

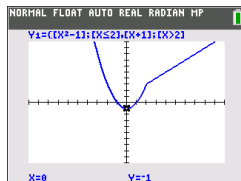
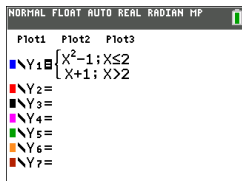
# **TI-84 Plus CE Graphing Calculator Release History: v5.2 and above**

# What's New

## What's New in TI-84 Plus CE Version 5.3

### Piecewise Function Graphing

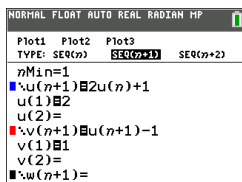
- New piecewise function to support entry of functions as they are seen in textbook. This command can be found in `[math]` MATH **B:piecewise**(.



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

### Sequence Editor Updates

- Updated to allow sequence function references at the same index level. Set `[mode]` to SEQ to enter a sequence function.



| n  | u    | u    |
|----|------|------|
| 1  | 2    | 1    |
| 2  | 5    | 4    |
| 3  | 11   | 10   |
| 4  | 23   | 22   |
| 5  | 47   | 46   |
| 6  | 95   | 94   |
| 7  | 191  | 190  |
| 8  | 383  | 382  |
| 9  | 767  | 766  |
| 10 | 1535 | 1534 |
| 11 | 3071 | 3070 |

n=1

### TI-Basic Programming Enhancements

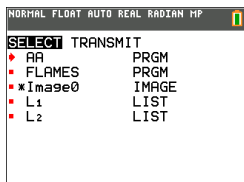
- New editing features have been added to the Program Editor. These include undo, insert, and cut/copy/paste. Press `[prgm]` to EDIT your program. Pressing `[alpha]` `[f5]` opens the new editing MENU.



- Programs can now be executed from RAM or Archive.
- Run Asm programs without the `Asm`( command.

## Classroom Management

- New RESEND menu in  $\boxed{2nd}$  [link] retains the last set of files sent from the sending calculator. Resend mix file types such as program and Image Vars without re-selecting the set of files. This feature is great for classroom sharing of files when using SEND RECEIVE from calculator to calculator.



## Math Enhancements

### Interactive Draw Tangent

- New option to store computed/graphed tangent ( $y=mx+b$ ) in the Y= editor. From  $\boxed{graph}$ , press  $\boxed{2nd}$  [draw] **5:Tangent(**.

### Quick Plot and Fit Equation

- New option that allows drop point activity only. No regressions need to be calculated. From  $\boxed{graph}$ , press  $\boxed{stat}$  **CALC E:QuickPlot&Fit-EQ**.

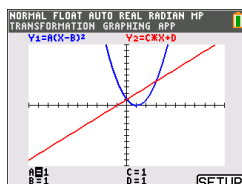
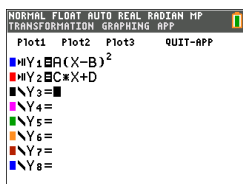
### Fraction Template

- Faster access to n/d template by pressing  $\boxed{alpha}$  and  $\boxed{X,T,\theta,n}$ .

## CE Apps Version 5.3

### [Transformation Graphing App](#)

- Now Transform up to two functions, Y1 and/or Y2, to support investigations of family of functions.



- Function graphing now allowed in Y3 to Y0. Transformation Graphing sets Xres=3 to support animation graphing. Change Xres=1 in  $\boxed{window}$  if needed for general graphing while in this App.
- Added an alternate key press to access  $\boxed{SETUP}$  (SETTINGS) and  $\boxed{GRAPH}$  from the graph screen for quicker set up of animations including TrailOn and TrailOff.



## [TI TestGuard™ CE App](#)

- Always use the latest TI TestGuard™ CE App version with the latest CE OS for exam setups.

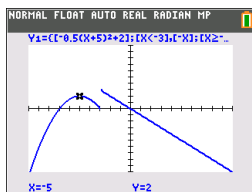
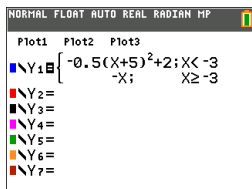
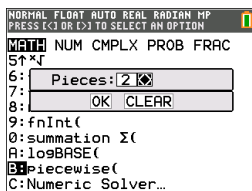
## [TI-Innovator™ Hub App](#)

- Contains the latest commands to support your TI Basic programming when working with the TI-Innovator™ Hub and TI-Innovator™ Rover.
- Always use the latest TI-Innovator™ Hub App version with the latest CE OS and TI-Innovator™ Hub sketch for the best STEM experience.

## **Using Piecewise Function Graphing**

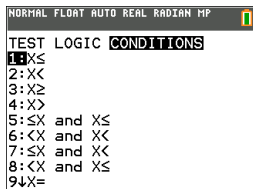
### How to enter a piecewise function

1. Press  $\boxed{\text{math}}$ .
2. Press  $\boxed{\uparrow}$  or  $\boxed{\downarrow}$  to scroll to **B:piecewise(**.
3. Press  $\boxed{\text{enter}}$ .
4. Press  $\boxed{4}$  or  $\boxed{\rightarrow}$  to select the number of pieces (1-5) for the function.
5. Press  $\boxed{\downarrow}$   $\boxed{\text{enter}}$  to select **OK**.
6. Enter functions in the  $\boxed{y=}$  editor.
7. Press  $\boxed{\text{zoom}}$  **6:ZStandard** to set the standard window and graph.



### Conditions Menu $\boxed{2\text{nd}}$ $\boxed{\text{test}}$

The CONDITIONS menu,  $\boxed{2\text{nd}}$   $\boxed{\text{test}}$   $\boxed{4}$  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  $\boxed{2nd}$  [test] (above  $\boxed{math}$ ). 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.

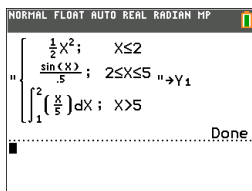
Note that if an interval form is selected from the CONDITIONS menu, the interval form will paste in the correct logical format for an interval as, for example,  $-2 < X$  and  $X < 5$ . This is the correct format for all features in the calculator to give the expected logical test result True(1)/False(0) 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, " $2X$ " $\rightarrow$  $Y1$ .
  - Quote:  $\boxed{\alpha}$   $\boxed{[ ]}$
  - Recall the YVar:  $\boxed{2nd}$   $\boxed{[rci]}$   $\boxed{\alpha}$   $\boxed{[f4]}$  (select a YVar) and  $\boxed{enter}$
  - Close quote and store:  $\boxed{\alpha}$   $\boxed{[ ]}$   $\boxed{sto\rightarrow}$
  - Select the YVar:  $\boxed{\alpha}$   $\boxed{[f4]}$  and  $\boxed{enter}$

### **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.

# Using Press-to-Test

Use Press-to-Test to manage exams using TI graphing calculators in your classroom. The teacher will tell you when to set your calculator in exam mode.

## Topic Links

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### Setting Up Test Mode

1. Turn the calculator OFF.
2. Press and hold down the  $\square$ ,  $\square$  and  $\square$  keys, and then release.
3. The RESET OPTIONS screen displays.
4. To change the default settings, move the cursor over the desired setting and press  $\square$ .

By default:

- ANGLE is set to DEGREE
  - STAT DIAGNOSTICS is set to ON
  - DISABLE logBASE and DISABLE  $\Sigma(\square)$  are set to YES
5. Press OK to display the confirmation screen.



6. Press any key to place the calculator in test mode.

**Note:**

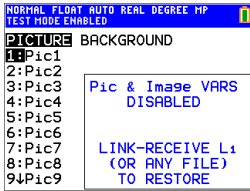
- The status bar is blue when in TEST MODE and TEST MODE ENABLED.
  - Pic & Image Vars are disabled.
  - All variables stored in RAM and in archived memory are deleted.
7. On the exam calculator, press  $\square$  to verify that applications are disabled. The following screen displays:



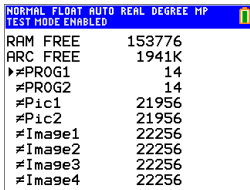
8. On the exam calculator, press **[prgm]** to verify that programs have been disabled. The following screen displays:



9. On the exam calculator, Pic and Image Vars are shown as disabled. The following screen displays:



10. In memory management (**[2nd]** **[mem]**, **2:Mem Management/Delete...**), disabled files will display with the not equal sign.





## Bringing a Calculator Out of Test Mode

You can re-enable all disabled calculator files by using one of the following methods:

- Link two TI-84 Plus CE graphing calculators using a unit-to-unit USB cable and then transfer a file by using  $\boxed{2\text{nd}}$   $\boxed{\text{link}}$ , **SEND RECEIVE**.
- Use TI Connect CE to send a calculator file to the calculator.
- Use the TI TestGuard™ App re-enable feature.

To clear a calculator of files created during an exam:

1. Turn off the calculator while in test mode.
2. "Re-Press-to-Test" - press and hold down the  $\boxed{\blacktriangleright}$ ,  $\boxed{\blacktriangleleft}$ , and  $\boxed{\text{on}}$  keys, and then release.
3. Select **OK** when you see the Reset Verification Screen. The calculator is now "clean."

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**Tip:** To preserve battery life, take your calculator out of Press-to-Test mode after the exam.

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## TI-Innovator™ Hub App

The TI-Innovator™ Hub App runs automatically in CE OS 5.3 and higher when the App is loaded on the calculator. The TI-Basic program editor is enhanced with a HUB submenu to help you with spelling and syntax of commands for TI-Innovator™ Hub programming. Save time by using the submenu to paste full TI-Innovator™ commands rather than typing alpha characters from the keypad as you write your programs.

**Note:** You can get CE OS 5.3 or higher and the TI-Innovator™ Hub App at [education.ti.com/go/download](http://education.ti.com/go/download).

# What's New

## What's New in TI-84 Plus CE Version 5.2

To report issues and help us improve our applications, please email us at [ti-cares@ti.com](mailto:ti-cares@ti.com).

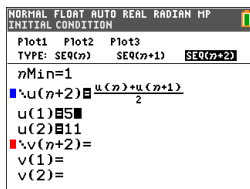
### Sequence Graphing

#### Additional Seq graphing mode

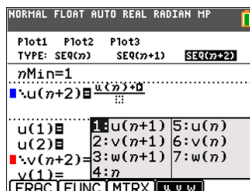
Adds additional sequence types:

seq(n+1)

seq(n+2)



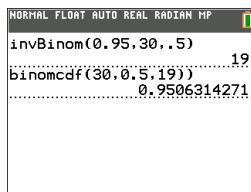
Adds easy sequence function entry from shortcut menu.



### Distributions

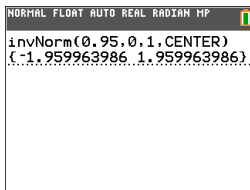
#### Inverse Binomial Cumulative Distribution

Calculate the inverse binomial cumulative distribution. If needed, also calculate the binomial CDF for the resulting values for a full analysis.



#### Inverse Normal Distribution Update

Updated to include an optional argument "tail" to calculate LEFT, (-∞, -a), CENTER [-a, a] or RIGHT (a, ∞) for Real a. LEFT is default.



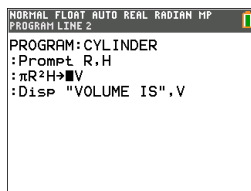
### TI-Basic Program Editor Update

- Additional or Enhanced TI-Basic Commands
  - Wait
  - eval(
  - Send( Supports TI-Innovator™ commands

- Get( Enhanced with timeout argument
- DelVar
- to String(

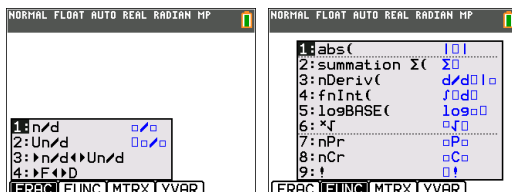
### TI-Basic Program Editor Line Number

If an error occurs when running a program, select Goto. The cursor is now near the error, and the command line number displays in the status bar.



### MathPrint Icons on Shortcut menus

Shortcut menus enhanced with MathPrint template icons.



## Assessment Updates

Always use the latest TestGuard™ CE App version with the latest CE OS for exam setups.

### CE Apps Version 5.2

#### [Language Localization Apps](#)

- Up to date with the latest localizations.

#### [SmartPad CE App](#)

- Remote keypad support updated for TI-SmartView™ CE v 5.2.

#### [TestGuard™ CE App](#)

- Always use the latest version of app and OS for exam setups.





#### [TI-Innovator™ Hub App](#)

For CE version 5.2 only, a HUB submenu is added to the TI-Basic program editor with command support for TI-Innovator™ Hub. This app title will not display in the CE menu and runs automatically when loaded on the CE OS version 5.2.

#### [Vernier EasyData™ App version 5.2](#)

- Enhanced for TI-SmartView™ CE.
- Pre-loaded on the CE emulator in TI-SmartView™ CE version 5.2. Single sensor data collection is now available using the CE emulator only running Vernier EasyData™ App version 5.2.

## LANGUAGE

Press  or  on the LANGUAGE spinner menu to select a loaded language. Press  or  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.

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## SmartPad™ CE App


### Connecting a Calculator as a Remote Key Pad

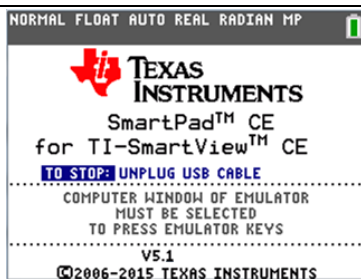
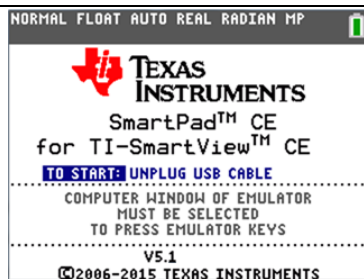
The SmartPad™ CE App allows you to connect a calculator as a remote key pad.

#### To use the TI-84 Plus CE as a remote keypad for TI-SmartView™ CE:

1. Load the SmartPad™ CE App on your TI-84 Plus CE.
2. Connect your TI-84 Plus CE to your computer using the USB Computer cable which came with your calculator.
3. Launch TI-SmartView™ CE.

**Note:** Make sure the TI-SmartView™ CE window is in focus by clicking on the TI-SmartView™ CE window.

4. Run SmartPad™ CE App on your TI-84 Plus CE.
5. Press  and select SmartPad™ CE from the Apps menu.
6. Read the information on the splash screen.



7. Press keys on the calculator key pad which remotely press the emulator key pad.

#### To stop the App:

- Disconnect the USB cable from the calculator to stop the App and remote key pad feature.

**Tip:** Reconnect the USB cable and run the App again if the remote key pad connectivity is no longer responding.

**Notes:**

- SmartPad™ CE App running on the TI-84 Plus CE will remotely press emulator keys for TI-84 Plus CE, TI-84 Plus C, and TI-84 Plus emulators in TI-SmartView™ CE.
- TI-SmartView™ CE does not support any other version of SmartPad™ App running on the TI-84 Plus or TI-83 Plus.
- The TI-84 Plus CE running the SmartPad™ CE App will not display calculations or graphs. The calculator becomes a remote USB key pad for the emulator only.
- The TI-84 Plus CE will remain a remote key pad when the TI-SmartView™ CE window is in focus. Click on the TI-SmartView window prior to pressing keys on the calculator.
- The TI SilverLink cable is not supported in TI-SmartView™ CE.

# Using Press-to-Test

Use Press-to-Test to manage exams using TI graphing calculators in your classroom.

## Setting Up Test Mode

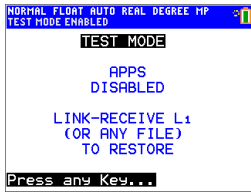
1. Turn the calculator OFF.
2. Press and hold down the  $\blacktriangleright$ ,  $\blacktriangleleft$ , and  $\square$  keys, and then release.
3. Press OK on each screen to place calculator in exam mode.
4. Exam LED will blink green.
5. The RESET OPTIONS screen displays.

### Notes:

- The status bar is blue when in TEST MODE and TEST MODE ENABLED.
  - Pic & Image Vars are disabled.
  - Calculator data (Vars) are deleted from RAM and Arc.
  - By default:
    - ANGLE is set to DEGREE
    - STAT DIAGNOSTICS is set to ON
    - DISABLE logBASE and DISABLE  $\Sigma($  are set to YES.
6. To change the default settings, move the cursor over the desired setting and press  $\square$ .



7. On the exam calculator, press **[apps]** to verify that applications are disabled. The following screen displays:

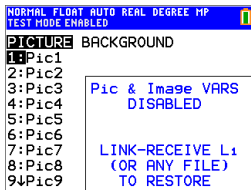


**Note:**

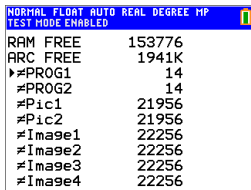
- All variables, excluding AppVars, stored in RAM and in archived memory are deleted.
  - Several Apps remain on the calculator for the exam. Press any key to see the Apps menu.
8. On the exam calculator, press **[prgm]** to verify that programs have been disabled. The following screen displays:



9. On the exam calculator, Pic and Image Vars are shown as disabled. The following screen displays:



10. In memory management (**[2nd] [mem], 2:Mem Management/Delete...**), disabled files will display with the not equal sign.



## Bringing a Calculator Out of Test Mode

You can re-enable all disabled calculator files by using one of the following methods:

- Link two TI-84 Plus CE graphing calculators using a unit-to-unit USB cable and then transfer a file by using  $\boxed{2nd}$   $\boxed{link}$ , **SEND RECEIVE**
- or-
- Use the TI TestGuard™ App re-enable feature.

### Notes:

To clear a calculator of files created during an exam, use the following two-step process:

If you do not need to clear files, use step 2 below:

1. Reset calculator files.
  - a) Turn off the calculator while in test mode.
  - b) "Re-Press-to-Test" - press and hold down the  $\boxed{\blacktriangleright}$ ,  $\boxed{\blacktriangleleft}$ , and  $\boxed{on}$  keys, and then release.
  - c) Select **OK** when you see the Reset Verification Screen. The calculator is now "clean."
2. Re-enable files to turn off test mode.
  - a) Link two TI-84 Plus CE graphing calculators using a unit-to-unit USB cable.
  - b) Send a file to bring the calculator(s) out of test mode.

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**Tip:** To preserve battery life, take your calculator out of Press-to-Test mode after the exam.

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## ***TI-Innovator™ Hub App***

The TI-Innovator™ Hub App runs automatically in CE OS 5.2 and higher when the App is loaded on the calculator. The TI-Basic program editor is enhanced with a HUB submenu to help you with spelling and syntax of commands for TI-Innovator™ Hub programming. Save time by using the submenu to paste full TI-Innovator™ commands rather than typing alpha characters from the keypad as you write your programs.

**Note:** This Hub App is listed only in [mem]. You can get CE OS 5.2 or higher and the TI-Innovator™ Hub App at [education.ti.com/go/download](http://education.ti.com/go/download).

## ***Vernier EasyData™ App***

Use EasyData™ App from Vernier Software & Technology to explore your world. The EasyData™ App auto-launches data collection when used with Vernier EasyTemp™ sensor, and loads built-in experiments for every supported Vernier sensor.