



**Getting Started with the  
TI-84 Plus CE online calculator  
Operating System and Apps Guide**

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# Using Your TI-84 Plus CE online calculator

The TI-84 Plus CE online calculator comes loaded with CE Operating System v 5.7 features and selected software applications (Apps) to perform calculations for your pre-algebra, algebra, calculus and science calculations.

## Key Features

- **High resolution, full-color display**
  - Distinguish between multiple graphs and plots with color-coded equations, plots, and objects
  - Make graphs easier to read by adding grid lines
- **Familiar functionality**
  - Similar menu structure and navigation as the TI-84 Plus family with enhanced features
  - Built-in MathPrint™ functionality to input and view math symbols, formulas and stacked fractions
  - Graph on top of 5 pre-loaded images to connect concepts to the real world

The applications extend the functionality of your online calculator, allowing you to perform specific math and science functions and to deepen your understanding of concepts. Pre-loaded applications include:

- Cabri™ Jr
- CellSheet™
- Conic Graphing
- Inequality Graphing
- Periodic Table
- Polynomial Root Finder and Simultaneous Equation Solver
- Probability Simulations
- Science Tools
- Transformation Graphing

**Note:** Calculator files cannot be sent to or saved from the TI-84 Plus CE online calculator. If an App or Image Var is deleted, use [Reset online calculator](#). A reset will not preserve calculator files such as list, matrix or TI-Basic programs.

Use this guide to learn more about these features and other essential tools of your TI-84 Plus CE online calculator.

## Using the Keypad

This section covers basic TI-84 Plus CE online calculator settings and explains how to navigate the home screen and menus.

### Keypad Tips

- Press  $\alpha$  [f1] - [f4] to locate shortcut menus.
- Press  $\oplus$  on most menu items for Catalog Help.
- You may see a context-sensitive shortcut menu located at  $\alpha$  [f5] for interactive features or actions such as interactive drawing features from the graph screen or TI-Basic program editing.

### Using the TI-84 Plus CE online calculator Keypad

This section describes the functions of specific keys on the TI-84 Plus CE online calculator keypad.

#### TI-84 Plus CE online calculator Keypad

**1** **Graph/Plot Setup Keys** allow access to interactive graphing features. When some graph screen features are active, you may see a shortcut menu in the  $\alpha$  [f5] location for feature options.

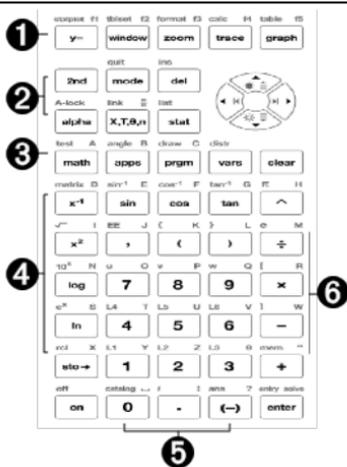
**2** **Editing Keys** allow you to edit expressions and values.

**3** **Math and Statistics Keys** display menus that access math, statistics, and other basic functions.

**4** **Scientific Keys** allow access to the capabilities of a standard scientific calculator—including trigonometric functions.

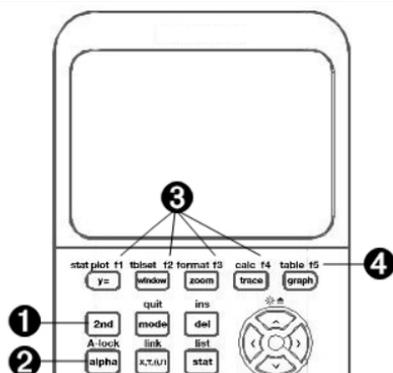
**5** **Number Keys** allow you to enter numbers.

**6** **Common Math Functions** allow you to divide, multiply, subtract, and add.



## Function Keys

- 1** **[2nd]** Access the second function printed to the left above each key.
- 2** **[alpha]** Access the third function printed to the right above each key.
- 3** **[alpha]** **[f1]** - **[f4]** Access shortcut menus for fraction templates, n/d, quick matrix entry, select **MATH** menus, and **VARS** menu functions.
- 4** **[alpha]** **[f5]** Context-sensitive shortcut menu for interactive features or actions such as interactive drawing features from the graph screen or TI-Basic program editing.



## Using the Function Keys

**Primary Function** The function appears on the key.

**Ex:** to display the **MATH** menu, press **[math]**.

**Secondary Function** The function appears above the key in the same color as the **[2nd]** key.

When you press the **[2nd]** key, the key name printed above the other key becomes active for the next keystroke.

**Ex:** to display the **TEST** menu, press **[2nd]** and then **[test]**.

The flashing cursor becomes **■** when you press **[2nd]**. **■** may also appear in the status bar.



**Tertiary (Alpha Key) Function** The function appears above the key in the same color as the **[alpha]** key.

The third function allows you to enter alphabetic characters and special symbols, and to access SOLVE and shortcut menus.

**Ex:** to display the letter A, press **[alpha]** and then **[A]**.

- To enter several alphabetic characters in a row, press **[2nd]** **[A-lock]**. This locks the alpha key in the ON position so that you avoid having to repeatedly press **[alpha]**. Press **[alpha]** again to unlock it.
- The flashing cursor becomes **■** when you press **[alpha]**. **■** may also appear in the status bar.



## Using the Home Screen

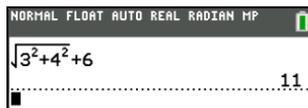
The image shows the TI-84 Plus CE home screen with a history of three calculations. The top status bar reads 'NORMAL FLOAT AUTO REAL RADIAN MP'. The history entries are:  $\sqrt{3^2+4^2}$  with answer 5,  $\frac{1}{2} + \frac{3}{5}$  with answer  $\frac{11}{10}$ , and  $| -25 - 9 |$  with answer 34. A cursor is visible at the end of the first line.

- 1 Expressions
- 2 Answers

1 2

Use the home screen to enter instructions and evaluate expressions. Answers appear on the same screen. Most calculations are stored in home screen history. Press  $\left[ \blacktriangle \right]$  and  $\left[ \blacktriangledown \right]$  to scroll through the entry history and paste the entries or answers to the current entry line.

1. Enter a calculation.
2. Press  $\left[ 2\text{nd} \right]$   $\left[ \text{quit} \right]$  from any screen until you get back to the home screen.
3. Press  $\left[ 2\text{nd} \right]$   $\left[ \sqrt{\phantom{x}} \right]$   $3$   $\left[ x^2 \right]$   $\left[ + \right]$   $4$   $\left[ x^2 \right]$   $\left[ \blacktriangleright \right]$   $\left[ + \right]$   $6$   $\left[ \text{enter} \right]$ .



**Note:** When you are in a MathPrint™ template, the cursor turns into a right arrow  $\blacktriangleright$  to indicate that you must press  $\left[ \blacktriangleright \right]$  to get out of the template before you continue entering the calculation.



### Displaying Entries and Answers

Mode settings control how the TI-84 Plus CE online calculator interprets expressions and displays answers. Press  $\left[ \text{mode} \right]$  to switch between classic entries and MathPrint™ mode. This guide focuses on MathPrint™ Mode, but may reference some classic entries.

### MathPrint™ Mode

- If an expression exceeds one line, it may scroll off the screen (on the home screen or the Y=screen). Press  $\left[ \blacktriangleright \right]$  to see the entire expression.

**Tip:** Press the cursor without pressing  $\left[ 2\text{nd} \right]$  to move the cursor along the line.

- An arrow appears to the left of an answer if it scrolls off the screen. Press  $\blacktriangleright$  and  $\blacktriangleleft$  before you enter another expression to display the entire answer.

Classic Entries	MathPrint™
$1/2$	$\frac{1}{2}$
$\sqrt{5}$	$\sqrt{5}$
$nDerive(x^2, x, 1)$	$\frac{d}{dx}(x^2) \mid x=1$

Some input areas in MathPrint™ mode only support classic entries.

Ex:  $\boxed{2nd}$   $\boxed{[tblset]}$

### MathPrint™ (default)

	Entry Answer (Scrolls)
	Entry Answer

## Scrolling Through the Home Screen History

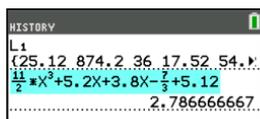
If all lines of the display are full, text scrolls off the top of the display.

You can scroll up through previous entries and answers on the home screen, even if you have cleared the screen. When you find an entry or answer that you want to use, you can select it and paste it (press [enter]) on the current entry line.

**Note:** List and matrix answers cannot be copied and pasted to the new entry line. However, you can copy the list or matrix command to the new entry line and execute the command again to display the answer.

- ▶ Press  $\uparrow$  or  $\downarrow$  to move the cursor to the entry or answer you want to copy and then press [enter].

The TI-84 Plus CE online calculator highlights the entry the cursor is on to help you select your desired choice.



The entry or answer that you copied is automatically pasted on the current input line at the cursor location.

**Note:** If the cursor is in a MathPrint™ expression, such as the denominator of a fraction, press [alpha]  $\uparrow$  to move the cursor out of the expression and then move the cursor to the entry or answer you want to copy to that location in the MathPrint™ template.

- ▶ Press [clear] or [del] to delete an entry/answer pair. After an entry/answer pair has been deleted, it cannot be displayed or recalled again.

## Returning to the Home Screen

To return to the home screen from any other screen, press  $\boxed{2nd}$  [quit] until you get back to home screen.

## Status Bar

The status bar displays on all screens and gives information about the selected calculator mode settings, any context help available for the item you currently have selected, and battery status.

The status bar may also show a busy indicator if the calculator is performing an operation,  $\alpha$  to indicate the calculator is in alpha status, and  $\mathbb{1}$  to indicate the secondary function is active.

Selected mode settings are displayed on the top line of the status bar when the cursor is in the active entry area. Mode settings do not display when the cursor is in the home screen history, since the mode may have been different for previous calculations.

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**Tip:**

Context help, if available, is displayed on the second line. The battery status icon, busy indicator, alpha indicator, and second key indicator are on the right. When you scroll into the home screen history, the context help on the status bar displays HISTORY.

In the example below, the cursor is on the GridColor option. The context help for how to change the GridColor using the spinner menu is displayed on the second line of the status bar.

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① Selected MODE settings.

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② Context help for current cursor position or active feature.

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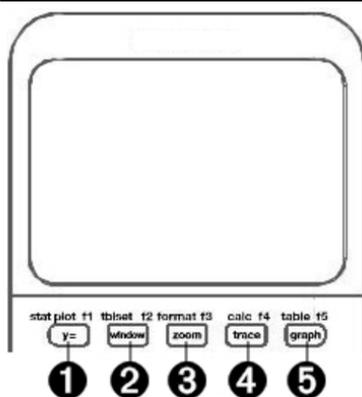
③ Battery icon for handheld calculator.

This area of the status bar also displays the busy indicator, alpha indicator, and second key indicator, depending on the state of the online graphing calculator.

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## Using Shortcut Menus



- 1  $\alpha$  [f1]  
Opens FRAC menu.
- 2  $\alpha$  [f2]  
Opens FUNC menu.
- 3  $\alpha$  [f3]  
Opens MTRX menu.
- 4  $\alpha$  [f4]  
Opens YVAR menu.
- 5  $\alpha$  [f5]  
Opens special menus.

Shortcut menus allow quick access to the following:

- [f1] Templates to enter fractions, and to toggle between whole and mixed fractions, and fractions and decimals.
- [f2] Selected functions from the MATH MATH and MATH NUM menus as you would see them in a textbook, when in MathPrint™ mode. Functions include absolute value, numeric differentiation, numeric integration, summation, log base n, square root, permutations, combinations, and factorials.
- [f3] Quick MathPrint™ matrix entry, when available.
- [f4] Names of function variables from the VARS Y-VARS menu.

To open a shortcut menu, press  $\alpha$  plus the corresponding F-key: [f1] for FRAC, [f2] for FUNC, [f3] for MTRX, [f4] for YVAR, or [f5] for special menus within interactive graph activities, such as when using DRAW or Quick Plot and Fit Equation, and for TI-Basic program editing.

To select a menu item:

-either-

- ▶ Press the number corresponding to the item.

-or-

- ▶ Use the arrow keys to move the cursor to the appropriate line and then press [enter].

You can select all shortcut menu items except matrix templates using standard menus. For example, you can choose the summation template from several places:

FUNC shortcut menu

[alpha] [f2]



[2nd] [catalog]



The shortcut menus are available to use where input is allowed. If the calculator is in Classic mode, or if a screen is displayed that does not support MathPrint™ display, entries will be displayed in Classic mode. The MTRX menu is only available in MathPrint™ mode on the home screen and in the Y= editor.

**Note:** Shortcut menus may not be available if [alpha] plus f-key combinations are used while an application is running.

### Display Cursors

The cursor may change to indicate what will happen when you press the next key or when you select the next menu item to be pasted as a character.

**Note:** The second cursor  and alpha cursor  may appear on the status bar, depending on the context.

Cursor	Appearance	Effect of Next Keystroke
Entry	Solid rectangle 	This is the default cursor. Enter characters at this cursor; this overrides any existing character.
Insert	Underline —	Press [2nd] [ins] for this cursor. Enter characters in front of the cursor location.
Second	Reverse arrow 	This allows you to enter a 2nd character or complete a 2nd operation.
Alpha	Reverse A 	An alpha character is entered, SOLVE is executed, or shortcut menus are displayed.

Cursor	Appearance	Effect of Next Keystroke
Full	Checkerboard rectangle 	No entry; the maximum characters are entered at a prompt or memory is full. Also indicates the limit of the allowed MathPrint™ mode levels.
MathPrint™	Right arrow 	The cursor moves to either the next part of the template or out of the template. Press the right arrow to move out of all MathPrint™ templates before entering the remaining terms in an expression.

If you press  $\alpha$  during an insertion, the cursor becomes an underlined **A** (**A**). If you press  $\text{2nd}$  during an insertion, the underlined cursor becomes an underlined  $\uparrow$  ( $\uparrow$ ).

**Note:** If you highlight a small character such as a colon or a comma and then press  $\alpha$  or  $\text{2nd}$ , the cursor does not change because the cursor width is too narrow.

## Working with Menus

You can access TI-84 Plus CE online calculator commands using menus.

### Displaying a Menu

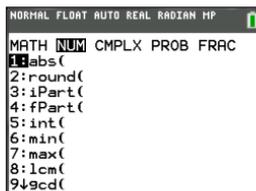
- When you press a key to display a menu, that menu temporarily replaces the screen where you are working.
- **Ex:** press  $\boxed{\text{math}}$  to display the **MATH** menu.
- After you select an item from a menu, the screen where you are working usually displays again.

**Note:** If a context help message is in the status bar when you press a menu that temporarily replaces the screen, that context help will remain in the status bar as a reminder that you are working within a context.

### Moving from One Menu to Another

Some keys access more than one menu. When you press such a key, the names of all accessible menus are displayed on the top line. When you highlight a menu name, the items in that menu are displayed. Press  $\boxed{\rightarrow}$  and  $\boxed{\leftarrow}$  to highlight each menu name.

**Note:** FRAC shortcut menu items are found in the FRAC menu, and are also found on the MATH NUM menu. FUNC shortcut menu items are also found on the MATH MATH menu.



### Scrolling a Menu

To scroll down the menu items, press  $\boxed{\downarrow}$ . To scroll up the menu items, press  $\boxed{\uparrow}$ .

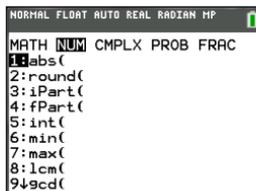
To page down 9 menu items at a time, press  $\boxed{\alpha} \boxed{\downarrow}$ . To page up 9 menu items at a time, press  $\boxed{\alpha} \boxed{\uparrow}$ .

To go to the last menu item directly from the first menu item, press  $\boxed{\uparrow}$ . To go to the first menu item directly from the last menu item, press  $\boxed{\downarrow}$ .

### Selecting an Item from a Menu

You can select an item from a menu in three ways.

- ▶ Press the number or letter of the item you want to select. The cursor can be anywhere on the menu, and the item you select does not need to be displayed on the screen.

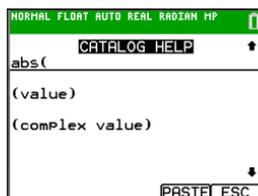


-or-

- ▶ Press  $\boxed{\downarrow}$  or  $\boxed{\uparrow}$  to move the cursor to the item you want, and then press [enter].

-or-

- ▶ Within the Catalog listing of functionality, move the cursor to the item you want, and then press  $\boxed{+}$ . For most commands, the Catalog Help syntax editor displays the correct syntax. Enter the syntax using the displayed help, and then press  $\boxed{\alpha}$   $\boxed{f4}$  to paste. The Catalog Help pastes the complete command.
- ▶ Press  $\boxed{\alpha}$   $\boxed{f5}$  to escape without pasting the command.



### Notes:

- After you select an item from a menu, the TI-84 Plus CE online calculator typically displays the previous screen.
- If you do not see PASTE on the Catalog Help screen, press  $\boxed{2nd}$   $\boxed{quit}$  until you return to the home screen, then repeat your actions. If this happens, it may mean the screens were layered and the previous screen did not have an active cursor on an input line to accept the pasting of the function or command.

### Leaving a Menu without Making a Selection

You can leave a menu without making a selection in these two ways.

- Press  $\boxed{2nd}$   $\boxed{quit}$  to return to the home screen.

-or-

- Press  $\boxed{clear}$  to return to the previous screen.

### Using Menus

When you press a key or key combination to display a menu, one or more menu names appear on the top line of the screen.

- The menu name on the left side of the top line is highlighted. Up to nine items in that menu are displayed, beginning with item 1.
- A number or letter identifies each item's place in the menu. The order is 1 through 9, then 0, then A, B, C. Once number and letter options are exhausted, the item number or letter area will be blank. Select these items using the arrow keys.
- When the menu continues beyond the displayed items, a down arrow ( $\downarrow$ ) replaces the colon next to the last displayed item.
- When a menu item ends in an ellipsis (...), the item displays a secondary menu, editor, or wizard when you select it.
- Use Catalog Help for more syntax help when needed. Select a menu item and then press  $\boxed{+}$  to go to a syntax help editor (if the menu item is supported).

### Working with MATH Menus

To display the MATH menu, press  $\boxed{math}$ . Press  $\boxed{\leftarrow}$  or  $\boxed{\rightarrow}$  to display the menus for the NUM (Number), CMLPX (Complex), PROB (Probability) or FRAC (Fraction) commands.

- **Note:** Use Catalog Help for more syntax help when needed. Select a menu item and then press  $\boxed{+}$  to go to a syntax help editor (if the menu item is supported).

## MATH

To display the **MATH** menu, press  $\boxed{\text{math}}$ .

1: $\blacktriangleright$ Frac	Displays the answer as a fraction.
2: $\blacktriangleright$ Dec	Displays the answer as a decimal.
3: $\sqrt{\quad}$	Calculates the cube.
4: $\sqrt[3]{\quad}$	Calculates the cube root.
* 5: $\sqrt[x]{\quad}$	Calculates the $x^{\text{th}}$ root.
6: fMin( $\quad$ )	Finds the minimum of a function.
7: fMax( $\quad$ )	Finds the maximum of a function.
* 8: nDeriv( $\quad$ )	Computes the numerical derivative of a function at a point.
* 9: fnInt	Computes the numerical integral of a function over an interval.
* 0: summation $\Sigma$ ( $\quad$ )	Computes the sum of an expression over an index.
* A: logBASE( $\quad$ )	Computes the logarithm of a specified value determined from a specified base: logBASE(value, base).
B: piecewise( $\quad$ )	Allows the entry of piecewise functions.
C: Numeric Solver...	Displays the equation solver.

\* FUNC shortcut menu  $\boxed{\alpha}$   $\boxed{f2}$

## NUM

To display the NUM menu, press  $\boxed{\text{math}}$   $\boxed{\blacktriangleright}$ .

* 1: abs( $\quad$ )	Absolute value
2: round( $\quad$ )	Round
3: iPart( $\quad$ )	Integer part
4: fPart( $\quad$ )	Fractional part
5: int( $\quad$ )	Greatest integer

6: min(	Minimum value
7: max(	Maximum value
8: lcm(	Least common multiple
9: gcd(	Greatest common divisor
0: remainder(	Reports the remainder as a whole number from a division of two whole numbers where the divisor is not zero.
** A: $\blacktriangleright$ n/d $\blacktriangleleft$ $\blacktriangleright$ Un/d	Converts an improper fraction to a mixed number or a mixed number to an improper fraction.
** B: $\blacktriangleright$ F $\blacktriangleleft$ $\blacktriangleright$ D	Converts a decimal to a fraction or a fraction to a decimal.
** C: Un/d	Displays the mixed number template in MathPrint™ mode. Displays a small u between the whole number and fraction in Classic mode. Use n/d to complete the mixed number.
** D: n/d	Displays the fraction template in MathPrint™ mode. Displays a thick fraction bar between the numerator and the denominator in Classic mode. Also accessible by pressing $\alpha$ $\boxed{X,T,\theta,n}$ .

\* FUNC shortcut menu  $\alpha$  [f2]

\*\* FRAC shortcut menu  $\alpha$  [f1]

## CMPLX

To display the CMPLX menu, press  $\mathbf{math}$   $\blacktriangleright$   $\blacktriangleright$ .

1: conj(	Returns the complex conjugate.
2: real(	Returns the real part.
3: imag(	Returns the imaginary part.
4: angle(	Returns the polar angle.
5: abs(	Returns the magnitude (modulus).
6: $\blacktriangleright$ Rect	Displays the result in rectangular form.
7: $\blacktriangleright$ Polar	Displays the result in polar form.

## PROB

To display the PROB menu, press  $\boxed{\text{math}}$   $\boxed{\blacktriangleleft}$   $\boxed{\blacktriangleleft}$ .

---

1: rand	Random-number generator
* 2: nPr	Number of permutations
* 3: nCr	Number of combinations
* 4: !	Factorial
5: randInt(	Random-integer generator
6: randNorm(	Random # from Normal distribution
7: randBin(	Random # from Binomial distribution
8: randIntNoRep(	Random ordered list of integers in a range

---

\* FUNC shortcut menu  $\boxed{\alpha}$  [f2]

## FRAC

To display the FRAC menu, press  $\boxed{\text{math}}$   $\boxed{\blacktriangleleft}$ .

---

** 1: n/d	Displays the fraction template in MathPrint™ mode. Displays a thick fraction bar between the numerator and the denominator in Classic mode. Also accessible by pressing $\boxed{\alpha}$ $\boxed{X,T,\theta,n}$ .
** 2: Un/d	Displays the mixed number template in MathPrint™ mode. Displays a small u between the whole number and fraction in Classic mode. Use n/d to complete the mixed number.
** 3: $\blacktriangleright$ F $\blacktriangleleft$ D	Converts a decimal to a fraction or a fraction to a decimal.
** 4: $\blacktriangleright$ n/d $\blacktriangleleft$ Un/d	Converts an improper fraction to a mixed number or a mixed number to an improper fraction.

---

\*\* FRAC shortcut menu  $\boxed{\alpha}$  [f1]

# Setting Up the Calculator Modes

Mode settings control how the calculator displays and interprets:

- Answers
- Elements of lists and matrices
- Graphs
- Language setting
- Numbers

## Setting Modes

To set calculator modes, press **[mode]**. The following menu appears on your screen:



**Note:** When you press **[mode]**, the cursor is on **NORMAL** by default. Press **[ $\uparrow$ ]** to switch between MathPrint™ and Classic modes.

**Note:** The Constant Memory™ feature retains mode settings when the unit is turned off.

## Changing Mode Settings

To change mode settings, follow these steps:

1. Press **[ $\downarrow$ ]** or **[ $\uparrow$ ]** to move the cursor to the line of the setting that you want to change.
2. Press **[ $\rightarrow$ ]** or **[ $\leftarrow$ ]** to move the cursor across the line to the desired setting.
3. Press **[enter]** to select a setting.

**Exception: LANGUAGE** Press **[ $\rightarrow$ ]** or **[ $\leftarrow$ ]** to select a loaded language. Press **[ $\downarrow$ ]** or **[ $\uparrow$ ]** to set the selected language.

**Note:** The second line of the status bar displays context help with a description of line modes.

Mode	Description
MATHPRINT CLASSIC	Controls whether inputs and outputs on the home screen and in the Y= editor are displayed as they are in textbooks
NORMAL SCI ENG	Numeric notation

Mode	Description
FLOAT 0 1 2 3 4 5 6 7 8 9	Number of decimal places in answers
RADIAN DEGREE	Unit of angle measure
FUNCTION PARAMETRIC POLAR SEQ	Type of graphing
THICK DOT-THICK THIN DOT-THIN	Resets all Y= line styles
SEQUENTIAL SIMUL	Whether to plot sequentially or simultaneously
REAL a+bi re <sup>∠</sup> (θi)	Real, rectangular complex, or polar complex
FULL HORIZONTAL GRAPH-TABLE	Full screen, two split-screen modes
FRACTION TYPE: n/d Un/d	Displays results as simple fractions or mixed fractions
ANSWERS: AUTO DEC	Controls the format of the answers
STAT DIAGNOSTICS: OFF ON	Determines which information is displayed in a statistical regression calculation
STAT WIZARDS: ON OFF	Determines if syntax help prompts are provided for optional and required arguments for many statistical, regression and distribution commands and functions
SET CLOCK	Sets the time and date
LANGUAGE: ENGLISH	Sets the display language

## **MATHPRINT™ CLASSIC**

**MATHPRINT™** mode displays most inputs and outputs the way they are shown in

textbooks, such as  $\frac{1}{2} + \frac{3}{4}$  and  $\int_1^2 x^2 dx$ .

**CLASSIC** mode displays expressions and answers as if written on one line, such as  $1/2 + 3/4$ . (Fraction bars appear as thick lines. A division operation will appear as a thin slash mark.)

### **Note:**

- Some areas in **MATHPRINT™** mode display in classic (one line) formats.
- If you switch between these modes, most entries (except matrix calculations) will be preserved.

---

## **NORMAL SCI ENG**

Answers are displayed in standard formats when the calculation or setting forces a decimal result on the calculator.

<b>Notation for 12345.67</b>	<b>Decimal answer displays as:</b>
<b>NORMAL</b> 12345.67 Retains the decimal notation up to limits of the calculator display and memory.	12345.67
<b>SCI</b> (Scientific) 1.234567 x 10 <sup>4</sup> One digit to the left of the decimal with the appropriate power of 10 to the right of *E.	1.234567E4
<b>ENG</b> (Engineering) 12.34567 x 10 <sup>3</sup> Up to three digits before the decimal and the power of 10 (to the right of E) is a multiple of three.	12.34567E3

### **Note:**

\* This E in the display stands for "x10" and the number entered after E becomes the power of 10.

The keypad contains  $\boxed{2\text{nd}} \boxed{[E]}$ , which displays as E on the calculator. The calculator notation, E, designates the "x10" part of the number without using extra parentheses. The calculator then follows the order of operations as expected when using SCI or ENG notation. This notation, E, is not typically accepted on homework and exams, and written results should use the standard notation, for example, the 1.234567 x 10<sup>4</sup>.

If you select **NORMAL** notation, but the answer cannot display in 10 digits (or the absolute value is less than .001), the TI-84 Plus CE online calculator expresses the answer in scientific notation.

---

## **FLOAT 0 1 2 3 4 5 6 7 8 9**

**FLOAT** (floating) decimal mode displays up to 10 digits, plus the sign and decimal. **FLOAT** will display in the status bar.

Selecting **0123456789** specifies the number of digits (0 through 9) to display to the right of the decimal for decimal answers. **FIX#** will display in the status bar.

The decimal setting applies to **NORMAL, SCI, and ENG** notation modes.

The decimal setting applies to these numbers, with respect to the **ANSWER** mode setting:

---

- An answer displayed on the home screen
- Coordinates on a graph
- The **Tangent**( DRAW instruction equation of the line, x, and **dy/dx** values
- Results of calculated operations
- The regression equation stored after the execution of a regression model

## RADIAN DEGREE

Angle modes control how the calculator interprets angle values in trigonometric functions and polar/rectangular conversions. The **RADIAN** or **DEGREE** setting will display in the status bar.

**RADIAN** mode interprets angle values as radians. Answers display in radians.

**DEGREE** mode interprets angle values as degrees. Answers display in degrees. Polar complex number arguments are always interpreted in radians.

## FUNCTION PARAMETRIC POLAR SEQ

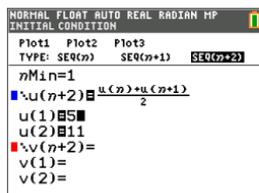
Graphing modes define the graphing parameters.

**FUNCTION** graphing mode plots functions, where Y is a function of X.

**PARAMETRIC** graphing mode plots relations, where X and Y are functions of T.

**POLAR** graphing mode plots functions, where r is a function of  $\theta$ .

**SEQUENCE** graphing mode plots sequences. Three sequences are available: u, v, and w, with an option of the independent variables of n, n+1, and n+2.



## THICK DOT-THICK THIN DOT-THIN

Line Style:	Graphs as:
<b>THICK</b>	Thick line style (default). More pixels displayed around a plotted point (pixel). Equivalent to CONNECTED on earlier TI-84 Plus calculators.
<b>DOT-THICK</b>	Large dot plotting. (3x3 pixels). Equivalent to DOT on earlier TI-84 Plus calculators.
<b>THIN</b>	Thin line style (graphing per pixel). Use THIN for functions

	whose graph has an axis as an asymptote or for any plotting where a more detailed view of the graph is needed as compared to THICK.
<b>DOT-THIN</b>	DOT display is 1 pixel per dot graphed. Use DOT-THIN for functions whose graph has an axis as an asymptote or for any plotting where a more detailed view of the graph is needed as compared to DOT-THICK.

**Note:**

- You can change individual line styles in the Y= editor.
- Setting a line style plotting mode sets all Y= line styles to the selected style.

## **SEQUENTIAL SIMUL**

**SEQUENTIAL** graphing-order mode evaluates and plots one function completely before the next function is evaluated and plotted.

**SIMUL** (simultaneous) graphing-order mode evaluates and plots all selected functions for a single value of X and then evaluates and plots them for the next value of X.

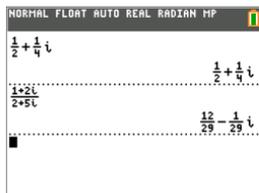
**Note:** Regardless of which graphing mode is selected, the calculator will sequentially graph all stat plots before it graphs any functions.

## **REAL $a+bi$ $re^{(\theta i)}$**

**REAL** mode does not display complex results unless complex numbers are entered as input.

Two complex modes display complex results.

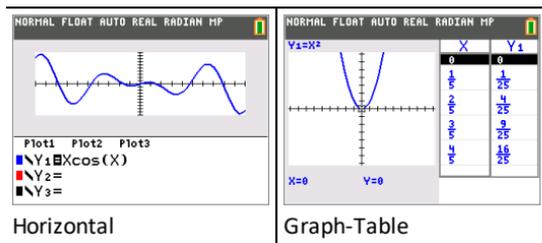
- **$a+bi$**  (rectangular complex mode) displays complex numbers in the form  $a+bi$ . The TI-84 Plus CE online calculator supports the n/d fraction template.
- **$re^{(\theta i)}$**  (polar complex mode) displays complex numbers in the form  $re^{(\theta i)}$ .



## **FULL HORIZONTAL GRAPH-TABLE**

**FULL** screen mode uses the entire screen to display a graph. Each split-screen mode displays two screens simultaneously.

- **HORIZONTAL** mode displays the current graph on the top half of the screen and most other calculator features on the bottom half.
- **GRAPH-TABLE** mode displays the current graph on the left half of the screen and plotted lists on the right half.



### FRACTION TYPE: $n/d$    $Un/d$

$n/d$  displays results as a simple fraction. Fractions may contain a maximum of six digits in the numerator; the value of the denominator may not exceed 9999.

$Un/d$  displays results as a mixed number, if applicable. **U**, **n**, and **d** must be all be integers. If **U** is a non-integer, the result may be converted  $U\ n/d$ . If **n** or **d** is a non-integer, a syntax error is displayed. The whole number, numerator, and denominator may each contain a maximum of three digits.

### ANSWERS: **AUTO**    **DEC**

**AUTO** displays answers in a similar format as the input. For example, if a fraction is entered in an expression, the answer will be in fraction form, if possible. If a decimal appears in the expression, the output will be a decimal number.

**DEC** displays answers as integers or decimal numbers.

**Note:** The **ANSWERS** mode setting also affects how values in sequences, lists, and tables are displayed. You can also convert values from decimal to fraction or fraction to decimal using **►FRAC**, **►DEC**, and **►F◄ ►D** located in the **FRAC** shortcut menu or the **MATH** submenu.

### STAT DIAGNOSTICS: **OFF**    **ON**

**OFF** displays a statistical regression calculation *without* the correlation coefficient ( $r$ ) or the coefficient of determination ( $r^2$ ).

**ON** displays a statistical regression calculation *with* the correlation coefficient ( $r$ ), and the coefficient of determination ( $r^2$ ), as appropriate.

## STAT WIZARDS: ON OFF

**ON:** Selection of menu items in **MATH PROB, STAT, CALC, DISTR DISTR, DISTR DRAW** and **seq()** in **LIST OPS** displays a screen which provides syntax help (wizard) for the entry of required and optional arguments into the command or function. The function or command will paste the entered arguments to the Home Screen history or to most other locations where the cursor is available for input. Some calculations will compute directly from the wizard. If a command or function is accessed from [catalog] the command or function will paste without wizard support.

If no wizard is available, use Catalog Help for more syntax help when needed. To use Catalog Help, select a menu item and then press  $\boxed{+}$ .

**OFF:** The function or command will paste to the cursor location with no syntax help (wizard).

---

## SET CLOCK

Use the clock to set the time and date, select the clock display format, and turn the clock on and off. The clock is turned on by default and is accessed from the mode screen.

### Displaying the Clock Settings

1. Press  $\boxed{\text{mode}}$ .
2. Press  $\boxed{\uparrow}$   $\boxed{\leftarrow}$   $\boxed{\uparrow}$  to move the cursor to **SET CLOCK**.
3. Press [enter] to change clock settings.



```
NORMAL FLOAT AUTO REAL RADIAN MP
ENTER TO SET CLOCK
MATHPRINT CLASSIC
NORMAL SCI ENG
FLOAT 0 1 2 3 4 5 6 7 8 9
RADIAN DEGREE
FUNCTION PARAMETRIC POLAR SEQ
CONNECTED DOT
SEQUENTIAL SIMUL
REML a+b1 re^(a1)
FULL HORIZONTAL GRAPH-TABLE
FRACTION TYPE: DMC Un#d
ANSWERS: AUTO DEC FRAC
GO TO 2ND FORMAT GRAPH: NO YES
STAT DIAGNOSTICS: OFF ON
STAT WIZARDS: ON OFF
SET CLOCK 02:03:02 09:08
```

**Note:** You may have to reset the clock if your battery power runs out. See [education.ti.com](http://education.ti.com) for future updates on the battery and battery preservation features.

### Turning the Clock On and Off

1. Press  $\boxed{2nd}$  [catalog].
2. Press  $\boxed{\downarrow}$  or  $\boxed{\uparrow}$  to scroll the **CATALOG** until the selection cursor points to **ClockOff** or **ClockOn**.
3. Press [enter] [enter].



```
NORMAL FLOAT AUTO REAL RADIAN MP
CATALOG
x^2cdf(
x^2pdf(
x^2-Test(
x^2GOF-Test(
Circle(
CLASSIC
Clear Entries
ClockOff
ClockOn
```

## LANGUAGE

Press  $\blacktriangleright$  or  $\blacktriangleleft$  on the LANGUAGE spinner menu to select a loaded language. Press  $\blacktriangledown$  or  $\blacktriangleup$  to set the selected language.

### Note:

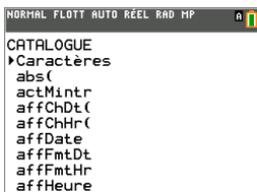
- The calculator will retain your language setting for most resets of the calculator.
- The **LANGUAGE** spinner menu will only display Language Apps loaded on the calculator. Check education.ti.com for all available languages. Use TI Connect™ CE to load files to your calculator.

### Using the Special Character Set

After you select your desired language, a new item (**CHARACTER**) is added to the TI-84 Plus CE online calculator **CATALOG**. This item accesses special characters and accent marks used in the language that you chose for localization. You can use these special characters and accent marks for display messages and text strings that you want to store to a variable. You cannot, however, use them in variable names.

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

**Note:** **CHARACTER** is always the first item in the **CATALOG**.



2. Press [enter] to display the **CHARACTER** screen.

Accent marks appear in the menus at the bottom of the screen.



3. You can:
  - Select a special character:
    - a) Press  $\blacktriangleleft$ ,  $\blacktriangleright$ ,  $\blacktriangledown$ , or  $\blacktriangleup$  to move the box to the special character that you want to use in a message or text string.
    - b) Press [enter] to place the character on the edit line.
    - c) Press  $\blacktriangleleft$ ,  $\blacktriangleright$ ,  $\blacktriangledown$ , or  $\blacktriangleup$  to move the box to **Done**.
    - d) Press [enter] to paste the contents of the edit line to the previous screen.

-or-

- Add an accent mark to a character:
  - a) Press the function key ( $[f1]$ ,  $[f2]$ ,  $[f3]$ ,  $[f4]$ , or  $[f5]$ ) immediately above the accent mark to select it. The ALPHA uppercase mode is automatically turned on. To

change to lowercase, press  $\boxed{\text{alpha}}$ .

- b) Press the key associated with the alpha character that you want to accent, for example, [A] (above  $\boxed{\text{math}}$ ). The accented character is displayed in the edit line.
- c) Press  $\boxed{\leftarrow}$ ,  $\boxed{\rightarrow}$ ,  $\boxed{\downarrow}$ , or  $\boxed{\uparrow}$  to move the box to **Done**.
- d) Press [enter] to paste the contents of the edit line to the previous screen.

# Evaluating Expressions

An expression is a group of

- numbers,
- variables,
- functions and their arguments,

-or-

- a combination of these elements.

An expression evaluates to a single answer.

On the TI-84 Plus CE online calculator, you enter an expression in the same order as you would write it on paper. For example:  $\pi R^2$  is an expression.

## Order of Operations

The TI-84 Plus CE online calculator uses an order of operations system called Equation Operating System (EOS™), which

- defines the order in which functions in expressions are entered and evaluated
- and-
- allows you to enter numbers and functions in a simple, straightforward sequence.

EOS™ evaluates the functions in an expression in this order:

Order	Function
1	Functions that precede the argument, such as <b>sin(</b> or <b>log(</b>
2	Functions that are entered after the argument, such as 2, -1, !, °, r, and conversions
3	Powers and roots, such as $2^5$ or $\sqrt[5]{32}$
4	Permutations ( <b>nPr</b> ) and combinations ( <b>nCr</b> )
5	Multiplication, implied multiplication, and division
6	Addition and subtraction
7	Relational functions, such as <b>&gt;</b> or <b>&lt;</b>
8	Logic operator <b>and</b>
9	Logic operators <b>or</b> and <b>xor</b>

**Note:** Within a priority level, EOS™ evaluates functions from left to right. Calculations within parentheses are evaluated first. A number in scientific or engineering notation, 2.34E6, is interpreted as  $(2.3 \times 10^6)$  with parentheses so the number remains the correct value during the EOS™ calculation.

### Implied Multiplication

The TI-84 Plus CE online calculator recognizes implied multiplication, so you do not need to press  $\times$  to express multiplication in all cases. For example, the TI-84 Plus CE online calculator interprets  $2\pi$ ,  $4\sin(46)$ ,  $5(1+2)$ , and  $(2*5)7$  as implied multiplication.

**Note:** TI-84 Plus CE online calculator implied multiplication rules differ from those of some other graphing calculators. For example:

Expression	TI-84 Plus CE online calculator evaluates as	Other Calculators may evaluate as
$1/2X$	$(1/2)X$	$1/(2X)$

### Parentheses

The TI-84 Plus CE online calculator completes all calculations inside a pair of parentheses first. For example, in the expression  $4(1+2)$ , EOS™ first evaluates the expression inside the parentheses,  $1+2$ , and then multiplies the answer, 3, by 4.

NORMAL FLOAT AUTO REAL RADIAN MP	
$4 \times 12$	48
$4(1+2)$	12

### Negation

To enter a negative number, use the negation key. Press  $\ominus$  and then enter the number. On the TI-84 Plus CE online calculator, negation is in the third level in the EOS™ hierarchy. Functions in the first level, such as squaring, are evaluated before negation.

Example:  $-X^2$ , evaluates to a negative number (or 0). Use parentheses to square a negative number.

NORMAL FLOAT AUTO REAL RADIAN MP	
$-2^2$	-4
$(-2)^2$	4

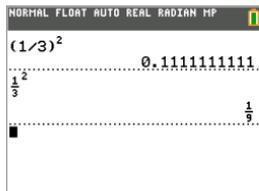
NORMAL FLOAT AUTO REAL RADIAN MP	
$2 \rightarrow R$	2
$-R^2$	-4
$(-R)^2$	4

**Note:** Use the  $\ominus$  key for subtraction and the  $\omin�$  key for negation. If you press  $\omin�$  to enter a negative number, as in  $9 \times \omin� 7$ , or if you press  $\omin�$  to indicate subtraction, as

in 9  $\square$  7, an error occurs. If you press  $\square$  A  $\square$  B, it is interpreted as implied multiplication (A)(-B).

## Entering Expressions and Instructions

You can use an expression on the home screen to calculate an answer. In most places where a value is required, you can use an expression to enter a value.



Expressions evaluate to the (approximate) decimal display



### Entering an Expression

To create an expression, you enter numbers, variables, and functions using the keypad and menus. An expression is evaluated when you press [enter], regardless of the cursor location. The entire expression is evaluated according to EOS™ rules, and the answer is displayed according to the mode setting for Answer.

Most TI-84 Plus CE online calculator functions and operations are symbols comprising several characters. You must enter the symbol from the keypad or a menu; do not spell it out. For example:

- To calculate the log of 45, you must press  $\square$  log  $\square$  45. Do not enter the letters **L**, **O**, and **G**. If you enter **LOG**, the TI-84 Plus CE online calculator interprets the entry as implied multiplication of the variables **L**, **O**, and **G**.
- When working with matrices, do not type the individual keys for [ , A, and ]. Use the NAMES menu in  $\square$  2nd  $\square$  [matrix] to paste the matrix name [A] to the cursor position.

Calculate  $3.76 \div (-7.9 + \sqrt{5}) + 2 \log 45$ .

MathPrint™	Classic
$3 \square . 76 \square \div \square ( \square (-) 7 \square - 9 \square + \square 2nd \square [\sqrt{\phantom{x}}] 5 \square \square ) \square + 2 \square \log \square 45 \square ) \square$ [enter]	$3 \square . 76 \square \div \square ( \square (-) 7 \square - 9 \square + \square 2nd \square [\sqrt{\phantom{x}}] 5 \square ) \square ) \square + 2 \square \log \square 45 \square ) \square$ [enter]
<p><b>Note:</b> The <math>\square</math> is a notable keystroke difference as compared to Classic.</p>	

**Note:** In MathPrint™ mode, press  $\square$  to get out of the MathPrint™ template and continue entering the expression.

## Multiple Entries on a Line

To enter two or more expressions or instructions on a line, separate them with colons ( $\alpha$  [ : ]). All instructions are stored together in last entry  $\square$  [entry] (above [enter]).



## Entering a Number in Scientific Notation

1. Enter the part of the number that precedes the exponent. This value can be an expression.
2. Press  $\square$  [EE]. E is pasted to the cursor location.
3. Enter the exponent, which can be one or two digits.

### Notes:

- If the exponent is negative, press  $\square$ , and then enter the exponent.
- E stands for "x10" and the calculator interprets the entire number as (123.45 x 10<sup>-2</sup>) as if it was entered with parentheses.



When you enter a number in scientific notation, the TI-84 Plus CE online calculator does not automatically display answers in scientific or engineering notation. The mode settings and the size of the number determine the display format.

## Functions

A function returns a value. For example, **log**( and **sin**( are functions. In general, the first letter of each function is lowercase. Most functions take at least one argument, as indicated by an open parenthesis following the name. For example, **sin**( requires one argument, **sin**(value).

**Note:** To see the arguments of a function or command in the calculator, find the item in a menu or  $\square$  [catalog] and press +. For most menu items, a Catalog Help screen will display and the syntax of the arguments will be displayed.

## Instructions (Commands)

An instruction (command) initiates an action on the calculator. For example, **ClrDraw** is an instruction to the calculator to clear drawn elements from a graph. Instructions cannot be used in expressions. In general, the first letter of each instruction name is uppercase. Some instructions take more than one argument, as indicated by an open parenthesis at the end of the name. For example, on the TI-84 Plus CE online calculator, **Circle**( requires three arguments, and has two optional arguments:

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

## Interrupting a Calculation

To interrupt a calculation or graph in progress, which is indicated by the busy indicator in the status bar, press **[on]**.

When you interrupt a calculation, a menu is displayed.

- To return to the home screen, select **1:Quit**.
- To go to the location of the interruption, select **2:Goto**.

When you interrupt a graph, a partial graph is displayed.

- To return to the home screen, press **[clear]** or any non-graphing key.
- To restart graphing, press a graphing key or select a graphing instruction.

### TI-84 Plus CE online calculator Edit Keys

Keystrokes	Result
<b>[right]</b> or <b>[left]</b>	<ul style="list-style-type: none"><li>• Moves the cursor within an expression; these keys repeat if held down on the keypad.</li></ul>
<b>[up]</b> or <b>[down]</b>	<ul style="list-style-type: none"><li>• Moves the cursor from line to line within an expression that occupies more than one line; these keys repeat if held down on the keypad.</li><li>• Moves the cursor from term to term within an expression in MathPrint™ mode; these keys repeat if held down on the keypad.</li><li>• On the home screen, scrolls through the history of entries and answers.</li></ul>
<b>[2nd]</b> <b>[left]</b>	<ul style="list-style-type: none"><li>• Moves the cursor to the beginning of an expression.</li></ul>
<b>[2nd]</b> <b>[right]</b>	<ul style="list-style-type: none"><li>• Moves the cursor to the end of an expression.</li></ul>
<b>[alpha]</b> <b>[up]</b>	<ul style="list-style-type: none"><li>• Moves the cursor out of a MathPrint™ expression and up into history on the home screen.</li><li>• Moves the cursor from a MathPrint™ expression to the previous Y-var in the Y=editor.</li></ul>
<b>[alpha]</b> <b>[down]</b>	<ul style="list-style-type: none"><li>• Moves the cursor from a MathPrint™ expression to the next Y-var in the Y=editor.</li></ul>
<b>[enter]</b>	<ul style="list-style-type: none"><li>• Evaluates an expression or executes an instruction.</li></ul>
<b>[clear]</b>	<ul style="list-style-type: none"><li>• Clears the current line on a line with text on the home screen.</li><li>• Clears everything on the home screen on a blank line on the home screen. This does not clear the history of your entries and answers.</li><li>• Press <b>[up]</b> to see the history.</li><li>• Use Clear Entries* followed by <b>[clear]</b> if you wish to delete all home screen entries. *Clear Entries is found in [catalog].</li><li>• Clears the expression or value where the cursor is located in an editor; it does not store a zero.</li></ul>
<b>[del]</b>	<ul style="list-style-type: none"><li>• Deletes a character at the cursor; this key repeats if held down on the</li></ul>

Keystrokes	Result
	keypad.
$\boxed{2nd}$ $\boxed{del}$	<ul style="list-style-type: none"> <li>Changes the cursor to an underline (<u>  </u>); inserts characters in front of the underline cursor; to end insertion, press <math>\boxed{2nd}</math> <math>\boxed{ins}</math> or press <math>\boxed{\leftarrow}</math>, <math>\boxed{\rightarrow}</math>, <math>\boxed{\uparrow}</math>, or <math>\boxed{\downarrow}</math>.</li> </ul>
$\boxed{2nd}$	<ul style="list-style-type: none"> <li>Changes the cursor or status bar indicator to <math>\mathbf{I}</math>; the next keystroke performs a <b>2nd</b> function (displayed above a key and to the left); to cancel <b>2nd</b>, press <math>\boxed{2nd}</math> again.</li> </ul>
$\boxed{\alpha}$	<ul style="list-style-type: none"> <li>Changes the cursor or status bar indicator to <math>\mathbf{\alpha}</math>; the next keystroke performs a third function of that key (displayed above a key and to the right) or accesses a shortcut menu. To cancel <math>\boxed{\alpha}</math>, press <math>\boxed{\alpha}</math> or press <math>\boxed{\leftarrow}</math>, <math>\boxed{\rightarrow}</math>, <math>\boxed{\uparrow}</math>, or <math>\boxed{\downarrow}</math>.</li> </ul>
$\boxed{2nd}$ $\boxed{A-lock}$	<ul style="list-style-type: none"> <li>Changes the cursor to <math>\mathbf{\alpha}</math>; sets alpha-lock; subsequent keystrokes access the third functions of the keys pressed; to cancel alpha-lock, press <math>\boxed{\alpha}</math>. If you are prompted to enter a name such as for a group or a TI-Basic program, alpha-lock is set automatically.</li> </ul> <p><b>Note:</b> The TI-84 Plus CE online calculator does not automatically set alpha-lock for entries that require list names.</p>
$\boxed{x, t, \theta, n}$	<ul style="list-style-type: none"> <li>Pastes an X in <b>Function</b> mode, a T in <b>Parametric</b> mode, a <math>\theta</math> in <b>Polar</b> mode, or an <math>n</math> in <b>Seq</b> mode with one keystroke.</li> </ul>
$\boxed{\alpha}$ $\boxed{[n/d]}$ (above $\boxed{x, t, \theta, n}$ )	<ul style="list-style-type: none"> <li>Pastes the n/d template at the cursor position.</li> </ul>

## Working with Graphs

This section covers how to change color options on a graph, how to draw points on a graph, and how to insert an image as a background on a graph.

### Using Color on the TI-84 Plus CE online calculator

The TI-84 Plus CE online calculator has many color options and a high resolution display that allows more information to be shown on the screen. The TI-84 Plus CE online calculator uses color in the following ways:

- Y= editor for line color.
- DRAW commands for line color, such as vertical lines, circles, and text on the graph screen.
- The graph format screen for grid, axes, or border color, and applying a background image or color.
- Statistical Plots.

Color options for various features are accessed via a spinner menu. With the cursor on a color selection for a feature, use the  $\leftarrow$  or  $\rightarrow$  to change the color. When the cursor is on any spinner menu, the context help in the status bar frequently displays the hint: PRESS [ $\leftarrow$ ] OR [ $\rightarrow$ ] TO SELECT AN OPTION.

**Note:** Take care to choose appropriate color combinations for the graph areas so that all features are visible.

### Resetting Color Options to Default

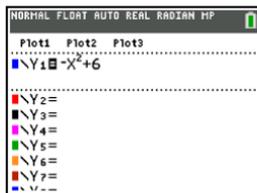
- With the cursor on a function in [Y=], press  $\boxed{\text{clear}}$   $\boxed{\text{clear}}$  to return to the default color and line style for that function.
- You can reset the calculator to its default settings, including color settings, by pressing  $\boxed{2\text{nd}}$   $\boxed{\text{mem}}$   $\boxed{7}$   $\boxed{2}$   $\boxed{2}$ .

### Using Color on the Graph Screen

The examples below show how to set up the graph of a function. Here, the mode is set to FUNCTION and the default settings are assumed.

Enter an equation in the Y= editor.

1. Press  $\boxed{Y=}$ .
2. Press  $\boxed{(-)}$   $\boxed{x,T,\theta,n}$   $\boxed{x^2}$   $\boxed{+}$   $\boxed{6}$ .



To set the line color in the Y= editor:

1. Press  $\boxed{1}$  to highlight the color and line style indicator.

2. Press [enter].

The spinner dialog displays. Notice the second line in the status bar, which displays hints.



3. Press  $\boxed{\rightarrow} \boxed{\rightarrow} \boxed{\rightarrow}$  to place the cursor box on the color and line style at the left of the screen and press [enter].

4. Press  $\boxed{\rightarrow} \boxed{\rightarrow} \boxed{\rightarrow}$  to select MAGENTA.

5. Press  $\boxed{\downarrow}$ .

**Note:** The thick line style is the default. It can be changed by pressing  $\boxed{\leftarrow}$  or  $\boxed{\rightarrow}$ .

6. Press  $\boxed{\downarrow}$  to highlight OK and then press [enter].

To set a Background Image:

1. Press  $\boxed{2nd} \boxed{[format]}$ .

Set GridColor, Axes, and BorderColor as desired.



2. Press  $\boxed{\uparrow}$  or  $\boxed{\downarrow}$  as necessary to highlight Background.

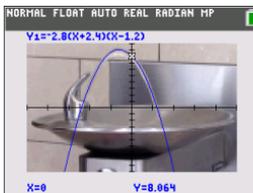
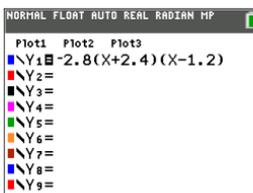
The spinner menu becomes active.

3. Press  $\boxed{\leftarrow}$  or  $\boxed{\rightarrow}$  to select the desired Background Image or color.

**Note:** There are five Image Vars included in your TI-84 Plus CE online calculator.

4. Press  $\boxed{trace}$  to see the graph and trace points.

**Note:** You can manipulate the graph to “fit” an object in the Background Image Var. You can also use QuickPlot and Fit Equation to fit an equation to a shape. (See **QuickPlot**.)



## Using QuickPlot and Fit Equation

QuickPlot and Fit Equation allows you to drop points on a graph screen and model a curve to those points using regression functions. You can select color and line style, draw points on a graph, and choose an equation to fit the drawn points. You can then store the results of the plot and equation.

QuickPlot and Fit Equation is an option in the **stat** CALC menu.

Drop points on the screen.  
Points can be saved to lists.



Calculate the regression equation, draw the curve, and store the function.

## Working With Images

The TI-84 Plus CE online calculator uses both pictures and background images. They are both stored in Flash archive, but they are used in different ways.

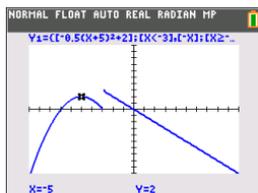
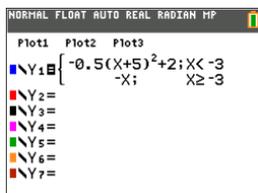
### Using Pictures and Backgrounds

- Image Vars (Image1 - Image9, and Image0) are variables stored in archive memory. An Image Var is used as a Background Image in the graph area. Image1 - Image 5 are pre-loaded on the TI-84 Plus CE online calculator. Additional images may not be loaded to the TI-84 Plus CE online calculator at this time.
- Pic Vars (Pic1 - Pic 9, and Pic0) are also variables stored in archive memory. Pic Vars can be created by drawing in the graphing area, and the changes saved and recalled to the graphing area. Saving a Pic Var will not include the Background Image behind your graphing area.
- Both Image Vars and Pic Vars are stored and run in Flash archive, not in RAM. They are both accessible in the VARS menu.
- The TI-84 Plus CE online calculator comes with the CE operating system, 5 pre-loaded Image Vars and selected Apps. No calculator files can be stored to the computer, sent to the online calculator, or linked to a connected calculator in this release.
- If you perform a RAM reset on the TI-84 Plus CE online calculator, the Image Vars and Pic Vars remain in Archive memory for use.
- If you delete a pre-loaded Image Var from the TI-84 Plus CE online calculator, use the [Reset Calculator](#) feature from the Workspace menus to reset all pre-loaded files offered in this release. This action \*will not\* retain your current work (RAM and Archive) such as lists, matrices, or TI-Basic programs.

## Using Piecewise Function Graphing

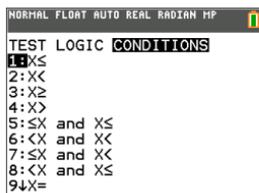
### How to enter a piecewise function

1. Press **[math]**.
2. Press **[↑]** or **[↓]** to scroll to **B:piecewise(**.
3. Press **[enter]**.
4. Press **[←]** or **[→]** to select the number of pieces (1-5) for the function.
5. Press **[↓]** **[enter]** to select **OK**.
6. Enter functions in the **[y=]** editor.
7. Press **[zoom]** **6:ZStandard** to set the standard window and graph.



### CONDITIONS Menu **[2nd]** **[test]**

The CONDITIONS menu, **[2nd]** **[test]** **[↓]** pastes several characters at once in the condition part of the piecewise template for quicker entry.



**Note:** The piecewise conditions are entered using the relations found in **[2nd]** **[test]** (above **[math]**). These relations are typically used for True(1)/False(0) testing in programming on the calculator.

### Special Information when using intervals in the condition part of the piecewise template:

Textbook format for an interval, such as  $-2 \leq X \leq 5$ , is allowed only when entered directly in the condition part of the piecewise template in the calculator. Do not use this format in other locations in the calculator for the same interval interpretation.

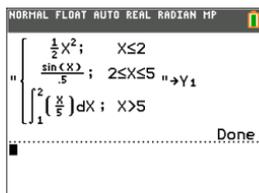
Note that if an interval form is selected from the CONDITIONS menu, the interval form will paste in the correct logical format for an interval as, for example,  $-2 < X$  and  $X < 5$ . This is the correct format for all features in the calculator to give the expected logical test result True(1)/False(0) and will also give the correct X interval in piecewise graphing.

**Note:**

- Overlapping intervals: The graph is plotted from left (Xmin) to right (Xmax). For each value of X from left to right, the calculator looks for the first valid expression to calculate the Y value. Overlapping intervals are allowed and will be graphed according to the first valid expression that can be computed for an X value.

**Tips**

- Once a piecewise template is selected with a certain number of pieces, you will not be able to add or delete a piece. You may select a larger number of pieces and enter zeros (False) to have placeholder rows. This is helpful when creating drawings using functions on the graph screen.
- The piecewise function uses one MathPrint™ level out of a maximum of four. You may see the checkerboard cursor (⊞) when you enter a function in the template, but that function is allowed if entered outside of a piecewise template. To keep the maximum number of MathPrint™ levels desired, enter the function in another YVar, such as Y3, and then use Y3 in the piecewise template.
- You can enter a function from the Home Screen. You can use this method to enter a "tall" function with many pieces. For example, "2X"→Y1:



- You can edit or view a function from  $\boxed{y=}$  on the home screen if needed and store the function back to  $\boxed{y=}$ . Remember the format, "2X"→Y1.
  - Quote:  $\boxed{\alpha}$  ["]
  - Recall the YVar:  $\boxed{2nd}$  [rc]  $\boxed{\alpha}$  [f4] (select a YVar) and [enter]
  - Close quote and store:  $\boxed{\alpha}$  ["]  $\boxed{sto}$ →
  - Select the YVar:  $\boxed{\alpha}$  [f4] and [enter]

## Working with Tables

When a function is entered in the Y= editor, you can view a table of values by pressing **2nd** [table].

NORMAL FLOAT AUTO REAL RADIAN HP

Plot1 Plot2 Plot3

Y1 =  $\frac{1}{2}X$

Y2 =  $0.5X$

Y3 =

Y4 =

Y5 =

Y6 =

Y7 =

Y8 =

NORMAL FLOAT AUTO REAL RADIAN HP

TABLE SETUP

TblStart=0

ΔTbl=1

Indpnt: **Auto** Ask

Depend: **Auto** Ask

NORMAL FLOAT AUTO REAL RADIAN HP

PRESS  $\blacktriangleleft$  TO EDIT FUNCTION

X	Y1	Y2			
0	0	0			
1	$\frac{1}{2}$	0.5			
2	1	1			
3	1.5	1.5			
4	2	2			
5	2.5	2.5			
6	3	3			

Y1 =  $\frac{1}{2}$

**Note:** The table setup, **2nd** [tblset], determines how table values are displayed. Check the table setup values if the table results are not in expected format of fraction. Using a mix of decimal and fractions will not retain fractions.

## Working with Matrices

You can enter matrices using the matrix editor on your TI-84 Plus CE online calculator. For example, you can perform the following operations on matrices:

- Addition
- Division
- Elementary Row Operations
- Inverses
- Multiplication
- Subtraction

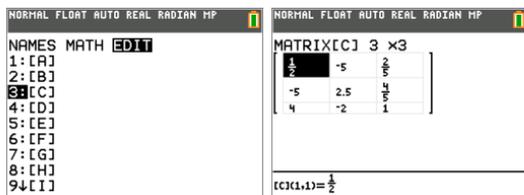
### Using the Matrix Editor

1. Press **2nd** [matrix].
2. Press **↓** to navigate to the EDIT submenu.
3. Select from one of 10 allowed matrix variable names [A] – [J].
4. Enter the dimension of the matrix, then enter values in each matrix cell.

**Note:** Once in the editor, use the arrow keys to navigate between cells.

#### Example:

Matrix [C] as a 3x3 matrix is now in memory.



### Performing a Calculation with a Matrix

1. Press **2nd** [quit] to go to the Home Screen.
2. Press **2nd** [matrix] use the MATH submenu to select a matrix command.
3. Use the NAMES submenu to paste the matrix name.

**Note:** A matrix name, such as [C], is a special character and can ONLY be pasted for a calculation from the **2nd** [matrix] NAMES menu and not typed from the calculator keypad.

#### Example:

To find the determinant of [C] as entered above:

- ▶ Use the **2nd** [matrix] MATH menu to paste the
  - 1: det( command
  - and-

-  $\boxed{2nd}$   $\boxed{matrix}$  NAMES 3: [C]

as matrix variables to the Home Screen.

```
NORMAL FLOAT AUTO REAL RADIAN MP
NAMES MATH EDIT
1: det(
2: ↑
3: dim(
4: Fill(
5: identity(
6: randM(
7: augment(
8: Matrxlist(
9: Listmatr(
```

```
NORMAL FLOAT AUTO REAL RADIAN MP
NAMES MATH EDIT
1: [A]
2: [B]
3: [C] 3x3
4: [D]
5: [E]
6: [F]
7: [G]
8: [H]
9: [I]
```

```
NORMAL FLOAT AUTO REAL RADIAN MP
det([C])
.....-38.95
```

**Note:** Remember that you cannot type in a matrix name from the calculator keypad. Use the  $\boxed{2nd}$   $\boxed{matrix}$  NAMES menu to paste a matrix name.

# Working with Probability and Statistics

This section covers probability and statistics functions and instructions (commands).

- Probability features deal with random numbers, which are generated by algorithms on the calculator.
- Statistics features allow you to create lists of data, then plot or analyze that data.

## Working with Probability

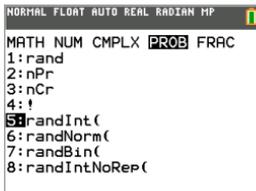
You can find probability features in the **math** PROB submenu.

Many probability features have Stat Wizards to help you enter the syntax.

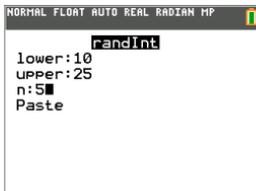
### Example:

To generate a set of five random integers between 10 and 25 (inclusive):

1. Press **math**, then press **▸** until you highlight **PROB**.
2. Press **▾** until you highlight **5: randInt(**, then [enter].



3. Enter the lower integer, then [enter].
4. Enter the upper integer, then [enter].
5. Enter the number of integers (**n**), then [enter].



6. Press [enter] to Paste.
7. Press [enter] again to see the random set of integers.

```
NORMAL FLOAT AUTO REAL RADIAN MP
randInt(10,25,5)
(21,10,15,25,13)
```

**Note:**

- With each rand execution, the TI-84 Plus CE online calculator generates the same random-number sequence for a given seed value. The TI-84 Plus CE online calculator factory-set seed value for rand is 0. To generate a different random-number sequence, store any nonzero seed value to rand. To restore the factory-set seed value, store 0 to rand, or reset the defaults by going to **2nd** [mem] **7:Reset... 2:Defaults...**
- The seed value also affects **randInt()**, **randNorm()**, and **randBin()** instructions.

### Working with Statistics

You can find statistics commands in the **stat** menu. You can create lists of data, then plot or analyze that data using the statistics commands.

You can use the following statistics functions:

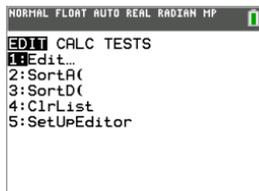
Description	Keys
Best fit equations (regressions)	<b>stat</b> <b>▸</b> <b>▲</b> <b>▼</b>
Define and store up to three stat plot definitions	<b>2nd</b> [stat plot]
Distributions	<b>2nd</b> [distr]
List-based statistical analysis	<b>2nd</b> [list] <b>▸</b> <b>▸</b>
Logistic and sine regression analysis	<b>stat</b> <b>▸</b> <b>▲</b> <b>▼</b>
One- and two-variable analysis	<b>stat</b> <b>▸</b> <b>1</b> and <b>stat</b> <b>▸</b> <b>2</b>
Statistical tests	<b>stat</b> <b>▸</b> <b>▸</b>

### Inferential Statistics

You can perform 16 hypothesis tests and confidence intervals and 15 distribution functions. You can display hypothesis test results graphically or numerically.

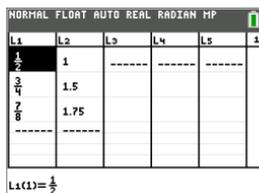
**To enter lists of data:**

1. Press **stat**.
2. Select **1: Edit** in the **EDIT** submenu, then [enter].



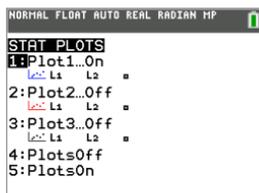
3. Enter your data into list columns.

**Note:** Once in the list editor, use the arrow keys to enter the data in the lists. L1 – L6 are built-in list names. Custom list names can be created by scrolling to a blank list name and pressing [enter].

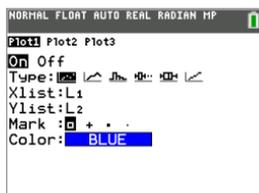


**To plot this data:**

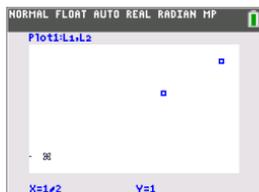
4. Press **2nd** [stat plot].
5. Press **1: Plot1** (to set up a scatter plot for L1 and L2), then [enter].



6. Press **◀** to highlight **On**.



7. Press **zoom** to automatically set up a graphing window for your data.
8. Press **9: ZoomStat** to see the graph.
9. Press **trace** and arrow keys to trace on the plot.



You can plot your statistics data in these ways:

- Scatter plot
- xyLine
- Histogram
- Regular or Modified box-and-whisker plot
- Normal probability plot

### To find the two variable statistics for L1 and L2:

1. Press **[stat]**.
2. Press **[>]** to highlight **CALC**.
3. Press **[v]** until you highlight **2:2-Var Stats**, then [enter].



4. Press **[v]** until you highlight **Calculate**, then [enter].



- ▶ The screen will display the variable statistics.

```
NORMAL FLOAT AUTO REAL DEGREE MP
Z-Var Stats
x̄=0.7083333333
Σx=2.125
Σx²=1.578125
Sx=0.190940654
σx=0.1559023911
n=3
ȳ=1.416666667
↓Σy=4.25
```

**Note:** Most common probability and statistics commands will have a wizard to prompt for syntax (values). The built-in Catalog Help is also available by pressing the  $\boxed{+}$  key on most menu items. This opens an editor to help you fill in the syntax (values) needed in a calculation.

## Working with Variables

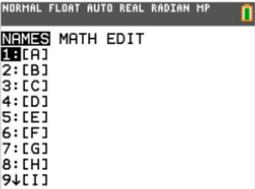
You can enter and use several types of data, including real and complex numbers, matrices, lists, functions, stat plots, graph databases, graph pictures, and strings.

### Using Variable Names

#### Variables and Defined Items

You can enter and use several types of data, including real and complex numbers, matrices, lists, functions, stat plots, graph databases, graph pictures, and strings.

The TI-84 Plus CE online calculator uses assigned names for variables and other items saved in memory. For lists, you also can create your own five-character names.

Variable Type	Names
Real numbers (including fractions)	A, B, ... , Z, $\theta$
Complex numbers	A, B, ... , Z, $\theta$
Matrices	[A], [B], [C], ... , [J] To enter a matrix name: Press <b>2nd</b> [matrix]. The Matrix Names menu appears. Press the number on the keypad that corresponds with the desired Matrix Name. Ex: Press 1 for [A] as shown below. 
Lists*	L1, L2, L3, L4, L5, L6, and user-defined names
Functions	Y1, Y2, ... , Y9, Y0
Parametric equations	X1T and Y1T, ... , X6T and Y6T

Variable Type	Names
Polar functions	<b>r1, r2, r3, r4, r5, r6</b>
Sequence functions	<b>u, v, w</b>
Stat plots	<b>Plot1, Plot2, Plot3</b>
Graphical databases	<b>GDB1, GDB2, ... , GDB9, GDB0</b> Save current equations from Y= and Window settings to re-use.
Background images	<b>Image1, Image2, ... , Image9, Image0</b> The TI-84 Plus CE online calculator comes pre-loaded with <b>Image1,... Image5</b> . No other images can be sent to the TI-84 Plus CE online calculator in this release.
Pictures	<b>Pic1, Pic2, ... , Pic9, Pic0</b>
Strings	<b>Str1, Str2, ... , Str9, Str0</b>
Groups	Grouped variables Save a group of allowed calculator files for sharing or to re-use when setting up a classroom.
System variables	<b>Xmin, Xmax</b> , and others

\* Once a list contains a complex number, it is designated as a complex list. To change a list to Real numbers, delete the list and enter the Real values.

### Notes about Variables

- You can create as many list names as memory will allow.
- From the home screen or from a program, you can store to matrices, lists, strings, and system variables such as **Xmax**, **TblStart**, and all Y= functions.
- From an editor, you can store to matrices, lists, and Y= functions.
- From the home screen, a program, or an editor, you can store a value to a matrix element or a list element.
- You can use **DRAW STO** menu items to store and recall Pic Vars.
- Although most variables can be archived, system variables including r, T, X, Y, and  $\theta$  cannot be archived.

**Note:** In TI-Basic programming, it is best practice to avoid using these system variables to avoid unexpected changes in the variable value due to calculations and graphing when executing a TI-Basic program.

- **Apps** are independent applications, which are stored in Flash archive. AppVars is a variable holder used to store variables created by independent applications. You cannot edit or change variables in AppVars unless you do so through the application that created them.

## Storing Variable Values

Values are stored to and recalled from memory using variable names. When you evaluate an expression that contains a variable name, the TI-84 Plus CE online calculator substitutes the value currently stored in that variable.

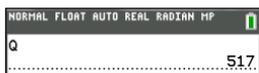
To store a value to a variable from the home screen or a program using the  $\boxed{\text{sto}\rightarrow}$  key, begin on a blank line and follow these steps.

1. Enter the value you want to store. The value can be an expression.
2. Press  $\boxed{\text{sto}\rightarrow}$ .  
 $\rightarrow$  is copied to the cursor location.
3. Press  $\boxed{\text{alpha}}$  and then the letter of the variable to which you want to store the value.
4. Press  $\boxed{\text{enter}}$ . The TI-84 Plus CE online calculator evaluates the expression and stores the value to the variable.



### Displaying a Variable Value

To display the value of a variable, enter the variable name on a blank line on the home screen, and then press  $\boxed{\text{enter}}$ .



### Archiving Variables (Archive, Unarchive)

You can store variables in the TI-84 Plus CE online calculator user data archive, a protected area of memory separate from RAM. The user data archive lets you:

- Store data, programs, applications or any other variables to a safe location where they cannot be edited or deleted inadvertently.
- Create additional free RAM by archiving variables.

By archiving variables that you do not need to edit frequently, you can free up RAM for applications that may require additional memory.

The TI-84 Plus CE online calculator places an asterisk (\*) to the left of archived variables in most menus as well as in  $\boxed{2\text{nd}} \boxed{\text{mem}}$  **2:Mem Management**. You cannot edit or execute archived variables in CE OS Version 5.2 or earlier. In CE OS Version 5.3 and later, you can execute TI-Basic programs if they are stored in an archive. If needed, you can use the Archive/UnArchive commands to manage the memory location.

**Example:**

If you archive a list named **L1**, you will see that it exists in memory. However, if you select and paste the name **L1** to the home screen, it will not appear on the home screen. You must unarchive it in order to see its contents and edit it.

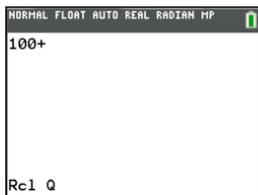
**Note:** Image Vars are run and stored in archive, but when an Image Vars displays in **VARS 4:Picture & Background**, the **BACKGROUND** menu does not display the asterisk **\***.

## Recalling Variable Values

To recall and copy variable contents to the current cursor location, follow these steps. To leave **Rcl**, press **clear**.

1. Press **2nd** **[rc]**. **Rcl** and the edit cursor are displayed on the bottom line of the screen.
2. Enter the name of the variable in one of the following ways:
  - Press **alpha** and then the letter of the variable.
  - Press **2nd** **[list]**, and then select the name of the list, or press **2nd** **[L1]** or **[L2]**, and so forth.
  - Press **2nd** **[matrix]**, and then select the name of the matrix.
  - Press **vars** to display the **VARS** menu or **vars** **[▶]** to display the **VARS Y-VARS** menu; then select the type and then the name of the variable or function.
  - Press **alpha** **[f4]** to display the **YVAR** shortcut menu, then select the name of the function.

The variable name you selected is displayed on the bottom line and the cursor disappears.



3. Press **[enter]**. The variable contents are inserted where the cursor was located before you began these steps.



### Notes:

- You can edit the characters pasted to the expression without affecting the value in memory.
- You can use **Rcl** in the **Y=** editor to paste a current function to a new **YVar** to avoid retyping long expressions.

# Solving Equations

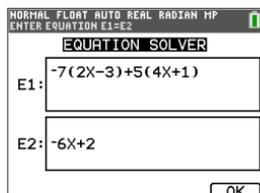
Press  $\boxed{\text{math}}$   $\boxed{\blacktriangle}$  to access **C:Numeric Solver...**

## Numeric Solver

1. Enter an equation as **expression 1=expression 2 (E1=E2)**.

You may enter more than one variable, but you will have to select one variable to solve. The other variables used will take on the value stored in the calculator.

2. Press OK.



3. Place the cursor on the variable to solve. For this example, the variable is X.

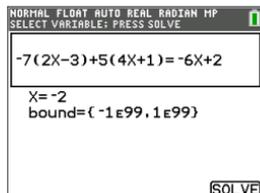
The current value of X stored in the calculator is displayed ( $X=0$ ).

You should enter a value close to your estimate of the solution. If needed, you can look at the intersection of the graph of both sides of your equation or use the table of values to know more about your problem. Here,  $X=0$  is a reasonable starting point for the calculator computation.

### Bounds:

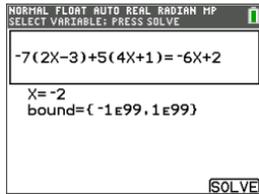
$\{-1E99, 1E99\}$  represents  $[-1 \times 10^{99}, 1 \times 10^{99}]$  as the calculator's "Real Number Line". You can edit this interval if you do not get all the solutions to your equation by limiting the values to a smaller interval. Use the graph of both side of your equation to identify a smaller interval around the solution seen on your graph.

4. Press the [SOLVE] ( $\boxed{\text{graph}}$ ) shortcut key.
5. Check your solution. The calculator checks the solution it generated. The difference between the two sides of your equation evaluated at the calculated solution displays as E1-E2.



## Interpreting the Numeric Solver Screen

- Always read the context help line for tips.
- The solution will be marked with a small square.



- **E1-E2=0 (expression 1 = expression 2)** is finding the difference of the left hand side of your equation, E1 with  $X=-2$  and the right hand side of your equation, E2 with  $X=-2$ . The difference is zero. The equation balances.  $X=-2$  is the solution. (Advanced: When  $E1=E2$  is not zero, but is a small value, the calculator algorithm likely gave a result close to the exact answer but within some tolerance of the calculator arithmetic.)

## Managing Calculator Files

To Manage your online calculator files, remember:

- The TI-84 Plus CE online calculator comes with the CE operating system, 5 pre-loaded Image Vars and selected Apps. No calculator files can be stored to the computer, sent to the online calculator, or linked to a connected calculator in this release.
- If you perform a RAM reset on the TI-84 Plus CE online calculator, the Image Vars and Pic Vars remain in Archive memory for use.
- If you delete a pre-loaded Image Var from the TI-84 Plus CE online calculator, use the [Reset Calculator](#) feature from the Workspace menus to reset all pre-loaded files offered in this release. This action *\*will not\** retain your current work (RAM and Archive) such as lists, matrices, or TI-Basic programs.

## Programming

For more information on TI-Basic Programming, please see [education.ti.com/eguide](http://education.ti.com/eguide)

In this release, the TI-84 Plus CE online calculator **does not support**

- the Python App and thus Python programming
- TI-Innovator™ Hub, TI-Innovator™ Rover, or any connected STEM devices

## Press-to-Test

Press-to-Test is not supported on the TI-84 Plus CE online calculator.

## Reset online calculator

### ***Resetting the TI-84 Plus CE online calculator:***

Using Reset Calculator from the Workspace menus will return the emulator to the default operating system, Image Vars and selected Apps. No student created calculator files will remain using this "Reset Calculator" feature of the TI-84 Plus CE online calculator Workspace. This feature may be appropriate for your exam needs.

**Note:** When you sign in to the online calculator on your computer, your online calculator will launch with your last work such as Home Screen calculations on that particular computer. If you sign in on a difference computer, your online calculator will launch with the last work you did on that computer.

## Using Applications (Apps)

These applications are preloaded on your TI-84Plus CE online calculator. You can view the Applications Guidebook at [education.ti.com/eguides](http://education.ti.com/eguides).

Press **[apps]** to see the complete list of applications.

### ***Cabri™ Jr. App***

Construct, analyze, and transform mathematical models and geometric diagrams on your online graphing calculator. You can:

- Perform analytic, transformational, and Euclidean geometric functions
- Build geometric constructions interactively with points, a set of points for locus, lines, polygons, circles, and other basic geometric objects
- Alter geometric objects on the fly to see patterns, make conjectures, and draw conclusions

### ***CellSheet™ App***

Combines spreadsheet functionality with the power of an online graphing calculator. Create cell formulas and use built-in functions.

Cells can contain:

- Integers
- Real numbers
- Formulas
- Variables
- Text and numeric strings
- Functions

Each spreadsheet contains 999 rows and 26 columns. The amount of data you can enter is limited only by the available RAM.

- Store (x,y) coordinate pairs to lists for viewing and optimizing functions for linear programming.

### ***Conic Graphing App***

Presents equations in function, parametric, or polar form and provides a simple way to graph the four conic shapes:

- Ellipse
- Circle
- Parabola
- Hyperbola

Enter the required parameters to graph, trace, or solve for the conic's characteristic.

## ***Inequality Graphing App***

Gives you new features for graphing equations and inequalities and evaluating the relationship between them. You can:

- Enter inequalities using relation symbols
- Graph inequalities and shade the union and intersection regions
- Enter inequalities (vertical lines only) in an X=editor
- Trace points of interest (such as intersections) between relations
- Store (x,y) coordinate pairs to lists for viewing and optimizing functions for linear programming.

## ***Periodic Table App***

Provides a graphical representation of the elements of the Periodic Table. This application allows you to:

- Observe and explore the Periodic Table of the Elements
- Find property data and useful information about the known elements
- Sort the elements by atomic number, alphabetically by name, or alphabetically by symbol
- Identify groups of elements by region (noble gasses, halogens, etc.) and block (p-, d-, s- and f-)
- Export property data to lists for further analysis
- Graph the major properties (atomic radii, electronegativities, etc.) against atomic number to illustrate the periodic nature of the elements

## ***Polynomial Root Finder and Simultaneous Equation Editor App***

This application:

- Calculates the roots (zeros) of polynomials of degree 1 through 10 with a convenient, easy-to-use interface.
- Allows you to store solutions into lists, load a list into the application for polynomial coefficients, and store the polynomial to a Y-Var to graph after quitting the App.
- Finds solutions to systems of linear equations.
- Allows you to load matrices containing the coefficients of linear systems, and identify whether a given system has a unique solution, an infinite number of solutions, or no solution.

## ***Probability Simulation App***

Explore probability theory with interactive animation that simulates the rolling of dice and tossing of coins, and generates random numbers on your online graphing calculator. Options include:

- Bar Graph - Trace on probabilities or frequencies
- Table of trials data
- Settings for specifying numbers of trials
- Ways to collect data

- Weighting

In addition, students can export data for further exploration.

### ***Science Tools App***

Science Tools allows you to perform unit conversions on your online graphing calculator. App elements include:

- Significant Figures Calculator
- Constants and Conversions
- Data and Graph Wizard
- Vector Calculator

### ***Transformation Graphing App***

Transformation Graphing lets you observe the effects of changing coefficient values without leaving the graph screen. Transformation Graphing affects only function graphing mode.  $X$  is the independent variable and  $Y$  is the dependent variable. It is not available in parametric, polar, or sequence graphing modes.

Transformation Graphing allows you to manipulate up to four coefficients on the graph:  $A$ ,  $B$ ,  $C$ , and  $D$ . All other coefficients act like constants using the value in memory. You can step through the transformation of a function or animate the transformation using play styles, play/pause, play, and fast play.

## Diagnosing and Correcting Error Conditions

The TI-84 Plus CE online calculator detects errors while performing these tasks:

- Evaluating an expression
  - Executing an instruction
  - Plotting a graph
  - Storing a value
1. Determine the error. The error screens give helpful hints about what may have happened, but the errors are not always fully explained.
  2. Correct the expression.

### Diagnosing an Error

When the TI-84 Plus CE online calculator detects an error, it returns an error message with a short description.



<b>1:Quit</b>	Displays the home screen
<b>2:Goto</b>	Displays the previous screen with the cursor at or near the error location

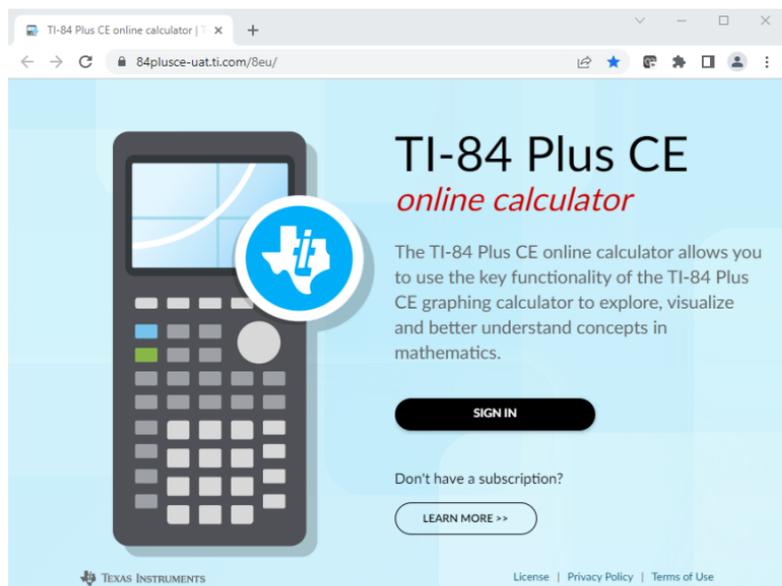
**Note:** If a syntax error occurs in the contents of a Y= function during program execution, then the **2:Goto** option returns to the Y= editor, not to the program.

### Correcting an Error

To correct an error, follow these steps.

1. Note the error type (ERROR:error type).
2. Select **2:Goto** (if it is available). The previous screen is displayed with the cursor at or near the error location.
3. Determine the error. The error screens give helpful hints about what may have happened, but the errors are not always fully explained.
4. Correct the expression.

## TI-84 Plus CE online calculator Workspace Features



TI-84 Plus CE online calculator

**TI-84 Plus CE**  
*online calculator*

The TI-84 Plus CE online calculator allows you to use the key functionality of the TI-84 Plus CE graphing calculator to explore, visualize and better understand concepts in mathematics.

**SIGN IN**

Don't have a subscription?

**LEARN MORE >>**

TEXAS INSTRUMENTS

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From the Landing Page at [84plusce.ti.com](https://84plusce.ti.com)

- **SIGN IN:** If you have a subscription follow the SIGN IN button steps.
  - **LEARN MORE:** Click on **LEARN MORE** about a subscription to the online calculator.  
<https://education.ti.com/84ceapp>
  - **See Also:** License, Privacy Policy and Terms of Use  
| [License](#) | [Privacy Policy](#) | [Terms of Use](#)
-

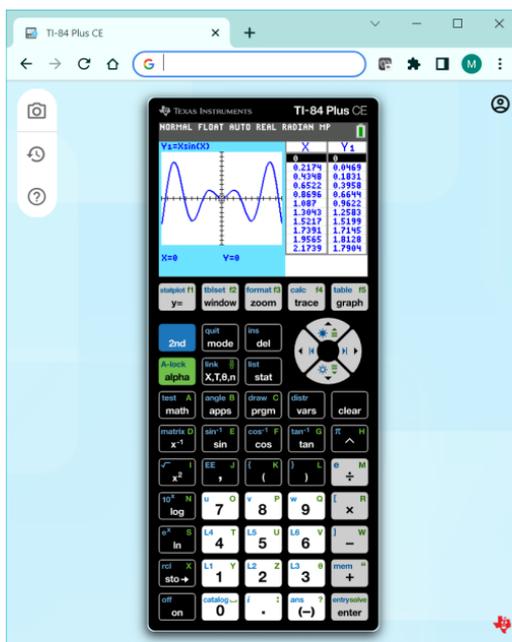
## Introduction to the TI-84 Plus CE online calculator Workspace

The TI-84 Plus CE online calculator allows you to display the online calculator in browser Workspace.

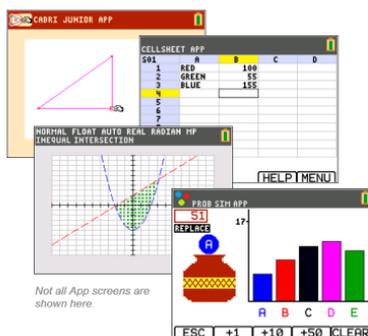
### TI-84 Plus CE online calculator

The TI-84 Plus CE online calculator state contains the following:

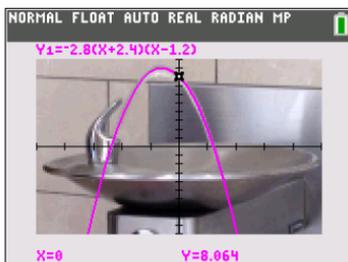
- CE Operating System v 5.7



- Selected Apps supported by the v 5.7 CE OS release
  - Cabri™ Jr
  - Probability Simulations
  - CellSheet™
  - Science Tools
  - Conic Graphing
  - Inequality Graphing
  - Periodic Table
  - Transformation Graphing
  - Polynomial Root Finder and Simultaneous Equation Solver
- CE Language Localization in [mode] settings



- Image Vars for Background images to support modeling in the graph area.
  - Image1 – Bridge
  - Image2 – Slides
  - Image3 – Cactus Flower
  - Image4 – Water Fountain
  - Image5 – Starfish



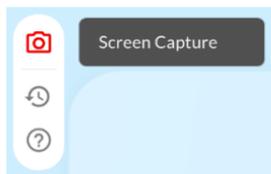
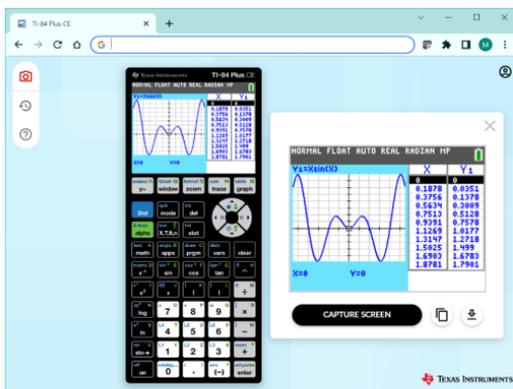
**Note:**

- The TI-84 Plus CE online calculator does not store or load calculator files from the computer or from a connected calculator.
- TI-Innovator™ Hub, TI-Innovator™ Rover, Python programming and Sensors are not supported.
- For full CE Python Classroom Solution, please see [TI-84 Plus CE Python eGuide](#)

**Workspace Experience**

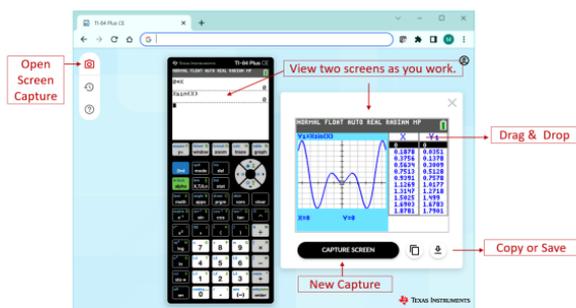
X	Y1
0.2174	0.8959
0.4748	0.8831
0.8522	0.3958
0.8696	0.6674
1.487	0.9822
1.3943	1.2583
1.5237	1.5198
1.7391	1.7146
1.9565	1.8228
2.1739	1.7894

## 1. Screen Capture

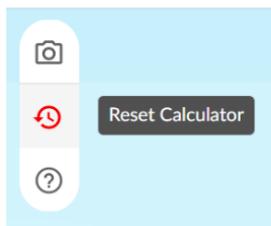


Capture TI-84 Plus CE online calculator screens by selecting the camera icon.

- Drag and drop from the screen capture pane into your work.
- Copy and paste screen capture into your work.
- Save as computer files.
- Use Screen Capture pane to support the view of two screens while you work.
- Capture a screen even when the online calculator is busy calculating or graphing.



## 2. Reset TI-84 Plus CE online calculator



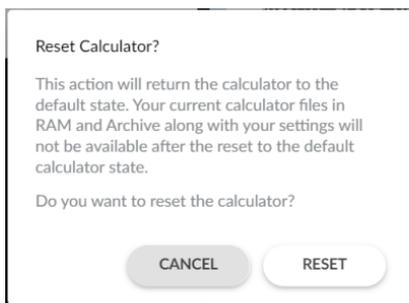
The TI-84 Plus CE online calculator comes loaded with the CE operating system, selected Apps, and 5 pre-loaded Image Vars.

No calculator files can be stored to the computer, sent to the online calculator or linked to a connected calculator.

Reset Calculator from the Workspace **restores** the default CE OS, selected Apps and pre-loaded Image Vars.

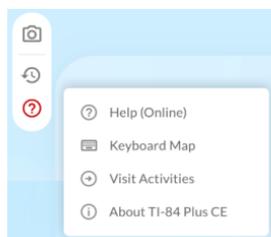
This action **will not** retain your current work (RAM and

Archive) such as lists, matrices, or TI-Basic programs. This feature is **not** the same as managing the online calculator memory from [2nd] [mem] features in the CE Operating System of the online calculator.



**Note:** When you sign in to the online calculator on your computer, your online calculator will launch with your last work such as Home Screen calculations on that particular computer. If you sign in on a different computer, your online calculator will launch with the last work you did on that computer.

### 3. Help and Resources



- **Help (Online)**

- Link to the e-Guide for TI-84 Plus CE online calculator

<http://education.ti.com/ti84plus-ce-help>

- **Note:** Full CE Classroom Solution e-Guide is at:

[TI-84 Plus CE Python eGuide](#)

- **Keyboard Map**

- Link to the keyboard mapping tables for Windows, Chromebook, and Mac

[Keyboard Mapping](#)

- **Visit Resources**

- Find activities for your TI-84 Plus CE.

[education.ti.com/84resources](http://education.ti.com/84resources)

- **About TI-84 Plus CE online calculator**

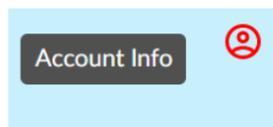


TI-84 Plus CE  
online calculator

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DONE

#### 4. Account Information



##### Select the Account Information Icon

- Account Information
- Subscription Expiration
- Session Expiration
- Sign Out

For more information, see the **LEARN MORE** link on the landing page.

<https://education.ti.com/84ceapp>

# Keyboard Mapping for the TI-84 Plus CE online calculator

Use the keyboard mapping to computer keyboard for Windows, Mac and Chromebook.

You can use your computer keyboard to press a key instead of pressing that key on the TI-84 Plus CE online calculator keypad image.

## Keys for Windows, Macintosh, and Chromebook

TI-84 Plus CE Primary Keys	Windows Keys	Macintosh Keys	Chromebook Keys
y=	f1	f1	search + 1
window	f2	f2	search + 2
zoom	f3	f3	search + 3
trace	f4	f4	search + 4
graph	f5	f5	search + 5
Left Arrow	LEFT ARROW	LEFT ARROW	LEFT ARROW
Down Arrow	DOWN ARROW	DOWN ARROW	DOWN ARROW
Up Arrow	UP ARROW	UP ARROW	UP ARROW
Right Arrow	RIGHT ARROW	RIGHT ARROW	RIGHT ARROW
2nd	F6	F6	search + 6
mode	Shift+m	Shift+m	shift + m
del	DELETE	fn+Backspace	search + backspace
alpha	F7	F7	search + 7
X,T,θ,n	Shift+x	Shift+x	shift + x
stat	Shift+s	Shift+s	shift + s
math	a	a	a
apps	b	b	b
prgm	c	c	c
vars	Shift+v	Shift+v	shift+v
clear	Backspace	Backspace	backspace
X <sup>-1</sup>	d	d	d
sin	e	e	e
cos	f	f	f
tan	g	g	g
^	shift +6 or h	shift + 6 or h	shift + 6 or h
X <sup>2</sup>	i	i	i

TI-84 Plus CE Primary Keys	Windows Keys	Macintosh Keys	Chromebook Keys
,	, or j	, or j	, or j
(	shift +9 or k	shift +9 or k	shift +9 or k
)	shift +0 or l	shift +0 or l	shift +0 or l
÷	/ or m	/ or m	/ or m
log	n	n	n
7	7 or o	7 or o	7 or o
8	8 or p	8 or p	8 or p
9	9 or q	9 or q	9 or q
x	shift +8 or r	shift +8 or r	shift +8 or r
ln	s	s	s
4	4 or t	4 or t	4 or t
5	5 or u	5 or u	5 or u
6	6 or v	6 or v	6 or v
- subtraction	- or w	- or w	- or w
sto→	x	x	x
1	1 or y	1 or y	1 or y
2	2 or z	2 or z	2 or z
3	3	3	3
+	shift +=	shift +=	shift +=
on	shift `	shift `	shift `
0	0	0	0
.(DECIMAL)	. or shift +:	. or shift +:	. or shift +:
(-)	shift + - or shift ?	shift + - or shift ?	shift + - or shift ?
enter	enter	enter	enter

## **General Information**

### ***online calculator e-Guide***

[education.ti.com/ti84plus-ce-help](http://education.ti.com/ti84plus-ce-help)

### ***Online Help***

[education.ti.com/eguide](http://education.ti.com/eguide)

Select your country for more product information.

### ***Contact TI Support***

[education.ti.com/ti-cares](http://education.ti.com/ti-cares)

Select your country for technical and other support resources.

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