



# **TI-82 Advanced Edition Python Graphing Calculator Getting Started Guide**

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# What's New

## *Whats New in TI-82 Advanced Edition Python*

### TI-82 Advanced Edition Python

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#### L'émulateur interactif TI-SmartView™ CE pour la famille TI-83 v6.0

- Emulator Workspace
    - Select View > Emulator Model to use the TI-82 Advanced Edition Python emulator!
    - Display the same OS and App functionality as the calculator including the Python82 App experience.
  - Explorer Workspace
    - A Python program (PY AppVar) will save from the CE to a computer as \*.py file. Open the \*.py file in a text editor to view or edit the file for the CE Python experience. As in previous releases, TI-SmartView™ CE and TI Connect™ CE Explorer will send/convert .py files to the calculator file type, PY AppVar.
- 

#### TI Connect™ CE v6.0

- Explorer Workspace
    - A Python program (PY AppVar) will save from the CE to a computer as \*.py file. Open the \*.py file in a text editor to view or edit the file for the CE Python experience. As in previous releases, TI-SmartView™ CE and TI Connect™ CE Explorer will send/convert .py files to the calculator file type, PY AppVar.
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Check the latest updates for TI-82 Advanced Edition Python, TI Connect CE and TI-SmartView™ pour la famille TI-83 at [education.ti.com/fr](http://education.ti.com/fr).

# Using Your TI-82 Advanced Edition Python Graphing Calculator

The TI-82 Advanced Edition Python graphing calculator comes with a USB cable, plenty of storage and operating memory. It also comes pre-loaded with software applications (Apps) to perform extended features.

## Key Features

- **High resolution, full-color backlit display**
  - Distinguish between multiple graphs and plots with color-coded equations, plots, and objects
  - Make graphs easier to read by adding grid lines
- **Familiar TI-8x family functionality**
  - Similar menu structure and navigation as the TI-8x family with enhanced features
  - Built-in MathPrint™ functionality to input and view math symbols, formulas and stacked fractions
  - Exact results for selected expressions evaluating to fraction, radical, or  $\pi$  results
- **Import and use images**
  - Use TI Connect™ CE software to send images (.gif, .jpg, .png, .tif, .bmp) from a computer to a calculator
  - Graph on top of images to connect concepts to the real world

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

- CellSheet™
- Inequality Graphing
- Polynomial Root Finder and Simultaneous Equation Solver
- Probability Simulations
- Python82 App for the TI-82 Advanced Edition Python
- Transformation Graphing

Use this guide to learn more about these features and other essential tools of your graphing calculator. Check the latest updates for TI-82 Advanced Edition Python, TI Connect CE and TI-SmartView™ pour la famille TI-83 at [education.ti.com/fr](http://education.ti.com/fr).

## Keyboard Basics

This section covers basic graphing calculator settings and explains how to navigate the home screen and menus.

### *Turning the TI-82 Advanced Edition Python On and Off*

This section covers basic on and off features for your graphing calculator.

#### Turning the Graphing Calculator On

Press **[on]**.

An information screen displays:



- Press **[1]** to continue to the home screen but not see this information screen the next time you press **[on]**.

-or-

- Press **[2]** to continue to the home screen.

**Note:** Any entry from this information screen will take you to the home screen (a blank screen).

The information screen shows the following for information purposes only. You must go to the home screen before you can complete the following.

- Press **[alpha]** [f1] - [f4] to locate shortcut menus.
- Press **[+]** on most menu items for Catalog Help.

**Note:** This message also displays when you reset RAM.

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.

#### Turning the Graphing Calculator Off

Press **[2nde]** [off].

- The Constant Memory™ function retains settings and memory, and clears any error condition.
- If you turn off the TI-82 Advanced Edition Python and connect it to another graphing calculator or personal computer, any communication will “wake” it up.



- 
- ②  $\alpha$  Access the third function printed to the right above each key.

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  - ③  $\alpha$   
[f1] - [f4] Access shortcut menus for fraction templates, n/d, quick matrix entry, select **MATH** menus, and **VARS** menu functions.

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  - 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

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- Primary Function** The function appears on the key.  
**Ex:** to display the **MATH** menu, press  $\text{math}$ .
- 
- Secondary Function** The function appears above the key in the same color as the  $\text{2nd}$  key. When you press the  $\text{2nd}$  key, the key name printed above the other key becomes active for the next keystroke.  
**Ex:** to display the **TEST** menu, press  $\text{2nd}$  and then [tests] ( $\text{math}$ ).  
 The flashing cursor becomes  $\text{I}$  when you press  $\text{2nd}$ .  $\text{I}$  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, special symbols, and shortcut menus.  
**Ex:** to display the letter A, press  $\alpha$  and then [A] ( $\text{math}$ ).
- To enter several alphabetic characters in a row, press  $\text{2nd}$  [verr A] to lock the alpha key in the ON position and avoid having to repeatedly press  $\alpha$ . Press  $\alpha$  again to unlock it.
  - The flashing cursor becomes  $\text{A}$  when you press  $\alpha$ .  $\text{A}$  may also appear in the status bar.



## Setting the Display Brightness

This section covers how to set the display brightness and explains automatic dimming.

### Adjusting the Display Brightness

You can adjust the display brightness to suit your viewing angle and lighting conditions.

To adjust the brightness, follow these steps.

- ▶ Press **2nde** **▼** to darken the screen one level at a time.
- ▶ Press **2nde** **▲** to lighten the screen one level at a time.

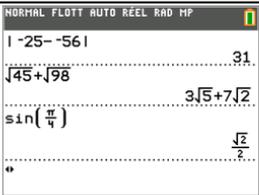
The TI-82 Advanced Edition Python retains the brightness setting in memory when it is turned off.

### Automatic Dimming

The TI-82 Advanced Edition Python automatically dims the screen brightness after 45 seconds of inactivity.

- ▶ Press **on** to return the screen to the preset brightness.
- ▶ Pressing **on** to adjust the brightness will not affect any of the current state of your calculator work.

## Using the Home Screen



1 Expressions  
2 Answers

The Home Screen displays a list of expressions and their corresponding answers:

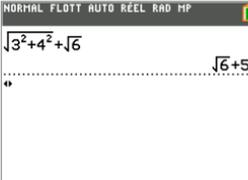
- 1 -25 - -56 | 31
- $\sqrt{45} + \sqrt{98}$  |  $3\sqrt{5} + 7\sqrt{2}$
- $\sin\left(\frac{\pi}{4}\right)$  |  $\frac{\sqrt{2}}{2}$

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  $\left[\Delta\right]$  and  $\left[\nabla\right]$  to scroll through the entry history and paste the entries or answers to the current entry line.

Enter a calculation.

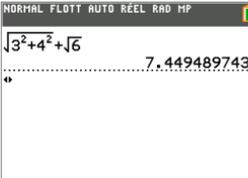
Press  $\left[2\text{nd}\right]\left[\text{de}\right]$  [quitter] from any screen until you get back to the home screen.

Press  $\left[2\text{nd}\right]\left[\sqrt{\phantom{x}}\right]$   $3$   $\left[x^2\right]$   $+$   $4$   $\left[x^2\right]$   $\left[\rightarrow\right]$   $+$   $\left[\sqrt{\phantom{x}}\right]$   $6$   $\left[\text{enter}\right]$ .



The Home Screen displays the expression  $\sqrt{3^2+4^2} + \sqrt{6}$  and its answer  $\sqrt{6} + 5$ .

**Note:** Press  $\left[\leftarrow\right]$  to toggle between exact and decimal representations.



The Home Screen displays the expression  $\sqrt{3^2+4^2} + \sqrt{6}$  and its decimal answer  $7.449489743$ .

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



The Home Screen displays the expression  $\sqrt{3^2+4^2}$  with a right arrow cursor  $\left[\rightarrow\right]$  at the end of the line.

## Displaying Entries and Answers

Mode settings control how the TI-82 Advanced Edition Python interprets expressions and displays answers. Press  $\boxed{\text{mode}}$  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 f(x)=screen). Press  $\boxed{\rightarrow}$  to see the entire expression.

**Tip:** Press the cursor without pressing  $\boxed{2\text{nde}}$  to move the cursor along the line.

- An arrow appears to the left of an answer if it scrolls off the screen. Press  $\boxed{\rightarrow}$  and  $\boxed{\leftarrow}$  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: $\boxed{2\text{nde}}$ [déf table]	

### MathPrint™ (default)

	Entry Answer (Scrolls)
	Entry Answer

## Scrolling Through the Home Screen History

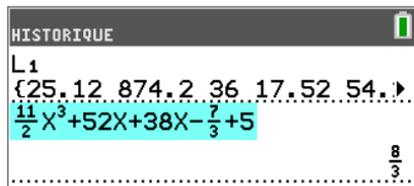
If all lines of the display are full, text scrolls off the top of the display.

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  $\boxed{\text{entrer}}$ ) 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  $\boxed{\uparrow}$  or  $\boxed{\downarrow}$  to move the cursor to the entry or answer you want to copy and then press  $\boxed{\text{entrer}}$ .

The TI-82 Advanced Edition Python 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  $\boxed{\text{alpha}}$   $\boxed{\uparrow}$  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  $\boxed{\text{annul}}$  or  $\boxed{\text{suppr}}$  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  $\boxed{2\text{nde}}$   $\boxed{\text{quitter}}$  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,  $\boxed{\text{busy}}$  to indicate the calculator is in alpha status, and  $\boxed{\text{f}}$  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.



① Selected MODE settings.

② Context help for current cursor position or active feature.

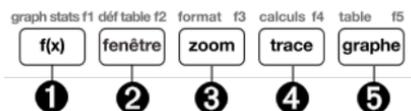
③ Battery icon.

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

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### Using Shortcut Menus



①  $\alpha$  [f1] Opens FRAC menu.

②  $\alpha$  [f2] Opens FONC menu.

③  $\alpha$  [f3] Opens MATR menu.

④  $\alpha$  [f4] Opens VAR Y 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 NBRE 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 VAR -VAR Y menu.

To open a shortcut menu, press  $\alpha$  plus the corresponding F-key: [f1] for FRAC, [f2] for FONC, [f3] for MATR, [f4] for VAR Y, 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.

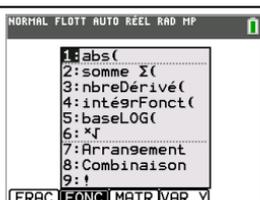
-or-

- ▶ Use the arrow keys to move the cursor to the appropriate line and then press  $\text{entree}$ .

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

### FONC shortcut menu

$\alpha$  [f2]



$2\text{nde}$  [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 MATR menu is only available in MathPrint™ mode on the home screen and in the f(x)= 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  $\mathbf{f}$  and alpha cursor  $\mathbf{A}$  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 $\mathbf{2nde}$ $\mathbf{[insérer]}$ for this cursor. Enter characters in front of the cursor location.
Second	Reverse arrow $\mathbf{f}$	This allows you to enter a 2nd character or complete a 2nd operation.
Alpha	Reverse A $\mathbf{A}$	An alpha character is entered, <b>SOLVE</b> is executed, or shortcut menus are displayed.
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.
Toggle Number Format		Press $\mathbf{\leftarrow\rightarrow}$ to toggle between exact and decimal formats of the result.

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

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

## Working with Menus

You can access TI-82 Advanced Edition Python 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.

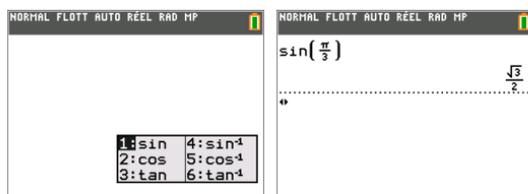
**Note:** If a context help message is in the status bar when you press a menu that temporarily replaces the screen, that context help will remain in the status bar as a reminder that you are working within a context.

### Trig and MathPrint™ Templates

There are two menus (Trigonometric Function Menu, and MathPrint™ Template Menu) that appear on top of your working screen. You can still navigate and paste commands or templates as usual.

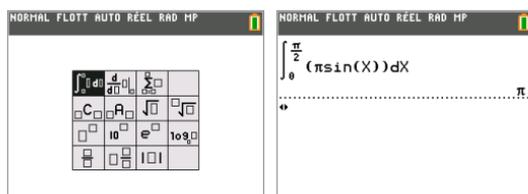
#### Trigonometric Function Menu

Press  $\boxed{\text{trig}}$  to access this menu.



#### MathPrint™ Template Menu

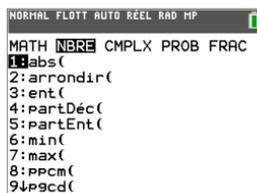
Press  $\boxed{\text{math}}\boxed{\text{d}}$  to access this menu.



## 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  $\rightarrow$  and  $\leftarrow$  to highlight each menu name.

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



## Scrolling a Menu

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

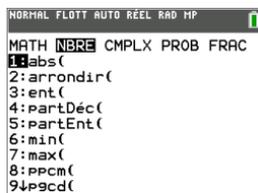
To page down 9 menu items at a time, press  $\alpha \downarrow$ . To page up 9 menu items at a time, press  $\alpha \uparrow$ .

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

## 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  $\downarrow$  or  $\uparrow$  to move the cursor to the item you want, and then press  $\text{enter}$ .

-or-

Within the Catalog listing of functionality, move the cursor to the item you want, and then press  $\text{+}$ . For most commands, the Catalog Help syntax editor displays the correct syntax. Enter the syntax using the displayed help, and then press  $\alpha \text{f4}$  to paste. The Catalog Help pastes the complete command.

Press  $\alpha \text{f5}$  to escape without pasting the command.



## Note:

After you select an item from a menu, the TI-82 Advanced Edition Python typically displays the previous screen.

If you do not see PASTE on the Catalog Help screen, press  $2\text{nde}$   $\text{[quitter]}$  until you return to the home screen, then go back into the menu and 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 **[2nde]** [quitter] to return to the home screen.

-or-

- Press **[annul]** 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, which also is highlighted.
- 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 (↓) 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 **[+]** to go to a syntax help editor (if the menu item is supported).

## Working with MATH Menus

To display the MATH menus, press  $\boxed{\text{math}}$ . 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: $x\sqrt{\quad}$	Calculates the $x^{\text{th}}$ root.
6: fMin( 7: fMax( * 8: nDeriv( * 9: fnInt * 0: summation $\Sigma$ ( * A: logBASE( B: piecewise( C: Numeric Solver...	Finds the minimum of a function. Finds the maximum of a function. Computes the numerical derivative of a function at a point. Computes the numerical integral of a function over an interval. Computes the sum of an expression over an index. Computes the logarithm of a specified value determined from a specified base: logBASE(value, base). Allows the entry of piecewise functions. Displays the equation solver.

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

### NUM

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

* 1: abs( 2: round( 3: iPart( 4: fPart( 5: int( 	Absolute value Round Integer part Fractional part 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.

\* 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  $\mathbf{math}$   $\blacktriangleleft$   $\blacktriangleleft$ .

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  $\alpha$  [f2]

## FRAC

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

** 1: n/d	Displays the fraction template in MathPrint™ mode. Displays a thick fraction bar between the numerator and the denominator in Classic mode.
** 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  $\alpha$  [f1]

# Setting Up the Calculator Modes

Mode settings control how the calculator displays and interprets:

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

## Setting Modes

To set calculator modes, press  $\boxed{\text{mode}}$ . The following menu appears on your screen:



**Note:** When you press  $\boxed{\text{mode}}$ , 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  $\boxed{\text{enter}}$  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
FLOAT 0 1 2 3 4 5 6 7 8 9	Number of decimal places in answers

Mode	Description
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 $a+bi$ $re^{i\theta}$	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: FRENCH	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.

Notation for 12345.67	Decimal answer displays as:
<b>NORMAL</b> 12345.67 Retains the decimal notation up to limits of the calculator display and memory.	12345.67
<b>SCI</b> (Scientific) $1.234567 \times 10^4$ 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) $12.34567 \times 10^3$ 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  $\boxed{2\text{nde}}$  [EE], 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  $1.234567 \times 10^4$ .

If you select **NORMAL** notation, but the answer cannot display in 10 digits (or the absolute value is less than .001), the TI-82 Advanced Edition Python 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.

---

## **FONCTION PARAMETRIQ POLAIRE SUITE**

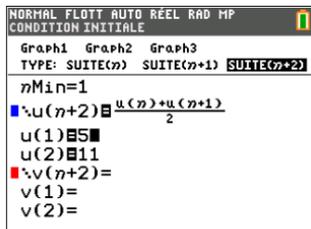
Graphing modes define the graphing parameters.

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

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

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

**SUITE** 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-8x family calculators.
<b>DOT-THICK</b>	Large dot plotting. (3x3 pixels). Equivalent to DOT on earlier TI-8x family 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.

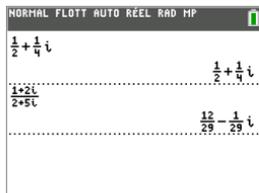
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## REAL $a+bi$ $re^{i\theta}$

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

Two complex modes display complex results.

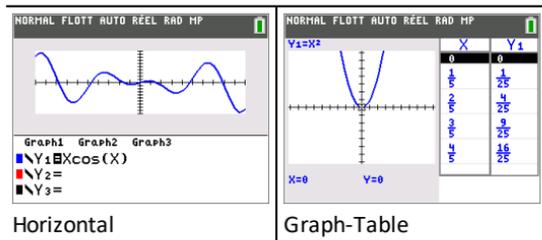
- **a+bi** (rectangular complex mode) displays complex numbers in the form  $a+bi$ . The TI-82 Advanced Edition Python supports the  $n/d$  fraction template.
- **re $^{\wedge}(\theta i)$**  (polar complex mode) displays complex numbers in the form  $re^{\wedge}(\theta i)$ .



## 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. Affiche les résultats dans les formats suivants : décimal, fraction, radical ou  $\pi$  (si pris en charge).

**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 $\leftrightarrow$ 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 **mode**.
2. Press **↑ ↑ ↑** to move the cursor to **SET CLOCK**.
3. Press **enter** to change clock settings.



**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 **2nde** [catalog].
2. Press **↓** or **↑** to scroll the **CATALOG** until the selection cursor points to **ClockOff** or **ClockOn**.
3. Press **enter** **enter**.

## LANGUAGE

Press **→** or **←** on the LANGUAGE spinner menu to select a language. Press **↓** or **↑** to set the selected language.

**Note:**

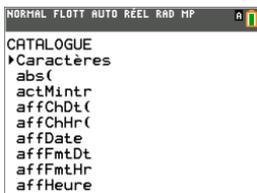
- The calculator will retain your language setting for most resets of the calculator.

## Using the Special Character Set

Use the special character set at the top of **CATALOG** to add special characters and accent marks for display messages and text strings stored to a variable. You cannot, however, use them in variable names.

1. Press **2nde** [catalog] to display the **CATALOG**.

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



2. Press **enter** to display the **CARACTÈRES** screen.

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



3. You can:

- Select a special character:
  - a) Press  $\leftarrow$ ,  $\rightarrow$ ,  $\downarrow$ , or  $\uparrow$  to move the box to the special character that you want to use in a message or text string.
  - b) Press  $\overline{\text{entrer}}$  to place the character on the edit line.
  - c) Press  $\leftarrow$ ,  $\rightarrow$ ,  $\downarrow$ , or  $\uparrow$  to move the box to **Done**.
  - d) Press  $\overline{\text{entrer}}$  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  $\overline{\text{alpha}}$ .
  - b) Press the key associated with the alpha character that you want to accent, for example,  $[A]$  (above  $\overline{\text{math}}$ ). The accented character is displayed in the edit line.
  - c) Press  $\leftarrow$ ,  $\rightarrow$ ,  $\downarrow$ , or  $\uparrow$  to move the box to **Done**.
  - d) Press  $\overline{\text{entrer}}$  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-82 Advanced Edition Python, 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-82 Advanced Edition Python 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>or</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

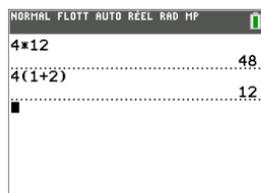
The TI-82 Advanced Edition Python recognizes implied multiplication, so you do not need to press  $\times$  to express multiplication in all cases. For example, the TI-82 Advanced Edition Python interprets  $2\pi$ ,  $4\sin(46)$ ,  $5(1+2)$ , and  $(2*5)7$  as implied multiplication.

**Note:** TI-82 Advanced Edition Python implied multiplication rules differ from those of some other graphing calculators. For example:

Expression	TI-82 Advanced Edition Python evaluates as	Other Calculators may evaluate as
$1/2X$	$(1/2)X$	$1/(2X)$

### Parentheses

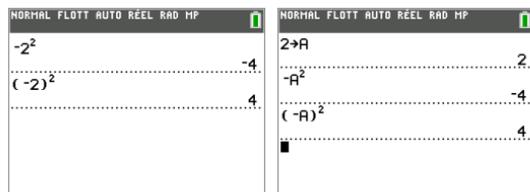
The TI-82 Advanced Edition Python completes all calculations inside a pair of parentheses first. For example, in the expression  $4(1+2)$ , EOS™ first evaluates the expression inside the parentheses,  $1+2$ , and then multiplies the answer, 3, by 4.



### Negation

To enter a negative number, use the negation key. Press  $\ominus$  and then enter the number. On the TI-82 Advanced Edition Python, negation is in the third level in the EOS™ hierarchy. Functions in the first level, such as squaring, are evaluated before negation.

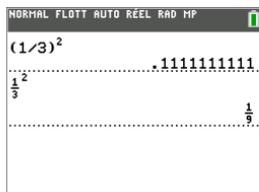
Example:  $-X^2$ , evaluates to a negative number (or 0). Use parentheses to square a negative number.



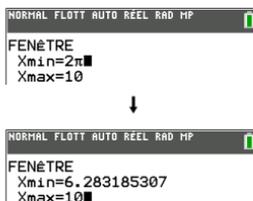
**Note:** Use the  $\square$  key for subtraction and the  $\ominus$  key for negation. If you press  $\square$  to enter a negative number, as in  $9 \times \square 7$ , or if you press  $\ominus$  to indicate subtraction, as in  $9 \ominus 7$ , an error occurs. If you press  $\alpha$  A  $\ominus$   $\alpha$  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.



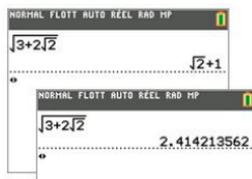
Expressions evaluate to the (approximate) decimal display



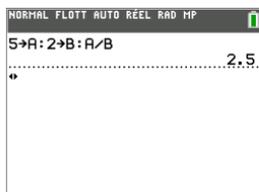
## Toggle Answers - AUTO Mode

On the home screen, if the cursor displays as  $\blacktriangleleft$ , press  $\blacktriangleright$  to change the number format\* of the answer. Fractions, radicals and  $\pi$  values are retained in results up to computation rules for a numeric calculator. When fraction, radical and  $\pi$  answers are not supported, only the decimal result will display.

**\*Note:** Some answers will retain fraction, square root, or  $\pi$  representations if used in a calculation.





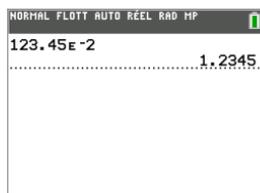


### Entering a Number in Scientific Notation

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

#### Note:

- If the exponent is negative, press  $\boxed{(-)}$ , and then enter the exponent.
- E stands for "x10" and the calculator interprets the entire number as  $(123.45 \times 10^{-2})$  as if it was entered with parentheses.

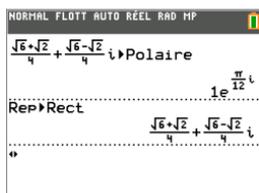
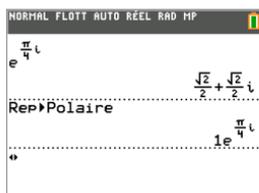


When you enter a number in scientific notation, the TI-82 Advanced Edition Python does not automatically display answers in scientific or engineering notation. The mode settings and the size of the number determine the display format.

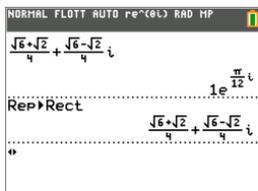
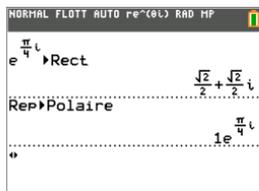
### Polar Complex Numeric Expressions and Commands

Set  $\boxed{\text{mode}}$  to REAL or POLAR and RADIAN angle to work with complex exponential functions using  $\boxed{[e^x]}$ . Selected radian angle values, multiples of  $\pi/12$ , will support exact radial answers for the TI-82 Advanced Edition Python.

#### Real Mode Conversions



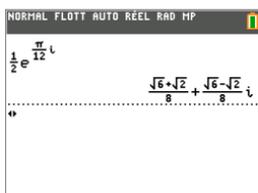
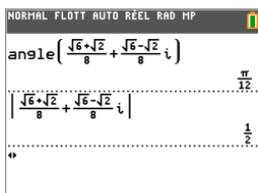
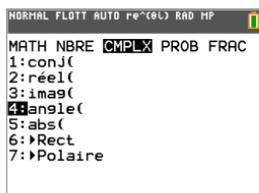
#### Polar Mode Conversions



- Use  $[e^x]$  to enter the exponential function and argument. This function always interprets the angle in radian. If Degree mode is set, expect a domain error and change the mode to radian.
- When attempting a conversion from polar to rectangular and back to polar representation, use  $[2nd]$   $[rép]$  when exact results are expected.

## Commands Using Complex Numbers

The  $[math]$  CMLPX menu contains useful commands when working with complex numbers.



## 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,  $\sin(\text{value})$ .

**Note:** To see the arguments of a function or command in the calculator, find the item in a menu or  $[2nd]$   $[catalog]$  and press  $+$ . For most menu items, a Catalog Help screen will display and the syntax of the arguments will be displayed.

## Instructions

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-82 Advanced Edition Python, **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 **annul** or any non-graphing key.
- To restart graphing, press a graphing key or select a graphing instruction.

## TI-82 Advanced Edition Python Edit Keys

Keystrokes	Result
<b>▢</b> or <b>◀</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>▣</b> or <b>▤</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>2nde</b> <b>◀</b>	<ul style="list-style-type: none"><li>• Moves the cursor to the beginning of an expression.</li></ul>
<b>2nde</b> <b>▶</b>	<ul style="list-style-type: none"><li>• Moves the cursor to the end of an expression.</li></ul>
<b>alpha</b> <b>▴</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 var Y in the f(x) editor.</li></ul>
<b>alpha</b> <b>▾</b>	<ul style="list-style-type: none"><li>• Moves the cursor from a MathPrint™ expression to the next var Y in the f(x) editor.</li></ul>
<b>entrer</b>	<ul style="list-style-type: none"><li>• Evaluates an expression or executes an instruction.</li></ul>
<b>annul</b>	<ul style="list-style-type: none"><li>• Clears the current line on a line with text on the home screen.</li></ul>

Keystrokes	Result
	<ul style="list-style-type: none"> <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 <math>\square</math> to see the history.</li> <li>Use Clear Entries* followed by <math>\boxed{\text{annul}}</math> 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>
$\boxed{\text{suppr}}$	<ul style="list-style-type: none"> <li>Deletes a character at the cursor; this key repeats if held down on the keypad.</li> </ul>
$\boxed{2\text{nde}}$ $\boxed{\text{suppr}}$	<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{2\text{nde}}</math> [insérer] or press <math>\boxed{\leftarrow}</math>, <math>\boxed{\rightarrow}</math>, or <math>\boxed{\downarrow}</math>.</li> </ul>
$\boxed{2\text{nde}}$	<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{2\text{nde}}</math> again.</li> </ul>
$\boxed{\text{alpha}}$	<ul style="list-style-type: none"> <li>Changes the cursor or status bar indicator to <math>\mathbf{A}</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{\text{alpha}}</math>, press <math>\boxed{\text{alpha}}</math> or press <math>\boxed{\leftarrow}</math>, <math>\boxed{\uparrow}</math>, <math>\boxed{\rightarrow}</math>, or <math>\boxed{\downarrow}</math>.</li> </ul>
$\boxed{2\text{nde}}$ $\boxed{\text{verr A}}$	<ul style="list-style-type: none"> <li>Changes the cursor to <math>\mathbf{A}</math>; sets alpha-lock; subsequent keystrokes access the third functions of the keys pressed; to cancel alpha-lock, press <math>\boxed{\text{alpha}}</math>. If you are prompted to enter a name such as for a group or a program, alpha-lock is set automatically.</li> </ul> <p><b>Note:</b> The TI-82 Advanced Edition Python 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>FONCTION</b> mode, a T in <b>PARAMETRIQ</b> mode, a <math>\theta</math> in <b>Polaire</b> mode, or an <i>n</i> in <b>SUITE</b> mode with one keystroke.</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-82 Advanced Edition Python Graphing Calculator

The TI-82 Advanced Edition Python graphing calculator has many color options and a high-resolution display that allows more information to be shown on the screen. The TI-82 Advanced Edition Python uses color in the following ways:

- $f(x)$  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  $\leftarrow$  and  $\rightarrow$  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

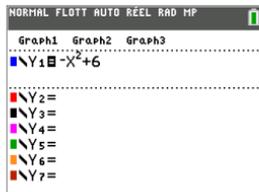
- With the cursor on a function in [Y=], press  $\boxed{\text{annul}}$   $\boxed{\text{annul}}$  to return to the default color and line style for that function.
- You can reset the calculator to its default settings, including color settings, by pressing  $\boxed{2\text{nde}}$   $\boxed{[\text{m}\text{em}]}$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

#### 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 FONCTION and the default settings are assumed.

Enter an equation in the  $f(x)$  editor.

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



To set the line color in the  $f(x)$  editor:

1. Press **[4]** 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 **[>]** **[>]** **[>]** to place the cursor box on the color and line style at the left of the screen and press **[enter]**.
4. Press **[>]** **[>]** **[>]** to select MAGENTA.
5. Press **[v]**.
6. Press **[v]** to highlight OK and then press **[enter]**.

**Note:** The thick line style is the default. It can be changed by pressing **[<]** or **[>]**.

To set a Background Image:

1. Press **[2nde]** **[format]**.
2. Press **[▲]** or **[▼]** as necessary to highlight Background.

Set GridColor, Axes, and BorderColor as desired.

The spinner menu becomes active.



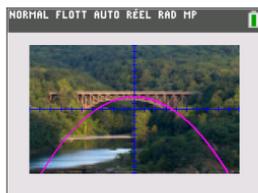
3. Press **[<]** or **[>]** to select the desired Background Image or color.

**Note:** Your Image Vars may be different than the one displayed.

**Note:** To create Background Image Vars, use the free TI Connect™ CE software to convert and send images to your TI-82 Advanced Edition Python graphing calculator.

4. Press **[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**.)



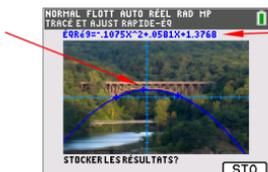
## Using QuickPlot and Fit Equation

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 **[stats]** CALC menu.

Prior to starting the QuickPlot and Fit Equation interactive feature on the graph area, be sure to set your Background Image Var and other graph settings from the FORMAT screen. Also set your WINDOW or ZOOM settings.

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-82 Advanced Edition Python 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. Several images are pre-loaded on the TI-82 Advanced Edition Python. You can also convert .gif, .jpg, .png, .tif, and .bmp images to TI-82 Advanced Edition Python Image Vars in TI Connect™ CE software and load them to the calculator. You cannot create images on the calculator.

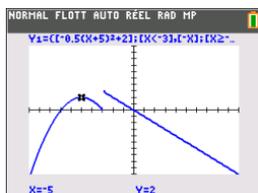
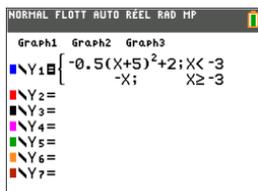
**Note:** TI Connect™ CE software is available as a free download from [education.ti.com/go/download](http://education.ti.com/go/download).

- 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.
- Image Vars and Pic Vars can only be shared with another TI-82 Advanced Edition Python graphing calculator.
- TI-82 Advanced Edition Python Pic Vars cannot be shared with the TI-82 Advanced.
- If you perform a RAM reset on the TI-82 Advanced Edition Python, the Image Vars and Pic Vars remain in Archive memory for use.

## Using Piecewise Function Graphing

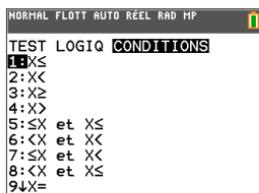
### How to enter a piecewise function

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



### Conditions Menu **[2nde]** **[tests]**

The CONDITIONS menu, **[2nde]** **[tests]** **[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 **[2nde]** **[tests]** (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.

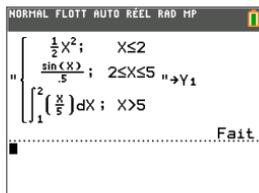
Note that if an interval form is selected from the CONDITIONS menu, the interval form will paste in the correct logical format for an interval as, for example,  $-2 < X$  and  $X < 5$ . This is the correct format for all features in the calculator to give the expected logical test result True(1)/False(0)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

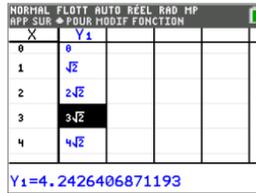
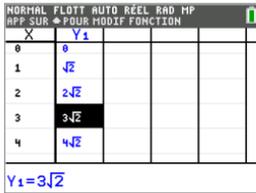
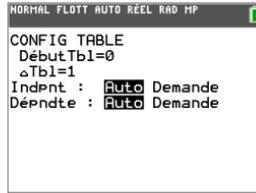
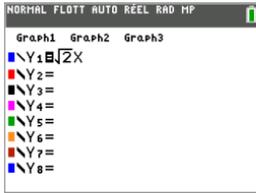
- Once a piecewise template is selected with a certain number of pieces, you will not be able to add or delete a piece. You may select a larger number of pieces and enter zeros (False) to have placeholder rows. This is helpful when creating drawings using functions on the graph screen.
- The piecewise 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  $f(x)$  on the home screen if needed and store the function back to  $f(x)$ . Remember the format, "2X"→Y1.
  - Quote:  $\alpha$  [ " ]
  - Recall the YVar:  $2nd$  [rappel]  $\alpha$  [f4] (select a YVar) and  $\text{enter}$
  - Close quote and store:  $\alpha$  [ " ]  $\text{sto} \rightarrow$
  - Select the YVar:  $\alpha$  [f4] and  $\text{enter}$

# Working with Tables

When a function is entered in the f(x) editor, you can view a table of values by pressing  $\boxed{2\text{nde}}$  [table].



When a cell is highlighted, press  $\boxed{\blacktriangleleft}$  to see the supported numeric formats displayed in the lower edit area on the screen.

**Note:** The table setup,  $\boxed{2\text{nde}}$  [déf table], determines how table values are displayed. Check the table setup values if the table results are not in expected formats of fraction, radical or  $\pi$ . Using a decimal or a mix of fraction, radical or  $\pi$  will not retain exact in most instances.

# Working with Matrices

You can enter matrices using the matrix editor on your graphing calculator. For example, you can perform the following operations on matrices:

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

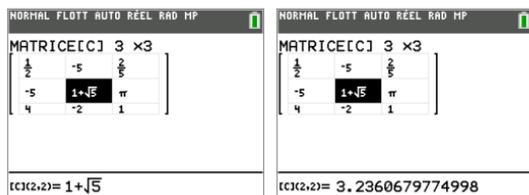
## Using the matrix editor

1. Press **[matrice]**.
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.



**Note:** When a cell is highlighted, press **[>]** to see the supported numeric formats displayed in the lower edit area on the screen.

## Performing a calculation with a matrix

1. Press **[2nde]** [quitter] to go to the Home Screen.
2. Press **[matrice]** 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 **[matrice]** NAMES menu and not typed from the calculator keypad.

### Example:

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

- ▶ Use the **[matrice]** MATH menu to paste the
  - 1: det( command

-and-

- **matrice** NAMES 3: [C]

as matrix variables to the Home Screen.

```
NORMAL FLOTT AUTO REEL RAD MP
NOMS MATH eDIT
1: det(
2: T
3: dim(
4: RmPlir(
5: unite(
6: matRleat(
7: augmenter(
8: Matr>liste(
9: Liste>matr(
```

```
NORMAL FLOTT AUTO REEL RAD MP
NOMS MATH eDIT
1: [A]
2: [B]
3: [C] 3x3
4: [D]
5: [E]
6: [F]
7: [G]
8: [H]
9: [I]
```

```
NORMAL FLOTT AUTO REEL RAD MP
det([C])
.....-84.24993519
█
```

**Note:** Remember that you cannot type in a matrix name from the calculator keypad. Use the **matrice** 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

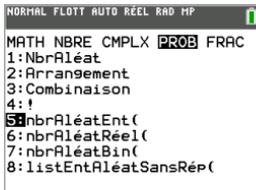
You can find probability features in the  $\boxed{\text{math}}$  PROB submenu.

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  $\boxed{\text{math}}$ , then press  $\boxed{\downarrow}$  until you highlight **PROB**.
2. Press  $\boxed{\downarrow}$  until you highlight **5: nbrAléatEnt(**, then  $\boxed{\text{entrer}}$ .

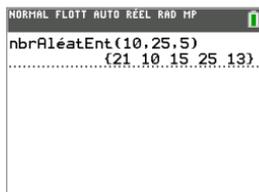


3. Enter the lower integer, then  $\boxed{\text{entrer}}$ .
4. Enter the upper integer, then  $\boxed{\text{entrer}}$ .
5. Enter the number of integers (**n**), then  $\boxed{\text{entrer}}$ .



6. Press  $\boxed{\text{entrer}}$  to Paste.

7. Press `enter` again to see the random set of integers.



```
NORMAL FLOTT AUTO REEL RAD MP
nbrAléatEnt(10,25,5)
(21,10,15,25,13)
```

**Note:** With each `rand` execution, the TI-82 Advanced Edition Python generates the same random-number sequence for a given seed value. The TI-82 Advanced Edition Python 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...**

**Note:** The seed value also affects `nbrAléatEnt()`, `nbrAléatRéal()`, and `nbrAléatBin()` instructions.

## Working with Statistics

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

You can use the following statistics functions:

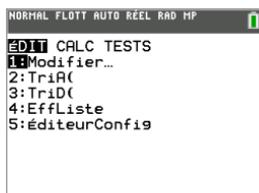
Description	Keys
Best fit equations (regressions)	<code>stats</code> <code>▶</code> <code>▲</code> <code>▼</code>
Define and store up to three stat plot definitions	<code>2nde</code> <code>[graph stats]</code>
Distributions	<code>2nde</code> <code>[distrib]</code>
List-based statistical analysis	<code>2nde</code> <code>[listes]</code> <code>▶</code> <code>▶</code>
Logistic and sine regression analysis	<code>stats</code> <code>▶</code> <code>▲</code> <code>▼</code>
One- and two-variable analysis	<code>stats</code> <code>▶</code> <code>1</code> and <code>stats</code> <code>▶</code> <code>2</code>
Statistical tests	<code>stats</code> <code>▶</code> <code>▶</code>

### 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 `stats`.
2. Select **1: ÉDIT** in the **EDIT** submenu, then `entrer`.



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**.

L1	L2	L3	L4	L5	2
0	0	$\sqrt{6-\sqrt{2}}$			
$\frac{\pi}{12}$		$\frac{1}{4}$			
$\frac{\pi}{6}$		$\frac{1}{2}$			
$\frac{\pi}{4}$		$\frac{\sqrt{2}}{2}$			
$\frac{\pi}{3}$		$\frac{\sqrt{3}}{2}$			

L2(1)=0

**Note:** When a cell is highlighted, press **right arrow** to see the supported numeric formats displayed in the lower edit area on the screen.

**To plot this data:**

4. Press **2nd** [graph stats].

5. Press **1: Plot1** (to set up a scatter plot for L1 and L2), then **enter**.

REPRESENTATIONS STAT	
1: Graph1..Aff	$\leftarrow$ L1 L2
2: Graph2..NAff	$\leftarrow$ L1 L2
3: Graph3..NAff	$\leftarrow$ L1 L2
4: GraphNAff	
5: GraphAff	

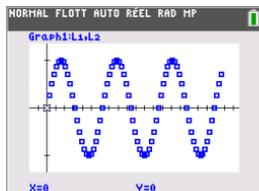
6. Press **left arrow** to highlight **On**.

Graph1 Graph2 Graph3	
Aff NAff	
Type: $\leftarrow$ $\leftarrow$ $\leftarrow$ $\leftarrow$ $\leftarrow$ $\leftarrow$ $\leftarrow$	
Xliste :L1	
Yliste :L2	
Marque : $\leftarrow$ + .	
Couleur: BLEU	

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.



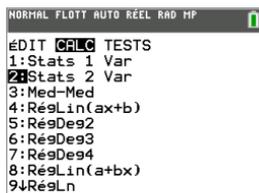
Exact values may display as decimals when tracing on a graph or plot.

You can plot your statistics data in these ways:

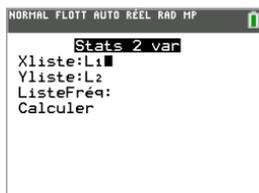
- Scatter plot
- xyLine
- Histogram
- Regular or Modified box-and-whisker plot
- Normal probability plot

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

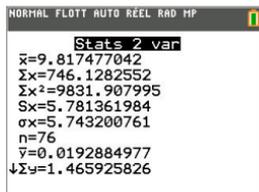
1. Press **[stats]**.
2. Press **[▶]** to highlight **CALC**.
3. Press **[▼]** until you highlight **2:2-Var Stats**, then **[entrer]**.



4. Press **[▼]** until you highlight **Calculate**, then **[entrer]**.



- The screen will display the variable statistics.



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

## Working with Variables

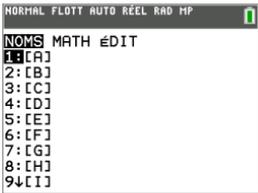
You can enter and use several types of data, including real and complex numbers, matrices, lists, functions, stat plots, graph databases, graph pictures, and strings.

### 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-82 Advanced Edition Python 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)	<b>A, B, ... , Z, <math>\theta</math></b>
Complex numbers	<b>A, B, ... , Z, <math>\theta</math></b>
Matrices	<b>[A], [B], [C], ... , [J]</b> To enter a matrix name: Press <b>[matrice]</b> . 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*	<b>L1, L2, L3, L4, L5, L6, and user-defined names</b>
Functions	<b>Y1, Y2, ... , Y9, Y0</b>
Parametric equations	<b>X1T and Y1T, ... , X6T and Y6T</b>
Polaire functions	<b>r1, r2, r3, r4, r5, r6</b>
Sequence functions	<b>u, v, w</b>
Stat plots	<b>Plot1, Plot2, Plot3</b>

Variable Type	Names
Graphical databases	<b>GDB1, GDB2, ... , GDB9, GDB0</b> Save current equations from $f(x)$ and Window settings to re-use.
Background images	<b>Image1, Image2, ... , Image9, Image0</b>
Pictures	<b>Pic1, Pic2, ... , Pic9, Pic0</b>
Strings	<b>Str1, Str2, ... , Str9, Str0</b>
Apps	Applications
AppVars	Application variables
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

- If numeric files contain exact radical or  $\pi$  values, the files will only share with the TI-82 Advanced Edition Python.
- 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  $f(x)$  functions.
- From an editor, you can store to matrices, lists, and  $f(x)$  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 program.

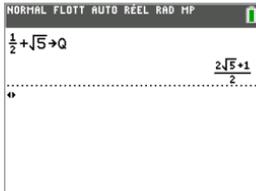
- **AppVars** is a variable holder used to store variables created by independent applications. You cannot edit or change variables in **AppVars** unless you do so through the application that created them.

## 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 graphing calculator substitutes the value currently stored in that variable.

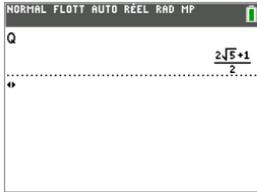
To store a value to a variable from the home screen or a program using the  $\boxed{\text{sto}\rightarrow}$  key, begin on a blank line and follow these steps.

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 graphing 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-82 Advanced Edition Python 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 graphing calculator places an asterisk (\*) to the left of archived variables in most menus as well as in 2nde [mém] **2:Mem Management**. If needed, you can use the Archive/UnArchive variables 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 display on the home screen. You must unarchive it in order to see its contents and edit it.

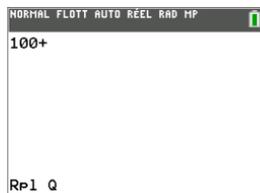
**Note:** Image Vars are run and stored in archive, but when an Image Var displays in **VARs 4:Picture & Background**, the BACKGROUND menu does not display the asterisk \*.

## Recalling Variable Values

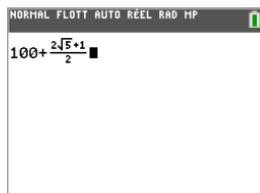
To recall and copy variable contents to the current cursor location, follow these steps. To leave **Rpl**, press **[annul]**.

1. Press **[2nde]** **[rappel]**. **Rpl** 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 **[2nde]** **[listes]**, and then select the name of the list, or press **[2nde]** **[L1]** or **[L2]**, and so forth.
  - Press **[matrice]**, and then select the name of the matrix.
  - Press **[var]** to display the **VARS** menu or **[var]** **[▶]** to display the **VARS VAR Y** menu; then select the type and then the name of the variable or function.
  - Press **[alpha]** **[f4]** to display the VAR Y 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 **[entrer]**. The variable contents are inserted where the cursor was located before you began these steps.

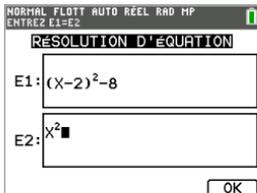


### Notes

- You can edit the characters pasted to the expression without affecting the value in memory.
- You can use **Rpl** in the  $f(x)$  editor to paste a current function to a new VAR Y to avoid retyping long expressions.

# Solving Equations

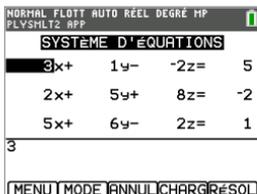
Press **[résol]** to access the built-in numeric solver, Résoudre..., and the pre-loaded polynomial and systems of equations solver, PlySmlt2 App.



Numeric Solver



Polynomial Solver



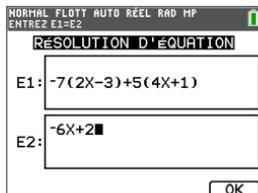
System of Equations Solver

## 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.



- 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 ( $X=0$ ).

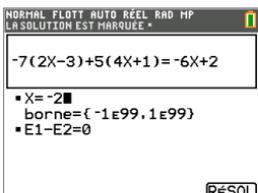
You should enter a value close to your estimate of the solution. If needed, you can look at the intersection of the graph of both sides of your equation or use the table of values to know more about your problem. Here,  $X=0$  is a reasonable starting point for the calculator computation.

Bound –  $\{-1E99, 1E99\}$  represents the calculator version of the Real Number line:  $\{-1 \times 10^{99}, 1 \times 10^{99}\}$ . You can change this interval if you know about where the solution lies given your study of a graph or table. For most textbook problems, you probably will not have to change this line.

- Press **[résol]**.
- Check your solution. The calculator checks the solution it generated.

### Interpreting the Numeric Solver Screen

Always read the context help line for tips.



The solution will be marked with a small square.

(Advanced) Bounds gives the interval where the solution is found. Here,  $\{-1E99, 1E99\}$  is  $\{-1 \times 10^{99}, 1 \times 10^{99}\}$  which has the calculator looking for the solution within a very large interval of numbers. You can adjust this interval if you do not get all the solutions to your equation by limiting the values to a smaller interval. Here, there is only one solution,  $X=-2$ .

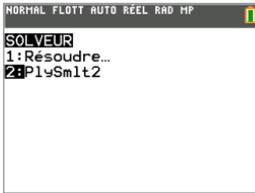
**E1-E2=0** (**expression 1 = expression 2**) is finding the difference of the left hand side of your equation, **E1** with  $X=-2$  and the right hand side of your equation, **E2** with  $X=-2$ . The difference is zero. The equation balances.

$X=-2$  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.)

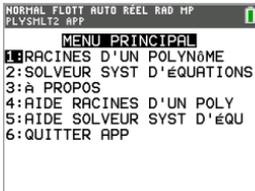
## Polynomial Solver

The Polynomial Equation Solver App comes pre-loaded on your calculator as an App.

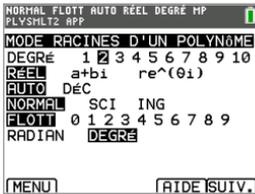
1. Press **[résol]** to access this solver.
2. Select **2: PlySmlt2**.



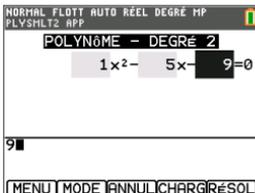
3. Select **1: RACINES D'UN POLYNÔME** from the MAIN MENU.



4. Select **DEGRÉ 2** with all default settings as shown.

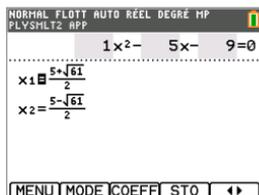


5. Press the shortcut key **[SUIV.]** (**[graphe]**)
6. Enter the polynomial.



7. Press **[résol]** (**[graphe]**).

8. View the solution.



9. Press  $\leftarrow$  (graphe) to change number format to decimal and back.

## System of Equations Solver

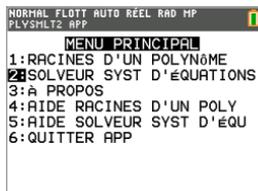
The Systems of Equations Solver App comes pre-loaded on your calculator as an App.

This solver can be accessed in the **[résol]** menu.

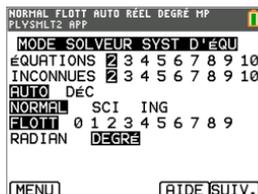
1. Select **2: PlySmt2**.



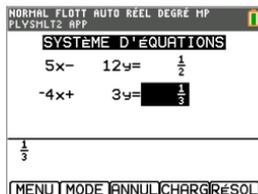
2. Select **2: SOLVEUR SYST D'ÉQUATIONS** from the **MAIN MENU**.



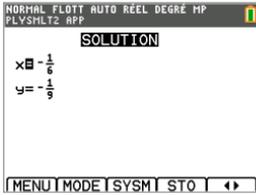
3. Select **ÉQUATIONS 2** and **INCONNUES 2** with all default settings as shown.



4. Press the shortcut key **[SUIV.]** (**[graphe]**).
5. Enter the system as shown.



6. Press **[résol]** (**[graphe]**).



7. Press **[↔]** (**[graphe]**) to change number format to decimal and back. Radical and  $\pi$  results may not be supported in the system solver.

# Managing Calculator Files

## Transferring calculator files to the TI-82 Advanced Edition Python

You can transfer calculator files between two TI-82 Advanced Edition Python calculators by connecting the unit-unit USB cable to the USB port at the top of the calculators. Use the menu items in [2nde] [échanger] to first set up one calculator to receive and then select files from the menus on the other calculator to send.

You can transfer files to your TI-82 Advanced Edition Python calculator by two methods.

1. Use the unit-unit USB cable to link two TI-82 Advanced Edition Python calculators.

Set up the receiving calculator.

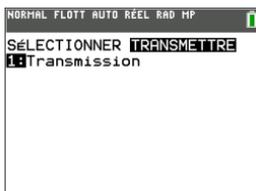
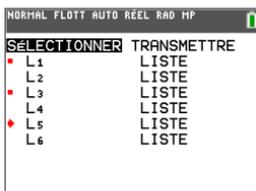
[2nde] [échanger] **RECEVOIR**



Set up the sending calculator by selecting files and transfer to connected calculator.

[2nde] [échanger] **ENVOYER**

Allow the complete transfer of files before removing the unit-unit USB cable.



- Use the calculator-computer USB cable to connect the TI-82 Advanced Edition Python to a computer and use TI Connect™ CE to manage allowed calculator files. See [education.ti.com/fr](http://education.ti.com/fr) to install the free TI Connect™ CE to manage your calculator files and take screen captures.

Most CE calculator data files such as list, matrix, Python programs (PY AppVars), TI-Basic programs, Image Vars, etc. will send to the TI-82 Advanced Edition Python. If not compatible, once on the TI-82 Advanced Edition Python, you will see a Var version error. For Python programs, run the program. If the imported module in the program is not available in Python82 App, the Shell will return an error message.

App transfer or management such as delete is not allowed on the TI-82 Advanced Edition Python. TI-82 Advanced Edition Python Apps will not display in the Explorer Workspace in TI Connect™ CE.

## Transferring the OS from calculator to calculator

You can transfer the operating system from one calculator to another using a USB unit-to-unit cable.

Connect two calculators of the same model by firmly inserting the USB cable ends into the calculators. The USB port is located on the top right side of the calculator.

**Warning:** Use the correct graphing calculator file specific for your model if using TI Connect™ CE. Only connect to the same model of calculator when sending an OS from one graphing calculator to another graphing calculator.

<p>Receiving calculator:</p> <p><code>2nde</code> [échanger] ▶ <code>entrer</code></p>	 <p>Normal FLOTT AUTO REEL RAD HP</p> <p>ENVOYER RECEVOIR RENVOYER</p> <p>1 Réception</p>
<p>When you press <code>entrer</code>, the graphing calculator displays the message <b>En attente...</b></p>	 <p>Normal FLOTT AUTO REEL RAD HP</p> <p>En attente...</p>
<p>Sending calculator:</p> <p><code>2nde</code> [échanger] ▲ ▲ <code>entrer</code>.</p>	 <p>Normal FLOTT AUTO REEL RAD HP</p> <p>ENVOYER RECEVOIR RENVOYER</p> <p>6 Pic et image...</p> <p>7: Matrice...</p> <p>8: Réel...</p> <p>9: Complexe...</p> <p>0: Var Y...</p> <p>A: Chaîne...</p> <p>B: Var App...</p> <p>C: Grouper...</p> <p>D: Envoyer O.S</p>

## Exam Mode and Exam LED

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

The examiner will tell you when to set your calculator in exam mode.

- Press-to-Test is a three-key sequence to place the TI-82 Advanced Edition Python in the allowed state for an exam.
- The Exam LED will blink amber when you have properly set the calculator up for the exam.
- You can create TI-Basic programs during the exam.
- Press-to-Test Mode:
  - Deletes all RAM and Archive files with exceptions:
    - Retains TI-developed Apps.
    - Disables Pics, Images, and Program variables.
  - Sets Mode settings to default.

### Using Press-to-Test Mode

1. Turn the calculator OFF.
2. Press and hold down the `[annul]`, `[entree]` and `[on]` keys, and then release.
3. The RESET OPTIONS screen displays.
4. Press **OK** to first validate any loaded TI Apps and then set up the exam mode. When validation and test mode setup is complete, the confirmation screen will display.

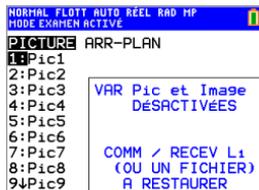


**Note:** A validation screen may display when entering Exam Mode. Please wait while the files are validated.

5. Press any key to place the calculator in test mode.
6. Exam LED will blink amber.

**Note:**

- A blue status bar is shown on the TI-82 Advanced Edition Python when in **EXAM MODE** and **EXAM MODE ENABLED**.
- All variables, including AppVars, stored in RAM and in archived memory are deleted.
- Pic & Image Vars are disabled.



- In memory management ( $\boxed{2\text{nde}}$  [mém] **Mem Management/Delete**), disabled files will display with the not equal sign.

### ***Bringing a Calculator Out of Exam Mode***

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

- Use TI Connect™ CE **Actions > Calculatrices Couleur : quitter le Mode Examen** to quit the exam mode on any connected graphing calculator. You may also send a calculator file to the connected graphing calculator to quit from exam mode.
- Link two TI-82 Advanced Edition Python graphing calculators using a unit-to-unit USB cable and then transfer a file by using  $\boxed{2\text{nde}}$  [échanger], **ENVOYER RECEVOIR**.

To clear a calculator of files created during an exam:

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

---

**Tip:** To preserve battery life, quit Exam Mode Press-to-Test after the exam using TI Connect™ CE.

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## Using Applications (Apps)

These applications are on your TI-82 Advanced Edition Python.

Update your calculator with the latest TI-82 Advanced Edition Python OS file which includes TI-82 Advanced Edition Python Apps at [education.ti.com/fr](http://education.ti.com/fr).

Press  $\boxed{2\text{nde}}$  [apps] to see the complete list of applications on the TI-82 Advanced Edition Python.

**Note:** Apps cannot send or receive to a TI-82 Advanced Edition Python calculator. Apps cannot be deleted. The following Apps are contained in the TI-82 Advanced Edition Python operating system.

### ***CellSheet™ App***

Combines spreadsheet functionality with the power of a 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.

### ***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.

## ***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.
- Can also be accessed in résol when the app is loaded.

## ***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 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.

## ***Python82 App for the TI-82 Advanced Edition Python***

TI-Python is based on CircuitPython, a variant of Python 3 for teaching coding. It was developed by Adafruit and adapted for use by TI.

The interpreter of your Python program is executed within this TI-Python environment, separate and different from the CE OS calculations. Calculations may also vary from other versions of Python due to number type storage in the Python version.

The Python82 App offers the following to support your Python programming on your calculator.

- File Manager to list the Python programs (Python AppVars) stored in RAM on your calculator.
- Editor to create new programs in your calculator and edit existing Python programs.

- Shell to display output of your Python program or to run Python commands at the Shell prompt. This environment is also referred to as an interpreter or console.

The Python modules available to import are math, random and time.

**Note:** There is no programming offered in either TI-Basic or Python82 to program TI-Innovator™ or TI-Innovator Rover.

### ***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 Accessories

## Using TI Desktop Software

Use TI desktop software to exchange information between your graphing calculator and your computer, or to display a TI graphing calculator for your entire classroom. Check the latest updates for TI-82 Advanced Edition Python, TI Connect CE and TI-SmartView™ pour la famille TI-83 at [education.ti.com/fr](http://education.ti.com/fr).

### Using TI Connect™ CE

The TI Connect™ CE v5.6.3 or higher software makes exchanging information between your graphing calculator and your computer quick and easy.

The TI Connect™ CE v5.6.3 or higher software includes three workspaces:

- **Calculator Explorer:** allows you to manage calculator content
  - Convert \*.py programs from your computer to Python AppVars by sending to the CE calculator using Calculator Explorer. See TI-Connect™ CE guide for more information at [education.ti.com/eguide](http://education.ti.com/eguide)
- **Screen Capture:** allows you to manage screen captures
- **Program Editor:** allows you to work with TI-Basic programming

### Using TI-SmartView™ CE

The TI-82 Advanced Edition Python emulator is available in TI-SmartView™ CE pour la famille TI-83. The Python82 App and experience is available to display the same experience as on the calculator.

The TI-SmartView™ CE software allows you to display a TI graphing calculator emulation. With TI-SmartView™ CE software, you can:

- View the history of your key press entries.
- Capture and save screen shots to use in other documents as you investigate a math or science concept.
- Use the View3™ pane to show three additional screens simultaneously.
- Use the SmartPad CE App running on a connected CE calculator as a remote keypad to press keys on your CE emulator in view.
- Demonstrate the Python82 App experience of File Manager, Editor, and Run Python programs (as Python AppVars). Convert \*.py programs from your computer to Python AppVars by sending to the emulator using Emulator Explorer. See TI-SmartView™ CE pour la famille TI-83 guide for more information.

The TI-SmartView™ CE software includes two workspaces:

- **Calculator Emulator:** allows you to perform calculations and view answers as you would on a physical calculator
- **Emulator Explorer:** allows you to manage calculator content

## Batteries

The TI-82 Advanced Edition Python graphing calculator comes equipped with:

- AAA batteries.
- USB computer cable for transferring files

### Battery Status

The battery status icon on the upper right of the screen gives information on battery life.



The battery icons indicate the level of battery power remaining.



Battery level is 75% to 100%.



Battery level is 50% to 75%.



Battery level is 25% to 50%.



Battery level is 5% to 25%.

### Warning:

- RAM memory may be lost in low battery conditions. You should save your files to a computer using TI Connect™ CE or archive your variables if your battery power gets low.

Displays this message when you turn on the unit.



## Error Conditions

The TI-82 Advanced Edition Python detects errors while performing these tasks:

- Evaluating an expression
- Executing an instruction
- Plotting a graph
- Storing a value

### Diagnosing an Error

When the TI-82 Advanced Edition Python detects an error, it returns an error message with a short description.



<b>1: Quitter</b>	Displays the home screen
<b>2: Voir</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  $f(x)$  function during program execution, then the **2: Voir** option returns to the  $f(x)$  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: Voir** (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.

## Battery Caution

- Do not ingest battery, Chemical Burn Hazard
- This product contains a coin or button cell battery. If the coin or button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.
- Keep new and used batteries away from children.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.
- If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.
- Call a local poison control center for treatment information.
- Even used batteries may cause severe injury or death.
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above 140F (60C) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc or rechargeable batteries.
- Risk of explosion if battery is replaced by an incorrect type.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations. Do **NOT** dispose of batteries in household trash or incinerate.

# General Information

## ***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.

## ***Service and Warranty Information***

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

Select your country for information about the length and terms of the warranty or about product service.

Limited Warranty. This warranty does not affect your statutory rights.