts an equation to a string.
...	
expr(Converts a string to an expression.
...	
inString(Returns a character's place number.
...	
length(Returns a string's character length.
...	
String►Equ(Converts a string to an equation.
sub(Returns a string subset as a string.
...	

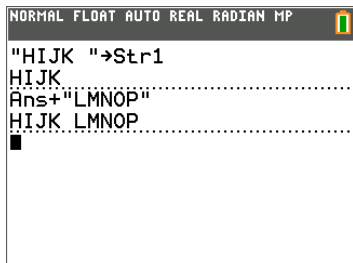
Concatenation

To concatenate two or more strings, follow these steps.

1. Enter *string1*, which can be a string or string name.
2. Press $\boxed{+}$.
3. Enter *string2*, which can be a string or string name. If necessary, press $\boxed{+}$ and enter *string3*, and so on.

string1+string2+string3...

4. Press $\boxed{\text{enter}}$ to display the strings as a single string.



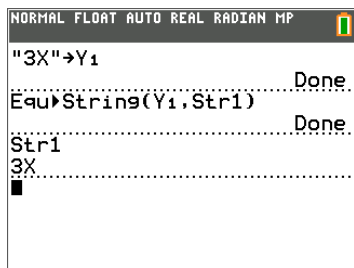
Selecting a String Function from the CATALOG

To select a string function or instruction and paste it to the current screen, follow the steps for selecting an item from the CATALOG.

EquString(

EquString(converts an equation to a string. The equation must be stored in a VARS Y-VARS variable. Y_n contains the equation. **Str n** (from **Str1** to **Str9**, or **Str0**) is the string variable to which you want the equation to be stored.

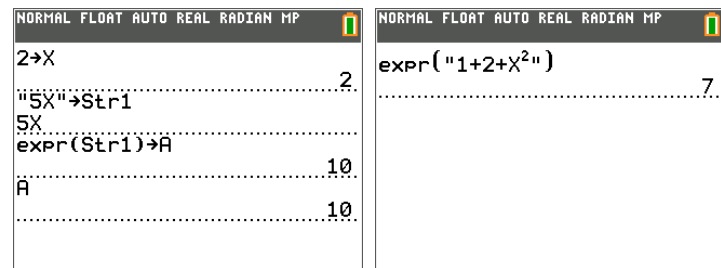
EquString(Y_n ,Str n)



expr(

expr(converts the character string contained in *string* to an expression and executes the expression. *string* can be a string or a string variable.

expr(string)



inString(

inString(returns the character position in *string* of the first character of *substring*. *string* can be a string or a string variable. *start* is an optional character position at which to start the search; the default is 1.

inString(string,substring[,start])


```

NORMAL FLOAT AUTO REAL RADIAN MP
inString("PQRSTUVWXYZ", "STU")
.....
4
inString("ABCABC", "ABC", 4)
.....
4

```

Note: If *string* does not contain *substring*, or *start* is greater than the length of *string*, **inString(** returns **0**.

length(

length(returns the number of characters in *string*. *string* can be a string or string variable.

Note: An instruction or function name, such as **sin(** or **cos(**, counts as one character.

length(string)

```

NORMAL FLOAT AUTO REAL RADIAN MP
"WXYZ"→Str1
WXYZ
length(Str1)
.....
4

```

String→Equ(

String→Equ(converts *string* into an equation and stores the equation to **Yn**. *string* can be a string or string variable. **String→Equ(** is the inverse of **Equ→String(**.

String→Equ(string, Yn)

<pre> NORMAL FLOAT AUTO REAL RADIAN MP "2X"→Str2 2X String→Equ(Str2, Y2) Done </pre>	<pre> NORMAL FLOAT AUTO REAL RADIAN MP Plot1 Plot2 Plot3 Y1= Y2=2X Y3= Y4= Y5= Y6= Y7= Y8= Y9= </pre>
--	---

sub(

sub(returns a string that is a subset of an existing *string*. *string* can be a string or a string variable. *begin* is the position number of the first character of the subset. *length* is the number of characters in the subset.

sub(string,begin,length)

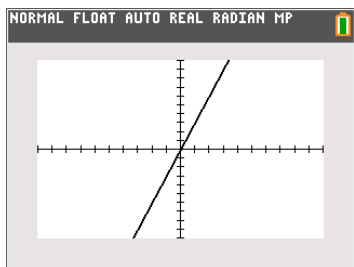
```
NORMAL FLOAT AUTO REAL RADIAN MP
"ABCDEFG"→Str5
ABCDEFG
sub(Str5,4,2)
DE
```

Entering a Function to Graph during Program Execution

In a program, you can enter a function to graph during program execution using these commands.

```
NORMAL FLOAT AUTO REAL RADIAN MP
PROGRAM: INPUT
:Input "ENTRY=",Str3
:String→Equ(Str3,Y3)
:DispGraph
:■
```

```
NORMAL FLOAT AUTO REAL RADIAN MP
prgmINPUT
ENTRY=3X■
```



Note: When you execute this program, enter a function to store to **Y3** at the **ENTRY=** prompt.

Hyperbolic Functions in the CATALOG

Hyperbolic Functions

The hyperbolic functions are available only from the CATALOG. The table below lists the hyperbolic functions in the order in which they appear among the other CATALOG menu items. The ellipses in the table indicate the presence of additional CATALOG items.

CATALOG	
...	
<code>cosh(</code>	Hyperbolic cosine
<code>cosh⁻¹(</code>	Hyperbolic arccosine
...	
<code>sinh(</code>	Hyperbolic sine
<code>sinh⁻¹(</code>	Hyperbolic arcsine
...	
<code>tanh(</code>	Hyperbolic tangent
<code>tanh⁻¹(</code>	Hyperbolic arctangent
...	

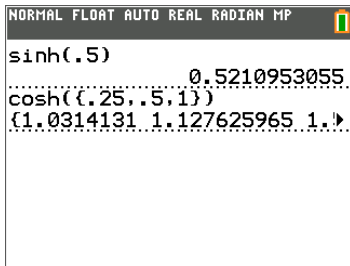
`sinh(`, `cosh(`, `tanh(`

`sinh(`, `cosh(`, and `tanh(` are the hyperbolic functions. Each is valid for real numbers, expressions, and lists.

`sinh(value)`

`cosh(value)`

`tanh(value)`



`sinh-1(`, `cosh-1(`, `tanh-1(`

`sinh-1(` is the hyperbolic arcsine function. `cosh-1(` is the hyperbolic arccosine function. `tanh-1(` is the hyperbolic arctangent function. Each is valid for real numbers, expressions, and lists.

`sinh-1(value)`

`cosh-1(value)`

`tanh-1(value)`

```
NORMAL FLOAT AUTO REAL RADIAN MP
sinh⁻¹({0,1})
{0.881373587}
tanh⁻¹(-.5)
-0.5493061443
█
```

Commands and Functions Listing

The purpose of this table of information is to provide a short description with syntax of command arguments as appropriate and menu locations for each command or function in the [Catalog listing](#) in the calculator.

This table is useful for executing commands when using the calculator or creating TI-Basic programs.

Items whose names are not alphabetic (such as +, !, and >) are listed in the [Arithmetic Operations, Test Relations, and Symbols](#) section. Unless otherwise specified, all examples in this section were performed in the default reset mode, and all variables are assumed to be the default value of 0.

From the **CATALOG**, you can paste any function or command to the home screen or to a command line in the program editor.

The same syntax information for function and command arguments below is available on the calculator and also in the TI Connect™ CE Program Editor.

- On the calculator, pressing [+] when a function or command is highlighted in the menu listing will display the Catalog Help syntax editor to assist your entries.
- Using TI Connect™ CE Program Editor, the catalog listing also displays the syntax of the arguments for functions and commands.

Note that some functions and commands are only valid when executed in a TI-Basic program and not from the home screen.

The items in this table appear in the same order as they appear in the **CATALOG** ([\[2nd\]](#) [catalog].)

In the table below, the † symbol indicates either keystrokes or certain commands which are only available in the Program Editor mode on the calculator. Press [\[prgm\]](#) and select to **EDIT** an existing program or **NEW** to start a new program to set the calculator in the Program Edit mode.

Some arguments are optional. Optional arguments will be indicated within [] in the syntax help given in the table below. [] are not symbols on the calculator and are not to be typed in. They are used here only to indicate an optional argument.

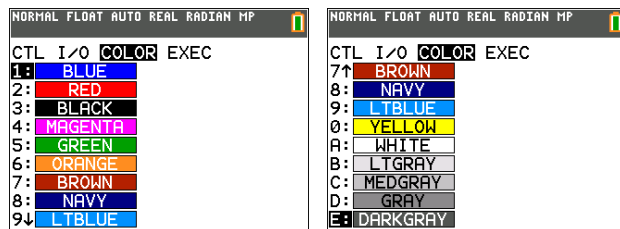
On the calculator, functions and commands paste as "tokens." This means they paste as one character and not as individual letters, symbols and spaces. Do not attempt to type in any function or command on the calculator. Just paste the token from menu locations. Watch the cursor jump over tokens as you edit to get a better understanding of tokens.

In TI Connect™ CE Program Editor, you can "feel" the same experience of pasting tokens when using the Catalog tree provided in that editor. You also can type in the functions and commands if you know the correct format and syntax. TI Connect™ CE "tokenizes" the functions and commands when you send the program to the calculator. However, you must type in the functions and commands exactly as the tokens. Note that some commands will have spaces as part of the token which you might not see. **For example**, Pause command as a token has a space at the end. Once you send the

program to the calculator, you can run the program and if there are any syntax errors, you can fix the issues on either the calculator or in TI Connect™ CE Program Editor.

CTL	I/O	COLOR	EXEC
		Color Numbers	Names
		10	BLUE
		11	RED
		12	BLACK
		13	MAGENTA
		14	GREEN
		15	ORANGE
		16	BROWN
		17	NAVY
		18	LTBLUE
		19	YELLOW
		20	WHITE
		21	LTGRAY
		22	MEDGRAY
		23	GRAY
		24	DARKGRAY

You can also choose a name in the `[vars]` menu (**COLOR** sub-menu).



GraphColor(*function#*,*color#*)

For example, **GraphColor(2,4)** or **GraphColor(2,MAGENTA)**.

Alpha CATALOG Listing

A

abs()

abs(*value*)

Returns the absolute value of a real number, expression, list, or matrix.

MATH
NUM
1:abs(

abs()

abs(*complex value*)

Returns the magnitude of a complex number or list.

MATH
CMPLX
5:abs(

and

valueA **and** *valueB*

Returns 1 (true) when both *valueA* and *valueB* are true. Otherwise, return is 0 (false).

valueA and *valueB* can be real numbers, expressions, or lists.

TI Connect™ Program Editor Tip:

Notice the token is "_and_" where "_" is a space.

2nd **[TEST]**
LOGIC
1:and

angle()

angle(*value*)

Returns the polar angle of a complex number or list of complex numbers.

MATH
CMPLX
4:angle(

ANOVA()

ANOVA(*list1,list2,list3,...,list20*)

Performs a one-way analysis of variance for comparing the means of two to 20 populations.

STAT
TESTS
H:ANOVA(

Ans

Ans

Returns the last answer.

2nd **[ANS]**

Archive

Archive *variables*

[2nd] [MEM]

Moves the specified *variable* from RAM to the user data archive memory.

5:Archive

Asm()

Asm(*assemblyprgname*)

[2nd]

Executes an assembly language program.

[CATALOG]

Asm(

AsmComp()

AsmComp(*prgmASM1, prgmASM2*)

[2nd]

Compiles an assembly language program written in ASCII and stores the hex version.

[CATALOG]

AsmComp(

Asm84CEPrgm

Asm84CEPrgm

[2nd] [CATALOG]

Must be used as the first line of an assembly language program.

Asm84CEPrgm

augment()

augment(*matrixA, matrixB*)

[2nd] [MATRIX]

Returns a matrix, which is *matrixB* appended to *matrixA* as new columns.

MATH

7:augment(

augment()

augment(*listA, listB*)

[2nd] [LIST]

Returns a list, which is *listB* concatenated to the end of *listA*.

OPS

9:augment(

AUTO Answer

AUTO

[MODE]

Displays answers in a similar format as the input.

Answers:

AUTO

AxesOff

AxesOff

+ [2nd]

AxesOff

Turns off the graph axes.

[FORMAT]
AxesOff

AxesOn

AxesOn[*color*#]

Turns on the graph axes with color. The *color* option allows the color of the axes to be specified.

Color#: 10 - 24 or color name pasted from [vars] COLOR..

+ [2nd]
[FORMAT]
AxesOn

$a+bi$

$a+bi$

Sets the mode to rectangular complex number format ($a+bi$).

+ [MODE]
 $a+b i$

B

BackgroundOff

BackgroundOff

Turns off background image in the graph area.

+ [2nd] [DRAW]
BACKGROUND
2:BackgroundOff:

BackgroundOn

BackgroundOn *n*

Displays a menu the Background Image Var *n* (Image#*n*) specified in the graph area.

+ [2nd] [DRAW]
BACKGROUND
1:BackgroundOn

bal(**bal**(*npmt* [, *roundvalue*])

Computes the balance at *npmt* for an amortization schedule using stored values for **PV**, **I%**, and **PMT** and rounds the computation to *roundvalue*.

[APPS]

1:Finance
CALC
9:bal(

binomcdf(**binomcdf**(*numtrials*, *p*, *x*)

Computes a cumulative probability at *x* for the discrete binomial distribution with the specified *numtrials* and probability *p* of success on each trial.

[2nd] [DISTR]

DISTR
B:binomcdf(

binompdf(**binompdf**(*numtrials*, *p*, *x*)

Computes a probability at *x* for the discrete binomial distribution with the specified *numtrials* and probability *p* of success on each trial.

[2nd] [DISTR]

DISTR
A:binompdf(

BorderColor**BorderColor**[*color#*]

Turns on a border color surrounding the graph area with the specified color. Color #: 1-4.

+ [2nd]

[FORMAT]

BorderColor

Boxplot**Boxplot** Plot#(*type*, *Xlist*, [*frequlist*, *color#*])

Defines Plot# (1, 2, or 3) of type

+ [2nd]

[stat plot]

TYPE

C**checkTmr(****checkTmr**(*starttime*)

Returns the number of seconds since you used **startTmr** to start the timer. The *starttime* is the value displayed by **startTmr**.

[2nd] [CATALOG]

checkTmr(

χ^2 cdf(

χ^2 cdf(*lowerbound*,*upperbound*,*df*)

2nd [DISTR]
DISTR
8: χ^2 cdf(

Computes the χ^2 distribution probability between *lowerbound* and *upperbound* for the specified degrees of freedom *df*.

χ^2 pdf(

χ^2 pdf(*x*,*df*)

2nd [DISTR]
DISTR
7: χ^2 pdf(

Computes the probability density function (pdf) for the χ^2 distribution at a specified *x* value for the specified degrees of freedom *df*.

χ^2 -Test(

χ^2 -Test(*observedmatrix*,*expectedmatrix*
[,*drawflag*,*color#*])

+ [STAT]
TESTS
C: χ^2 - Test
(

Performs a chi-square test. *drawflag*=1 draws results; *drawflag*=0 calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

χ^2 GOF

χ^2 GOF-Test(*observedlist*,*expectedlist*,*df*
[,*drawflag*,*color#*])

+ [STAT]
TESTS
D: χ^2 GOF -
Test(

Performs a test to confirm that sample data is from a population that conforms to a specified distribution.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Circle(

Circle(*X*,*Y*,*radius*[,*color#*,*linestyle#*])

2nd [DRAW]
DRAW
9: Circle(

Draws a circle with center (*X*,*Y*) and *radius* with specified

Color#: 10 - 24 or color name pasted from [vars] COLOR.

linestyle#: 1-2.

CLASSIC

CLASSIC

Displays inputs and outputs on a single line, such as $1/2+3/4$.

[MODE]
CLASSIC

Clear Entries

Clear Entries

Clears the contents of the Last Entry storage area.

[2nd] [MEM]
MEMORY
3:Clear
Entries

ClockOff

ClockOff

Turns off the clock display in the mode screen.

[2nd]
[CATALOG]
ClockOff

ClockOn

ClockOn

Turns on the clock display in the mode screen.

[2nd]
[CATALOG]
ClockOn

ClrAllLists

ClrAllLists

Sets to **0** the dimension of all lists in memory.

[2nd] [MEM]
MEMORY
4:ClrAllLists

ClrDraw

ClrDraw

Clears all drawn elements from a graph or drawing.

[2nd] [DRAW]
DRAW
1:ClrDraw

ClrHome

ClrHome

Clears the home screen.

+ [PRGM]
I/O
8:ClrHome

ClrList

ClrList*listname1[,listname2, ...,listname n]*

[STAT]

EDIT

4:ClrList

Sets the dimension of one or more listnames to 0.

ClrTable

ClrTable

+ **[PRGM]**

I/O

9:ClrTable

Clears all values from the table.

conj(

conj(*value*)

[MATH]

CMPLX

1:conj(

Returns the complex conjugate of a complex number or list of complex numbers.

CoordOff

CoordOff

+ **[2nd]**

[FORMAT]

CoordOff

Turns off cursor coordinate value display.

CoordOn

CoordOn

+ **[2nd]**

[FORMAT]

CoordOn

Turns on cursor coordinate value display.

cos(

cos(*value*)

[COS]

Returns cosine of a real number, expression, or list.

\cos^{-1} (

\cos^{-1} (*value*)

[2nd] [cos⁻¹]

Returns arccosine of a real number, expression, or list.

cosh(

cosh(*value*)

[2nd]

cosh(

Returns hyperbolic cosine of a real number, expression, or list.

[CATALOG]

cosh(

cosh⁻¹(**cosh⁻¹(value)**

Returns hyperbolic arccosine of a real number, expression, or list.

[2nd]

[CATALOG]

cosh⁻¹(**CubicReg****CubicReg** [*Xlistname*, *Ylistname*, *freqlist*, *regequ*]

[STAT]

CALC

6:CubicReg

Fits a cubic regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.**cumSum(****cumSum(list)**Returns a list of the cumulative sums of the elements in *list*, starting with the first element.

[2nd] [LIST]

OPS

6:cumSum(

cumSum(**cumSum(matrix)**Returns a matrix of the cumulative sums of *matrix* elements. Each element in the returned matrix is a cumulative sum of a *matrix* column from top to bottom.

[2nd] [MATRIX]

MATH

0:cumSum(

D

dayOfWk(

dayOfWk(*year,month,day*)

Returns an integer from 1 to 7, with each integer representing a day of the week. Use **dayOfWk**(to determine on which day of the week a particular date would occur. The *year* must be 4 digits; *month* and *day* can be 1 or 2 digits.

2nd [CATALOG]

dayOfWk(
1:Sunday
2:Monday
3:Tuesday...

dbd(

dbd(*date1,date2*)

Calculates the number of days between *date1* and *date2* using the actual-day-count method.

[APPS]

1:Finance
CALC
D:dbd(

DEC Answers

DEC

Displays answers as integers or decimal numbers.

[MODE]

Answers:
DEC

►Dec

value►Dec

Displays a real or complex number, expression, list, or matrix in decimal format.

[MATH]

MATH
2: ► Dec

Degree

Degree

Sets degree angle mode.

+ [MODE]

Degree

DelVar

DelVar *variable*

Deletes from memory the contents of *variable*.

+ [PRGM]

CTL
G:DelVar

DependAsk

DependAsk

Sets table to ask for dependent-variable values.

+ **2nd** [TBLSET]

Depend: Ask

DependAuto

DependAuto

Sets table to generate dependent-variable values automatically.

+ [2nd]
[TBLSET]
Depend:
Auto

det(

det(*matrix*)

Returns determinant of *matrix*.

[2nd]
[MATRIX]
MATH
1:det(

DetectAsymOff

DetectAsymOff

Turns off checks for rational function asymptotes when graphing. Impacts graph speed. Does not perform extra calculations to detect asymptotes pixel to pixel while graphing. Pixels will connect across the screen even across an asymptote.

+ [2nd] [FORMAT]
DetectAsymOff

DetectAsymOn

DetectAsymOn

Turns on checks for rational function asymptotes when graphing. Impacts graph speed. Performs more calculations and will not connect pixels across an asymptote on a graph.

+ [2nd] [FORMAT]
DetectAsymOn

DiagnosticOff

DiagnosticOff

Sets diagnostics-off mode; r , r^2 , and R^2 are not displayed as regression model results.

[2nd] [CATALOG]
DiagnosticOff

DiagnosticOn

DiagnosticOn

2nd [CATALOG]

DiagnosticOn

Sets diagnostics-on mode; r , r^2 , and R^2 are displayed as regression model results.

dim(

dim(*listname*)

2nd [LIST]

OPS

3:dim(

Returns the dimension of *listname*.

dim(

dim(*matrixname*)

2nd

[MATRIX]

MATH

3:dim(

Returns the dimension of *matrixname* as a list.

dim(

length→dim(*listname*)

2nd [LIST]

OPS

3:dim(

Assigns a new dimension (*length*) to a new or existing *listname*.

dim(

{*rows,columns*}→dim(*matrixname*)

2nd [MATRIX]

MATH

3:dim(

Assigns new dimensions to a new or existing *matrixname*.

Disp

Disp

+ **PRGM**

I/O

3:Disp

Displays the home screen.

Disp

Disp [*valueA,valueB,valueC,...,value n*]

+ **PRGM**

I/O

3:Disp

Displays each value.

DispGraph

DispGraph

Displays the graph.

+ [PRGM]

I/O

4:DispGraph

DispTable

DispTable

Displays the table.

+ [PRGM]

I/O

5:DispTable

►DMS

value►DMS

Displays *value* in DMS format.

[2nd]

[ANGLE]

ANGLE

4: ► DMS

Dot-Thick

Dot-Thick

Sets dot plotting mode; resets all Y=editor graph-style settings to Dot-Thick.

+ [MODE]

Dot-Thick

Dot-Thin

Dot-Thin

Sets dot plotting mode; resets all Y=editor graph-style settings to Dot-Thin.

+ [MODE]

Dot-Thin

DrawF

DrawF*expression*[*color*#]

Draws *expression* (in terms of **X**) on the graph with specified

Color#:10 - 24 or color name pasted from [vars] COLOR.

[2nd] [DRAW]

DRAW

6:DrawF

DrawInv

DrawInv*expression*[*color*#]

2nd **[DRAW]**
DRAW
8:DrawInv

Draws the inverse of *expression* by plotting **X** values on the y-axis and **Y** values on the x-axis with specified

Color#: 10 - 24 or color name pasted from [vars] COLOR.

DS<(

DS<(*variable,value*):*commandA:commands*

+ **[PRGM]**
CTL
B:DS<(

Decrements *variable* by 1; skips *commandA* if *variable* < *value*.

E

e

e

2nd **[e]**

Returns decimal approximation of the constant **e**.

e^(

e^(*power*)

2nd **[e^x]**

Returns **e** raised to *power*.

e^(

e^(*list*)

2nd **[e^x]**

Returns a list of **e** raised to a *list* of powers.

E

Exponent:

*value***E***exponent*

2nd **[EE]**

Returns *value* times 10 to the *exponent*.

E

Exponent:

*list***E***exponent*

2nd **[EE]**

Returns *list* elements times 10 to the *exponent*.

E

Exponent:

matrixExponent

2nd **[EE]**

Returns *matrix* elements times 10 to the *exponent*.

►Eff(

►Eff(*nominal rate*,
compounding periods)

[APPS] 1:Finance
CALC
C: ► Eff(

Computes the effective interest rate.

Else

Else

See [If:Then:Else](#)

End

End

† **[PRGM]**
CTL
7:End

Identifies end of **For**(, **If-Then-Else**, **Repeat**, or **While** loop.

Eng

Eng

† **[MODE]**
Eng

Sets engineering display mode.

Equ►String(

Equ►String(**Y=** *var*,**Strn**)

2nd
[CATALOG]
Equ ► String
(

Converts the contents of a **Y=** *var* to a string and stores it in **Strn**

eval(

eval(*expression*)

† **[PRGM]**
I/O
C:eval(

Returns an evaluated expression as a string with 8 significant digits. The expression must be real.

eval(**eval**(*expression*)

Returns an evaluated expression as a string with 8 significant digits. The expression must simplify to a real expression.

† [PRGM]
HUB
6:eval(**ExecLib****ExecLib**

Extends TI-Basic (not available)

† [PRGM]
CTL
K:ExecLib**expr(****expr**(*string*)Converts the character string contained in *string* to an expression and executes the expression. *string* can be a string or a string variable.† [PRGM]
I/O
expr(**ExpReg****ExpReg** [*Xlistname*,*Ylistname*,*freqlist*,*regequ*]Fits an exponential regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.[STAT]
CALC
0:ExpReg**ExprOff****ExprOff**Turns off the expression display during **TRACE**.† [2nd]
[FORMAT]
ExprOff**ExprOn****ExprOn**Turns on the expression display during **TRACE**.† [2nd]
[FORMAT]
ExprOn**F****Fcdf(****Fcdf**(*lowerbound*,*upperbound*,*numerator*
df,*denominator df*)Computes the F distribution probability between *lowerbound* and *upperbound* for the specified *numerator df* (degrees of freedom) and *denominator df*.[2nd] [DISTR]
DISTR
0: Fcdf(

► F ◀► D

► F ◀► D

Converts an answer from a fraction to a decimal or from a decimal to a fraction. Fraction and or decimal may be an approximation.

[ALPHA] **[F-1]**

4: ► F ◀► D

or

[MATH]

NUM

B: ► F ◀► D

[MATH]

FRAC

3: ► F ◀► D

Fill(

Fill(value,matrixname)

Stores *value* to each element in *matrixname*.

[2nd]

[MATRIX]

MATH

4:Fill(

Fill(

Fill(value,listname)

Stores *value* to each element in *listname*.

[2nd] **[LIST]**

OPS

4:Fill(

Fix

Fix #

Sets fixed-decimal mode for # of decimal places.

† [MODE]

0123456789

(select one)

Float

Float

Sets floating decimal mode.

† **MODE**
Float

fMax(

fMax(*expression,variable,lower,upper[,tolerance]*)

Returns the value of *variable* where the local maximum of *expression* occurs, between *lower* and *upper*, with specified *tolerance*.

MATH
MATH
7:fMax(

fMin(

fMin(*expression,variable,lower,upper[,tolerance]*)

Returns the value of *variable* where the local minimum of *expression* occurs, between *lower* and *upper*, with specified *tolerance*.

MATH
MATH
6:fMin(

fnInt(

fnInt(*expression,variable,lower,upper[,tolerance]*)

Returns the function integral of *expression* with respect to *variable*, between *lower* and *upper*, with specified *tolerance*.

MATH
MATH
9:fnInt(

FnOff

FnOff [*function#,function#,...function n*]

Deselects all **Y=** functions or specified **Y=** functions.

VARS
Y-VARS
4:On/Off
2:Fnoff

FnOn

FnOn [*function#,function#,...function n*]

Selects all **Y=** functions or specified **Y=** functions.

VARS
Y-VARS
4:On/Off
1:Fnon

For(

:For(*variable,begin,end*
[,increment]):*commands:End:commands*

† **PRGM**
CTL
4:For(

For(

Executes *commands* through **End**, incrementing *variable* from *begin* by *increment* until *variable*>*end*.

fPart(

fPart(*value*)

Returns the fractional part or parts of a real or complex number, expression, list, or matrix.

[MATH]
NUM
4:fPart(

Fpdf(

Fpdf(*x*,*numerator df*,*denominator df*)

Computes the F distribution probability between *lowerbound* and *upperbound* for the specified *numerator df* (degrees of freedom) and *denominator df*.

[2nd] **[DISTR]**
DISTR
9: **Fpdf**(

►Frac

value►**Frac**

Displays a real or complex number, expression, list, or matrix as a fraction simplified to its simplest terms.

[MATH]
MATH
1: ► **Frac**

Full

Full

Sets full screen mode.

+ **[MODE]**
Full

Func

Func

Sets function graphing mode.

+ **[MODE]**
Func

G

GarbageCollect

GarbageCollect

Displays the garbage collection menu to allow cleanup of unused archive memory.

[2nd] **[CATALOG]**
GarbageCollect

gcd(

gcd(*valueA*,*valueB*)

Returns the greatest common divisor of *valueA* and *valueB*, which can be real numbers or lists.

MATH
NUM
9:gcd(

geometcdf(

geometcdf(*p*,*x*)

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 probability of success *p*.

2nd **[DISTR]**
DISTR
F:geometcdf(

geometpdf(

geometpdf(*p*,*x*)

Computes a probability at *x*, the number of the trial on which the first success occurs, for the discrete geometric distribution with the specified probability of success *p*.

2nd **[DISTR]**
DISTR
E:geometpdf(

Get(

Get(*variable*)

Retrieves a value from a connected TI-Innovator™ Hub and stores the data to a variable on the receiving CE calculator.

Note: See also [Send\(](#) and [eval\(](#)

† **[PRGM]**
I/O
A:Get(

Get(

Get(*variable*)

Retrieves a value from a connected TI-Innovator™ Hub and stores the data to a variable on the receiving CE calculator.

Note: See also [Send\(](#) and [eval\(](#)

Ti-Innovator™
Hub
† **[PRGM]**
HUB
5:Get

GetCalc(

GetCalc(*variable*[,*portflag*])

Gets contents of *variable* on another TI-84 Plus CE and stores it to *variable* on the receiving TI-84 Plus CE. By default, the TI-84 Plus CE uses the USB port if it is connected. If the USB cable is not connected, it uses the I/O port.

portflag=0 use USB port if connected;

portflag=1 use USB port;

portflag=2 use I/O port.(Ignored when program runs on the TI-84 Plus

† **[PRGM]**
I/O
0:GetCalc(

GetCalc(

CE.)

getDate

getDate

2nd [CATALOG]

getDate

Returns a list giving the date according to the current value of the clock. The list is in *{year, month, day}* format.

getDtFmt

getDtFmt

2nd

[CATALOG]

getDtFmt

Returns an integer representing the date format that is currently set on the device.

1 = M/D/Y
2 = D/M/Y
3 = Y/M/D

getDtStr(

getDtStr(*integer*)

2nd

[CATALOG]

getDtStr(

Returns a string of the current date in the format specified by *integer*, where:

1 = M/D/Y
2 = D/M/Y
3 = Y/M/D

getTime

getTime

[2nd] **[CATALOG]**

Returns a list giving the time according to the current value of the clock. The list is in *{hour,minute,second}* format. The time is returned in the 24 hour format.

getTime

getTmFmt

getTmFmt

[2nd]

Returns an integer representing the clock time format that is currently set on the device.

[CATALOG]

getTmFmt

12 = 12 hour format

24 = 24 hour format

getTmStr(

getTmStr(*integer*)

[2nd]

Returns a string of the current clock time in the format specified by *integer*, where:

[CATALOG]

getTmStr(

12 = 12 hour format

24 = 24 hour format

getKey

getKey

+ **[PRGM]**

Returns the key code for the current keystroke, or **0**, if no key is pressed.

I/O

7:getKey

Goto

Goto*label*

+ **[PRGM]**

Transfers control to *label*.

CTL

0:Goto

GraphColor(

GraphColor(*function#*,*color#*)

+ [PRGM]

Sets the color for *function#*.

CTL

H:GraphColor(

Color#: 10 - 24 or color name pasted from [vars] COLOR.

GraphStyle(

GraphStyle(*function#*,*graphstyle#*)

+ [PRGM]

Sets a *graphstyle* for *function#*.

CTL

H:GraphStyle(

GridDot

GridDot [*color#*]

+ [2nd]

Turns on grid dots in the graph area in the specified color.

[FORMAT]

GridDot

Color#: 10 - 24 or color name pasted from [vars] COLOR.

GridLine

GridLine [*color#*]

+ [2nd]

Turns on grid lines in the graph area in the specified color.

[FORMAT]

GridLine

Color#: 10 - 24 or color name pasted from [vars] COLOR.

GridOff

GridOff

+ [2nd] [FORMAT]

Turns off grid format.

GridOff

G-T

G-T

+ [MODE]

Sets graph-table vertical split-screen mode.

GRAPH-

TABLE

H

Histogram

Histogram Plot#(*type*,*Xlist*,[,*freqlist*,*color#*])

+ [2nd]

Used as the "type" argument in the command

[stat plot]

Histogram

Where # gives Plot1, Plot2 or Plot3.

TYPE

Horiz

Horiz

+ [MODE]

Sets horizontal split-screen mode.

Horiz

Horizontal

Horizontal y [,color#,linestyle#]

[2nd] [DRAW]

Draws a horizontal line at y in a specified

DRAW

Color#: 10 - 24 or color name pasted from [vars] COLOR.

3:Horizontal

line style #: 1-4.

/

i

i

[2nd] [*i*]

Returns the complex number *i*.

identity(

identity(*dimension*)

[2nd] [MATRIX]

Returns the identity matrix of *dimension* rows x *dimension* columns.

MATH

5:identity(

If

If *condition:commandA:commands*

+ [PRGM]

If *condition* = 0 (false), skips *commandA*.

CTL

1:If

If

Then

End

If:*condition*Then:*commands*End:*commands*

+ [PRGM]

Executes *commands* from **Then** to **End** if *condition* = 1 (true).

CTL

2:Then

If
Then
Else
End

If:
*condition*Then:*commands*Else:*commands*End:*commands*

+ [PRGM]
CTL
3:Else

Executes *commands* from **Then** to **Else** if *condition* = 1 (true); from **Else** to **End** if *condition* = 0 (false).

imag(

imag(*value*)

[MATH]
CMPLX
3:imag(

Returns the imaginary (non-real) part of a complex number or list of complex numbers.

inBinom(

inBinom(*area*,*trial*,*p*)

[2nd][DISTR]

The inverse binomial cumulative distribution function results in the minimum number of successes, such that the cumulative probability for that minimum number of successes \geq the given cumulative probability (*area*). If more information is needed, also find the binomcdf for the result from invBinom(as shown below for a full analysis.

DISTR

C:invBinom(

Details:

Assume the toss of a fair coin 30 times. What is the minimum number of heads you must observe such that the cumulative probability for that number of observed heads is at least 0.95?

The results on the screen first show that the minimum number of successes to obtain at least the given cumulative probability of 0.95 is 19. Next, the cumulative probability for up to 19 is computed using binomcdf(and is approximately 0.9506314271 which meets the criteria of $0.9506314271 \geq 0.95$

```
NORMAL FLOAT AUTO REAL RADIAN MP
invBinom(.95,30,.5)
.....19
binomcdf(30,.5,19)
.....0.9506314271
```

Alternate Method:

Set $Y1 = \text{binomcdf}(30, 0.5, X)$ and use the table of values (starting at 0 and increment by 1) to find when the cumulative probability is at or just above the given cumulative probability. This gives you a view of all values to make decisions. For this example, search in the table to find the cumulative probability just larger than 0.95. Again, the number of

inBinom(

successes is 19.

The image shows a TI-84 Plus calculator screen. The top part displays the function $Y_1 = \text{binomcdf}(30, 0.5, X)$ with various plot options (Plot1 to Plot3) and Y-variables (Y1 to Y9). The bottom part shows a table with the following data:

X	Y1				
13	0.2923				
14	0.4278				
15	0.5722				
16	0.7077				
17	0.8192				
18	0.8998				
19	0.9506				
20	0.9786				
21	0.9919				
22	0.9974				
23	0.9993				

Below the table, the value $Y_1 = 0.9506314270685$ is displayed.

IndpntAsk

IndpntAsk

Sets table to ask for independent-variable values.

+ [2nd]
[TBLSET]
Indpnt:
Ask

IndpntAuto

IndpntAuto

Sets table to generate independent-variable values automatically.

+ [2nd]
[TBLSET]
Indpnt:
Auto

Input

Input

Displays graph.

+ [PRGM]
I/O
2:Input

Input

Input [*variable*] + **PRGM**
I/O
Input ["*text*",*variable*] 2:Input
Prompts for value to store to *variable*.

Input

Input [**Strn**,*variable*] + **PRGM**
I/O
Displays **Strn** and stores entered value to *variable*. 2:Input

inString(

inString(*string*,*substring*[,*start*]) **2nd**
[CATALOG] **inString**(
Returns the character position in *string* of the first character of *substring* beginning at *start*.

int(

int(*value*) **MATH**
NUM
Returns the largest integer a real or complex number, expression, list, or matrix. 5:int(

Σ Int(

Σ Int(*pmt1*,*pmt2*[,*roundvalue*]) **APPS**
1:Finance
CALC
Computes the sum, rounded to *roundvalue*, of the interest amount between *pmt1* and *pmt2* for an amortization schedule. A: Σ Int(

invNorm(

invNorm(*area*[, μ , σ ,*tail*]) **2nd**[DISTR]
DISTR
tail [catalog]: **LEFT**, **CENTER**, **RIGHT** 3:invNorm(
Computes the inverse cumulative normal distribution function for a given area under the normal distribution curve specified by μ and σ .
The optional argument tail can be **LEFT** ($-\infty$, -a), **CENTER** [-a,a] or **RIGHT** (a, ∞) for Real a.

The tokens **LEFT**, **CENTER** and **RIGHT** can be found in [catalog].

LEFT

LEFT

2nd [CATALOG]

LEFT

LEFT is a tail argument for the **invNorm(** command where the optional argument tail can be **LEFT** ($-\infty,-a$), **CENTER** $[-a,a]$ or **RIGHT** (a,∞) for Real a .

See also **invNorm(**.

RIGHT

RIGHT

2nd [CATALOG]

RIGHT

RIGHT is a tail argument for the **invNorm(** command where the optional argument tail can be **LEFT** ($-\infty,-a$), **CENTER** $[-a,a]$ or **RIGHT** (a,∞) for Real a .

See also **invNorm(**.

CENTER

CENTER

2nd [CATALOG]

CENTER

CENTER is a tail argument for the **invNorm(** command where the optional argument tail can be **LEFT** ($-\infty,-a$), **CENTER** $[-a,a]$ or **RIGHT** (a,∞) for Real a .

See also **invNorm(**.

LEFT

RIGHT

CENTER

NORMAL FLOAT AUTO REAL RADIAN MP	NORMAL FLOAT AUTO REAL RADIAN MP	NORMAL FLOAT AUTO REAL RADIAN MP
CATALOG LabelOff LabelOn Lbl lcm(▶LEFT length(Line(LinReg(a+bx) LinReg(ax+b)	CATALOG ref(remainder(Repeat Return ▶RIGHT round(*row(row+(*row+(▶CENTER	CATALOG binomcdf(binompdf(BorderColor BoxPlot ▶CENTER checkTmr(χ ² cdf(χ ² pdf(χ ² -Test(A

invT(**invT**(*area,df*)

[2nd] [DISTR]

Computes the inverse cumulative student-t probability function specified by degree of freedom, *df* for a given area under the curve.

 DISTR
 4:invT(
iPart(**iPart**(*value*)

[MATH]

Returns the integer part of a real or complex number, expression, list, or matrix.

 NUM
 3:iPart(
irr(**irr**(*CF0,CFList[,CFFreq]*)

[APPS]

Returns the interest rate at which the net present value of the cash flow is equal to zero.

 1:Finance
 CALC
 8:irr(
isClockOn**isClockOn**

[2nd]

Identifies if clock is ON or OFF. Returns 1 if the clock is ON. Returns 0 if the clock is OFF.

 [CATALOG]
 isClockOn
IS>(**:IS>**(*variable,value*)

+ [PRGM]

:commandA

CTL

:commands

A:IS>(

Increments *variable* by 1; skips *commandA* if *variable*>*value*.

L**L****L***listname*

[2nd] [LIST]

Identifies the next one to five characters as a user-created list name.

 OPS
 B: L
LabelOff**LabelOff**

+ [2nd] [FORMAT]

LabelOff

Turns off axes labels.

LabelOff

LabelOn

LabelOn

+ [2nd] [FORMAT]

Turns on axes labels.

LabelOn

Lbl

Lbl *label*

+ [PRGM]

Creates a *label* of one or two characters.

CTL

9:Lbl

lcm(

lcm(*valueA*,*valueB*)

[MATH]

Returns the least common multiple of *valueA* and *valueB*, which can be real numbers or lists.

NUM

8:lcm(

length(

length(*string*)

[2nd]

Returns the number of characters in *string*.

[CATALOG]

length(

Line(

Line(*X1*,*Y1*,*X2*,*Y2* [,*erase#*,*color#*,*linestyle#*])

[2nd] [DRAW]

Draws a line from (*X1*,*Y1*) to (*X2*,*Y2*) with the following options:
erase #: 1,0, color #: 10-24, and line style #: 1-4.

DRAW

2:Line(

Line(

Line(*X1*,*Y1*,*X2*,*Y2*,0 [,*line#*])

[2nd] [DRAW]

Erases a line (erase #: 1,0) from (*X1*,*Y1*) to (*X2*,*Y2*).

DRAW

2:Line(

LinReg(a+bx)

LinReg(a+bx) [*Xlistname*,*Ylistname*,*freqlist*,*regequ*]

Fits a linear regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

[STAT]
CALC
8:LinReg
(a+bx)

LinReg(ax+b)

LinReg(ax+b) [*Xlistname*,*Ylistname*,*freqlist*,*regequ*]

Fits a linear regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

[STAT]
CALC
4:LinReg
(ax+b)

LinRegTInt

LinRegTInt [*Xlistname*,*Ylistname*,*freqlist*,*confidence level*, *regequ*]

Performs a linear regression and computes the t confidence interval for the slope coefficient b.

+ [STAT]
TESTS
G:LinRegTInt

LinRegTTest

LinRegTTest [*Xlistname*,*Ylistname*,*freqlist*,*alternative*,*regequ*]

Performs a linear regression and a *t*-test. *alternative*=-1 is <; *alternative*=0 is =; *alternative*=1 is >.

+ [STAT]
TESTS
F:LinRegTTest

ΔList(

ΔList(list)

Returns a list containing the differences between consecutive elements in *list*.

[2nd] [LIST]
OPS
7: Δ List(

List→matr(

List→matr(listname1,...,listname n,matrixname)

Fills *matrixname* column by column with the elements from each specified *listname*.

[2nd] [LIST]
OPS
0>List → matr
(

In(

In(*value*)

LN

Returns the natural logarithm of a real or complex number, expression, or list.

LnReg

LnReg [*Xlistname*, *Ylistname*, *freqlist*, *regequ*]

STAT

CALC

9:LnReg

Fits a logarithmic regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

log(

log(*value*)

LOG

Returns logarithm of a real or complex number, expression, or list.

logBASE(

logBASE(*value*, *base*)

MATH

Returns the logarithm of a specified value determined from a specified base: logBASE(*value*, *base*).

A: logBASE

Logistic

Logistic [*Xlistname*, *Ylistname*, *freqlist*, *regequ*]

CALC

B:Logistic

Fits a logistic regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

M

Manual-Fit

Manual-Fit $[eqname,color\#,line\ style\#]$

[STAT]

Fits a linear equation to a scatter plot with specified color and line style.

CALC

Color#: 10 - 24 or color name pasted from [vars] COLOR.

D:Manual-Fit

line style #: 1-4.

MATHPRINT

MATHPRINT

[MODE]

Displays most entries and answers the way they are displayed in

textbooks, such as $\frac{1}{2} + \frac{3}{4}$.

MATHPRINT

Matr▶list(

Matr▶list $(matrix,listnameA,...,listname\ n)$

[2nd] [LIST]

Fills each *listname* with elements from each column in *matrix*.

OPS

A:Matr▶ list(

Matr▶list(

Matr▶list $(matrix,column\#,listname)$

[2nd] [LIST]

Fills a *listname* with elements from a specified *column#* in *matrix*.

OPS

A:Matr▶ list (

max(

max $(valueA,valueB)$

[MATH]

Returns the larger of *valueA* and *valueB*.

NUM

7:max(

max(

max $(list)$

[MATH]

Returns the larger of *valueA* and *valueB*.

NUM

7:max(

max(**max(list)****2nd** **[LIST]**Returns largest real or complex element in *list*.**MATH**
2:max(**max(****max(listA,listB)****2nd** **[LIST]**Returns a real or complex list of the larger of each pair of elements in *listA* and *listB*.**MATH**
2:max(**max(****max(value,list)****2nd** **[LIST]**Returns a real or complex list of the larger of *value* or each *list* element.**MATH**
2:max(**mean(****mean(list[,freqlist])****2nd** **[LIST]**Returns the mean of *list* with frequency *freqlist*.**MATH**
3:mean(**median(****median(list[,freqlist])****2nd** **[LIST]**Returns the median of *list* with frequency *freqlist*.**MATH**
4:median(**Med-Med****Med-Med [Xlistname,Ylistname,freqlist,regu]****[STAT]**Fits a median-median model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regu*.**CALC**
3:Med-Med**Menu(****Menu("title","text1",label1[,...,"text7",label7])****†** **[PRGM]**

Generates a menu of up to seven items during program execution.

CTL
C:Menu(**min(****min(valueA,valueB)****[MATH]**

min(

Returns smaller of *valueA* and *valueB*.

NUM
6:min(

min(

min(list)

2nd [LIST]

Returns smallest real or complex element in *list*.

MATH
1:min(

min(

min(listA,listB)

2nd [LIST]

Returns real or complex list of the smaller of each pair of elements in *listA* and *listB*.

MATH
1:min(

min(

min(value,list)

2nd [LIST]

Returns a real or complex list of the smaller of *value* or each *list* element.

MATH
1:min(

ModBoxplot

ModBoxplot Plot#(*type,Xlist,[freqlist,color#]*)

+ **2nd**
[stat plot]

Used as the "type" argument in the command.

Where # gives Plot1, Plot2 or Plot3.

TYPE

N

nCr

valueA **nCr** *valueB*

MATH

Returns the number of combinations of *valueA* taken *valueB* at a time.

PRB
3:nCr

nCr*value nCr list***MATH**Returns a list of the combinations of *value* taken each element in *list* at a time.**PRB**
3:nCr**nCr***list nCr value***MATH**Returns a list of the combinations of each element in *list* taken *value* at a time.**PRB**
3:nCr**nCr***listA nCr listB***MATH**Returns a list of the combinations of each element in *listA* taken each element in *listB* at a time.**PRB**
3:nCr**n/d****n/d****ALPHA** [F1]

Displays results as a simple fraction.

1: n/d
or**MATH****NUM**
D: n/d
or**MATH****FRAC**
1:n/d

nDeriv(

nDeriv(*expression,variable,value[, ϵ]*)

When command is used in Classic mode, returns approximate numerical derivative of *expression* with respect to *variable* at *value*, with specific tolerance ϵ .

In MathPrint mode, numeric derivative template pastes and uses default tolerance ϵ .

MATH

MATH

8:nDeriv(

► n/d ◀► Un/d

► n/d ◀► Un/d

Converts the results from a fraction to mixed number or from a mixed number to a fraction, if applicable.

ALPHA [F1]

3: ► n/d ◀►

Un/d

or

MATH

NUM

A: ► n/d◀►

Un/d

or

MATH

FRAC

4: ► n/d ◀

►Un/d

►Nom(

►Nom(*effective rate, compounding periods*)

Computes the nominal interest rate.

APPS 1:Finance

CALC

B: ► Nom(

Normal

Normal

Sets normal display mode.

+ **MODE**

Normal

normalcdf(

normalcdf(*lowerbound*,*upperbound*[, μ , σ])

2nd [DISTR]

DISTR

Computes the normal distribution probability between *lowerbound* and *upperbound* for the specified μ and σ .

2:normalcdf(

normalpdf(

normalpdf(*x*[, μ , σ])

2nd [DISTR]

DISTR

Computes the probability density function for the normal distribution at a specified *x* value for the specified μ and σ .

1:normalpdf(

NormProbPlot

NormProbPlot Plot#(*type*,*Xlist*[,*freqlist*,*color*#])

+ **2nd**

[stat plot]

Used as the "type" argument in the command

TYPE

Where # gives Plot1, Plot2 or Plot3.

not(

not(*value*)

2nd [TEST]

LOGIC

Returns **0** if *value* is 0. *value* can be a real number, expression, or list.

4:not(

nPr

valueA **nPr** *valueB*

[MATH]

PRB

Returns the number of permutations of *valueA* taken *valueB* at a time.

2:nPr

nPr

value **nPr** *list*

[MATH]

PRB

Returns a list of the permutations of *value* taken each element in *list* at a time.

2:nPr

nPr

list **nPr** *value*

[MATH]

PRB

Returns a list of the permutations of each element in *list* taken *value* at a time.

2:nPr

nPr

listA nPr *listB*

MATH

Returns a list of the permutations of each element in *listA* taken each element in *listB* at a time.

PRB
2:nPr

npv(

npv(*interest rate*,*CF0*,*CFList*[],*CFFreq*)

APPS

Computes the sum of the present values for cash inflows and outflows.

1:Finance
CALC
7:npv(

O

OpenLib(

OpenLib(

+ **PRGM**

Extends TI-Basic. (Not available.)

CTL
J:OpenLib
(

or

valueA or *valueB*

2nd **[TEST]**

Returns 1 if *valueA* or *valueB* is 0. *valueA* and *valueB* can be real numbers, expressions, or lists.

LOGIC
2:or

Output(

Output(*row*,*column*,"*text*")

+ **PRGM**

Displays *text* beginning at specified *row* and *column* of the home screen.

I/O
6:Output(

Output(

Output(*row*,*column*,*value*)

+ **PRGM**

Displays *value* beginning at specified *row* and *column* of the home screen.

I/O
6:Output(

P

Param

Param

+ **MODE**

Par

Param

Sets parametric graphing mode.

Pause

Pause

↑ **PRGM**

Suspends program execution until you press **ENTER**.

CTL

8:Pause

Pause

Pause [*value*]

↑ **PRGM**

Displays *value*; suspends program execution until you press **ENTER**.

CTL

8:Pause

Pause

Pause [*value*, *time*]

↑ **PRGM**

Displays *value* on the current home screen and execution of the program continues after the time period specified. For time only, use Pause ""*time* where the value is a blank string. Time is in seconds.

CTL

8:Pause

Pause *value,time*.

piecewise

piecewise(

math.

New piecewise function to support entry of functions as they are seen in textbook. This command can be found in **math** MATH **B:piecewise**(

▲ or ▼ to

scroll to

B:piecewise

(

Plot1(Plot2(Plot3(

Plot#(*type*,*Xlist*,*Ylist*[,*mark*,*color*#])

↑ **2nd**

Defines **Plot#** (**1, 2, or 3**) of **type Scatter** or **xyLine** for *Xlist* and *Ylist* using *mark* and *color*.

[STAT PLOT]

STAT PLOTS

Color#: 10 - 24 or color name pasted from [vars] COLOR.

1:Plot1

Note: *Xlist* and *Ylist* represent the Xlist and Ylist names.

2:Plot2

3:Plot3

Plot1(Plot2(Plot3(

Plot#(*type*,*Xlist* [,*freqlist*,*color*#])

↑ **2nd**

Plot1(Plot2(Plot3(

Defines **Plot # (1, 2, or 3)** of type **Histogram** or **Boxplot** for *Xlist* with frequency, *freqlist* and color #.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Note: *Xlist* represents the *Xlist* name.

[STAT PLOT]
STAT PLOTS
1:Plot1
2:Plot2
3:Plot3

Plot1(Plot2(Plot3(

Plot#(type,Xlist,[freqlist,mark,color#])

Defines **Plot # (1, 2, or 3)** of type **ModBoxplot** for *Xlist* with frequency *freqlist* using *mark* and *color #*.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Note: *Xlist* represents the *Xlist* name.

+ [2nd]
[STAT PLOT]
STAT PLOTS
1:Plot1
2:Plot2
3:Plot3

Plot1(Plot2(Plot3(

Plot#(type,datalist,[data axis,mark,color#])

Defines **Plot # (1, 2, or 3)** of type **NormProbPlot** for *datalist* on *data axis* using *mark* and *color #* *data axis* can be **X** or **Y**.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Note: *datalist* represents the *datalist* name.

+ [2nd]
[STAT PLOT]
STAT PLOTS
1:Plot1
2:Plot2
3:Plot3

PlotsOff

PlotsOff [1,2,3]

Deselects all stat plots or one or more specified stat plots (1, 2, or 3).

[2nd]
[STAT PLOT]
STAT
PLOTS
4:PlotsOff

PlotsOn

PlotsOn [1,2,3]

Selects all stat plots or one or more specified stat plots (1, 2, or 3).

[2nd]
[STAT PLOT]
STAT
PLOTS
5:PlotsOn

Pmt_Bgn

Pmt_Bgn

Specifies an annuity due, where payments occur at the beginning of each

[APPS]
1:Finance

Pmt_Bgn

payment period.

CALC
F:Pmt_Bgn

Pmt_End

Pmt_End

Specifies an ordinary annuity, where payments occur at the end of each payment period.

[APPS]
1:Finance
CALC
E:Pmt_End

poissoncdf(

poissoncdf(μ, x)

Computes a cumulative probability at x for the discrete Poisson distribution with specified mean μ .

[2nd] [DISTR]
DISTR
D:poissoncdf
(

poissonpdf(

poissonpdf(μ, x)

Computes a probability at x for the discrete Poisson distribution with the specified mean μ .

[2nd] [DISTR]
DISTR
C:poissonpdf
(

Polar

Polar

Sets polar graphing mode.

+ [MODE]
Polar

►Polar

complex value ►Polar

Displays *complex value* in polar format.

[MATH]
CMPLX
7: ► Polar

PolarGC

PolarGC

Sets polar graphing coordinates format.

+ [2nd]
[FORMAT]
PolarGC

prgm

prgmname

Executes the program *name*.

+ **PRGM**
CTRL
D:prgm

Σ Prn(

Σ Prn(*pmt1*,*pmt2*,*roundvalue*)

Computes the sum, rounded to *roundvalue*, of the principal amount between *pmt1* and *pmt2* for an amortization schedule.

APPS
1:Finance
CALC
0: Σ Prn(

prod(

prod(*list*,*start*,*end*)

Returns product of *list* elements between *start* and *end*

2nd **[LIST]**
MATH
6:prod(

Prompt

Prompt *variableA*,*variableB*,...,*variable n*

Prompts for value for *variableA*, then *variableB*, and so on.

+ **PRGM**
I/O
2:Prompt

1-PropZInt(

1-PropZInt(*x*,*n*,*confidence level*)

Computes a one-proportion *z* confidence interval.

+ **STAT**
TESTS
A:1-PropZInt(

2-PropZInt(

2-PropZInt(*x1*,*n1*,*x2*,*n2*,*confidence level*)

Computes a two-proportion *z* confidence interval.

+ **STAT**
TESTS
B:2-PropZInt(

1-PropZTest(

1-PropZTest(*p0*,*x*,*n*,*alternative*,*drawflag*, *color#*)

Computes a one-proportion *z* test. *alternative*=-1 is <; *alternative*=0 is ; *alternative*=1 is >. *drawflag*=1 draws results; *drawflag*=0 calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ **STAT**
TESTS
5:1-PropZTest
(

2-PropZTest(

2-PropZTest($x1,n1,x2,n2$ [,*alternative*,*drawflag*, *color*#])

† [STAT]

TESTS

6:2-PropZTest

Computes a two-proportion z test. *alternative*=-1 is <; *alternative*=0 is ; *alternative*=1 is >. *drawflag*=1 draws results; *drawflag*=0 calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Pt-Change(

Pt-Change(x,y [,*color*#])

[2nd] [DRAW]

POINTS

3:Pt-Change(

Toggles a point on or off at (x,y) on the graph area. Off will be in the Background color and On will be the specified

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Pt-Off(

Pt-Off(x,y [,*mark*])

[2nd] [DRAW]

POINTS

2:Pt-Off(

Erases a point at (x,y) on the graph area using *mark*. The Off state may be the background color determined by the *ImageVar* or *color* setting.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Pt-On(

Pt-On(x,y [,*mark*,*color*#])

[2nd] [DRAW]

POINTS

1:Pt-On(

Draws a point at (x,y) on the graph area using *mark* and the specified *color*#.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

PwrReg

PwrReg [*Xlistname*,*Ylistname*,*freqlist*,*regequ*]

[STAT]

CALC

A:PwrReg

Fits a power regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

Pxl-Change(**Pxl-Change**(*row,column[,color#]*)**2nd** [DRAW]

POINTS

Toggles Off to On in the graph area: with specified *color#*

Toggles On to Off in the graph area: Off will display the set Background Image Var or Color.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

6:Pxl-Change

(

Pxl-Off(**Pxl-Off**(*row,column*)**2nd** [DRAW]

POINTS

The Off state will display the set Background Image Var or COLOR.

5:Pxl-Off(**Pxl-On(****Pxl-On**(*row,column[,color#]*)**2nd** [DRAW]

POINTS

Draws pixel on the graph area at (*row,column*) in the specified color.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

4:Pxl-On(**pxl-Test(****pxl-Test**(*row,column*)**2nd** [DRAW]

POINTS

Returns 1 if pixel (*row,column*) is on, 0 if it is off;**7:pxl-Test(****P►Rx(****P►Rx**(*r,θ*)**2nd** [ANGLE]

ANGLE

Returns X, given polar coordinates *r* and θ or a list of polar coordinates.**7:P►Rx(****P►Ry(****P►Ry**(*r,θ*)**2nd** [ANGLE]

ANGLE

Returns Y, given polar coordinates *r* and θ or a list of polar coordinates.**8:P►Ry(**

Q

QuadReg

QuadReg [*Xlistname*,*Ylistname*,*freqlist*,*regequ*]

STAT

Fits a quadratic regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

CALC
5:QuadReg

QuartReg

QuartReg [*Xlistname*,*Ylistname*,*freqlist*,*regequ*]

STAT

Fits a quartic regression model to *Xlistname* and *Ylistname* with frequency *freqlist*, and stores the regression equation to *regequ*.

CALC
7:QuartReg

R

Radian

Radian

† **MODE**

Sets radian angle mode.

Radian

rand

rand(*numtrials*)

MATH

Returns a random number between 0 and 1 for a specified number of trials *numtrials*.

PRB
1:rand

randBin(

randBin(*numtrials*,*prob*[,*numsimulations*])

MATH

Generates and displays a random real number from a specified Binomial distribution.

PRB
7:randBin(

randInt(

randInt(*lower,upper* [,*numtrials*])

Generates and displays a random integer within a range specified by *lower* and *upper* integer bounds for a specified number of trials *numtrials*.

[MATH]

PRB

5:randInt(

randIntNoRep(

randIntNoRep(*lowerint,upperint* [,*numelements*])

Returns a random ordered list of integers from a lower integer to an upper integer which may include the lower integer and upper integer. If the optional argument *numelements* is specified, the first *numelements* are listed. The first *numelements* term in the list of random integers are displayed.

[MATH]

PRB

8:randIntNoRep(

randM(

randM(*rows,columns*)

Returns a random matrix of *rows* × *columns*.

Max rows x columns = 400 matrix elements.

[2nd]

[MATRIX]

MATH

6:randM(

randNorm(

randNorm(μ,σ [,*numtrials*])

Generates and displays a random real number from a specified Normal distribution specified by μ and σ for a specified number of trials *numtrials*.

[MATH]

PRB

6:randNorm(

$re^{\theta i}$

$re^{\theta i}$

Sets the mode to polar complex number mode ($re^{\theta i}$).

+ [MODE]

$re^{\theta i}$

Real

Real

Sets mode to display complex results only when you enter complex numbers.

+ [MODE]

Real

real(

real(*value*)

Returns the real part of a complex number or list of complex numbers.

[MATH]

CPLX

2:real(

RecallGDB

RecallGDB *n*

Restores all settings stored in the graph database variable **GDB***n*.

[2nd] [DRAW]

STO

4:RecallGDB

RecallPic

RecallPic *n*

Displays the graph and adds the picture stored in **Pic***n*.

[2nd] [DRAW]

STO

2:RecallPic

►Rect

complex value ►**Rect**

Displays *complex value* or list in rectangular format.

[MATH]

CMPLX

6:► Rect

RectGC

RectGC

Sets rectangular graphing coordinates format.

+ **[2nd]**

[FORMAT]

RectGC

ref(

ref(*matrix*)

Returns the row-echelon form of a *matrix*.

[2nd]

[MATRIX]

MATH

A:ref(

remainder(

remainder(*dividend*, *divisor*)

Reports the remainder as a whole number from a division of two whole numbers where the divisor is not zero.

[MATH]

NUM

0:remainder(

remainder(

remainder(*list*, *divisor*)

[MATH]

NUM

Reports the remainder as a whole number from a division of two lists where the divisor is not zero.

0:remainder(

remainder(

remainder(*dividend*, *list*)

[MATH]

NUM

Reports the remainder as a whole number from a division of two whole numbers where the divisor is a list.

0:remainder(

remainder(

remainder(*list*, *list*)

[MATH]

NUM

Reports the remainder as a whole number from a division of two lists.

**0:remainder
(**

Repeat

Repeat*condition:commands:End:commands*

† **[PRGM]**

CTL

Executes *commands* until *condition* is true.

6:Repeat

Return

Return

† **[PRGM]**

CTL

Returns to the calling program.

E:Return

round(

round(*value*[,*#decimals*])

[MATH]

NUM

Returns a number, expression, list, or matrix rounded to *#decimals* (9).

2:round(

*row(

***row**(*value*,*matrix*,*row*)

[2nd] [MATRIX]

MATH

Returns a matrix with *row* of *matrix* multiplied by *value* and stored in *row*.

E: * row(

row+(**row+**(*matrix,rowA,rowB*)Returns a matrix with *rowA* of *matrix* added to *rowB* and stored in *rowB*.[2nd] [MATRIX]
MATH
D:row+***row+**(***row+**(*value,matrix,rowA,rowB*)Returns a matrix with *rowA* of *matrix* multiplied by *value*, added to *rowB*, and stored in *rowB*.[2nd] [MATRIX]
MATH
F: * row+**rowSwap**(**rowSwap**(*matrix,rowA,rowB*)Returns a matrix with *rowA* of *matrix* swapped with *rowB*.[2nd] [MATRIX]
MATH
C:rowSwap**rref**(**rref**(*matrix*)Returns the reduced row-echelon form of a *matrix*.[2nd] [MATRIX]
MATH
B:rref**R►Pr**(**R►Pr**(*x,y*)Returns **R**, given rectangular coordinates *x* and *y* or a list of rectangular coordinates.[2nd] [ANGLE]
ANGLE
5:R ► Pr**R►Pθ**(**R►Pθ**(*x,y*)Returns **θ**, given rectangular coordinates *x* and *y* or a list of rectangular coordinates.[2nd] [ANGLE]
ANGLE
6:R ► P θ

2-SampFTest**2-SampFTest**

[
listname1

,
listname2

freqlist1,freqlist2,alternative,drawflag,color#]

Performs a two-sample F test. *alternative=-1* is $<$; *alternative=0* is $=$; *alternative=1* is $>$. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ [STAT]

TESTS

E:2-Samp F Test

2-SampFTest**2-SampFTest***Sx1,n1,Sx2,n2*

[*,alternative,drawflag,color#*]

Performs a two-sample F test. *alternative=-1* is $<$; *alternative=0* is $=$; *alternative=1* is $>$. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ [STAT]

TESTS

E:2-Samp F Test

2-SampTInt**2-SampTInt**

[*listname1,listname2,freqlist1,freqlist2,confidence level,pooled*]

(Data list input)

Computes a two-sample t confidence interval. *pooled=1* pools variances; *pooled=0* does not pool variances.

+ [STAT]

TESTS

O:2-SampTInt

2-SampTInt**2-SampTInt** *$\bar{x}1,Sx1,n1,\bar{x}2,Sx2,n2$,confidence*

level,pooled]

(Summary stats input)

Computes a two-sample t confidence interval. *pooled=1* pools variances; *pooled=0* does not pool variances.

+ [STAT]

TESTS

O:2-SampTInt

2-SampTTest

2-SampTTest

```
[  
  listname1  
,  
  listname2  
,  
  freqlist1  
  ,freqlist2,alternative,pooled,drawflag,color#])
```

Computes a two-sample t test. *alternative=-1* is $<$; *alternative=0* is $=$; *alternative=1* is $>$. *pooled=1* pools variances; *pooled=0* does not pool variances. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ **STAT**

TESTS

4:2-SampTTest

2-SampTTest

```
2-SampTTest( $\bar{x}1, Sx1, n1, v2, Sx2, n2$   
[,alternative,pooled,drawflag,color#])
```

Computes a two-sample t test. *alternative=-1* is $<$; *alternative=0* is $=$; *alternative=1* is $>$. *pooled=1* pools variances; *pooled=0* does not pool variances. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ **STAT**

TESTS

4:2-SampTTest

2-SampZInt(

```
2-SampZInt( $\sigma_1, \sigma_2$   
[,listname1,listname2,freqlist1,freqlist2,confidence  
level])  
(Data list input)
```

Computes a two-sample z confidence interval.

+ **STAT**

TESTS

9:2-SampZInt(

2-SampZInt(

```
2-SampZInt( $\sigma_1, \sigma_2, \bar{x}1, n1, \bar{x}2, n2$  [,confidence level])  
(Summary stats input)
```

Computes a two-sample z confidence interval.

+ **STAT**

TESTS

9:2-SampZInt(

2-SampZTest(

2-SampZTest(σ_1, σ_2
[,
listname1
,
listname2
freqlist1, freqlist2, alternative, drawflag, color#)

Computes a two-sample z test. *alternative=-1* is <; *alternative=0* is
; *alternative=1* is >. *drawflag=1* draws results; *drawflag=0*
calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ **[STAT]**

TESTS

3:2-SampZTest(

2-SampZTest(

2-SampZTest($\sigma_1, \sigma_2, \bar{x}_1, n1, \bar{x}_2, n2$
[,*alternative, drawflag, color#*)

Computes a two-sample z test. *alternative=-1* is <; *alternative=0* is
; *alternative=1* is >. *drawflag=1* draws results; *drawflag=0*
calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

+ **[STAT]**

TESTS

3:2-SampZTest(

Scatter

Scatter Plot#(*type, Xlist, [freqlist, color#*)

Used as the "type" argument in the command

Where # gives Plot1, Plot2 or Plot3.

+ **[2nd]** **[stat plot]**

TYPE

Sci

Sci

Sets scientific notation display mode.

+ **[MODE]**

Sci

Select(

Select(*Xlistname, Ylistname*)

Selects one or more specific data points from a scatter plot or xyLine
plot (only), and then store's the selected data points to two new
lists, *Xlistname* and *Ylistname*.

[2nd] **[LIST]**

OPS

8:Select(

Send(

Send(string)

+ **PRGM**
I/O
B:Send(

Sends one or more TI-Innovator™ Hub commands to a connected hub.

Notes:

See also [eval](#) and [Get](#) command related to the Send(command.

TI-Innovator™ Hub commands are supported in the HUB submenu in the CE OS v.5.2 program editor.

Send(

TI-
Innovator™
Hub

Send(string)

+ **PRGM**
HUB

Sends one or more TI-Innovator™ Hub commands to a connected hub.

Notes:

See also [eval](#) and [Get](#) command related to the Send(command.

TI-Innovator™ Hub commands are supported in the HUB submenu in the CE OS v.5.2 program editor.

See menu
location
depending
on TI-
Innovator
Hub
sensors.

seq(

seq(expression,variable,begin,end[,increment])

2nd [LIST]
OPS
5:seq(

Returns list created by evaluating *expression* with regard to *variable*, from *begin* to *end* by *increment*.

SEQ(*n*)

Seq(*n*)

+ **MODE**

In sequence mode, **SEQ(*n*)** sets the sequence editor type to enter sequence functions, u, v, or w, as a function of the independent variable *n*. Can also be set from the Y= editor in **SEQ mode**.

SEQ(*n*)

SEQ(*n*+1)

Seq(*n*+1)

+ **MODE**

In sequence mode, **SEQ(*n*+1)** sets the sequence editor type to enter sequence functions, u, v, or w, as a function of the independent variable *n*+1. Can also be set from the Y= editor in **SEQ mode**.

SEQ(*n*+1)

SEQ($n+2$)

Seq($n+2$)

+ [MODE]

In sequence mode, **SEQ($n+2$)** sets the sequence editor type to enter sequence functions, u, v, or w, as a function of the independent variable $n+2$. Can also be set from the Y= editor in **SEQ mode**.

SEQ($n+2$)

```
NORMAL FLOAT AUTO REAL RADIAN MP  A
CATALOG
Send(
seq(
Seq
▶SEQ(n)   Type
SEQ(n+1) Type
SEQ(n+2) Type
Sequential
setDate(
setDtFmt(
```

Note: "Type" will NOT be included in the TIC CE PE syntax

On the device, "Type" does not paste and is similar to how the device displays, for example, DEC Answers where Answers appears in [catalog] but does not paste.

Seq

Seq

+ [MODE]

Sets sequence graphing mode.

Seq

Sequential

Sequential

+ [MODE]

Sets mode to graph functions sequentially.

Sequential

setDate(

setDate(*year, month, day*)

[2nd] [CATALOG]

Sets the date using a year, month, day format. The *year* must be 4 digits; *month* and *day* can be 1 or 2 digit.

setDate(

setDtFmt(

setDtFmt(*integer*)

[2nd]

Sets the date format.

[CATALOG]

- 1 = M/D/Y
- 2 = D/M/Y
- 3 = Y/M/D

setDtFmt(

setTime(

setTime(*hour,minute, second*)

[2nd] [CATALOG]

setTime(

Sets the time using an hour, minute, second format. The *hour* must be in 24 hour format, in which 13 = 1 p.m.

setTmFmt(

setTmFmt(*integer*)

[2nd] [CATALOG]

setTmFmt(

Sets the time format.

12 = 12 hour format

24 = 24 hour format

SetUpEditor

SetUpEditor

[STAT]

EDIT

5:SetUpEditor

Removes all list names from the stat list editor, and then restores list names **L1** through **L6** to columns **1** through **6**.

SetUpEditor

SetUpEditor *listname1[,listname2,...,listname20]*

[STAT]

EDIT

5:SetUpEditor

Removes all list names from the stat list editor, then sets it up to display one or more *listnames* in the specified order, starting with column **1**.

Shade(

Shade(*lowerfunc,upperfunc*
[,Xleft,Xright,pattern,patres,color#])

[2nd] [DRAW]

DRAW

7:Shade(

Draws *lowerfunc* and *upperfunc* in terms of **X** on the current graph and uses *pattern* and *patres* to shade and color the area bounded by *lowerfunc*, *upperfunc*, *Xleft*, and *Xright*. *lowerfunc* and *upperfunc* are shaded in the same specified color.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Shade χ^2 (

Shade χ^2 (*lowerbound*,*upperbound*,*df*[,*color*#])

2nd [DISTR]

DRAW

Draws the density function for the χ^2 distribution specified by degrees of freedom *df*, and shades and colors the area between *lowerbound* and *upperbound*.

3:Shade χ^2 (

Color#: 10 - 24 or color name pasted from [vars] COLOR.

ShadeF(

ShadeF(*lowerbound*,*upperbound*,*numerator df*,*denominator df*[,*color*#])

2nd [DISTR]

DRAW

4:Shade F (

Draws the density function for the F distribution specified by *numerator df* and *denominator df* and shades and colors the area between *lowerbound* and *upperbound*.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

ShadeNorm(

ShadeNorm(*lowerbound*,*upperbound*[, μ , σ ,*color*#])

2nd [DISTR]

DRAW

1:ShadeNorm(

Draws the normal density function specified by μ and σ and shades and colors the area between *lowerbound* and *upperbound*.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Shade_t(

Shade_t(*lowerbound*,*upperbound*,*df*[,*color*#])

2nd [DISTR]

DRAW

2:Shade_t(

Draws the density function for the Student-t distribution specified by degrees of freedom *df*, and shades or colors the area between *lowerbound* and *upperbound*.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Simul

Simul

+ **MODE****Simul**

Sets mode to graph functions simultaneously.

sin(

sin(*value*)

SIN

Returns the sine of a real number, expression, or list.

\sin^{-1} (

\sin^{-1} (*value*)

2nd **SIN⁻¹**

Returns the arcsine of a real number, expression, or list.

sinh(

sinh(*value*)

2nd **CATALOG****sinh(**

Returns the hyperbolic sine of a real number, expression, or list.

\sinh^{-1} (

\sinh^{-1} (*value*)

2nd **CATALOG** **\sinh^{-1} (**

Returns the hyperbolic arcsine of a real number, expression, or list.

SinReg

SinReg

STAT

[*iterations*,*Xlistname*,*Ylistname*,*period*,*regequ*]

CALC**C:SinReg**

Attempts *iterations* times to fit a sinusoidal regression model to *Xlistname* and *Ylistname* using a *period* guess, and stores the regression equation to *regequ*.

solve(

solve(*expression,variable,guess,{lower,upper}*)

Solves *expression* for *variable*, given an initial *guess* and *lower* and *upper* bounds within which the solution is sought.

+ [MATH]
MATH
0:solve(

SortA(

SortA(*listname*)

Sorts elements of *listname* in ascending order.

[2nd] [LIST]
OPS
1:SortA(

SortA(

SortA(*keylistname,dependlist 1*
[,*dependlist 2,...,dependlist n*])

Sorts elements of *keylistname* in ascending order, then sorts each *dependlist* as a dependent list.

[2nd] [LIST]
OPS
1:SortA(

SortD(

SortD(*listname*)

Sorts elements of *listname* in descending order.

[2nd] [LIST]
OPS
2:SortD(

SortD(

SortD(*keylistname,dependlist 1[,dependlist 2,...,*
dependlist n])

Sorts elements of *keylistname* in descending order, then sorts each *dependlist* as a dependent list.

[2nd] [LIST]
OPS
2:SortD(

startTmr

startTmr

Starts the clock timer. Store or note the displayed value, and use it as the argument for **checkTmr()** to check the elapsed time.

[2nd] [CATALOG]
startTmr

STATWIZARD OFF

STATWIZARD OFF

Disables wizard syntax help for statistical commands, distributions, and seq{.

2nd [CATALOG]
STATWIZARD
OFF

STATWIZARD ON

STATWIZARD ON

Enables wizard syntax help for statistical commands, distributions, and seq{.

2nd [CATALOG]
STATWIZARD
ON{

stdDev{

stdDev(*list*{,*freqlist*})

Returns the standard deviation of the elements in *list* with frequency *freqlist*.

2nd [LIST]
MATH
7:stdDev{

Stop

Stop

Ends program execution; returns to home screen.

+ **PRGM**
CTL
F:Stop

Store →

Store: *value*→*variable*

Stores *value* in *variable*.

STO→

StoreGDB

StoreGDB *n*

Stores current graph in database **GDB***n*.

2nd [DRAW]
STO
3:StoreGDB

StorePic

StorePic *n*

2nd **[DRAW]**

Stores current picture in picture **Pic***n*.

STO

1:StorePic

String→Equ(

String→Equ(*string*,**Y=** *var*)

† **[PRGM]**

Converts *string* into an equation and stores it in **Y=** *var*.

I/O

string can be a string or string variable.

F:String→Equ(

String→Equ(is the inverse of **Equ→String(**.

sub(

sub(*string*,*begin*,*length*)

2nd **[CATALOG]**

Returns a string that is a subset of another *string*, from *begin* to *length*.

sub(

sum(

sum(*list*[,*start*,*end*])

2nd **[LIST]**

Returns the sum of elements of *list* from *start* to *end*.

MATH

5:sum(

summation Σ (

Σ (*expression*[,*start*,*end*])

[MATH]

Classic command as shown.

NUM

In MathPrint™ the summation entry template displays and returns the sum of elements of *list* from *start* to *end*, where *start* \leq *end*.

0: summation Σ (

T

tan(

tan(*value*)

[TAN]

Returns the tangent of a real number, expression, or list.

\tan^{-1} (

\tan^{-1} (*value*)

[2nd] [TAN⁻¹]

Returns the arctangent of a real number, expression, or list.

Tangent(

Tangent(*expression,value[,color#,linestyle#]*)

[2nd] [DRAW]

DRAW

Draws a line tangent to *expression* at $X=$ *value* with specified *color#*: 10-24 and line style *linestyle #*: 1-2.

5:Tangent(

Color#: 10 - 24 or color name pasted from [vars] COLOR.

tanh(

tanh(*value*)

[2nd]

[CATALOG]

Returns hyperbolic tangent of a real number, expression, or list.

tanh(

\tanh^{-1} (

\tanh^{-1} (*value*)

[2nd]

[CATALOG]

Returns the hyperbolic arctangent of a real number, expression, or list.

\tanh^{-1} (

tcdf(

tcdf(*lowerbound,upperbound,df*)

[2nd] [DISTR]

DISTR

Computes the Student-*t* distribution probability between *lowerbound* and *upperbound* for the specified degrees of freedom *df*.

6:tcdf(

Text(

Text(*row,column,text1,text2,...,text n*)

[2nd] [DRAW]

DRAW

Writes *text* on graph beginning at pixel (*row,column*), where 0 *row* 164 and 0 *column* 264.

0:Text(

Full mode, row must be ≤ 148 ; column must be 256

Horiz mode, row must be $\text{row} \leq 66$ and column must be ≤ 256

G-T mode, row must be $\text{row} \leq 126$; column must be 176

TextColor(

TextColor(*color#*)

+ [2nd]

TextColor(

Set text color prior to using the **Text(** command.

[DRAW]

Color#: 10 - 24 or color name pasted from [vars] COLOR.

DRAW

A:TextColor
(

Then

Then

See If:Then

Thick

Thick

+ [MODE]

Resets all Y=editor line-style settings to Thick.

Thick

Thin

Thin

+ [MODE]

Resets all Y=editor line-style settings to Thin.

Thin

Time

Time

+ [2nd]

Sets sequence graphs to plot with respect to time.

[FORMAT]

Time

timeCnv(

timeCnv(*seconds*)

[2nd] [CATALOG]

Converts seconds to units of time that can be more easily understood for evaluation. The list is in *{days, hours, minutes, seconds}* format.

timeCnv

TInterval

TInterval [*listname, freqlist, confidence level*]
(Data list input)

+ [STAT]

TESTS

Computes a *t* confidence interval.

8:TInterval

Interval

Interval $\bar{x}, Sx, n[, confidence\ level]$
(Summary stats input)

† **STAT**
TESTS

Computes a t confidence interval.

8:Interval

toString(

toString(*value*[,*format*])

† **PRGM**
I/O

Converts value to a string where *value* can be real, complex, an evaluated expression, list, or matrix. String *value* displays in classic *format* (0) following the mode setting AUTO/DEC or in decimal *format* (1).

E:toString(

tpdf(

tpdf(*x, df*)

2nd **DISTR**
DISTR

Computes the probability density function (pdf) for the Student- t distribution at a specified x value with specified degrees of freedom df .

5:tpdf(

Trace

Trace

TRACE

Displays the graph and enters **TRACE** mode.

T-Test

T-Test $\mu \theta$
[,*listname, freqlist, alternative, drawflag, color#*])
(Data list input)

† **STAT**
TESTS
2:T-Test

Performs a t test with frequency *freqlist*. *alternative=-1* is <; *alternative=0* is ; *alternative=1* is >. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

T-Test

T-Test $\mu \theta, \bar{x}, Sx, n[, alternative, drawflag, color#]$

† **STAT**
TESTS
2:T-Test

Performs a t test with frequency *freqlist*. *alternative=-1* is <; *alternative=0* is ; *alternative=1* is >. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

tvm_FV

tvm_FV[(N,I%,PV,PMT,P/Y,C/Y)]

Computes the future value.

[APPS]

1:Finance
CALC
6:tvm_FV

tvm_I%

tvm_I%[(N,PV,PMT,FV,P/Y,C/Y)]

Computes the annual interest rate.

[APPS]

1:Finance
CALC
3:tvm_
I%

tvm_N

tvm_N[(I%,PV,PMT,FV,P/Y,C/Y)]

Computes the number of payment periods.

[APPS]

1:Finance
CALC
5:tvm_N

tvm_Pmt

tvm_Pmt[(N,I%,PV,FV,P/Y,C/Y)]

Computes the amount of each payment.

[APPS]

1:Finance
CALC
2:tvm_
Pmt

tvm_PV

tvm_PV[(N,I%,PMT,FV,P/Y,C/Y)]

Computes the present value.

[APPS]

1:Finance
CALC
4:tvm_PV

U

UnArchive

UnArchive *variable*

Moves the specified variables from the user data archive memory to RAM.

To archive variables, use **Archive**.

[2nd] [MEM]

6:UnArchive

Un/d

Un/d

Displays results as a mixed number, if applicable.

[MATH]
NUM
C: Un/d

or

[MATH]
FRAC
2:Un/d

uvAxes

uvAxes

Sets sequence graphs to plot $u(n)$ on the x-axis and $v(n)$ on the y-axis.

+ **[2nd]**
[FORMAT]
uv

uwAxes

uwAxes

Sets sequence graphs to plot $u(n)$ on the x-axis and $w(n)$ on the y-axis.

+ **[2nd]**
[FORMAT]
uw

V

1-VarStats

1-VarStats [*Xlistname*,*freqlist*]

Performs one-variable analysis on the data in *Xlistname* with frequency *freqlist*.

[STAT]
CALC
1:1-Var Stats

2-VarStats

2-VarStats [*Xlistname*,*Ylistname*,*freqlist*]

Performs two-variable analysis on the data in *Xlistname* and *Ylistname* with frequency *freqlist*.

[STAT]
CALC
2:2-Var Stats

variance(

variance(*list*[,*freqlist*])

Returns the variance of the elements in *list* with frequency *freqlist*.

[2nd] **[LIST]**
MATH
8:variance(

Vertical

Vertical x ,*color#*,*linestyle#*

[2nd] [DRAW]

Draws a vertical line at x with specified color and line style.

DRAW

Color#: 10 - 24 or color name pasted from [vars] COLOR.

4:Vertical

line style #: 1-4.

vwAxes

vwAxes

+ **[2nd]**

[FORMAT]

Sets sequence graphs to plot $v(n)$ on the x -axis and $w(n)$ on the y -axis.

vw

W

Wait

Wait*time*

+ **[PRGM]**

CTL

Suspends execution of a program for a given time. Maximum time is 100 seconds.

A:Wait

Wait

**TI-
Innovator™
Hub**

Wait*time*

+ **[PRGM]**

HUB

Suspends execution of a program for a given time. Maximum time is 100 seconds.

4:Wait

Web

Web

+ **[2nd]**

[FORMAT]

Sets sequence graphs to trace as webs.

Web

:While

:While*condition:commands*

+ **[PRGM]**

:End:command

CTL

Executes *commands* while *condition* is true.

5:While

X

xor

valueA xor *valueB*

2nd [TEST]

Returns 1 if only *valueA* or *valueB* = 0. *valueA* and *valueB* can be real numbers, expressions, or lists.

LOGIC
3:xor

xyLine

xyLine Plot#(*type*,*Xlist*,[*freqlist*,*color*#])

Used as the "type" argument in the command

Where # gives Plot1, Plot2 or Plot3.

†
2nd
[stat plot]
TYPE

Z

ZBox

ZBox

Displays a graph, lets you draw a box that defines a new viewing window, and updates the window.

† **ZOOM**
ZOOM
1:ZBox

ZDecimal

ZDecimal

Adjusts the viewing window so that **TraceStep=0.1**, **$\Delta X=0.5$** and **$\Delta Y=0.5$** , and displays the graph screen with the origin centered on the screen.

† **ZOOM**
ZOOM
4:ZDecimal

ZFrac1/2

ZFrac1/2

Sets the window variables so that you can trace in increments of $\frac{1}{2}$, if possible. Sets **TraceStep** to $\frac{1}{2}$ and **ΔX** and **ΔY** to $\frac{1}{4}$.

ZOOM
ZOOM
B:ZFrac1/2

ZFrac1/3

ZFrac1/3

Sets the window variables so that you can trace in increments of $\frac{1}{3}$, if possible. Sets **TraceStep** to $\frac{1}{3}$ and **ΔX** and **ΔY** to $\frac{1}{6}$.

ZOOM
ZOOM
C:ZFrac1/3

ZFrac1/4

ZFrac1/4

ZOOM

ZOOM

Sets the window variables so that you can trace in increments of $\frac{1}{4}$, if possible. Sets **TraceStep** to $\frac{1}{4}$ and ΔX and ΔY to $\frac{1}{8}$.

D:ZFrac1/4

ZFrac1/5

ZFrac1/5

ZOOM

ZOOM

Sets the window variables so that you can trace in increments of $\frac{1}{5}$, if possible. Sets **TraceStep** to $\frac{1}{5}$ and ΔX and ΔY to $\frac{1}{10}$.

E:ZFrac1/5

ZFrac1/8

ZFrac1/8

ZOOM

ZOOM

Sets the window variables so that you can trace in increments of $\frac{1}{8}$, if possible. Sets **TraceStep** to $\frac{1}{8}$ and ΔX and ΔY to $\frac{1}{16}$.

F:ZFrac1/8

ZFrac1/10

ZFrac1/10

ZOOM

ZOOM

Sets the window variables so that you can trace in increments of $\frac{1}{10}$, if possible. Sets **TraceStep** to $\frac{1}{10}$ and ΔX and ΔY to $\frac{1}{20}$.

G:ZFrac1/10

ZInteger

ZInteger

† **ZOOM**

ZOOM

Redefines the viewing window using the following dimensions:
TraceStep=1, $\Delta X=0.5$, Xscl=10, $\Delta Y=1$, Yscl=10.

8:ZInteger

ZInterval

ZInterval σ [,*listname*,*freqlist*,*confidence level*]
(Data list input)

+ [STAT]
TESTS

Computes a z confidence interval.

7:ZInterval

ZInterval

ZInterval σ , \bar{x} , n [,*confidence level*]
(Summary stats input)

+ [STAT]
TESTS

Computes a z confidence interval.

7:ZInterval

Zoom In

Zoom In

+ [ZOOM]

Magnifies the part of the graph that surrounds the cursor location.

ZOOM

2:Zoom In

Zoom Out

Zoom Out

+ [ZOOM]

Displays a greater portion of the graph, centered on the cursor location.

ZOOM

3:Zoom Out

ZoomFit

ZoomFit

+ [ZOOM]

Recalculates **Ymin** and **Ymax** to include the minimum and maximum **Y** values, between **Xmin** and **Xmax**, of the selected functions and replots the functions.

ZOOM

0:ZoomFit

ZoomRcl

ZoomRcl

+ [ZOOM]

Graphs the selected functions in a user-defined viewing window.

MEMORY

3:ZoomRcl

ZoomStat

ZoomStat

Redefines the viewing window so that all statistical data points are displayed.

† [ZOOM]
ZOOM
9:ZoomStat

ZoomSto

ZoomSto

Immediately stores the current viewing window.

† [ZOOM]
MEMORY
2:ZoomSto

ZPrevious

ZPrevious

Replots the graph using the window variables of the graph that was displayed before you executed the last **ZOOM** instruction.

† [ZOOM]
MEMORY
1:ZPrevious

ZQuadrant1

ZQuadrant1

Displays the portion of the graph that is in quadrant 1.

[ZOOM]
ZOOM
A:ZQuadrant1

ZSquare

ZSquare

Adjusts the **X** or **Y** window settings so that each pixel represents an equal width and height in the coordinate system, and updates the viewing window.

† [ZOOM]
ZOOM
5:ZSquare

ZStandard

ZStandard

Replots the functions immediately, updating the window variables to the default values.

† [ZOOM]
ZOOM
6:ZStandard

Z-Test(

Z-Test(μ , σ
[,*listname*,*freqlist*,*alternative*,*drawflag*,*color*#])
(Data list input)

Performs a *z* test with frequency *freqlist*. *alternative*= -1 is <;

† [STAT]
TESTS
1:Z-Test(

Z-Test(

alternative=0 is ; *alternative=1* is >. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

Z-Test(

Z-Test(μ , σ , \bar{X} , n [,*alternative*,*drawflag*,*color#*])
(Summary stats input)

+ **STAT**
TESTS

1:Z-Test(

Performs a *z* test. *alternative=-1* is <; *alternative=0* is ; *alternative=1* is >. *drawflag=1* draws results; *drawflag=0* calculates results.

Color#: 10 - 24 or color name pasted from [vars] COLOR.

ZTrig

ZTrig

+ **ZOOM**

ZOOM

7:ZTrig

Replots the functions immediately, updating the window variables to preset values for plotting trig functions.

Arithmetic Operations, Test Relations, and Symbols

! (factorial)

Factorial: *value*!

Returns factorial of *value*.

MATH

PRB

4:!

! (factorial)

Factorial: *list*!

Returns factorial of *list* elements.

MATH

PRB

4:!

° (degrees notation)

Degrees notation: *value*°

Interprets *value* as degrees; designates degrees in DMS format.

2nd [ANGLE]

ANGLE

1: °

ʳ (radian)

Radian: *angle*ʳ

Interprets *angle* as radians.

2nd [ANGLE]

ANGLE

3:ʳ

ᵀ (transpose)

Transpose: *matrix*ᵀ

Returns a matrix in which each element (row, column) is swapped with the corresponding element (column, row) of *matrix*.

2nd [MATRIX]

MATH

2: ᵀ

^x√

*x*throot^x√*value*

Returns *x*throot of *value*.

MATH

MATH

5: ^x√

^x√(

*x*throot^x√*list*

MATH

MATH

$x\sqrt{\text{}}$ Returns x^{th} root of *list* elements.5: $x\sqrt{\text{}}$ $x\sqrt{\text{}}$ $listx\sqrt{value}$ Returns *list* roots of *value*.**MATH****MATH**5: $x\sqrt{\text{}}$ $x\sqrt{\text{}}$ $listAx\sqrt{listB}$ Returns *listA* roots of *listB*.**MATH****MATH**5: $x\sqrt{\text{}}$ **3 (cube)****Cube:** $value^3$

Returns the cube of a real or complex number, expression, list, or square matrix.

MATH**MATH**3: 3 $^3\sqrt{\text{}}$ (cube root)**Cube root:** $^3\sqrt{(value)}$

Returns the cube root of a real or complex number, expression, or list.

MATH**MATH**4: $^3\sqrt{\text{}}$ **= (equal)****Equal:**
 $valueA=valueB$ Returns 1 if $valueA = valueB$. Returns 0 if $valueA \neq valueB$.
 $valueA$ and $valueB$ can be real or complex numbers, expressions, lists, or matrices.**2nd** **[TEST]****TEST**

1: =

≠ (not equal)**Not equal:**

$valueA \neq valueB$

2nd [TEST]

TEST

2: ≠

Returns 1 if $valueA \neq valueB$. Returns 0 if $valueA = valueB$.
 $valueA$ and $valueB$ can be real or complex numbers,
 expressions, lists, or matrices.

< (less than)**Less than:**

$valueA < valueB$

2nd [TEST]

TEST

5: <

Returns 1 if $valueA < valueB$. Returns 0 if $valueA \geq valueB$.
 $valueA$ and $valueB$ can be real or complex numbers,
 expressions, or lists.

> (greater than)**Greater than:**

$valueA > valueB$

2nd [TEST]

TEST

3: >

Returns 1 if $valueA > valueB$. Returns 0 if $valueA \leq valueB$.
 $valueA$ and $valueB$ can be real or complex numbers,
 expressions, or lists.

≤ (less or equal)**Less than or equal:**

$valueA \leq valueB$

2nd [TEST]

TEST

6: ≤

Returns 1 if $valueA \leq valueB$. Returns 0 if $valueA > valueB$.
 $valueA$ and $valueB$ can be real or complex numbers,
 expressions, or lists.

≥ (greater or equal)**Greater than or equal:**

$valueA \geq valueB$

2nd [TEST]

TEST

4: ≥

Returns 1 if $valueA \geq valueB$. Returns 0 if $valueA < valueB$.
 $valueA$ and $valueB$ can be real or complex numbers,
 expressions, or lists.

⁻¹ (inverse)**Inverse:** $value^{-1}$ **x⁻¹**

Returns 1 divided by a real or complex number or expression.

$^{-1}$ (inverse)

Inverse: $list^{-1}$



Returns 1 divided by *list* elements.

$^{-1}$ (inverse)

Inverse: $matrix^{-1}$



Returns *matrix* inverted.

2 (square)

Square: $value^2$



Returns *value* multiplied by itself. *value* can be a real or complex number or expression.

2 (square)

Square: $list^2$



Returns *list* elements squared.

2 (square)

Square: $matrix^2$



Returns *matrix* multiplied by itself.

$^$ (power)

Powers: $value^{power}$



Returns *value* raised to *power*. *value* can be a real or complex number or expression.

$^$ (power)

Powers: $list^{power}$



Returns *list* elements raised to *power*.

^ (power)

Powers: $value^{list}$



Returns $value$ raised to $list$ elements.

^ (power)

Powers: $matrix^{power}$



Returns $matrix$ elements raised to $power$.

- (negation)

Negation: $-value$



Returns the negative of a real or complex number, expression, list, or matrix.

10^((power of ten)

Power of ten: $10^{(value)}$



Returns 10 raised to the $value$ power. $value$ can be a real or complex number or expression.

10^((power of ten)

Power of ten: $10^{(list)}$



Returns a list of 10 raised to the $list$

√((square root)

Square root: $\sqrt{(value)}$



Returns square root of a real or complex number, expression, or list.

*** (multiply)**

Multiplication:
 $valueA * valueB$



Returns $valueA$ times $valueB$.

*** (multiply)**

Multiplication:



*** (multiply)** $value * list$

Returns $value$ times each $list$ element.

*** (multiply)****Multiplication:** $list * value$ 

Returns each $list$ element times $value$.

*** (multiply)****Multiplication:** $listA * listB$ 

Returns $listA$ elements times $listB$ elements.

*** (multiply)****Multiplication:** $value * matrix$ 

Returns $value$ times $matrix$ elements.

*** (multiply)****Multiplication:** $matrixA * matrixB$ 

Returns $matrixA$ times $matrixB$.

/ (divide)**Division:** $valueA / valueB$ 

Returns $valueA$ divided by $valueB$

/ (divide)**Division:** $list / value$ 

Returns $list$ elements divided by $value$.

/ (divide)**Division:** $value / list$ 

/ (divide)

Returns value divided by *list* elements.

/ (divide)

Division: $listA/listB$



Returns *listA* elements divided by *listB* elements.

+ (add)

Addition: $valueA+valueB$



Returns *valueA* plus *valueB*.

+ (add)

Addition: $list+value$



Returns list in which *value* is added to each *list* element.

+ (add)

Addition: $listA+listB$



Returns *listA* elements plus *listB* elements.

+ (add)

Addition:
 $matrixA+matrixB$



Returns *matrixA* elements plus *matrixB* elements.

+ (concatenation)

Concatenation:
 $string1 + string2$



Concatenates two or more strings.

- (subtract)

Subtraction:
 $valueA - valueB$



Subtracts $valueB$ from $valueA$.

- (subtract)

Subtraction:
 $value - list$



Subtracts $list$ elements from $value$

- (subtract)

Subtraction:
 $list - value$



Subtracts $value$ from $list$ elements.

- (subtract)

Subtraction:
 $listA - listB$



Subtracts $listB$ elements from $listA$ elements.

- (subtract)

Subtraction:
 $matrixA - matrixB$



Subtracts $matrixB$ elements from $matrixA$ elements.

' (minutes notation)

Minutes notation: $\text{degrees}^\circ \text{minutes}'$
 $\text{seconds}''$

2nd [ANGLE]
ANGLE
2:'

Interprets *minutes* angle measurement as minutes.

" (seconds notation)

Seconds notation:
 $\text{degrees}^\circ \text{minutes}' \text{seconds}''$

ALPHA ["]

Interprets *seconds* angle measurement as seconds.

Error Messages

When the TI-84 Plus CE detects an error, it returns an error message as a menu title, such as **ERR:SYNTAX** or **ERR:DOMAIN**. This table contains each error type, possible causes, and suggestions for correction. The error types listed in this table are each preceded by **ERR:** on your graphing calculator display. For example, you will see **ERR:ARCHIVED** as a menu title when your graphing calculator detects an **ARCHIVED** error type.

ERROR TYPE	Possible Causes and Suggested Remedies
ARCHIVED	You have attempted to use, edit, or delete an archived variable. For example, the expression <code>dim(L1)</code> produces an error if L1 is archived.
ARCHIVE FULL	You have attempted to archive a variable and there is not enough space in archive to receive it.
ARGUMENT	A function or instruction does not have the correct number of arguments. The arguments are shown in italics. The arguments in brackets are optional and you need not type them. You must also be sure to separate multiple arguments with a comma (,). For example, <code>stdDev(list[<i>freqlist</i>])</code> might be entered as <code>stdDev(L1)</code> or <code>stdDev(L1,L2)</code> since the frequency list or <i>freqlist</i> is optional.
BAD ADDRESS	You have attempted to send or receive an application and an error (e.g. electrical interference) has occurred in the transmission.
BAD GUESS	In a CALC operation, you specified a Guess that is not between Left Bound and Right Bound . For the <code>solve(</code> function or the equation solver, you specified a <i>guess</i> that is not between <i>lower</i> and <i>upper</i> . Your guess and several points around it are undefined. Examine a graph of the function. If the equation has a solution, change the bounds and/or the initial guess.
BOUND	In a CALC operation or with <code>Select(</code> , you defined Left Bound > Right Bound . In <code>fMin(</code> , <code>fMax(</code> , <code>solve(</code> , or the equation solver, you entered <i>lower upper</i> .
BREAK	You pressed the <code>ON</code> key to break execution of a program, to halt a DRAW instruction, or to stop evaluation of an expression.
DATA TYPE	You entered a value or variable that is the wrong data type. For a function (including implied multiplication) or an instruction, you entered an argument that is an invalid data type, such as a complex number where a real number is

ERROR TYPE	Possible Causes and Suggested Remedies
	<p>required.</p> <p>In an editor, you entered a type that is not allowed, such as a matrix entered as an element in the stat list editor.</p> <p>You attempted to store an incorrect data type, such as a matrix, to a list.</p> <p>You attempted to enter complex numbers into the n/d MathPrint™ template.</p>
DIMENSION MISMATCH	<p>Your calculator displays the ERR:DIMENSION MISMATCH error if you are trying to perform an operation that references one or more lists or matrices whose dimensions do not match. For example, multiplying $L1 * L2$, where $L1 = \{1,2,3,4,5\}$ and $L2 = \{1,2\}$ produces an ERR:DIMENSION MISMATCH error because the number of elements in $L1$ and $L2$ do not match.</p> <p>You may need to turn Plots Off to continue.</p>
DIVIDE BY 0	<p>You attempted to divide by zero. This error is not returned during graphing. The TI-84 Plus CE allows for undefined values on a graph.</p> <ul style="list-style-type: none"> You attempted a linear regression with a vertical line.
DOMAIN	<p>You specified an argument to a function or instruction outside the valid range. The TI-84 Plus CE allows for undefined values on a graph.</p> <p>You attempted a logarithmic or power regression with a $-X$ or an exponential or power regression with a $-Y$.</p> <p>You attempted to compute $\Sigma Prn($ or $\Sigma Int($ with $pmt2 < pmt1$.</p>
DUPLICATE	<p>You attempted to create a duplicate group name.</p>
Duplicate Name	<p>A variable you attempted to transmit cannot be transmitted because a variable with that name already exists in the receiving unit.</p>
EXPIRED	<p>You have attempted to run an application with a limited trial period which has expired.</p>
Error in Xmit	<p>The TI-84 Plus CE was unable to transmit an item. Check to see that the cable is firmly connected to both units and that the receiving unit is in receive mode.</p> <p>You pressed [ON] to break during transmission.</p> <p>Setup RECEIVE first and then SEND, when sending files ([LINK]) between graphing calculators.</p>
ID NOT FOUND	<p>This error occurs when the SendID command is executed but the proper graphing calculator ID cannot be found.</p>
ILLEGAL	<p>You attempted to use an invalid function in an argument to</p>

ERROR TYPE	Possible Causes and Suggested Remedies
NEST	a function, such as seq(within <i>expression</i> for seq(.
INCREMENT	The increment, step, in seq(is 0 or has the wrong sign. . The TI-84 Plus CE allows for undefined values on a graph. The increment in a For(loop is 0.
INVALID	You attempted to reference a variable or use a function where it is not valid. For example, Yn cannot reference Y , Xmin , ΔX , or TblStart . In Seq mode, you attempted to graph a phase plot without defining both equations of the phase plot. In Seq mode, you attempted to graph a recursive sequence without having input the correct number of initial conditions. In Seq mode, you attempted to reference terms other than (n-1) or (n-2) . You attempted to designate a graph style that is invalid within the current graph mode. You attempted to use Select(without having selected (turned on) at least one xyLine or scatter plot.
INVALID DIMENSION	The ERR:INVALID DIMENSION error message may occur if you are trying to graph a function that does not involve the stat plot features. The error can be corrected by turning off the stat plots. To turn the stat plots off, press 2nd [STAT PLOT] and then select 4:PlotsOff . You specified a list dimension as something other than an integer between 1 and 999. You specified a matrix dimension as something other than an integer between 1 and 99. You attempted to invert a matrix that is not square.
ITERATIONS	The solve(function or the equation solver has exceeded the maximum number of permitted iterations. Examine a graph of the function. If the equation has a solution, change the bounds, or the initial guess, or both. irr(has exceeded the maximum number of permitted iterations. When computing I% , the maximum number of iterations was exceeded.
LABEL	The label in the Goto instruction is not defined with a Lbl instruction in the program.
LINK L1 (or any other file) to Restore	The calculator has been disabled for testing. To restore full functionality, use TI Connect™ CE software to download a file to your calculator from your computer, or transfer any file to your calculator from another TI-84 Plus CE.

ERROR TYPE	Possible Causes and Suggested Remedies
MEMORY	<p>Memory is insufficient to perform the instruction or function. You must delete items from memory before executing the instruction or function.</p> <p>Recursive problems return this error; for example, graphing the equation $Y1=Y1$.</p> <p>Branching out of an If/Then, For(), While, or Repeat loop with a Goto also can return this error because the End statement that terminates the loop is never reached.</p> <p>Attempting to create a matrix with larger than 400 cells.</p>
MemoryFull	<p>You are unable to transmit an item because the receiving unit's available memory is insufficient. You may skip the item or exit receive mode.</p> <p>During a memory backup, the receiving unit's available memory is insufficient to receive all items in the sending unit's memory. A message indicates the number of bytes the sending unit must delete to do the memory backup. Delete items and try again.</p>
MODE	<p>You attempted to store to a window variable in another graphing mode or to perform an instruction while in the wrong mode; for example, DrawInv in a graphing mode other than Func.</p>
NO SIGN CHANGE	<p>The solve() function or the equation solver did not detect a sign change.</p> <p>You attempted to compute I% when FV, (N PMT), and PV are all 0, or when FV, (N PMT), and PV are all 0.</p> <p>You attempted to compute irr() when neither CFList nor CFO is > 0, or when neither CFList nor CFO is < 0.</p>
NONREAL ANSWERS	<p>In Real mode, the result of a calculation yielded a complex result. . The TI-84 Plus CE allows for undefined values on a graph.</p>
OVERFLOW	<p>You attempted to enter, or you have calculated, a number that is beyond the range of the graphing calculator. The TI-84 Plus CE allows for undefined values on a graph.</p>
RESERVED	<p>You attempted to use a system variable inappropriately.</p>
SINGULAR MATRIX	<p>A singular matrix (determinant = 0) is not valid as the argument for -1.</p> <p>The SinReg instruction or a polynomial regression generated a singular matrix (determinant = 0) because the algorithm could not find a solution, or a solution does not exist.</p> <p>The TI-84 Plus CE allows for undefined values on a graph.</p>

ERROR TYPE	Possible Causes and Suggested Remedies
SINGULARITY	<i>expression</i> in the solve(function or the equation solver contains a singularity (a point at which the function is not defined). Examine a graph of the function. If the equation has a solution, change the bounds or the initial guess or both.
STAT	You attempted a stat calculation with lists that are not appropriate. Statistical analyses must have at least two data points. Med-Med must have at least three points in each partition. When you use a frequency list, its elements must be 0. $(X_{\max} - X_{\min}) / X_{\text{sc1}}$ must be between 0 and 131 for a histogram.
STAT PLOT	You attempted to display a graph when a stat plot that uses an undefined list is turned on.
SYNTAX	The command contains a syntax error. Look for misplaced functions, arguments, parentheses, or commas. For example, stdDev(list(<i>freqlist</i>)) is a function of the TI-84 Plus CE. The arguments are shown in italics. The arguments in brackets are optional and you need not type them. You must also be sure to separate multiple arguments with a comma (.). For example stdDev(list(<i>freqlist</i>)) might be entered as stdDev(L1) or stdDev(L1,L2) since the frequency list or <i>freqlist</i> is optional.
TOLERANCE NOT MET	You requested a tolerance to which the algorithm cannot return an accurate result.
UNDEFINED	You referenced a variable that is not currently defined. For example, you referenced a stat variable when there is no current calculation because a list has been edited, or you referenced a variable when the variable is not valid for the current calculation, such as a after Med-Med .
VALIDATION	Electrical interference caused a link to fail or this graphing calculator is not authorized to run the application.
VARIABLE	You have tried to archive a variable that cannot be archived or you have tried to unarchive an application or group. Examples of variables that cannot be archived include: Real numbers LRESID, R, T, X, Y, Theta , Statistic variables under Vars , STATISTICS menu, Vvars , and the AppdList .
VERSION	You have attempted to receive an incompatible variable version from another graphing calculator. A program may contain commands not supported in the OS version on your graphing calculator. Always use the latest

ERROR TYPE	Possible Causes and Suggested Remedies
WINDOW RANGE	<p>OS. TI-84 Plus CE and TI-84 Plus share programs but a version error will be given if any new TI-84 Plus CE programs may need to be adjusted for the high resolution graph area.</p> <p>A problem exists with the window variables.</p> <p>You defined Xmax Xmin or Ymax Ymin.</p> <p>You defined θ_{\max} θ_{\min} and $\theta_{\text{step}} > 0$ (or vice versa).</p> <p>You attempted to define Tstep=0.</p> <p>You defined Tmax Tmin and Tstep > 0 (or vice versa).</p> <p>Window variables are too small or too large to graph correctly. You may have attempted to zoom to a point that exceeds the TI-84 Plus CE's numerical range.</p>
ZOOM	<p>A point or a line, instead of a box, is defined in ZBox.</p> <p>A ZOOM operation returned a math error.</p>

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