

## TI-83-Plus Calculator Basics Tips and Techniques

### TI-83 Plus Keyboard

Generally, the keyboard is divided into these zones: graphing keys, editing keys, advanced function keys, and scientific calculator keys.

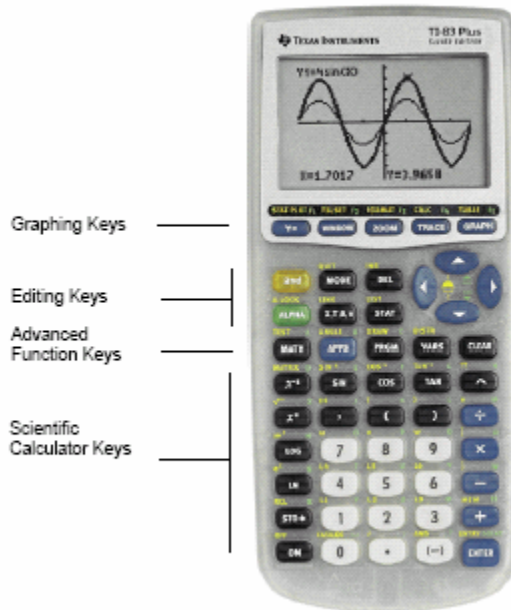
**Graphing** — Graphing keys access the interactive graphing features.

**Editing** — Editing keys allow you to edit expressions and values.

**Advanced** — Advanced function keys display menus that access the advanced functions.

**Scientific** — Scientific calculator keys access the capabilities of a standard scientific calculator.

#### TI-83 Plus



Colors may vary in actual product.

### Using the $y$ and $f$ Keys

The secondary function of each key is printed in yellow above the key. When you press the yellow  $y$  key, the character, abbreviation, or word printed in yellow above the other keys becomes active for the next keystroke. For example, when you press  $y$  and then  $\text{TEST}$ , the TEST menu is displayed. This guidebook describes this keystroke combination as  $y$  [TEST].

The alpha function of each key is printed in green above the key. When you press the green  $f$  key, the alpha character printed in green above the other keys becomes active for the next keystroke. For example, when you press  $f$  and then  $\text{A}$ , the letter A is entered. This guidebook describes this keystroke combination as  $f$  [A].

## Setting the Display Contrast

You can adjust the display contrast to suit your viewing angle and lighting conditions. The TI-83 Plus retains the contrast setting in memory when it is turned off. To adjust the contrast, follow these steps:

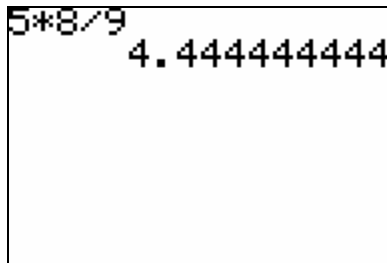
1. Press and release the  $\text{y}$  key.
  2. Press and hold  $\uparrow$  or  $\}$ , which are below and above the contrast symbol (yellow, half-shaded circle).
- $\uparrow$  lightens the screen.
  - $\}$  darkens the screen.

## Home Screen

The home screen is the primary screen of the TI-83 Plus. On this screen, enter instructions to execute and expressions to evaluate. The answers are displayed on the same screen.

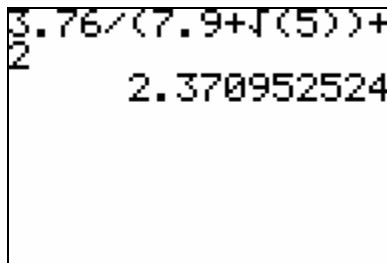
## Displaying Entries and Answers

When an entry is executed on the home screen, the answer is displayed on the right side of the next line.



5\*8/9  
4.444444444

Calculate  $3.76 \div (7.9 + \sqrt{5}) + 2$



3.76/(7.9+sqrt(5))+  
2  
2.370952524

## Returning to the Home Screen

To return to the home screen from any other screen, press  $\text{y}$  [QUIT].

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### TI-83 Plus Edit Keys

or ~	Moves the cursor within an expression; these keys repeat.
} or †	Moves the cursor from line to line within an expression that occupies more than one line; these keys repeat.  On the top line of an expression on the home screen, } moves the cursor to the beginning of the expression.  On the bottom line of an expression on the home screen, † moves the cursor to the end of the expression
y	Moves the cursor to the beginning of an expression.
y ~	Moves the cursor to the end of an expression
	Evaluates an expression or executes an instruction.
'	On a line with text on the home screen, clears the current line.  On a blank line on the home screen, clears everything on the home screen.  In an editor, clears the expression or value where the cursor is located; it does not store a zero.
{	Deletes a character at the cursor; this key repeats.
y [INS]	Changes the cursor to an underline (___); inserts characters in front of the underline cursor; to end insertion, press y [INS] or press } ,   , † , or ~ .
y	Changes the cursor to $\text{D}$ ; the next keystroke performs a 2 <sup>nd</sup> operation (an operation in yellow above a key and to the left); to cancel 2nd, press y again.
f	Changes the cursor to $\text{O}$ ; the next keystroke pastes an alpha character (a character in green above a key and to the right); to cancel $\alpha$ , press f or press } ,   , † , or ~ .
y [A-LOCK]	Changes the cursor to $\text{O}$ ; sets alpha-lock; subsequent keystrokes (on an alpha key) paste alpha characters; to cancel alpha-lock, press f .. If you are prompted to enter a name such as for a group or a program, alpha-lock is set automatically
"	Pastes an <b>X</b> in <b>Func</b> mode, a <b>T</b> in <b>Par</b> mode, a <b>q</b> in <b>Pol</b> mode, or an <b>n</b> in <b>Seq</b> mode with one keystroke.
y	Displays the last operation performed.

### Storing Values in a Variable

Values are stored to and recalled from memory using variable names. When an expression containing the name of a variable is evaluated, the value of the variable at **that** time is used.

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

1. Enter the value you want to store.
2. Press  $\text{STO}$ .
3. Press  $f$  and then the letter of the variable to which you want to store the value.
4. Press  $\text{ENTER}$ .
5. Enter the expression you wish to evaluate. Press  $\text{ENTER}$ .

### Using a TI-83 Plus Menu

You can access most TI-83 Plus operations 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 seven items in that menu are displayed, beginning with item **1**, which also is highlighted.
- A number or letter identifies each menu item's place in the menu. The order is **1** through **9**, then **0**, then **A**, **B**, **C**, and so on. The **LIST NAMES**, **PRGM EXEC**, and **PRGM EDIT** menus only label items **1** through **9** and **0**.
- 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 or editor when you select it.
- When an asterisk (\*) appears to the left of a menu item, that item is stored in user data archive.

### Displaying a Menu

While using your TI-83 Plus, you often will need to access items from its menus. When you press a key that displays a menu, that menu temporarily replaces the screen where you are working. For example, when you press  $\text{MATH}$ , the **MATH** menu is displayed as a full screen. After you select an item from a menu, the screen where you are working usually is displayed again.

### 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  $\sim$  and  $\downarrow$  to highlight each menu name.

### Leaving a Menu without Making a Selection

You can leave a menu without making a selection in any of four ways.

- Press  $y$  [QUIT] to return to the home screen.
- Press  $\uparrow$  to return to the previous screen.
- Press a key or key combination for a different menu, such as  $\text{MATH}$  or  $\text{PRGM}$ .
- Press a key or key combination for a different screen, such as  $\text{O}$  or  $y$  [TEST].

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The following shows the  $\boxed{\text{MATH}}$  menus:

```
MATH NUM CPX PRB
1:  $\rightarrow$ Frac
2:  $\rightarrow$ Dec
3:  $\rightarrow$ 3
4:  $\rightarrow$  $\sqrt{\phantom{x}}$ 
5:  $\rightarrow$  $\sqrt[n]{\phantom{x}}$ 
6:  $\rightarrow$ fMin(
7:  $\rightarrow$ fMax(
```

```
MATH NUM CPX PRB
1: abs(
2: round(
3: iPart(
4: fPart(
5: int(
6: min(
7:  $\rightarrow$ max(
```

```
MATH NUM CPX PRB
1: conj(
2: real(
3: imag(
4: angle(
5: abs(
6:  $\rightarrow$ Rect
7:  $\rightarrow$ Polar
```

```
MATH NUM CPX PRB
1: rand
2: nPr
3: nCr
4: !
5: randInt(
6: randNorm(
7: randBin(
```

The following shows the  $\boxed{\text{TEST}}$  menus:

```
TEST LOGIC
1: =
2:  $\neq$ 
3:  $\>$ 
4:  $\geq$ 
5:  $\<$ 
6:  $\leq$ 
7:  $\<$ 
```

## Graphing

### Defining a Graph

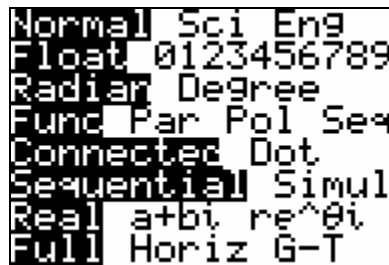
To define a graph in any graphing mode, follow these steps. Some steps are not always necessary.

1. Press  $\boxed{z}$  and set the appropriate graph mode.
2. Press  $\boxed{o}$  and enter, edit, or select one or more functions in the **Y=** editor.
3. Deselect stat plots, if necessary.
4. Set the graph style for each function.
5. Press  $\boxed{p}$  and define the viewing window variables.
6. Press  $\boxed{y}$  **[FORMAT]** and select the graph format settings.
7. Press  $\boxed{s}$  to display it.

### Checking and Changing the Graphing Mode

To display the mode screen, press  $\boxed{z}$ . The default settings are highlighted below. To graph functions, you must select **Func** mode before you enter values for the window variables and before you enter the functions.

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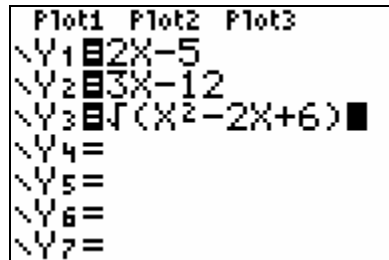
- The TI-83 Plus has four graphing modes: **Func** (function graphing), **Par** (parametric), **Pol** (polar), and **Seq** (sequence).
- **Float** or **0123456789** (fixed) decimal mode affects displayed graph coordinates.
- **Radian** or **Degree** angle mode affects interpretation of some functions.
- **Connected** or **Dot** plotting mode affects plotting of selected functions.
- **Sequential** or **Simul** graphing-order mode affects function plotting when more than one function is selected.

### Defining or Editing a Function

To define or edit a function, follow these steps.

1. Press  $\square$  to display the **Y=** editor.
2. Press  $\uparrow$  to move the cursor to the function you want to define or edit. To erase a function, press  $\square$ .
3. Enter or edit the expression to define the function. The independent variable in the function is **X**. **Func** mode defines  $x$  as **X**. When you enter the first character, the **=** is highlighted, indicating that the function is selected.
4. Press  $\downarrow$  or  $\uparrow$  to move the cursor to the next function.

An example of the  $\square$  screen:



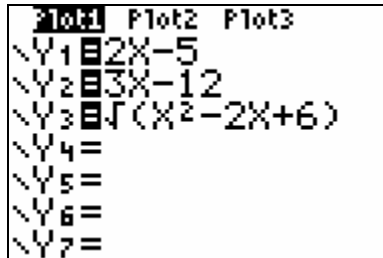
### Selecting and Deselecting a Function

You can select and deselect (turn on and turn off) a function in the **Y=** editor. A function is selected when the **=** sign is highlighted. The TI-83 Plus graphs only the selected functions. You can select any or all functions **Y1** through **Y9**, and **Y0**. To select or deselect a function in the **Y=** editor, follow these steps:

1. Press  $\square$  to display the **Y=** editor.
2. Move the cursor to the function you want to select or deselect.
3. Press  $|$  to place the cursor on the function's **=** sign.
4. Press  $\downarrow$  to change the selection status. When you enter or edit a function, it is selected automatically. When you clear a function, it is deselected.

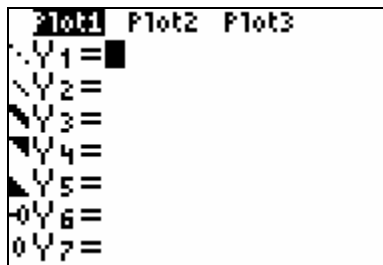
### Turning On or Turning Off a Stat Plot in the Y= Editor

To view and change the on/off status of a stat plot in the Y= editor, use **Plot1 Plot2 Plot3** (the top line of the Y= editor). When a plot is on, its name is highlighted on this line. To change the on/off status of a stat plot from the Y= editor, press } and ~ to place the cursor on **Plot1**, **Plot2**, or **Plot3**, and then press | .



### Graph Style Icons in the Y= Editor

This table describes the graph styles available for function graphing. Use the styles to visually differentiate functions to be graphed together. For example, you can set Y1 as a dotted line, Y2 as a solid line, and Y3 as a thick line.



Style	Description	Example
Dotted line	A small dot represents each plotted point; this is the default in <b>Dot</b> mode	Y1
Thin line	A solid line connects plotted points; this is the default in <b>Connected Mode</b>	Y2
Thick line	A thick solid line connects plotted points	Y3
Above	Shading covers the area above the graph	Y4
Below	Shading covers the area below the graph	Y5
Path	A circular cursor traces the leading edge of the graph and draws a path.	Y6
Animate	A circular cursor traces the leading edge of the graph without drawing a path	Y7

### Setting the Graph Style

To set the graph style for a function, follow these steps.

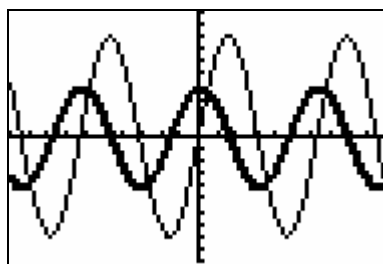
1. Press o to display the Y= editor.
2. Press ↑ and } to move the cursor to the function.
3. Press | | to move the cursor left, past the = sign, to the graph style icon in the first column. The insert cursor is displayed. (Steps 2 and 3 are interchangeable.)

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4. Press  $\leftarrow$  repeatedly to rotate through the graph styles. The seven styles rotate in the same order in which they are listed in the table above.
5. Press  $\sim$ ,  $\uparrow$  or  $\}$  when you have selected a style.

```

Plot1 Plot2 Plot3
\Y1=8sin(X)
\Y2=4cos(X)
\Y3=
\Y4=
\Y5=
\Y6=
\Y7=
    
```



### The TI-83 Plus Viewing Window

The viewing window is the portion of the coordinate plane defined by **Xmin**, **Xmax**, **Ymin**, and **Ymax**. **Xscl** (X scale) defines the distance between tick marks on the x-axis. **Yscl** (Y scale) defines the distance between tick marks on the y-axis. To turn off tick marks, set **Xscl=0** and **Yscl=0**. From the  $\leftarrow$  menu, the first picture shows the standard default window; the second is the decimal default window.

```

WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1
    
```

```

WINDOW
Xmin=-4.7
Xmax=4.7
Xscl=1
Ymin=-3.1
Ymax=3.1
Yscl=1
Xres=1
    
```

### Displaying the Format Settings

To display the format settings, press  $\leftarrow$  [FORMAT]. The default settings are highlighted below.

```

RectGC PolrGC
CoordOn CoordOff
GridOff GridOn
AxesOn AxesOff
LabelOff LabelOn
ExprOn ExprOff
    
```

- Sets cursor coordinates
- Sets coordinates display on or off
- Sets grid off or on
- Sets axes on or off
- Sets axes label off or on
- Sets expression display on or off

To change a format setting, follow these steps.

1. Press  $\uparrow$ ,  $\}$ ,  $\sim$ , and  $\leftarrow$  as necessary to move the cursor to the setting you want to select.
2. Press  $\leftarrow$  to select the highlighted setting.

### Exploring Graphs with TRACE

Use  $\leftarrow$  to move the cursor from one plotted point to the next along a function. To begin, press  $\leftarrow$ . If the graph is not displayed already, press  $\leftarrow$  to display it. The trace cursor is on the first selected function in the **Y=** editor, at the middle **X** value on the

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screen. The cursor coordinates are displayed at the bottom of the screen if **CoordOn** format is selected. The **Y=** expression is displayed in the top-left corner of the screen, if **ExprOn** format is selected. To move the trace cursor, press `|` or `~`. To move the trace cursor from function to function, press `}` or `↑`.

### ZOOM Menu

To display the **zoom** menu, press `q`. You can adjust the viewing window of the graph quickly in several ways. All **zoom** instructions are accessible from programs.

```
ZOOM MEMORY
1:ZBox
2:Zoom In
3:Zoom Out
4:ZDecimal
5:ZSquare
6:ZStandard
7:ZTrig
```

```
ZOOM MEMORY
4:ZDecimal
5:ZSquare
6:ZStandard
7:ZTrig
8:ZInteger
9:ZoomStat
0:ZoomFit
```

1: <b>ZBox</b>	Draws a box to define the viewing window.
2: <b>Zoom In</b>	Magnifies the graph around the cursor.
3: <b>Zoom Out</b>	Views more of a graph around the cursor.
4: <b>ZDecimal</b>	Sets $\Delta X$ and $\Delta Y$ to 0.1.
5: <b>ZSquare</b>	Sets equal-size pixels on the <b>X</b> and <b>Y</b> axes.
6: <b>ZStandard</b>	Sets the standard window variables.
7: <b>ZTrig</b>	Sets the built-in trig window variables.
8: <b>ZInteger</b>	Sets integer values on the <b>X</b> and <b>Y</b> axes.
9: <b>ZoomStat</b>	Sets the values for current stat lists.
0: <b>ZoomFit</b>	Fits <b>YMin</b> and <b>YMax</b> between <b>XMin</b> and <b>XMax</b> .

### CALCULATE Menu

To display the **CALCULATE** menu, press `y` [**CALC**]. Use the items on this menu to analyze the current graph functions.

```
CALCULATE
1:value
2:zero
3:minimum
4:maximum
5:intersect
6:dy/dx
7:∫f(x)dx
```

1: <b>value</b>	Calculates a function <b>Y</b> value for a given <b>X</b> .
2: <b>zero</b>	Finds a zero (x-intercept) of a function.
3: <b>minimum</b>	Finds a minimum of a function.
4: <b>maximum</b>	Finds a maximum of a function.
5: <b>intersect</b>	Finds an intersection of two functions.
6: <b>dy/dx</b>	Finds a numeric derivative of a function.
7: <b>∫f(x)dx</b>	Finds a numeric integral of a function.