Texas Instruments

TI-nspire™

Math and Science Learning Technology Handheld

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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Introduction

The TI-Nspire™ math and science learning handheld

This guidebook provides information about a powerful, advanced learning handheld available from Texas Instruments: the TI-Nspire™handheld.

Your learning handheld comes equipped with a variety of pre-installed software applications that have features relevant to different subjects and curriculums.

Extend the reach of your TI-Nspire™ handheld with accessories, such as the TI-Nspire™ computer software, TI-Nspire™ ViewScreen™ Panel and TI-Nspire™ Computer Link Software.

How to use this guidebook

This guidebook is intended to provide instruction for the basic operation of the TI-Nspire™ handheld.

The chapters in this guidebook include:

Getting Started - Provides start up information for the learning handheld, and offers students and educators an overview of the basic operations of the TI-Nspire™ handheld.

Working with Documents - Provides instruction for creating and working with documents.

Using Calculator- Provides an overview of the Calculator application.

Using Graphs & Geometry - Provides an overview of the Graphs & Geometry application.

Using Lists & Spreadsheet- Provides an overview of the Lists & Spreadsheet application.

Using Notes- Provides an overview of the Notes application.

Using Data & Statistics - Provides instruction for using the Data & Statistics application to analyze data created in other applications.

Data Collection - Provides an overview of the Data Collection tool.

Service and Warranty Information - Includes service and warranty information and contact information for technical support.

Where to find more information

The remainder of the product information is available in electronic form. The comprehensive guidebook for using the TI-Nspire™ handheld is included on the CD-ROM that came with your learning handheld. This guidebook is also available online as a free download at education.ti.com/guides.

Getting Started

Your TI-Nspire™ handheld operates in two modes:

- TI-Nspire
- TI-84 Plus Silver Edition

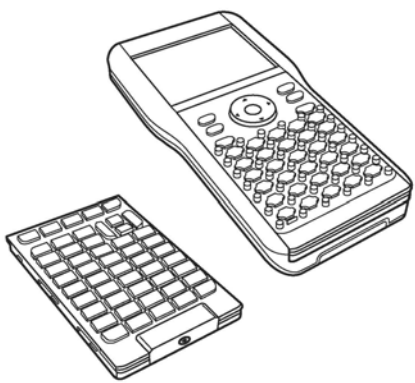
There are two keypads, one for each mode, but your handheld has only one operating system. The operating system for the TI-84 Plus keypad is bundled with the TI-Nspire™ operating system. Both mode operating systems are updated when you update the OS for the handheld. The TI-84 Plus mode OS cannot be installed separately using a stand-alone TI-84 Plus OS.

To learn about the capabilities and features of the TI-84 Plus mode, see the TI-84 Plus guidebook on your CD or at education.ti.com. The capabilities and features of the TI-Nspire mode are described in this guidebook.

Note: There are many TI-84 Plus applications (Apps). Apps that are certified by TI to be compatible with your TI-Nspire handheld will operate correctly. All apps preinstalled on your handheld are certified. Other applications that have not been certified may also operate correctly, but some will not.

Dual Keypads

Your TI-Nspire™ handheld comes with two keypads: the first is the TI-Nspire™ keypad and the second is the TI-84 Plus keypad.



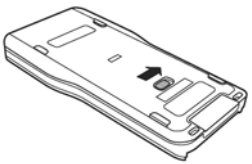
TI-84 Plus keypad (on left) and TI-Nspire keypad (attached to handheld)

Changing the keypad

Caution: When changing keypads, be certain that the handheld is completely powered down before removing the keypad. Removing the keypad before the display clears may result in loss of data.

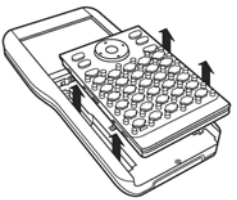
1. Remove the cover, and turn the handheld over. Slide the latch release to the right.

   The keypad releases.



2. Turn the handheld right side up, and slide the keypad away from the display screen.

3. Lift the keypad off the handheld.



4. Insert the other keypad.

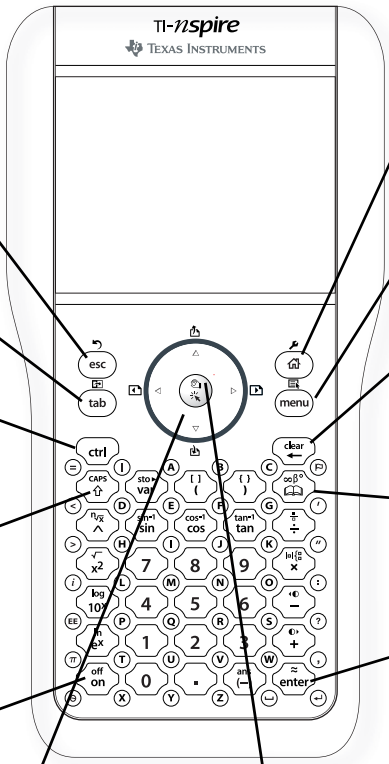
   Ensure that it fits comfortably into the guides on the bottom and sides of the handheld.

   Note: The keypad does not slide in from the bottom edge of the unit. Instead, fit it into the guides just above the batteries.

5. When the keypad is properly seated on the handheld, push the keypad toward the display screen.

   The keypad clicks into place when properly seated and completely inserted into the handheld.

TI-Nspire™ handheld keys



esc Removes menus or dialog boxes from the screen.

tab Moves to the next entry field.

ctrl Provides access to the function or character shown above each key.

caps Makes the next character typed upper-case.

off on Turns on the TI-Nspire handheld.

NavPad
Press ◀, ▶, ▲, or ▼ to move the cursor.

Click button
Selects an object on the screen.

ctrl + or pressing and holding
Displays the grab cursor so you can grab an object on the screen.

home Displays the home menu.

menu Displays application or context menu.

clear Clears (erases) the entry line or deletes selected object.

Displays the catalog for entering commands.

enter Evaluates an expression, executes an instruction, or selects a menu item.

Keyboard shortcuts

Use the following keyboard shortcuts to perform common functions.

Editing Text	
cut	ctrl X
copy	ctrl C
paste	ctrl V
undo	ctrl Z
redo	ctrl Y
Inserting Characters, Symbols	
display character palette	ctrl
not equal to	ctrl =
underscore	ctrl ␣
≥	ctrl >
≤	ctrl <
semi-colon (;)	ctrl :
display math template palette	ctrl
∞	ctrl i
$	ctrl "
degree symbol	ctrl '
Managing Documents	
create new document	ctrl N
insert new page	ctrl I
select application	ctrl K
save current document	ctrl S
Navigation	
Home	ctrl 7
End	ctrl 1
Page Up	ctrl 9
Page Down	ctrl 3
Up a level in the hierarchy	ctrl ▲
Down a level in the hierarchy	ctrl ▼
Navigating in Documents	
displays previous page	ctrl ◀
displays next page	ctrl ▶
displays Page Sorter	ctrl ▲
Wizards and Templates	
add a column to a matrix	CAPS ↵
add a row to a matrix	↵
integration template	CAPS
derivative template	CAPS
Modifying Display	
increase contrast	ctrl
decrease contrast	ctrl
power off	ctrl off on

Initial startup

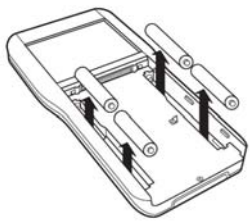
The TI-Nspire™ math and science learning handheld uses four AAA batteries, which are provided with the product.

Replacing batteries

Caution: When removing the keypad to change batteries, be certain that the handheld is completely powered down. Removing the keypad before the display is cleared may result in loss of data.

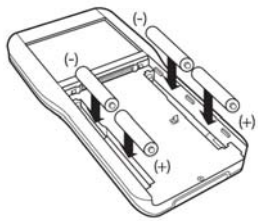
1. Remove the keypad from the handheld.
2. Carefully remove the batteries.

   Caution: You may need to use a tool to remove the batteries as they fit tightly in the unit. If you use a tool, be careful not to damage either the batteries or the handheld.



3. Insert fresh batteries.

   Ensure that the + side of each battery faces away from the display screen.



4. Replace the keypad.

Battery Precautions

Take these precautions when replacing batteries.

- Do not leave batteries within the reach of children.
- Do not mix new and used batteries. Do not mix brands, or types within brands, of batteries.
- Do not mix rechargeable and non-rechargeable batteries.
- Install batteries according to polarity (+ and -) diagrams.
- Do not place non-rechargeable batteries in a battery recharger.
- Properly dispose of used batteries immediately.

- Do not incinerate or dismantle batteries.
- Seek medical advice immediately if a cell or battery has been swallowed.

Additional precautions for rechargeable batteries

- Use only the charger recommended for the cell or battery, or the one that was provided with the original equipment.
- Remove the cell or battery from the charger or alternating current adapter when not in use or being charged.
- Use of the battery in other devices may result in personal injury or damage to equipment or property.

For proper disposal of used batteries

- Do not mutilate, puncture, or dispose of batteries in fire. The batteries can burst or explode, releasing hazardous chemicals. Discard used batteries according to local regulations.

Adjusting the contrast

To lighten the display, press and hold ctrl and tap −.

To darken the display, press ctrl and tap +.

Turning the handheld on and off

To turn the handheld on, press on.

To turn the handheld off, press ctrl on. The next time you turn on the handheld, it is in the same state as when you left it. The settings and memory contents are retained.

Automatic Power Down

To prolong battery life, Automatic Power Down turns off the handheld after several minutes of inactivity. The next time you turn on the TI-Nspire™ handheld, it is exactly as you left it.

Turning on your TI-Nspire™ handheld for the first time

▶ After installing the batteries included with your new handheld, press on to turn the handheld on.

A progress bar displays while the operating system loads.

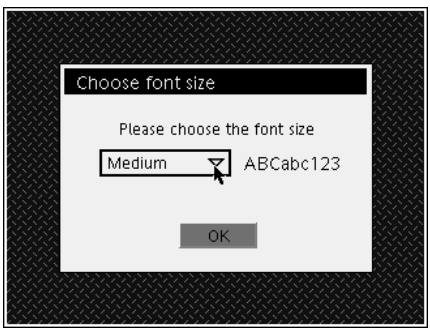
Choosing a language

When loading is complete, you are prompted to select the language to display on the handheld.

1. Press ▼ until the language you wish to display is highlighted, and then press the click button on the NavPad ( ) or enter to select it.
2. Press tab to highlight the OK button, and press or enter to select it.

Choosing a font size

Next, you are prompted to select the font size you wish to use to display text on the handheld.



1. Press ▼ until the font size you wish to display is highlighted, and then press or enter to select it.
2. Press tab to highlight the **OK** button, and press or enter to select it.

Note: You can reset the font size on your handheld at any time by changing the system settings.

When you have selected the font size, the **Welcome** screen displays. This screen describes a few of the basics of using your new handheld.

Press ▼ on the NavPad to scroll down through the document.

Once you have finished with the welcome screen, press (tab) to highlight the **OK** button, then press ⏻ or (enter) to display the home menu.

The Home menu

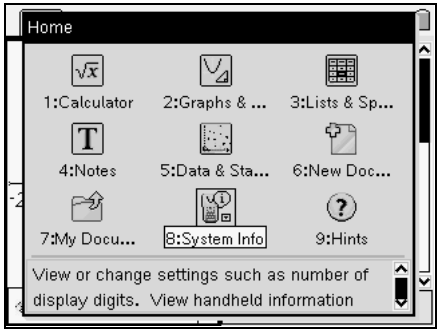
The **Home** menu provides a starting point for all activities on your handheld. Use the **Home** menu to perform the following tasks:

- creating new documents
- opening and managing existing documents
- viewing and changing system and document settings
- viewing hints for operating the handheld.

Using the Home menu

The **Home** menu displays when you power on your handheld for the first time.

Note: To return to the **Home** menu from any other location, press (home).



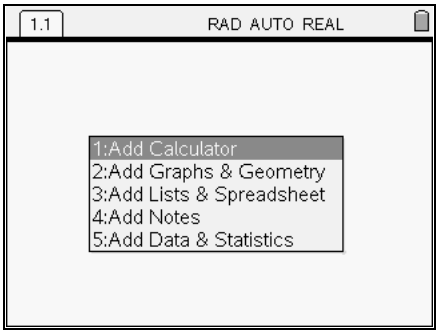
1. Press the arrows on the NavPad (◀, ▶, ▲, or ▼) to move among the options on the **Home** menu.

   A brief description of what each option does displays at the bottom of the screen.

   Note: Not all options are available at all times. If an option is not available, its icon is grayed-out on the home menu.

2. Press (ctrl) or (enter) to select a highlighted option, or press the number associated with the option.

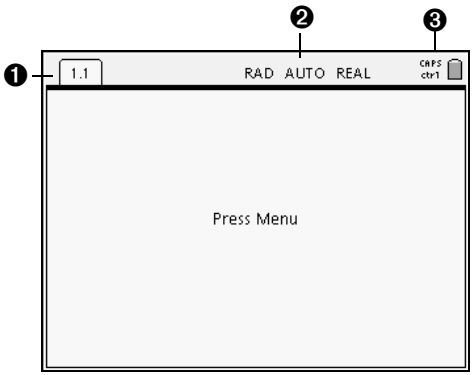
   For example, press (5) to open a new document.



To learn more about applications and documents, see the *Working with Documents* chapter.

The TI-Nspire™ handheld screen

The handheld screen provides information about the document you are working in, as well as the system settings and status. The example below illustrates the main elements of the handheld screen. A description of each element follows.



❶ **Page tabs** - indicate the problem number followed by the page number.

❷ **System Settings** - display the system settings in use, what modifier keys are in use, and provides a snapshot of battery status.

❸ **Status icons** - indicate whether any modifier keys are active, and display battery and memory status.

Viewing status information

The icons that display across the top of the handheld screen provide a quick look at the operating status of the handheld. Icons indicate whether any modifier keys are active, and display the current page number and the total page number. Battery status and low memory indicators also display in this area.

Icon	Indicator	Action
	Active key	Indicates whether ctrl or CAPS keys are active.
	Handheld Status	Indicates whether any devices are connected.
critical good low	Battery Status	Indicates battery life.
	Memory Status	Indicates memory space available on the handheld.

Viewing system settings

The system information menu allows you to view the following system information:

- Document settings
- System settings
- Handheld status
- About screen

Not all options are accessible at all times. For example, if no document is open, you cannot view document settings. When an option is not available, it appears in light gray on the menu.

Document settings

Document settings control how the handheld displays and interprets information in each document. All numbers, including elements of matrices and lists, display according to the document settings.

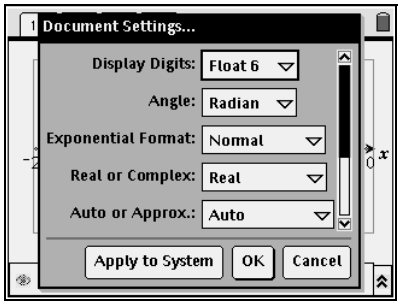
Document settings Options

The following table lists the document settings and their possible values.

Field	Values
Display Digits	Float Float1 - Float12 Fix0 - Fix12
Angle	Radian Degree Gradian
Exponential Format	Normal Scientific Engineering
Real or Complex	Real Rectangular Polar
Exact or Approx.	Auto Exact Approximate
Vector Format	Rectangular Cylindrical Spherical
Base	Decimal Hex Binary

Changing document settings

1. Press ctrl ⌂ 1 6 to display the Document Settings dialog box.



2. Press tab to move down through the list of settings. (Press ◀ if you need to move back up through the list.)
3. When you reach the setting that you want to change, press ▼ to expand the selection list.
4. Press the ▲ and ▼ keys to highlight the option you wish to select and press ⬭ or enter .
5. Press the ▶ key until the **OK** button is highlighted.
6. Press ⬭ or enter to apply the new document settings.

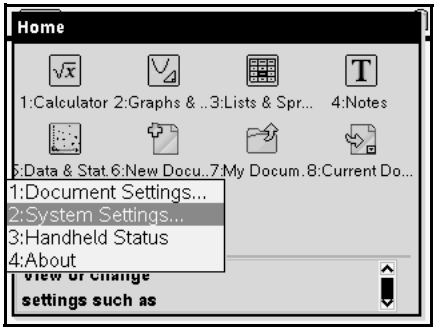
   Note: If you want to apply the new settings to the device, highlight **Apply to System** and press ⬭ or enter.

System settings

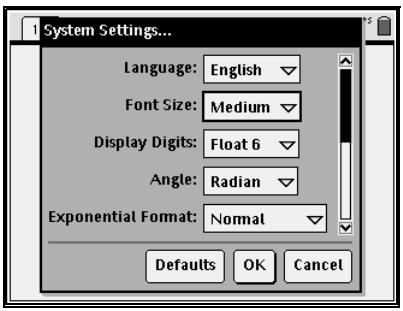
System settings apply default settings to all documents on the handheld. When you create a new document, by default, it uses the system settings to control how the document displays and interprets information. Document settings applied to an individual document override the system settings. System settings also control the language and the font size for the handheld.

Changing system settings

1. Press (home) (8) (2) to open the System Settings window.



2. Press (tab) until the category of settings you want to change is highlighted.



3. Press ▼ to display the list of possible settings.
4. Press ▼ to highlight the setting you wish to select.
5. Press (ctrl) or (enter) to select the new setting.
6. When you have changed all the settings to suit your needs, press (tab) until OK is highlighted, and press (ctrl) or (enter) to apply your changes.

   Note: Click **Defaults** to return the handheld to the factory settings.

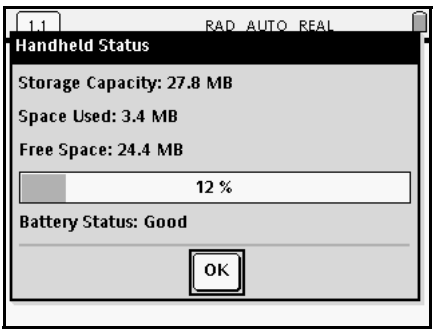
Handheld status

The **Handheld Status** screen shows the amount of memory (in bytes) used by all documents and variables on your TI-Nspire™ handheld. The **Handheld Status** screen displays the following information:

- Storage Capacity
- Space Used
- Free Space
- Battery Status

Checking available memory

1. Press (home) (8) (3).



2. Press (esc) or (enter) to dismiss the **Handheld Status** screen.

Freeing Memory

If you have insufficient memory to store documents on your handheld, you must free memory to create the space you need. To free memory, you must delete documents and/or folders from memory. If you wish to keep the documents and folders for use later, you can back them up to another handheld or to a computer.

Deleting items from memory

If have documents stored on your handheld that you no longer need, you can delete them from memory to create additional space.

Before you delete documents from memory, consider restoring sufficient available memory by copying files to another handheld.

1. Open **My Documents**.

   Press (home) (7).

2. Press ▲ or ▼ to select the folder or document you want to delete.

3. Press (clear).

4. Press (touchpad) or (enter) to confirm that you want to delete the file.

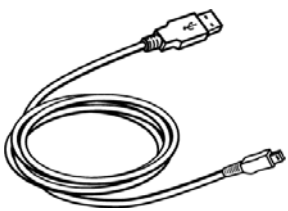
   Note: Press (esc) to cancel the deletion. Press (ctrl) (Z) to cancel.

Using connection cables

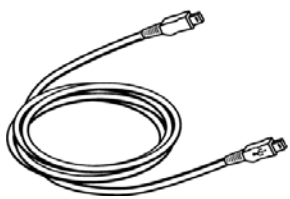
Your TI-Nspire™ handheld comes with connection cables that allow you to share files with both a computer and another device. Different cables work with each keypad.

USB cables

You can use USB cables to connect two TI-Nspire handhelds, to connect a TI-Nspire handheld to a computer, or to connect one TI-Nspire™ handheld using TI-Nspire™ TI-84 Plus keypad to another.



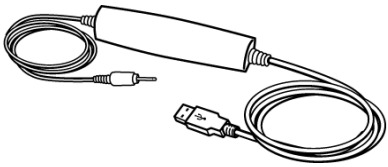
TI-Nspire™ USB connection cable to connect handheld to a computer using TI-Nspire Computer Link software.



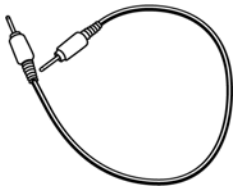
TI-Nspire™ handheld mini-USB cable to connect two TI-Nspire handhelds

TI-84 Plus Mode cables

If you already have TI-84 Plus handhelds and use the I/O port for connectivity, you can use the same cables to connect to a TI-Nspire handheld using the 84 keypad.



USB connection cable to connect handheld to a computer using TI Connect software.



TI-84 Plus I/O device-to-device connection cable

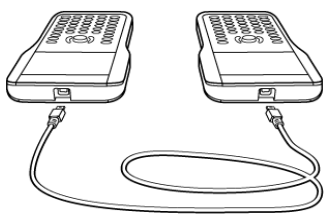
Backing up files to another handheld

To back up files to another TI-Nspire™ handheld, follow the steps below. Complete instructions for connecting two handhelds are included in the electronic version of the handheld guidebook, provided on the CD that came with your handheld.

Connecting two TI-Nspire™handhelds with the USB unit-to-unit cable

The TI-Nspire™ handheld USB A port is located at the center of the top of the handheld.

1. Firmly insert either end of the USB unit-to-unit cable into the USB A port.
2. Insert the other end of the cable into the receiving unit's USB A port.

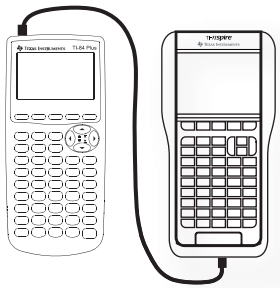


Sending a document

1. Press (home) (7) to open My Documents on the sending unit.
2. Press the ▲ and ▼ keys to highlight the document you want to send.
3. Press (ctrl) (home) (1) (5) to select **Send** from the Document menu.
4. When the file transfer is complete, a message displays on the receiving unit.

Connecting a TI-Nspire™ with TI-84 Plus Keypad to a TI-84 Plus handheld

TI-Nspire™ TI-84 Plus keypad I/O link port is located at the bottom edge of the keypad. The TI-84 Plus I/O link port is located at the top left edge of the graphing calculator.



1. Firmly insert either end of the I/O unit-to-unit cable into the port.
2. Insert the other end of the cable into the other graphing calculator's I/O port.

Connecting the TI-Nspire™ handheld to a computer

1. Firmly insert the mini-USB end of the cable into the port at the top of your handheld.

2. Firmly insert the USB end of the cable into the USB port of the computer.

Backing up files to a computer

Use the TI-Nspire™ Computer Link Software or TI Connect (with the TI-84 Plus keypad) to back up the contents of your handheld to a computer. TI-Nspire™ Computer Link Software and TI Connect software are available on the product CD that came with your handheld.

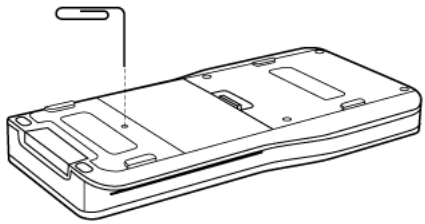
Resetting the memory

The **Reset** button on the underside of the handheld resets all memory. When resetting all memory on the TI-Nspire™ handheld, RAM and Flash memory is restored to factory settings. All files will be deleted. All system variables are reset to default settings.

Caution: Before you reset all memory, consider restoring sufficient available memory by deleting only selected data. If you reset all memory, the pre-installed apps on your handheld will be deleted.

To reset all memory on the handheld, follow these steps.

1. Use a paper clip or ball point pen to press the **Reset** button on the underside of the handheld.



2. Hold for three seconds, and release.

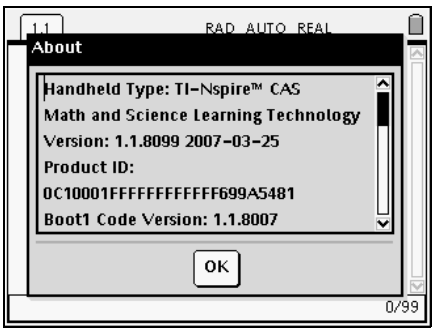
   Handheld memory is cleared.

When you clear memory, the contrast cometimes changes. If the screen is faded or blank, adjust the contrast by pressing ctrl ⊕ or ctrl ⊖.

Displaying the About screen

The **About** screen displays information about theTI-Nspire™ handheld type, the Operating System (OS) Version, and Product Identification (ID).

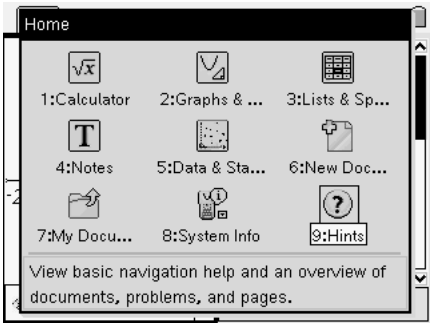
To display the **About** screen, press ⌂ 8 4.



For information regarding OS updates, see the chapter *Transferring Files* in the electronic version the the handheld guidebook. This guidebook is available on the CD that came with your handheld, or on the Texas Instruments web site: http://education.ti.com/guides.

Viewing Hints

Hints provide helpful information for navigating the handheld. To view **Hints**, press (home) 9.



Using the catalog

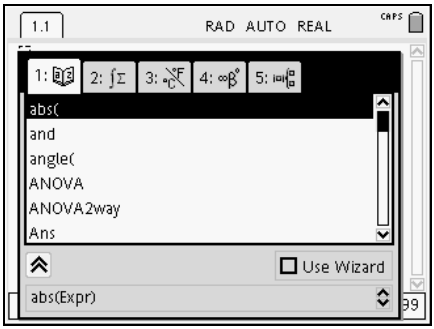
Use the catalog to access a list of TI-Nspire™ commands and functions, units, symbols and expression templates. Commands and functions are listed alphabetically. Commands or functions not beginning with a letter are found at the end of the list. (&, /, +, -, etc.).

The catalog window uses five tabs to categorize commands, special characters and templates:

- 1: shows an alphabetic list of commands and functions.
- 2: shows math commands and functions by category.
- 3: shows a list of units.
- 4: shows a table of symbols.
- 5: shows expression templates.

Opening the catalog

1. Press (doc) to open the catalog.



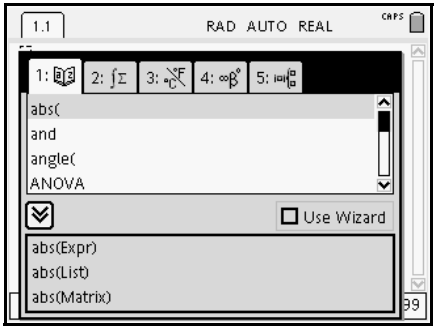
2. Press the number key for the category of the item.

   For example, press 4 to show a table of symbols.

3. Press ▼ until the item you want to insert is highlighted.

   Notice that a syntax example for the item displays at the bottom of the screen.

   Note: To see additional syntax examples of the selected item, press tab, and then press enter to maximize or minimize the Help. To move back to the selected item, press ctrl tab.



4. Press enter to insert the item.

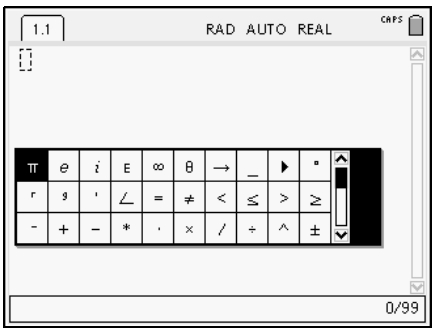
Using Wizards

Some functions have a wizard to help you enter function arguments. To use the wizard, press tab until the **Use Wizard** box is highlighted. Press ctrl or enter to select the check box.

Entering special characters

The symbol palette contains a subset of the objects found in the catalog.

1. To display the symbol palette, press ctrl .



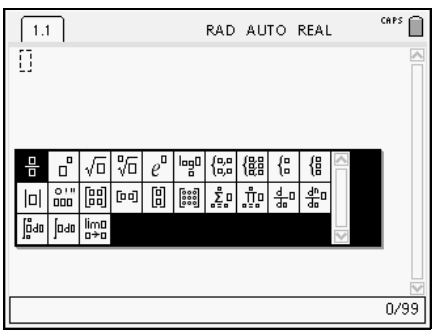
2. Press ◀, ▶, ▲ or ▼ until the item you want to insert is highlighted.

3. Press enter to insert the item.

Entering Math expressions

Math expression templates help you create two dimensional objects, including partial, product, sum, square root and integral.

1. To display the math expressions palette, press ctrl .



2. Press ◀, ▶, ▲ or ▼ until the item you want to insert is highlighted.

3. Press ctrl or enter to insert the item.

Entering international language characters

The Ⓕ key allows you to enter specially accented or punctuated characters in applications that allow text input.

1. Open an application that allows text input.
2. Type the desired text.
3. Position the cursor after the letter that you want to accent. For example, "e" while in the French locale.
4. Press Ⓕ on the keypad. Notice that the "e" changes to "é." Keep pressing Ⓕ until you find the accented version of e that you want. Press ⏎ or the next letter of your text to accept the character and continue typing.

Working with Documents

The TI-Nspire™ handheld lets you save your work in documents, which you can share with other handheld users, and those using the desktop software. In fact, all of the work you do with the TI-Nspire™ handheld is contained in one or more documents. The three main components involved in organizing and saving work on your handheld are:

- Documents
- Page Sorter
- My Documents

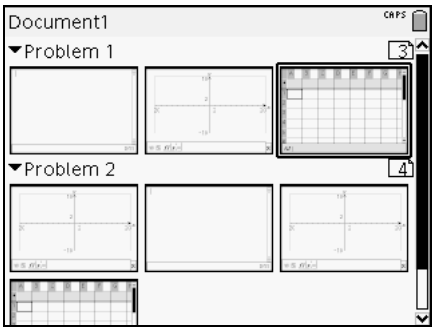
Documents

The TI-Nspire™ document model is simple and easy to use when you understand its structure.

- Each document is divided into one or more **problems**.
- Each problem contains one or more **pages**.
- Each page can be divided into as many as four **work areas**.
- Each work area can contain any of the TI-Nspire™ math and science learning technology **applications** (Calculator, Graphs & Geometry, Lists & Spreadsheet, Data & Statistics and Notes).

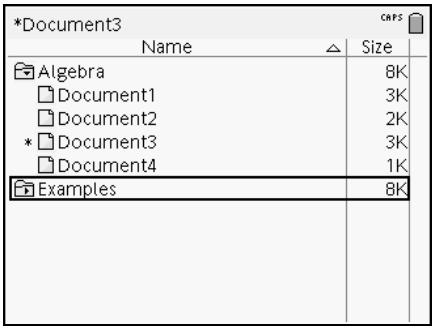
Page Sorter

Although the handheld typically displays the pages in your document one at a time, the Page Sorter lets you see all of the problems in your document and all pages within each problem in thumbnail format. You can use the Page Sorter to rearrange and delete pages, and copy a page from one problem and paste it in another.



My Documents

My Documents is a file manager where you store and organize your documents. Documents are stored in folders.



Creating documents

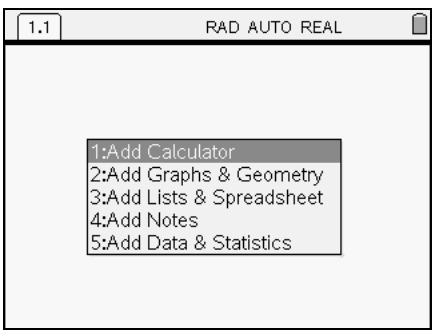
There are two methods for creating a document. You can create a blank document and then add applications and apply a layout, or if no document is currently open, you can create a document containing a single application.

Creating a blank document

- Press (home) (6) to open a document from the home menu, or use the shortcut keys.

  Shortcut keys: (ctrl) (N)

  A new document opens and displays a blank page with the Add Application menu.

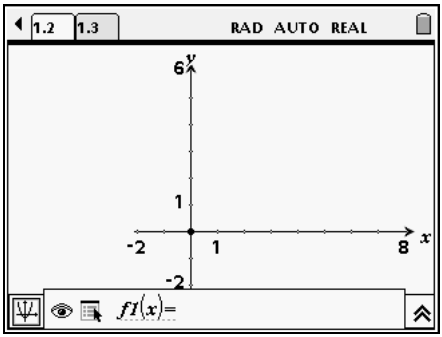


  Note: The tab at the top left of the screen indicates that this is the first page of the first problem.

Adding an application

- Press the number that corresponds to the application you wish to add to the page.

  For example, press 2 to add the Graphs & Geometry application to the page. The application displays in the work area.

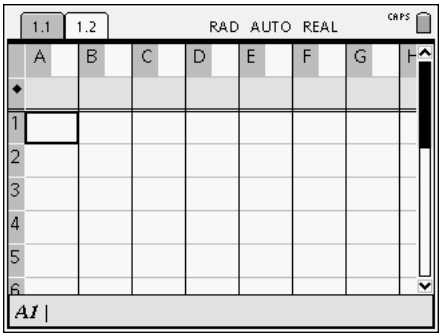


Creating a document with an application

If no documents are currently open, you can create a document with an application already added.

- Press ⌂ and select the number of the application you want to create. For example, press ⌂ 3 to create a new Lists & Spreadsheet page.

  A new document opens with Lists & Spreadsheet on the page.



Note: If you are currently working in a document, this method adds a new page, containing the selected application.

Working with applications

Once you have added an application to your page, there are three menus that provide access to the features and functionality of the application, and allow you to manipulate your documents. These menus are:

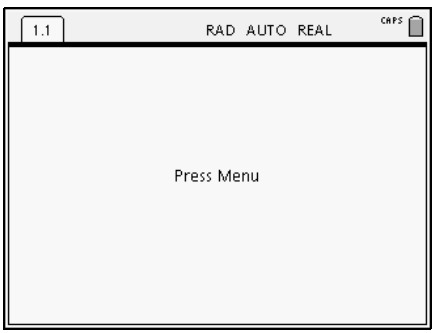
- the Application menu
- the Context menu
- the Page Tools menu

Application menu

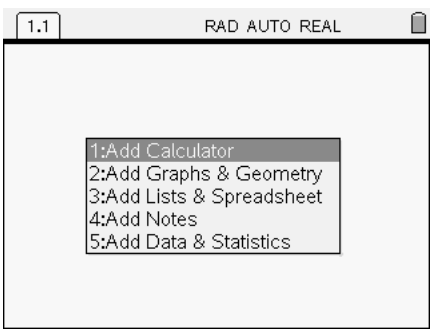
The Application menu displays tools for working with a specific application. Each application has a unique menu.

Using the Application menu

1. If you are on a blank page, Press (menu) to display the Application menu. The menu displays applications that you can add to the page.

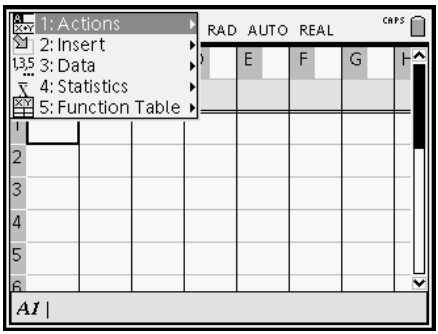


2. Press the number of the application you want to add to the page. For example, press 3 to add the Lists & Spreadsheet application.



3. Press (menu) to display the Application menu.

   When you have an application on a page, the Application menu displays options for working with the current application. The example below displays the Application menu for the Lists & Spreadsheet application.



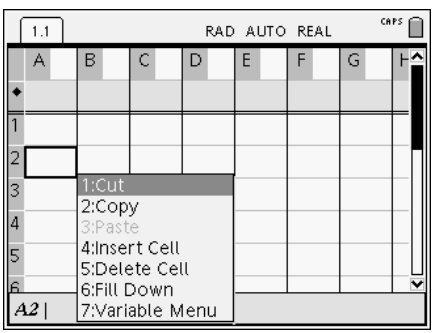
Context menu

The context menu displays options that are specific to the selected object or the current cursor location.

Using the Context menu

- To access a context-sensitive menu from an application, press (ctrl) (menu).

  In the example below, the context menu displays options available for the selected cell in Lists & Spreadsheet.

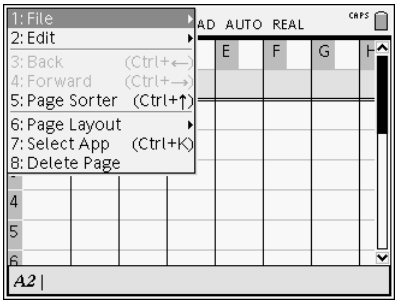


Page Tools menu

The Page Tools menu allows you to move between pages, modify page layout, insert pages or problems, delete pages and change document settings.

Using the Page Tools menu

1. Press ctrl ⌂ to display the menu.



2. Press the number of the option you wish to select. For example, to change the page layout, press 6.

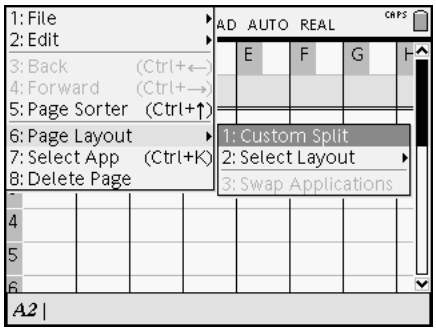
Changing the page layout

When you create a new document, it contains space to add one application. If you need to add more than one application to a page, you can change the layout to accommodate as many as four applications.

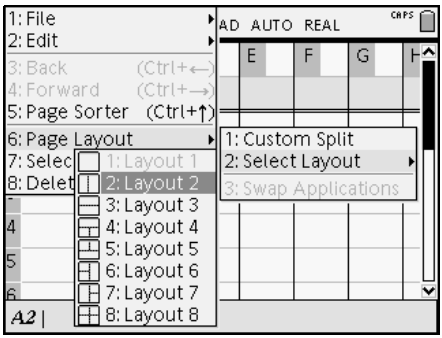
You can choose a standard layout, provided as a menu item, or you can customize a layout to suit your needs.

Choosing a standard layout

1. Press ctrl ⌂ 6 to display layout options.

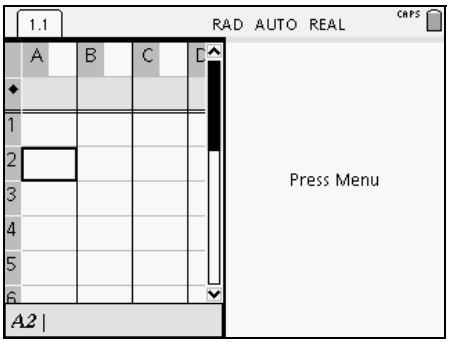


2. If you want to select a standard layout, press 2.



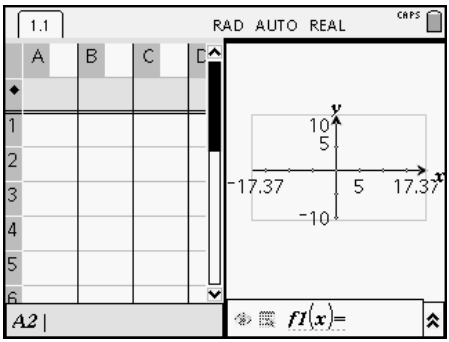
3. Press the number that corresponds to the layout you want to apply to the page.

   For example, press 2 to create a two-pane layout, divided vertically on the page. The page is divided into the layout design you have selected.



4. Press ctrl tab to move to the right pane on the page.

5. Press the number of the application you want to add the new pane. For example, to add the Graphs & Geometry application to the right pane, press 2.

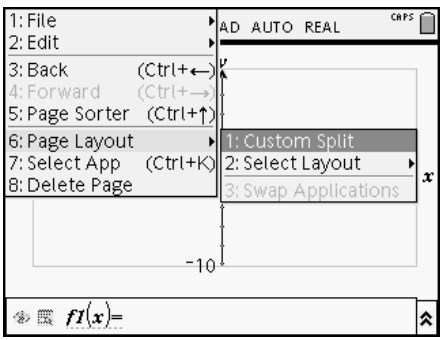


Note: If you need to change the layout of the page to add or delete applications, you can do so at any time.

Creating a custom layout

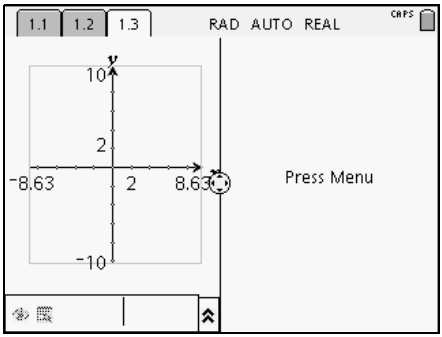
If the standard layouts do not meet your needs, you can customize the space allotted to applications on a page.

1. Press ctrl 6 to display layout options.



2. Press (1) to select the custom split option.

   The standard layout displays, with a blinking divider between the application panes.



3. Press ▲, ▼, ◀ or ▶ to move the divider to adjust the height and width of the panes in the layout.

   Note: Press (+) or (−) to select a defined layout.

4. Press (⊛) or (enter) to accept the layout dimensions.

Repositioning applications on a page

If you want to change the position of applications on a page with multiple applications, you can do so by "swapping" the positions of two applications.

Swapping applications

1. Select **Swap App** from the Page Tools menu.

   Press (ctrl) (⌂) (6) (3)

2. Press (ctrl) (tab) to select the application you want to move.

   The selected application is surrounded by a heavy, flashing black border, and the Swap App cursor ↺ displays on the screen.

   Note: On a two-pane page layout, the selected application automatically swaps position with the opposite pane. Press (⊛) or (enter) to complete the swap.

3. Press ▲, ▼, ◀ or ▶ to position the cursor over the application you are targeting to swap.

4. Press ⏻ or enter to complete the swap.

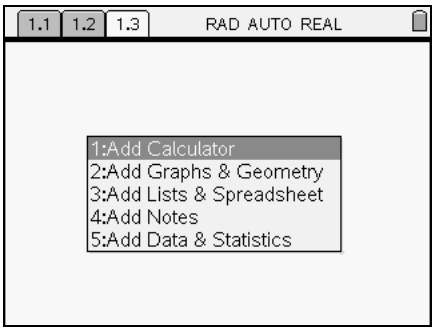
   Note: Press esc to cancel the swap.

Adding a problem to a document

A document can contain as many as 30 problems. To add a new problem:

1. Press ctrl ⌂ 2 8.

   A new problem with one page is added to the document.



   Note: The tab at the top left of the screen indicates that this is the first page of the second problem.

2. Press the number of the application you want to add to the new page.

Adding a page to a problem

Each problem can contain up to 50 pages. To add a new page to a problem:

- Press ctrl ⌂ 2 7 to add a blank page

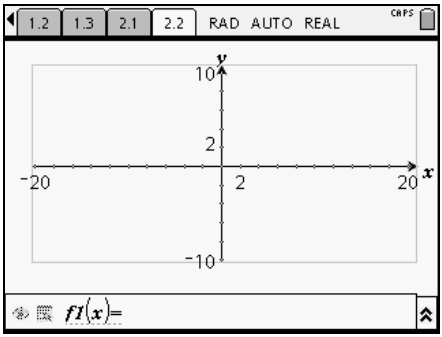
  or

- Press ⌂ to display the **Home** menu, then press the number of the application you'd like to add to the new page in the problem.

  For example, press ⌂ 1 to add a new page with the Calculator application.

  Shortcut keys: ctrl I.

  A new page is added to the current problem.



Note: The tab at the top left of the screen indicates that this is the second page of the second problem.

Moving through pages in a document

Use the following keys to navigate through your documents.

ctrl ◀ displays the previous page.

ctrl ▶ displays the next page.

ctrl ▲ displays the Page Sorter.

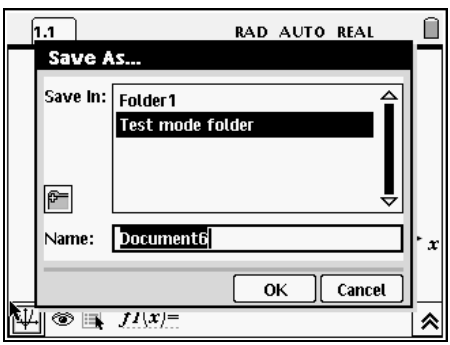
Saving a document

If you are working in a document and want to save it:

1. Press ctrl ⌂ 1 3 or

   Shortcut keys: ctrl S

   If you are saving the document for the first time, you will be asked which folder to save it to, and what to name the document.



2. Type a name for the new document.
3. If you want to save the document in a different folder, press caps tab and type a new folder name, or press ctrl to view a list of existing folders.
4. Press ▼ to highlight the folder name and press ctrl to select it.
5. Press tab to select OK.
6. Press ctrl or enter to save the document.

Viewing and reordering pages in a document

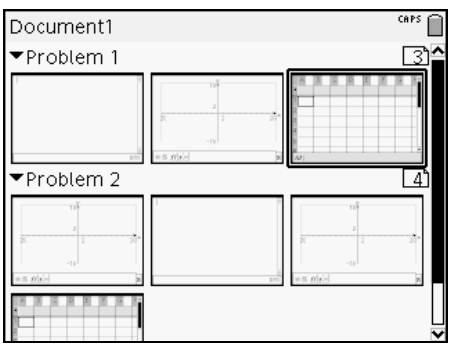
The Page Sorter displays all of the problems in your document and all pages within each problem in thumbnail format. You can use the Page Sorter to rearrange and delete pages, copy a page from one problem and paste it in another and apply templates to pages.

Opening the Page Sorter from a document

▶ Press ctrl home 5 or

Shortcut keys: ctrl ▲.

The Page Sorter screen displays all of the problems and pages in the current document.

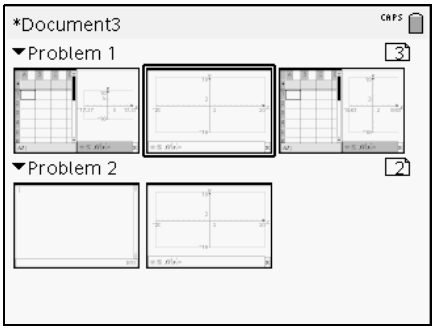


Reordering pages in a problem

To move a page within a document from the Page Sorter:

1. Use the ◀ and ▶ keys to select the page you want to move.

   A heavy border around the page indicates that it is selected.



2. Either press and hold or press ctrl until the grab cursor displays.

3. Press ◀, ▶, ▲ and ▼ to move the page to the desired position.

4. Press or enter to finish the move.

   Note: You can press esc to cancel.

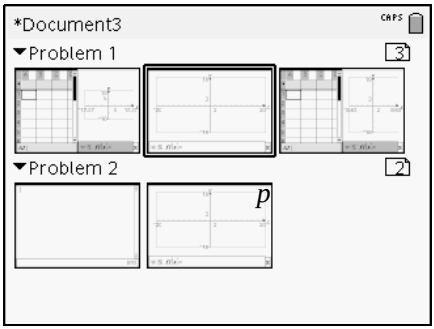
   The page moves to the new location within the problem, and the counter adjusts accordingly.

Copying a page to another problem

To copy a page from one problem to another in the same document:

1. Press ◀, ▶, ▲ and ▼ to select the page you want to copy.

   A heavy border around the page indicates that it is selected.



2. Press ctrl © to copy the page.
3. Press ◀, ▶, ▲ and ▼ to move the page to the desired position in the new problem.
4. Press ctrl (V) to paste the page in the new location.

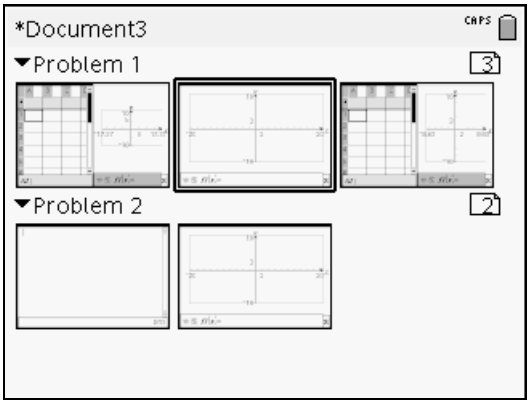
   The page moves to the new location within the problem, and the counter adjusts accordingly.

Copying a page to another document

To copy a page from one document to another document:

1. Press ◀, ▶, ▲ and ▼ to select the page you want to copy.

   A heavy border around the page indicates that it is selected.



2. Press ctrl C to copy the page.
3. Press ⌂ 7 to Open My Documents.
4. Press ▲ and ▼ to highlight the folder containing the document you want to copy the page to.
5. Press ▶ to open the folder, or press menu 3.
6. Press the ▲ and ▼ keys to highlight the document.
7. Press ⌨ or enter to open the document.
8. Press ctrl ▲ to display the Page Sorter.
9. Press ◀, ▶, ▲ and ▼ to move the page to the desired position in the document.
10. Press ctrl V to paste the page in the new location.

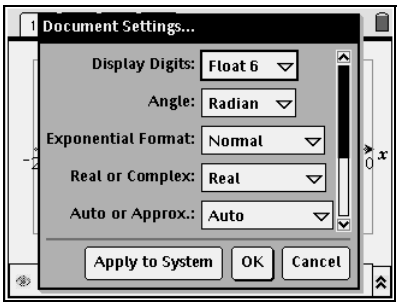
    The page moves to the new location within the problem, and the counter adjusts accordingly.

Document settings

You can change the mode settings for a document when you want to use settings different from those you have specified for the handheld. For instance, if you want to change the angle mode or exponential format used by the current document without changing the settings for every document on the handheld, use Document Settings to do so.

Changing document settings

1. Press (home) (8) (1) to display the Document Settings dialog box.



2. Press (tab) to move down through the list of settings.

   Note: Press (caps ⇧) (tab) if you need to move back up through the list.

3. When you reach the setting that you want to change, press ▼ to expand the selection list.

4. Press the ▲ and ▼ keys to highlight the option you wish to select and press (ctrl) or (enter).

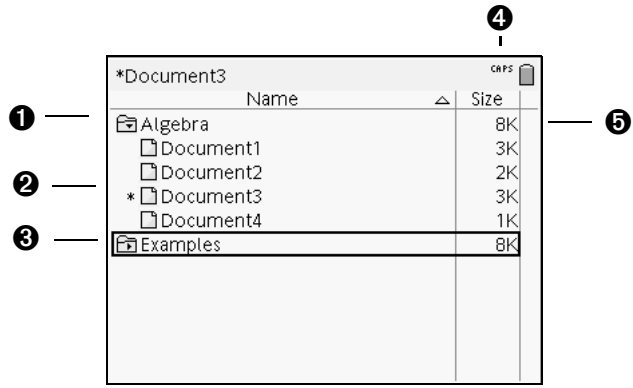
5. Press (tab) until the **OK** button is highlighted.

6. Press (ctrl) or (enter) to apply the new document settings.

   Note: If you want these settings to apply to future documents also, highlight **Apply to System** and press (ctrl).

Managing documents

My Documents is a file manager where you store and organize your documents. The example below illustrates the My Documents screen with its main parts labeled. Following the screen, you can find descriptions of each labeled part.



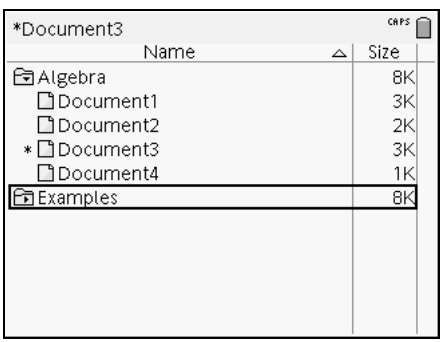
❶ Expanded folder
❷ Unsaved document
❸ Collapsed folder
❹ System status indicators
❺ File size

Opening My Documents

To open **My Documents**:

► Press (home) 7.

Note: If you are working in a document, press ctrl ▲ ctrl ▲.



The **My Documents** screen opens, displaying all folders and files on the handheld.

Opening documents

To open a document:

1. Press ▲ and ▼ to highlight the folder containing the document.
2. Press (ok) or (enter) to open the folder.
3. Press the ▲ and ▼ keys to highlight the document you want to open.
4. Press (ok) or (enter) to open the document.

Expanding folders

To expand a single folder:

1. Press ▲ and ▼ to highlight the folder.
2. Press (ok) or (enter) to open the folder.
3. The icon changes to the opened icon and a list displays showing all documents within the folder.

Expanding all folders

To expand all folders on the My Documents screen:

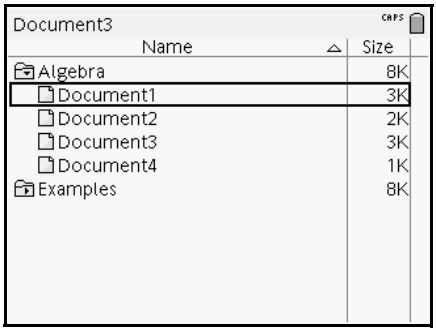
- Press (menu) (4).

  All folders expand to display their contents.

Renaming folders or documents

To rename a folder or document:

1. Press the ▲ and ▼ keys to highlight the document or folder you want to rename.
2. Press (menu) (2).



The document or folder name is highlighted.

3. Type a new name and press (enter) to complete the change.

Note: Press (esc) to cancel.

Collapsing folders

To collapse a single folder:

- Press ◀ to collapse an expanded folder. The icon returns to the closed folder icon and the contents of the folder no longer display on the screen.

To collapse all folders:

- Press (menu) (5) to collapse all folders.

Creating folders

You can create folders two different ways:

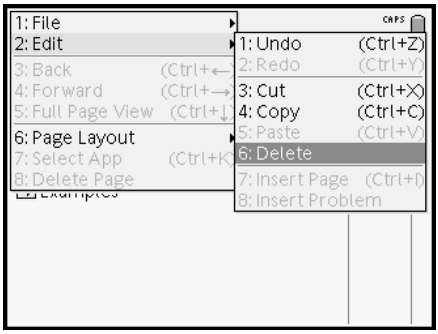
- You can create a folder when you save a new document: The **Save** and **Save As...** menu commands allow you to enter a new folder name for the document.
- You can create a folder directly from the My Documents screen. Press (menu) (1). Type a name for new folder, and press (tab) or (enter) to add it.

File and folder naming conventions

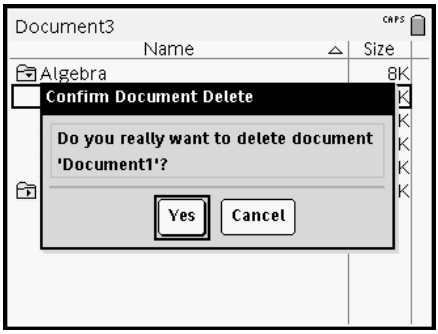
Folder names must be unique. File and folder names can be very long, and can include almost all characters, including spaces and punctuation.

Deleting documents and folders

1. Press ▲ and ▼ to highlight the document or folder you want to delete.
2. Press ctrl ⌂ 2 6 or press clear.



A dialog box displays, confirming that you want to delete the file or folder.



3. Press ☜ or enter to select Yes.

   The document is deleted.

Note: Press ctrl ⌂ 2 1 to Undo a file or folder deletion.

Duplicating documents and folders

Use Cut (ctrl C) and Paste (ctrl V) to duplicate documents and folders.

To copy a document to another folder, select the desired folder, then paste.

Recovering deleted documents

Most operations performed in My Documents can be undone. Press ctrl Z (Undo) to cancel the last operation until the deleted document is restored.

Linking values on pages

Variable linking is a powerful tool for building and exploring mathematical models. Values and functions created or defined in one application can interact with other applications (within the same problem) to share data.

There are a few things to keep in mind when using linked items:

- Values can be linked between applications on one page or between different pages of the same problem.
- Since all applications are linked to the same actual data, if you delete it from any application, then all references to the data are lost.
- If the linked value is changed in the original application, the change is reflected in all linked usages.

Each application allows you to define a value or function as a variable. Defining a variable is the first step in linking values.

Creating TI-Nspire™ variables

Variables can be any portion or attribute of an object or function created within an application. Examples of attributes that can become variables are the area of a rectangle, the radius of a circle, the value contained in a spreadsheet cell or the contents of a row or column, or a function expression. When you create a variable, it is stored in memory within the problem .

Types of variables

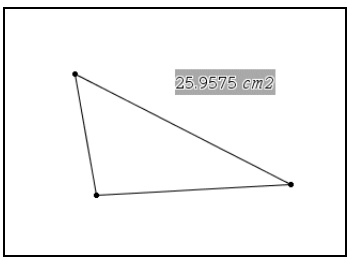
You can store the following data types as variables:

Data type	Examples
Expression	2.54 1.25E6 2π xmin/10 2+3i $(x-2)^2$ $\sqrt{2}/2$
List	{2, 4, 6, 8} {1, 1, 2}

Data type	Examples
Matrix	$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 6 & 9 \end{bmatrix}$ This can be entered as: `[1,2,3;3,6,9]`
Character string	"Hello" "xmin/10" "The answer is:"
Function	myfunc(arg) ellipse(x, y, r1, r2)
Measurement	coordinate, length, perimeter, slope, angle, integral

Creating a variable from a Graphs & Geometry value

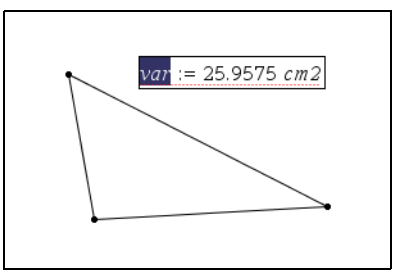
1. Click to select the value to store as a variable.

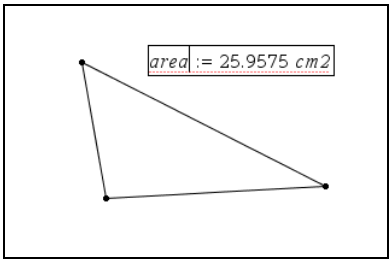


2. Do one of the following:

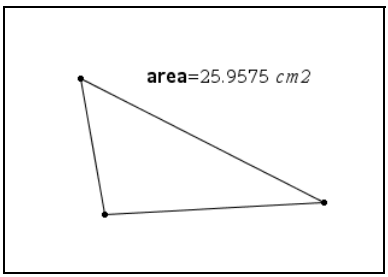
   - Press (stoVar). The Variables options are displayed with Store highlighted.
   - Press (ctrl) (L) to display the Variables options. Store is highlighted.
   - Open the Tools menu and select the Variables option. The Variables options are displayed with Store highlighted.

3. Press (≈ enter). VAR := appears before the selected value. This is the default variable name. Type over VAR with the variable name you want to give the value.





4. When the variable name is typed, press enter. The value is saved to that variable name, and the stored value or its name appears in bold text to indicate it is a stored value.



Creating a variable from a Lists & Spreadsheet cell value

You can share a cell value with other TI-Nspire™ math and science learning technology applications. When defining or referring to a shared cell in Lists & Spreadsheet, you precede the name with an apostrophe (').

1. Click the cell that you want to share.
2. Press var or ctrl L. A formula is inserted into the cell with *var* as a placeholder for a variable name.
3. Replace the letters "*var*" with a name for the variable, and press enter.

   The value is now available as a variable to other TI-Nspire™ math and science learning technology applications within the current problem.

Note: If a variable with the name you specified already exists in the current problem, Lists & Spreadsheet displays an error message.

Creating Calculator variables

As alternatives to using var, you can use ":=" or the **Define** command. All of the following statements are equivalent.

$5+8^3$

num := 5+8^3

Define *num*=5+8^3

Special considerations for variables

Rules for naming variables

Variable and function names that you create must meet the following naming rules.

Note: Avoid defining variables that use the same names as those used for statistical analysis. In some cases, an error condition could occur. Variable names used for statistical analysis are listed in the Appendix of Functions, under the **StatMatrix** entry.

- You can use 1 to 16 characters consisting of letters, digits, and the underscore character (_). Letters can be U.S. or Greek letters (but not Π or π), accented letters, and international letters.
- You can use uppercase or lowercase letters. The names *AB22*, *Ab22*, *aB22*, and *ab22* all refer to the same variable.
- Do not use spaces.
- If you use an underscore as the first character, the variable it is considered a type of unit, such as *_m*, *_ft*, and *_in*. Units do not allow subsequent underscores in the name.
- You cannot use a preassigned variable or function name, such as *ans* or **min**.

  Note: For a complete list of TI-Nspire™ functions, refer to the TI-Nspire™ Reference Guide.

Here are some examples:

Variable name	Valid?
Myvar	Yes
My var	No. Contains a space.
a	Yes
Log	No. Name is preassigned to the **log( )** function.
Log1	Yes

Preventing name conflicts

A TI-Nspire™ shared variable can have the same name as a table cell or column letter. To help you prevent name conflicts in your table formulas, Lists & Spreadsheet provides syntax rules.

- To refer to a variable whose name could conflict with the name of a cell (such as A1), precede the variable name with an apostrophe (‘A1).
- To refer to a table column (such as A) without conflicting with a single-letter variable name *A*, follow the column letter with a pair of brackets (A[]).

Use this syntax:	To refer to:	Remarks
myvar	The shared variable *myvar*.	No special syntax needed, because this name does not conflict with a cell or column reference.
A1	The table cell at column A, row 1.	This syntax always refers to table cell A1—never to variable *A1*.
‘A1	The shared variable *A1*.	The apostrophe makes this a reference to variable *A1*—never to table cell A1.
A	The shared variable *A*.	This syntax never refers to column A.
A[]	Column A of the current table.	Brackets make this a reference to column A—never to variable *A*.

Checking a variable’s value using the Calculator application

You can check the value of an existing variable by entering its name on the Calculator entry line.

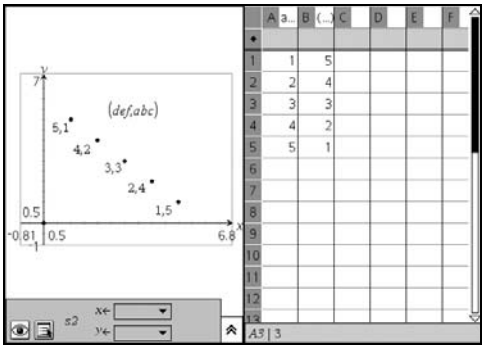
► On the Calculator entry line, type the variable name **num** and press enter.

The value most recently stored in num is displayed as the result.

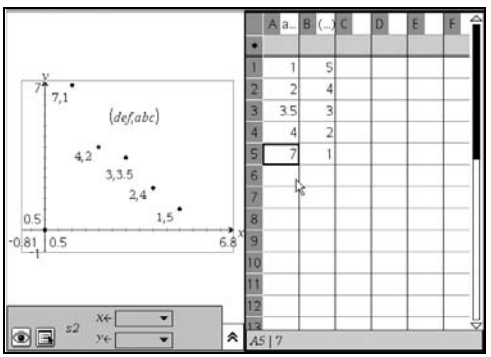
Using (linking) TI-Nspire™ variables

Sharing, or linking, the variables you create is a powerful tool for math exploration. The display of linked variables is automatically updated when the variable’s value changes.

In the following two examples, two data lists were created in Lists & Spreadsheet and then plotted in Graphs & Geometry.



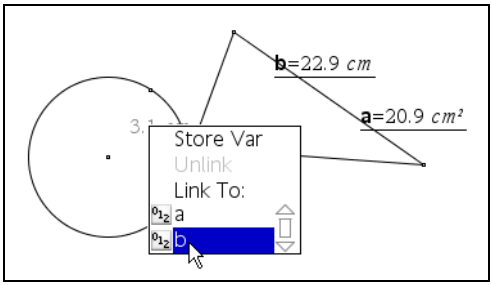
When the values are altered in Lists & Spreadsheet, they automatically update in Graphs & Geometry.



Linking to shared variables

To use a stored variable:

1. Display the page and select the location or object to which you want to link a variable.
2. Do one of the following:
   - Press (sto→ var). The Variables display.
   - Press (ctrl) (L) to display the Variables options.
   - Open the Tools menu and select the Variables option.
3. Press ▲ and ▼ to scroll the list, or type part of the variable name. As you type, the TI-Nspire™ system displays a list of variables that begin with the letters you typed. Typing part of the name enables you to locate a variable more quickly if the list is long.



4. When you locate and highlight the name of the variable you want to use, click the name or press enter. The selected variable value is linked.

Linking a Lists & Spreadsheet cell to a variable

When you link a cell to a variable, Lists & Spreadsheet keeps the cell value updated to reflect the current value of the variable. The variable can be any variable in the current problem space and can be defined in Graphs & Geometry, Calculator, or any instance of Lists & Spreadsheet.

Note: Do not link to a system variable. Doing so could prevent the variable from being updated by the system. System variables include *ans*, *StatMatrix*, and statistics results (such as *RegEqn*, *dfError*, and *Resid*).

1. Click the cell that you want to link to the variable.

2. Click var or ctrl L, and click **Cell**.

   The VarLink menu displays.

3. Under **Link To**, scroll to the name of the variable and click it.

   The cell shows the value of the variable.

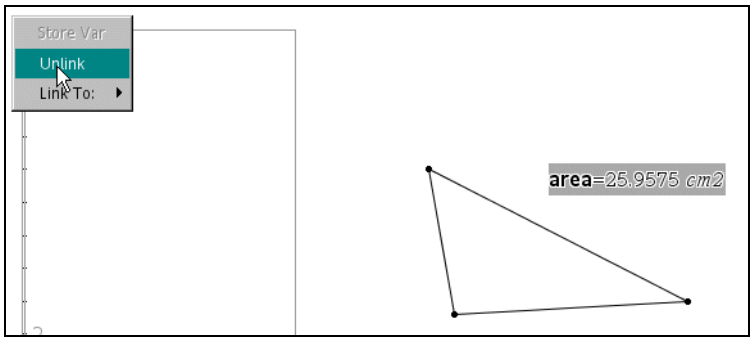
Removing a linked variable

To remove a linked variable from a page:

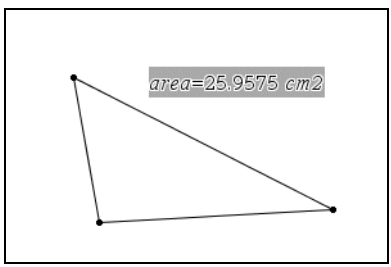
1. Select the linked variable.
2. Do one of the following:
   - Press sto→ var.

- Press ctrl L to display the Variables options.
- Open the Tools menu and select the Variables option.

The Variables options display.



3. Select **Unlink**. The link is removed from the value, and the value is displayed without any bolding.



Sending a document to another handheld

You can send documents and Operating System (OS) files to another TI-Nspire™ handheld.

Rules for sending files

- If a document with the same name as the one you are sending already exists on the receiving TI-Nspire™ handheld, the document will be renamed. The system appends a number to the name to make it unique. For example, if a document called **Mydata** existed on the receiving TI-Nspire™ handheld, it would be renamed **Mydata(2)**.

  Both the sending and receiving units display a message that shows the new name.
- There is a 255-character maximum length for a file name, including the entire path. If a transmitted file has the same name as an existing file on the receiving unit and the file names contain 255 characters, then the name of the transmitted file will be truncated to allow the software to follow the renaming scheme described in the previous bullet.
- All variables associated with the document being transmitted are transfered with the document.
- Transmissions will time out after 30 seconds.

Sending a document

1. Open My Documents.

   Press (⌂) (7).
2. Press the ▲ and ▼ keys on the NavPad to highlight the document you want to send.
3. Select **Send** from the My Documents menu.

   Press (ctrl) (⌂) (1) (5).
4. The file transfer begins. A progress bar displays to allow you to follow the transfer. There is a cancel button on the Sending... dialog that allows you to cancel the transmission while it in progress.

   When the transfer is complete, a message displays. If the file was renamed on the receiving handheld, the new file name displays.

Receiving a document

No action is required by the user of the receiving TI-Nspire™ handheld. Units are automatically powered on when the cable is attached.

Canceling a transfer

1. To cancel a transmission in-progress, press Cancel on the dialog of the sending unit.

   Note: To cancel a transfer from the receiving handheld, press esc.

2. A link transmission error message displays.

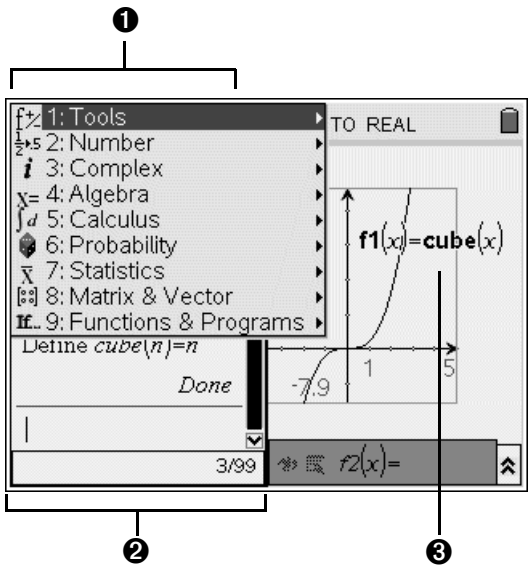
3. Press esc or enter to cancel the transmission error message.

   For more information, see the *Transferring Files* chapter in Part 2 of this guidebook, available on the CD that came with your handheld, or on the Texas Instruments web site at http://education.ti.com/guides.

Using Calculator

Getting started with the Calculator application

The Calculator application gives you a place to enter and evaluate math expressions. You can also use it to define variables, functions, and programs. When you define or edit a variable, function, or program, it becomes available to any TI-Nspire™ math and science learning technology application—such as Graphs & Geometry—that resides in the same problem.



1. Calculator menu – This menu is available anytime you are in the Calculator work area. Press (menu) to display the menu. The menu in this screen snapshot may not exactly match the menu on your screen.
2. Calculator work area
   - You enter a math expression on the entry line and then press (enter) to evaluate the expression.
   - Expressions display in standard mathematical notation as you enter them.
   - Entered expressions and results show in the Calculator history.
3. Example of Calculator variables used in another TI-Nspire™ application

The Calculator tool menu

The Calculator tool menu lets you to enter and evaluate a variety of math expressions.

Menu Name	Menu Option	Function
Tools		
	Define	Inserts the **Define** command.
	Recall Definition	Lets you view, reuse, or modify a function or program that you have defined.
	Delete Variable	Inserts the **delVar** command.
	Clear a-z	Deletes all variables with single-letter names.
	Clear History	Deletes all expressions in the Calculator history.
	Insert Comment	Lets you insert text.
Number		
	Convert to Decimal	Inserts ▸**Decimal** command.
	Factor	Inserts **factor()**.
	Least Common Multiple	Inserts **lcm()**.
	Greatest Common Divisor	Inserts **gcd()** function.
	Remainder	Inserts **remain()**.
	Fraction Tools	Lets you select **propFrac()**, **getNum()**, **getDenom()**.
	Number Tools	Lets you select **round()**, **iPart()**, **fPart()**, **sign()**, **mod()**, **floor()**, or **ceiling()**.
Complex		
	Complex Conjugate	Inserts **conj()**.
	Real Part	Inserts **real()**.
	Imaginary Part	Inserts **imag()**.

Menu Name	Menu Option	Function
	Polar Angle	Inserts **angle()**.
	Magnitude	Inserts the absolute value template.
	Convert to Polar	Inserts ▶**Polar** command.
	Convert to Rectangular	Inserts ▶**Rect** command.
Probability		
	Factorial (!)	Inserts **!**.
	Permutations	Inserts **nPr()**.
	Combinations	Inserts **nCr()**.
	Random	Lets you select **rand()**, **randInt()**, **randBin()**, **randNorm()**, **randSamp()**, or **RandSeed**.
	Distributions	Lets you select from several distributions, such as **Normal Pdf**, **Binomial Cdf**, and **Inverse** F.
Statistics		
	Stat Calculations	Lets you select from several statistics calculations, such as one-variable analysis, two-variable analysis, and regressions.
	Stat Results	Inserts the *stat.results* variable.
	List Math	Lets you select from several list calculations, such as minimum, maximum, and mean.
	List Operations	Lets you select from several list operations, such as sorting, filling, and converting to a matrix.

Menu Name	Menu Option	Function
	Distributions	Lets you select from several distributions, such as **Normal Pdf**, **Binomial Cdf**, and **Inverse** F.
	Confidence Intervals	Lets you select from several confidence intervals, such as **t interval** and **z interval**.
	Stat Tests	Lets you select from several tests such as **ANOVA**, **t test**, **z test**.
Matrix & Vector		
	Transpose	Inserts ^{T}
	Determinant	Inserts **det()**.
	Row-Echelon Form	Inserts **ref()**.
	Reduced Row-Echelon Form	Inserts **rref()**.
	Simultaneous	Inserts **simult()**.
	Create	Lets you select from several matrix-creation options, such as identity, diagonal, submatrix, and others.
	Norms	Lets you select **norm()**, **rowNorm()**, or **colNorm()**.
	Dimensions	Lets you select **dim()**, **rowDim()**, or **colDim()**.
	Row Operations	Lets you select **rowSwap()**, **rowAdd()**, **mRow()**, or **mRowAdd()**.
	Element Operations	Inserts "dot" operators such as **.+** (dot add) and **.^** (dot power).
	Advanced	Inserts **eigVl()**, **eigVc()**, **LU**, or **QR**.

Menu Name	Menu Option	Function
	Vector	Inserts **unitV()**, **crossP()**, **dotP()**, **▶Polar**, **▶Rect** ,**▶Cylind**, or **▶Sphere**.
Functions & Programs		
	Func...EndFunc	Inserts a template for creating a function.
	Prgm...EndPrgm	Inserts a template for creating a program.
	Local	Inserts the **Local** command.
	Control	Lets you select from a list of function and program-control templates, such as **If...Then...EndIf**, **While...EndWhile**, **Try...Else...EndTry**, and others.
	Transfer	Inserts transfer commands **Return**, **Cycle**, **Exit**, **Lbl**, **Stop**, or **Goto**.
	Disp	Displays intermediate results.
	Mode	Inserts commands for setting or reading modes, such as display digits, angle mode, base mode, and others.
	Add New Line	Starts a new line within a function or program definition.

Before you begin

▶ Turn on the handheld, and add a Calculator application to a document.

Entering and evaluating math expressions

Options for entering expressions

Calculator lets you enter and edit expressions through several methods.

- By pressing keys on the handheld keypad

- By selecting items from the Calculator menu
- By selecting items from the Catalog (▭)

Entering simple math expressions

Note: To enter a negative number on the handheld, press (−). To enter a negative number on a computer keyboard, press the hyphen key (**-**).

Suppose you want to evaluate $\frac{2^8 \cdot 43}{12}$

1. Select the entry line in the Calculator work area.
2. Type **2^8** to begin the expression.

3. Press ▶ to return the cursor to the baseline, and then type (×) **43** (÷) **12.**

4. Press (enter) to evaluate the expression.

   The expression displays in standard mathematical notation, and the result displays on the right side of the Calculator.

Note: If a result does not fit on the same line with the expression, it displays on the next line.

Controlling the form of a result

You might expect to see a decimal result instead of 2752/3 in the preceding example. A close decimal equivalent is 917.33333..., but that's only an approximation.

You can force a decimal approximation in a result:

- By pressing (ctrl) (enter) instead of (enter) to evaluate the expression.

Pressing ctrl ≈ enter *forces approximate result.*

- By including a decimal in the expression (for example, **43.** instead of **43**).

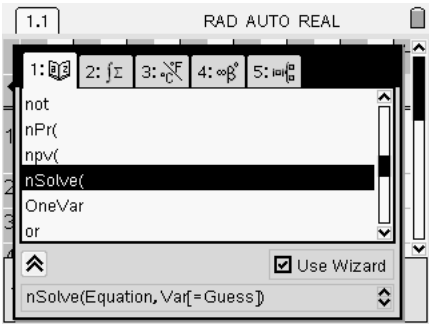
- By wrapping the expression in the **approx()** function.

- By changing the document's mode setting to Approximate. (Press ctrl ⌂ to display the **File** menu, and then select **Document Settings**.) Note that this method forces all results in all of the document's problems to approximate.

Inserting items from the Catalog

You can use the Catalog to insert system functions and commands, symbols, and expression templates into the Calculator entry line.

1. Press ⌂ to open the Catalog.



Note: Some functions have a wizard that prompts you for each argument. If you prefer to enter the argument values directly on the entry line, you may need to disable the wizard.

2. Press the number key for the category of the item. For example, press 1 to show the alphabetic list.

   1: shows an alphabetic list of functions and commands.

   2: ∫Σ shows math functions and commands by category.

   4: ∞β° shows a table of symbols.

   5: shows expression templates.

3. Press ▼ and then use ◀, ▶, ▲, or ▼ as necessary to select the item that you want to insert.

   Note: To see syntax examples of the selected item, press tab, and then press enter to alternately show or hide the Help. To move back to the selected item, press ⇧ tab.

4. Press enter to insert the item into the entry line.

Using an expression template

The Calculator has templates for entering matrices, piecewise functions, derivatives, products, and other math expressions.

For example, suppose you want to evaluate $\sum_{n=3}^{7}(n)$

1. Press ctrl to open the Template palette.

2. Select to insert the algebraic sum template.

   The template appears on the entry line with small blocks representing elements that you can enter. A cursor appears next to one of the elements to show that you can type a value for that element.

$$\sum_{\square=\square}^{\square}(\square)$$

3. Use the arrow keys to move the cursor to each element's position, and type a value or expression for each element.

$$\sum_{n=3}^{7}(n)$$

4. Press enter to evaluate the expression.

$$\sum_{n=3}^{7}(n) \qquad 25$$

Editing Calculator expressions

Although you cannot edit an expression in the Calculator history, you can copy all or part of an expression from the history and paste it to the entry line. You can then edit the entry line.

Positioning the cursor in an expression

- Press (tab) to cycle through the parameters of a template.

  – or –

  Press ◀, ▶, ▲, or ▼ to move the cursor through the expression. The cursor moves to the closest valid position in the direction that you press.

Note: An expression template may force the cursor to move through its parameters, even though some parameters may not be exactly in the path of the cursor movement. For example, moving upward from the main argument of an integral always moves the cursor to the top limit.

Inserting into an expression in the entry line

1. Position the cursor at the point where you want to insert additional elements.
2. Type the elements that you want to insert.

Note: When you insert an open parenthesis, Calculator adds a temporary close parenthesis, displayed in gray. You can override the temporary parenthesis by typing the same parenthesis manually or by entering something past the temporary parenthesis (thereby implicitly validating its position in the expression). After you override the temporary gray parenthesis, it is replaced with a black parenthesis.

Selecting part of an expression

When you select part of an expression, Calculator selects the smallest valid sub-expression. As you extend a selection, Calculator selects the next-smallest sub-expression. This helps you maintain a mathematically valid expression. Exceptions include +, - (subtraction), and *, which can be partially selected.

1. Press ◀, ▶, ▲, or ▼ to move the cursor to a starting point.
2. Press and hold (caps) and press ◀, ▶, ▲, or ▼ to select.

Deleting all or part of an expression on the entry line

1. Select the part of the expression to delete.
2. Press (clear).

Working with the Calculator history

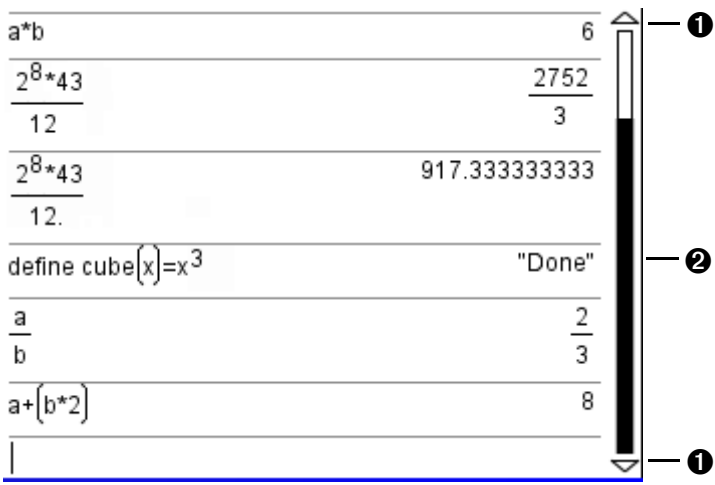
As you enter and evaluate expressions in the Calculator application, each entry/result pair is saved in the Calculator history. The history gives you a way to review your calculations, repeat a set of calculations, and copy expressions for reuse in other pages or documents.

Viewing the Calculator history

The history of the expressions you have entered accumulates above the entry line, with the most recent expression at the bottom. If the history does not fit in the Calculator work area, you can scroll through the history.

Note: You may notice a processing slowdown when the history contains a large number of entries.

► Press ▲ or ▼.



❶ Scrollbar buttons

❷ Scroll position indicator

Reusing a previous expression or result

You can copy an expression, subexpression, or result from the Calculator history and paste it into the entry line or into other TI-Nspire™ applications.

1. Scroll to the item that you want to copy.
2. Select the item.

Note: The float setting for the current document may limit the number of decimal places displayed in a result. To capture the result in its full precision, select it either by scrolling with the up and down arrow keys or by triple-clicking it.

3. Press ctrl C to make the copy.
4. Select the location where you want the copy.
5. Press ctrl V to paste the copy.

Note: If you copy an expression that uses variables into a different problem, the values of those variables are not copied. You must define the variables in the problem where you paste the expression.

Deleting an expression from the history

When you delete an expression, all variables and functions defined in the expression retain their current values.

1. Use the arrow keys to select the expression that you want to delete.
2. Press clear.

   The expression and its result are removed.

Clearing the Calculator history

When you clear the history, all variables and functions defined in the history retain their current values. If you clear the history by mistake, use the undo feature.

1. Press menu to display the Calculator menu.
2. On the **Tools** menu, select **Clear History**.

   All expressions and results are removed from the history.

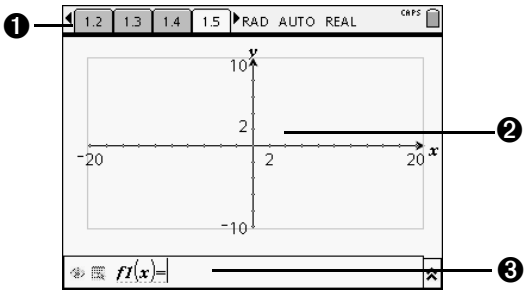
Where to find more information

More in-depth information, step-by-step instructions, and screen examples of all the Calculator features are contained in the Using Calculator chapter in Part 2 of the user guide, which is available on the CD-ROM that came with your handheld and as a download from the web site: http://education.ti.com/guides.

Using Graphs & Geometry

The Graphs & Geometry application enables you to:

- Graph and explore functions.
- Create and explore geometric shapes.
- Animate points on objects or graphs and explore their behavior.
- Graph data collected by the Data Collection application.
- Explore graphical and geometric transformations.
- Explore and investigate concepts of calculus.
- Link to data created by other applications and utilize it in Graphs & Geometry.



❶ Problem/Page number counter

❷ Sample Graphs & Geometry work area in Graphing View

❸ Graphs & Geometry data entry line

These are the basic components of the Graphs & Geometry application.

The toolbar

To quickly access a tool menu, use the numeric quick keys.

Menu Option List	Overview of Tool Actions	Press:
1: Tools	Provides tools to access the pointer, hide or show various graph features, add text, delete all objects in the work area, open the calculator, and access attributes for an object or function.	menu 1
2: View	Provides tools to manipulate the work area features and display.	menu 2

Menu Option List	Overview of Tool Actions	Press:
3: Graph Type	Enables you to select the type of graph to plot: function, parametric, or scatter plot.	menu 3
4: Window	Provides different Zoom settings as well as the ability to define *x*-max, *x*-min, *y*-max, and *y*-min.	menu 4
5: Trace	Places and enables the trace tool on the graph.	menu 5
6: Points & Lines	Provides tools for drawing various types of points, lines, segments, rays, and vectors.	menu 6
7:Measurements	Provides tools for measuring angles, lengths, areas, and slope.	menu 7
8: Shapes	Provides tools for drawing circles, triangles, rectangles, and polygons.	menu 8
9: Constructions	Provides tools to define perpendicular and parallel lines, bisectors, midpoints, locus, compass, and perform measurement transfers.	menu 9
A: Transformations	Provides tools for symmetry, reflection, translation, rotation, and dilation.	menu A

Tools Menu Tools

Tool name	Tool function	Press:
1: Pointer	Selects, moves, and manipulates objects.	menu 1 1
2: Hide/Show	Enables you to hide or display any object, function, or feature on the work area.	menu 1 2
3: Attributes	Enables you to change the attributes of a selected object on the graph. These vary depending upon the object selected.	menu 1 3
4: Delete All	Removes all objects and graphed functions from the page.	menu 1 4

Tool name	Tool function	Press:
5: Text	Places user-created alpha-numeric values on the page. Numerical values can be applied to objects. The tool can be used to enter a function and graph it.	menu 1 5
6: Coordinates and Equations	Displays the coordinates of a point or the equation of a line or circle.	menu 1 6
7: Calculate	Opens the calculator to perform calculations using measurements, numerical values, or calculation results.	menu 1 7
8: Redefine	Redefines a previously defined point to a new location; for example, it can define a point in free space to a location on an object or from one object to another object.	menu 1 8
9: Data Collection	Adds the Data Collection tool to the current Graphs & Geometry page. See the Data Collection chapter for details on using this tool.	menu 1 9

View Menu Tools

Tool name	Tool function
1: Graphing	Places the work area in graphing mode. Axes fill the work area, and the entry lines displays at the bottom of the screen. This is the default display when Graphs & Geometry is added to a page.
2: Plane Geometry	Places the work area in geometry mode. Show scale displays, but no axes, grid, or entry line displays.
3: Show Analytic Window	Opens a small graphing window on a plane geometry work area. Places the Graphs & Geometry work area in modeling mode. This tool can be used only after Plane Geometry is selected.

Tool name	Tool function
4: Hide (Show) Axes	Hides the axes if they are currently displayed on the page. Displays the axes if none are displayed on the page. Cartesian axes are the supported axes.
5: Show (Hide) Grid	Turns the grid on or off on the page. Objects can be attached to the grid when the grid is displayed.
6: Hide (Show) Entry Line	Hides or displays the entry line on the page.
7: Show (Hide) Scale	Toggles between showing and hiding the scale legend on the work area. When the scale is shown, the value and/or units can be changed to desired values/units. This applies only to geometric constructions.
8: Add Function Table	Launches the Lists & Spreadsheet function table. When launched from Graphs & Geometry, it is pre-populated with all functions defined in the problem with the exception of hidden functions. More information on using Function Tables is available in the Lists & Spreadsheet chapter of this document.

Graphing Type Menu Tools

Tool name	Tool function	Press:
1: Function Graph	Displays the function mode entry line at the bottom of the work area.	menu 3 1
2: Parametric Graph	Displays the parametric mode entry line at the bottom of the work area. This display shows the t-min, t-max and t-step values. The defaults are 0-2π for t-min, t-max, and π/24 for t-step.	menu 3 2
3: Scatter Plot	Displays the Scatter Plot mode entry line at the bottom of the work area.	menu 3 3

Window Menu Tools

Tool name	Tool function	Press:
1: Window Settings	Displays a Window Parameters dialog that enables you to enter the *x*-min, *x*-max, *y*-min, and *y*-max values for the axes.	menu 4 1
2: Zoom - Box	Enables you to define a rectangular area that you want enlarged. Once the box is defined, the system automatically zooms the display to contain just the area that lies within the box. Press esc to cancel.	menu 4 2
3: Zoom - In	Enables you to define the center point of the zoom in location.	menu 4 3
4: Zoom - Out	Enables you to define the center point of the zoom out location.	menu 4 4
5: Zoom - Quadrant 1	Automatically sets *x*-min, *x*-max, *y*-min, and *y*-max to emphasize the first quadrant. The *x* and *y* scale factors are equal.	menu 4 5
6: Zoom - Standard	Automatically sets *x*-min, *x*-max, *y*-min, and *y*-max to center the origin. The *x* and *y* scale factors are equal.	menu 4 6
7: Zoom - User	If you modify any window settings (such as x-min), Zoom-User saves the present settings. If you do not modify any window settings, Zoom-User restores the last saved settings.	menu 4 7
8: Zoom - Trig	Automatically sets *x*-min and *x*-max to integer multiples of π. The *x* and *y* scale factors are equal.	menu 4 8
9: Zoom - Data	Redefines the axes so that all statistical data points are displayed.	menu 4 9

Tool name	Tool function	Press:
A: Zoom - Fit	Recalculates *y*-min and *y*-max to include the minimum and maximum *y* values of all functions between the current *x*-min and *x*-max. Hidden functions are not included.	menu 4 A

Trace Menu Tools

Tool name	Tool function
1: Graph Trace	Places and activates a trace point on the graph that allows you to trace a function. Trace identifies points of interest as they are encountered during the trace.
2: Geometry Trace	Enables you to view the pathway of a geometric or analytic object (such as a function graph) on the work area. The pathway has a delayed fade. As more movement occurs on the work area, older portions of the pathway fade. If you temporarily halt movement, a portion of the trace path remains displayed.
3: Erase Geometry Trace	Halts geometric trace and erases all persistent pathways on the work area.

Points and Lines Menu Tools

Tool name	Tool function	Press:
1: Point	Constructs a point defined in free space, on an object, or at the intersection of two objects.	menu 6 1
2: Point On	Constructs a point defined on an object. When the object is a function graph, the coordinates are displayed.	menu 6 2
3: Intersection Point	Constructs a point at each intersection of two selected objects.	menu 6 3

Tool name	Tool function	Press:
4: Line	Constructs an infinite line defined by two points or by a point and a direction. If you press CAPS while creating the line, you limit its orientation, relative to the x-axis or the horizontal aspect of the screen, by 15° increments.	menu 6 4
5: Segment	Constructs a segment, defined by two end points, which may be created or defined in free space or on a defined object. If you press CAPS while creating the segment, you limit its orientation, relative to the x-axis or the horizontal aspect of the screen, by 15° increments.	menu 6 5
6: Ray	Constructs a ray, defined by an end point and direction, extending infinitely. If you press CAPS while creating the ray, you limit its orientation, relative to the x-axis or the horizontal aspect of the screen, by 15° increments.	menu 6 6
7: Tangent	Creates a tangent line.	menu 6 7
8: Vector	Constructs a vector with magnitude and direction defined by two points. If you press CAPS while creating the vector, you limit its orientation, relative to the x-axis or the horizontal aspect of the screen, by 15° increments.	menu 6 8

Measurements Menu Tools

Tool name	Tool function	Press:
1: Length	Displays the distance between two selected points or the length of a segment, perimeter, circumference, or radius.	menu 7 1

Tool name	Tool function	Press:
2: Area	Displays the area of a selected polygon or circle.	menu 7 2
3: Slope	Displays the slope of a selected line or segment. A vertical slope is represented by ∞.	menu 7 3
4: Angle	Displays the measure of an angle or an angle defined by three selected points.	menu 7 4
5: Integral	Calculates and displays the numerical value of the integral of a selected function, and shades the area between the curve and the x-axis from point a to point b.	menu 7 5

Shapes Menu Tools

Tool name	Tool function	Press:
1: Circle	Constructs a circle. The center point is defined by the first click on the page and the radius is determined by the second click.	menu 8 1
2: Triangle	Constructs a triangle, defined by three points (vertices).	menu 8 2
3: Rectangle	Constructs a rectangle. Click once to define one corner. Move then click to define one side. Move perpendicularly to draw the rectangle. Click to complete it.	menu 8 3
4: Polygon	Constructs an *n*-sided polygon. Each click defines a vertex. The polygon is completed by clicking the initial vertex, or by pressing enter.	menu 8 4
5: Regular Polygon	Constructs an *n*-sided regular polygon. Click to define the center and click again to define the radius. Move clockwise (convex) or counter-clockwise (star) to set the value of *n*.	menu 8 5

Constructions Menu Tools

Tool name	Tool function	Press:
1: Perpendicular	Constructs a line perpendicular to a selected line, segment, ray, vector, axis, or side of a polygon, and passing through a created or selected point.	menu 9 1
2: Parallel	Constructs a line parallel to a selected line, segment, ray, vector, axis, or side of a polygon, and passing through a created or selected point.	menu 9 2
3: Perpendicular Bisector	Constructs a perpendicular line that bisects two points, a segment, or side of a polygon.	menu 9 3
4: Angle Bisector	Constructs a line that bisects an angle identified by three selected points where the second point is the vertex.	menu 9 4
5: Midpoint	Constructs a midpoint of two selected points, a segment, or side of a polygon.	menu 9 5
6: Locus	Constructs the locus of a point or object defined by the movement of a driver point along a pathway. Pathways are geometric objects.	menu 9 6
7: Compass	Constructs a circle from a center point with a radius defined by a selected segment or the distance between two points.	menu 9 7
8: Measurement Transfer	Transfers an entered or measured value to a selected object, axis, or function graph. If the original value changes, the change is reflected in the transferred measurement.	menu 9 8

Transformations Menu Tools

Tool name	Tool function	Press:
1: Symmetry	Creates the image of an object rotated 180° around a point.	menu A 1
2: Reflection	Creates the image of an object reflected across a line, segment, ray, vector, axis, or side of a polygon.	menu A 2
3: Translation	Creates the image of an object translated by a specified vector.	menu A 3
4: Rotation	Creates the image of an object rotated around a point by a specified angular value.	menu A 4
5: Dilation	Creates the image of an object dilated from a point by a specified factor.	menu A 5

The work area

Graphs & Geometry provides two types of work areas:

- Graphing
- Plane Geometry

The graphing view

The graphing view is the default Graphs & Geometry work area display. It contains

- coordinate axes in the Zoom Standard format (1:1 scale)
- the entry line from which you can graph up to 100 functions.

Axes, entry line, and grid can all be displayed or hidden, but in this view, no scale for any drawn shapes (e.g. Circle, etc.) can be displayed. All objects created in this view are analytic objects. Therefore, their displayed size and proportion are affected only by the scale of the axis system (the command "Show Scale" has no effect).

The plane geometry view

The plane geometry view removes the axes and entry line from the work area to enable you to draw geometric shapes and explore them. In this view, you can display and set a scale for your drawings.

To change to Plane Geometry view:

1. From the View menu, select the Plane Geometry View tool.
   Press menu 2 2.
2. The display refreshes to clear the axes and entry line and display a default scale. Any graphs or drawings created in graphing view are not displayed on the plane geometry area.

To return to graphing mode:

- From the View Menu, select the Graphing View tool.
  Press menu 2 1.
  The display refreshes to show the axes and entry line.

  Note: Any geometric constructions created while in the plane geometry view are retained and displayed along with any previously-created graphs.

The analytic window

The analytic (graphing) window is available in the plane geometry view. It adds an analytic (graphing) window on top of a portion of the plane geometry work area. This provides a combination work area that enables you to use both work area types without toggling the view between them.

To open the analytic window:

1. Ensure that the work area is in Plane Geometry view.
2. From the View menu, select Show Analytic Window .
   Press menu 2 3.
3. A reduced size graphing window opens on the lower left corner of the plane geometry space.

You can alter the work area, without changing the view, to temporarily:

- hide the axes. Any graphs or objects remain displayed on the work area.
- hide the entry line.
- hide the scale.
- resize the axes using the zoom tools or by dragging tic marks.

To remove the analytic window from the work area

- From the View menu, select Hide Analytic Window .
  Press menu 2 3.

Object behavior in different views

When you create an object in the graph area, it is called an analytic object, and all points of the object reside on the graph plane. When you change the axes scale, you automatically affect the appearance of the object. If you calculate a value associated with the object such as the area, only generic units are assigned (u for unit). These objects remain associated with the coordinate plane until you delete them or redefine them to the plane geometry area. When working with a modeling view work area, you cannot move an analytic object onto the plane geometry area.

When you create an object in the plane geometry area, it is a geometric object. These objects can have an assigned scale, such as miles or centimeters, instead of u for units. You can lock a point, such as one vertex of a triangle, on the work area, but since the object is not tied to a coordinate plane, you cannot display coordinates for that vertex. When working with a modeling view work area, you can move a geometric object into the graphing work area. The object remains a geometric object, and is not associated with the axes.

Summary of differences

Feature	**Graph Area**	**Plane Geomety Area**
Aspect Ratio	Adjustable; initially 1:1	Always 1:1 (static)
Units of Measure	Generic (displayed as *u*)	User-defined (per scale)
Area Graph Type	Cartesian	Euclidian
Uses	• Define and graph functions • Create scatter plots • Define and graph parametric functions • Construct analytic objects • Label equations • Identify coordinates for discrete points	• Construct Euclidean objects • Create transformations • Determine measurements (e.g., length, angle, area)

Feature	Graph Area	Plane Geomety Area
Behavior	Analytic constructions must remain in the analytic area.	Geometric constructions can be moved into the analytic area but remain geometric in nature.

Creating and manipulating axes

When the Graphs & Geometry application is first added to a page, a set of Cartesian axes is displayed. You can change the appearance of your axes in the following ways:

- Adjust the length:
  - Select one axis and retype the domain or range labels.
  - Select one axis and drag the line to the desired length.

  The aspect ratio of the axes is automatically retained. To modify the scale of only one axis, press and hold the Shift key.
- Use the Window Settings tool ( ) to define the x-max, x-min, y-max and y-min values for the axes.
- Use the Zoom tool options.
- Adjust the end style of the axes using the Attributes tool.
- Adjust the tic marks on the axes: Click and hold one tic mark, and move it on the axis.
- Adjust the location of the axes: To move the existing axes without resizing them, click and hold the centerpoint (0,0) of the axes or grab an axis between two tic marks and drag to the desired location.

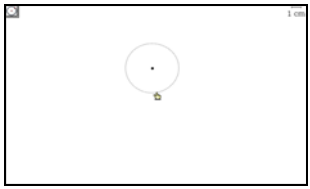
Drawing a circle

The following instructions enable you to construct a circle. While each tool is a little different depending upon the type of object created, the principles of using the tools to draw objects are very similar. You can obtain additional information, instructions, and see examples of objects in the Graphs & Geometry chapter of the User Guide.

1. Open Graphs & Geometry on a page.

   Press menu 8 1. Move to the work area.
2. Click on the screen to define the center point of the circle.

   Move the cursor away from this point. A circle with a dotted circumference line emerges as you move the cursor.

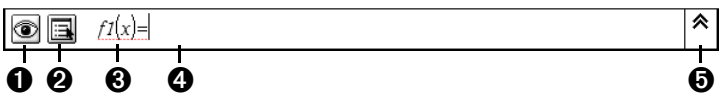


3. When the circle has the radius you desire, click again.

   The dotted circumference changes to a solid circumference in the work area.

Note: If you hold down the CAPS key when creating the circle, the radius is limited in length to integers.

The entry line



From left to right, the parts of this line are:

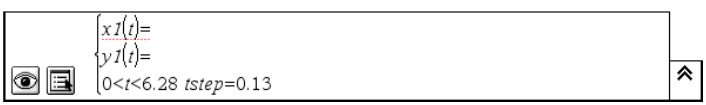
❶ Hide/Show function button.

❷ Attributes button.

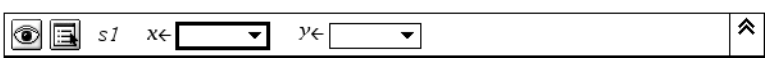
❸ f1(x)=. function notation used by the function or inequality.

❹ Blank area into which you enter the function, inequality, parametric or scatter plot data to be graphed.

❺ Expand/Contract (History) button.



Parametric Mode entry line. The default values for t-min, t-max, and t-step are shown.



Scatter Plot Mode entry line

Using the entry line

To enter a function on the entry line:

1. Select the mode.

2. Type the function you want to graph in the space at the right of the = sign.

3. Press enter or tab.

You can enter and graph a maximum of 99 functions on the screen (*f1(x)* - *f99(x)*) in addition to any user-named functions such as *g1(x)*. You can review the functions entered on a page by pressing the Expand button. Use ▲ and ▼ to move up and down the list.

You can also graph functions by typing them into a text box.

- Select the Text tool (Ab), and type the function you want to graph into the box displayed when you move the curson onto the page.
- Drag the text box to the x-axis, and drop it on the axis to graph the function.

Regardless of how you enter functions, each function is labeled on the graph for identification.

Graphing inequalities

Sometimes a function requires something other than the equal sign. To change = to a different sign and graph the inequality:

1. Position the cursor to the right of the equal sign.

2. Press clear to delete the equal sign.

3. Use the Symbol Palette to enter the appropriate inequality.

   The possible inequalities are: >, <, ≤, ≥, ≠.

4. Type the rest of the inequality expression.

5. Press enter to graph it.

   The expression, as typed, displays next to the graph. Shading is always present for inequalities to show the values that satisfy the inequality. If you graph two inequalities that overlap, the area of overlap is shaded darker than either of the individual inequality graphs.

Finding points of interest: zeroes, minima, maxima

When you create a graph, you can use the Point On tool ( ) to locate the zeros, minima, and maxima if these are possible to display on the work area. Both local and global points of interest display. To find them, move the point along the object or graphed line, and when you are near a point of interest, the coordinates automatically display along with one of the following identifiers:

- Zeroes: z (Coordinates)

- Minimum: m (Coordinates)
- Maximum: M (Coordinates)

Animating objects

You can animate a point on a line, ray, axis, vector, graph, segment and circle. In addition, you can also animate points on multiple objects in the work area at one time.

Putting a point on an object in motion

1. Press menu 6 2.

   Click on the object to identify the point you want to animate.

2. Press menu 1 3.

   When the attribute bar displays, select the animation attribute ( ).

3. The default speed is 0. You can type a number from 1 - 9 to set speed or you can use < or > to select a speed from -12 to 12.

   The higher the number you type, the faster the animation speed.

4. Select → for one-way animation or ↔ for oscillating animation.

   Animation begins automatically when you select the speed and direction. You can use the + and − to increase/decrease the speed of animation incrementally once it is set.

The animation control panel

Once a point is animated, a floating control panel is displayed on the page. You can move this panel by dragging it to a new location.

When animation is active, the panel contains a Reset and a Pause button. When either button is pressed, the Pause button changes to a Start button. These controls are globally applied to a page and affect all animated points.

Panel when animation active

Panel with animation paused/reset

Stopping animation

To stop the animation of an object:

1. Click the Pause or Reset button on the control bar.
2. Display the Animation tool for the point, and change the speed to 0 (zero).

3. Click an empty area of the screen to apply the change, or press enter.

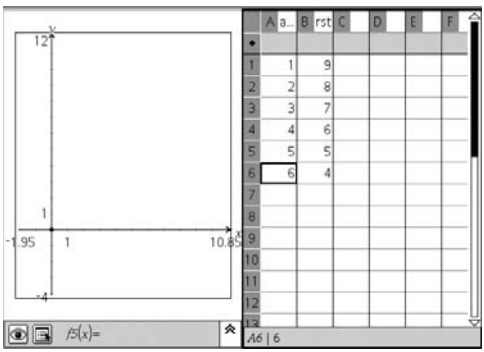
4. Click Start to resume animation if other animated points were temporarily stopped.

   Note: To permanently stop all animation on a page, change the velocity to 0 for each animated point.

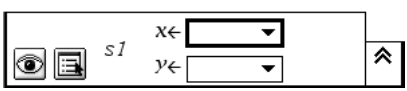
Creating a Scatter Plot

If you do not have an existing set of data points available for plotting, create them on the same page using the Lists & Spreadsheet application.

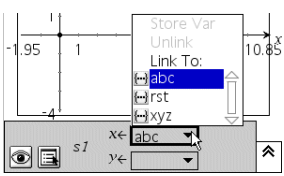
1. To create the data lists and scatter plot on the same page, select a page configuration with two work areas.
2. Create the data lists on the Lists & Spreadsheet portion of the page.



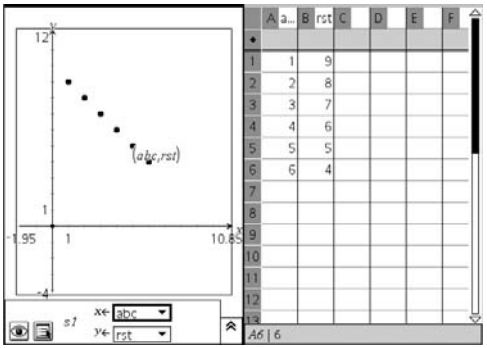
3. Select the Scatter Plot tool ( )
   Press menu 3 3.



4. Select the lists to plot from the drop down list for each axis.



5. When both entry fields have a data list specified, the scatter plot is created and displayed on the Graphs & Geometry work area.



More Information

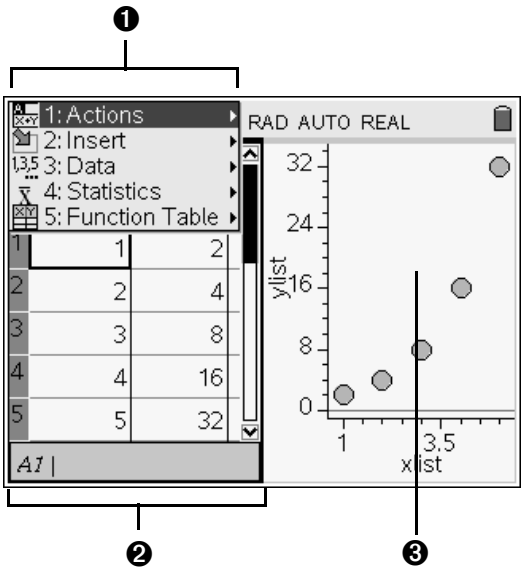
More in-depth information, step-by-step instructions, and examples of all the Graphs & Geometry features are contained in the Graphs & Geometry chapter in Part 2 of the user guide, available on the CD that came with your handheld, or on the web site at http://education.ti.com/guides.

Using Lists & Spreadsheet

Getting started with tables

The Lists & Spreadsheet application gives you a place to work with tablular data. You can use Lists & Spreadsheet to:

- Store numeric data, text, or math expressions.
- Define a table cell in terms of the contents of other cells.
- Define an entire column in terms of another column.
- Work with variables created in the Graphs & Geometry and Calculator applications.
- Collect tables of real-world data from sensors.
- Generate columns of data based on other columns or sequences that you define.
- Share individual cells with other TI-Nspire™ math and science learning technology applications as variables, and share columns of data as lists.
- Plot table data using the Data & Statistics application.
- Generate function tables from functions defined in Calculator or Graphs & Geometry.
- Perform statistical analysis on lists of data.



❶ Lists & Spreadsheet menu (available when a Lists & Spreadsheet work area is active) Press (menu) to display the menu.

❷ Sample Lists & Spreadsheet work area

❸ Lists & Spreadsheet data shared with another TI-Nspire™ application

The Lists & Spreadsheet tool menu

The Lists & Spreadsheet tool menu lets you modify your display and enter and evaluate a variety of math expressions.

Menu Name	Menu Option	Function
Actions		
	Move Column	Lets you reposition the current column.
	Resize	Lets you stretch or shrink rows and columns.
	Select	Selects an entire row or column, or helps you insert a range of cells into a cell formula.

Menu Name	Menu Option	Function
	Go To (ctrl G)	Jumps to the specified cell, such as **d16** or **g20**.
	Recalculate (ctrl R)	Recalculates results of all cell formulas.
	Sort	Lets you sort the selected columns of the spreadsheet based on the contents of a single column.
Insert		
	Insert Cell	Inserts a cell.
	Insert Row	Inserts a row above the current row.
	Insert Column	Inserts a column before the current column.
Data		
	Generate Sequence	Displays a dialog box for creating a sequence.
	Data Capture	Allows manual or automatic capture of object data from Graphs & Geometry. Use ctrl . to trigger each manual capture.
	Fill Down	Lets you duplicate the contents of a selected cell or group of cells within a column.
	Quick Graph	Uses the Data & Statistics application to graph one or two selected columns of data as a dot plot or scatter plot.

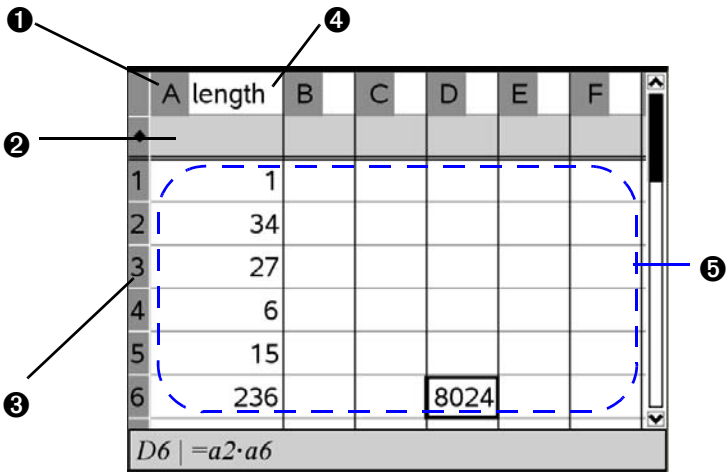
Menu Name	Menu Option	Function
Statistics		
	Stat Calculations	Lets you select from several statistics calculations, such as one-variable analysis, two-variable analysis, and regressions.
	Distributions	Lets you select from several distributions, such as **Normal Pdf**, **Binomial Cdf**, and **Inverse** F.
	Confidence Intervals	Lets you select from several confidence intervals, such as **t interval** and **z interval**.
	Stat Tests	Lets you select from several hypothesis tests such as **t test**, **z test**, and **ANOVA**.
Function Table		
	Switch to Function Table (ctrl T)	Toggles the function table view.
	Select Function	Lets you select a different function for the current column.
	Edit Function Table Settings	Lets you change the viewing parameters for the table.
	Delete Column	Removes the current column.
	Edit Function Expression	Lets you change a function definition without leaving the function table.

Navigating in a table

You can select any cell to view or edit its contents. When a table is larger than the Lists & Spreadsheet work area, you can view different parts of the table by:

- Pressing ◀, ▶, ▲, and ▼ to move through the table. This moves the selection from cell to cell and scrolls the table as necessary to keep the selected cell in view.
- Using the **Go To** command on the **Actions** menu to select a specific cell. Type the cell's column letter and row number (such as G16).

A column letter appears at the top of each column, and a row number appears in the left cell of each row. The top two rows and the left column of the table remain in place as you scroll so you can more easily determine your location in the table.



❶ Column reference

❷ Header or formula row

❸ Row reference

❹ Column/list name

❺ Cells

Methods of entering table data

The method you use to enter table data depends on the type of data and your personal preferences. You can use different methods in combination.

- For numbers, text, and simple math expressions and formulas such as =a3•**length**^{2}, press the corresponding keys on the handheld keypad. In this example, press (=) (A) (3) (×) (L) (E) (N) (G) (T) (H) (√x²).

- For more complex math expressions such as $\sum_{n=1}^{5} \frac{1}{n}$ press to display the complete Catalog of system functions and commands, symbols, and expression templates.
- To display only the list of templates, press ctrl .
- To display only the list of symbols, press ctrl .

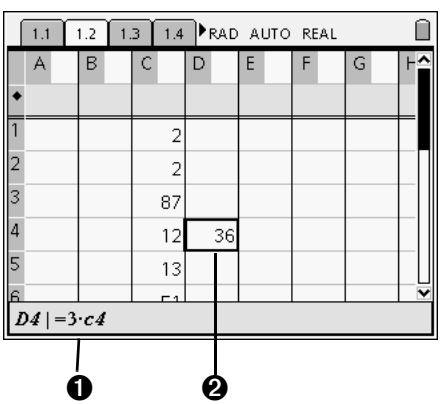
Working with individual table cells

Creating absolute and relative cell references

Cell references let you enter formulas that refer to table data instead of having to duplicate it and remember to update it. When you change the contents of a referenced cell, all references to the data are updated automatically in the table.

Anytime you want to update all references and formula results in the table, you can select **Recalculate** from the **Actions** menu (or press ctrl R).

Cell formulas begin with the = symbol. You refer to a cell by using its column letter and row number. Entering =3*C4 as a formula, for example, creates an expression that is 3 * the contents of the cell at column **C**, row **4**.

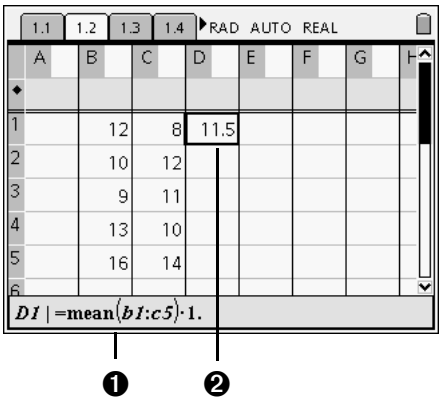


❶ Formula containing a cell reference entered in cell D4

❷ Result of formula (3*12=36)

You can refer to a rectangular block of cells in a formula by entering the location of the upper-left cell and the lower-right cell, separated by a colon.

For example, **=mean(B1:C5)*1.** creates a result that is the mean of all cells in the block bounded by columns **B** through **C** and rows **1** through **5**. (The "*1." in the expression forces the result to a decimal approximation.)



❶ Formula that refers to a rectangular block of cells

❷ Result of formula

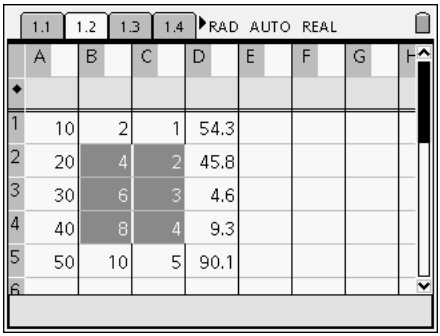
References such as **C4** and **C4:E11** are *relative* references. Lists & Spreadsheet keeps track of relative cell references. It adjusts each reference automatically when you copy or move the cell containing the reference to another location in the table.

If you need a reference that always refers to a cell in a specific location in the table, use an *absolute* reference. To create an absolute cell reference, type a $ symbol before the column letter and row number. The $ symbol is available in the Symbol Palette (ctrl ⌨).

For example, type C4 to create an absolute reference to the cell in column C, row 4. Lists & Spreadsheet does not adjust absolute references in a formula when you copy or move the cell containing the reference.

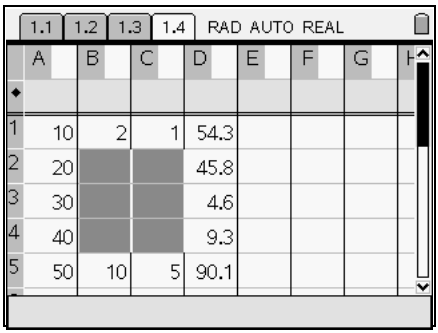
Deleting the contents of a cell or block of cells

1. Press ◀, ▶, ▲, or ▼ to select the cell. (You can also hold down the ⇧ key and then press ◀, ▶, ▲, or ▼ to select a rectangular block of cells.)



2. Press clear.

   The selected cell contents are deleted.

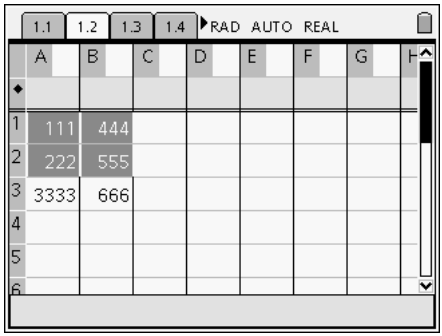


Note: If other cells contain formulas that refer to the cell's previous contents, those cells show an error.

Copying a cell or block of cells

When you copy cells, the formulas (if any) in the original cells are copied to the destination cells, replacing the previous contents of those cells.

1. Press ◀, ▶, ▲, or ▼ to select the cell. (You can also hold down the CAPS key and then press ◀, ▶, ▲, or ▼ to select a rectangular block of cells.)

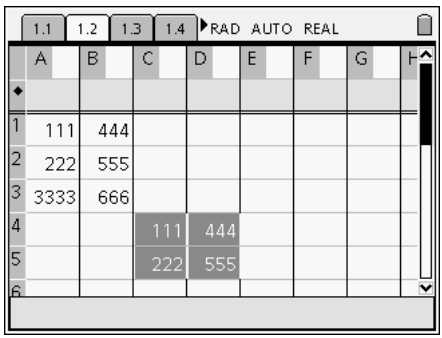


2. Press ctrl C.

   The selected cell contents are copied to the Clipboard.

3. Select the cell where you want to duplicate the copied cell. If you are copying a block of data, select the cell that will become the upper left corner of the copied block.

4. Press ctrl V.



Filling adjacent cells

You can repeat a cell's formula or value throughout adjacent cells. This gives you a quick way to fill cells with the same value or create a series of cells that contain the same formula. You can fill down within a column.

1. Select the cell whose value or formula you want to repeat.
2. Press menu to display the Lists & Spreadsheet menu.
3. On the **Data** menu, select **Fill Down**.
4. Press ▼ repeatedly to move down, selecting the range of cells that will hold the repetitions.

5. Press enter.

   The selected cell is duplicated throughout the selected range.

Notes

- In step 1, you can select more than one cell to be repeated. If you do, make sure that you select enough destination cells to hold the repeated copies.
- If you select multiple cells in step 1 and the cells contain a simple sequence (such as 1,2,3 or 5,10,15,20), the sequence is continued in the filled area.

Working with rows and columns of data

Selecting a row or column

▶ Move to the top of the column, and then press ▲.
– or –
Move to the leftmost cell of the row, and then press ◀.

Resizing a row or column

1. Select the row or column that you want to resize.
2. Press menu to display the Lists & Spreadsheet menu.
3. On the **Actions** menu, select **Resize**.
4. Use ◀ and ▶ to resize the column, or use ▲ and ▼ to resize the row.
5. Press enter.

Inserting an empty row or column

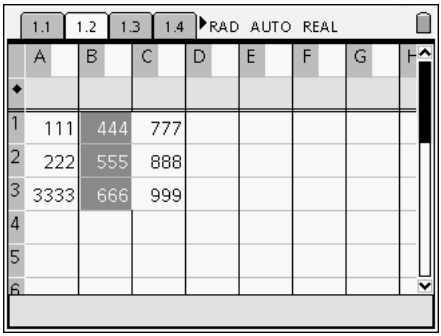
1. Select the column or row where you want to insert the new data.
2. Press menu to display the Lists & Spreadsheet menu.
3. On the **Insert** menu, select either **Row** or **Column**.
   – If you are inserting a row, the remaining rows shift down to create space for the new row.
   – If you are inserting a column, the remaining columns shift right to create space.

Note: If other cells contain formulas with relative references to a displaced row or column, those references adjust accordingly.

Deleting entire rows or columns

You can delete a row, column, group of rows, or group of columns. When you delete a row or column, the remaining rows or columns move up or left to fill the gap.

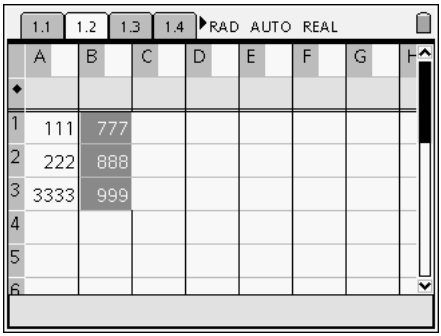
1. Select the column or row that you want to delete.



2. If you are deleting more than one row or column, hold down CAPS, and press ◀ and ▶ to select additional columns or press ▲ and ▼ to select additional rows.

3. Press clear.

   The selected rows or columns are deleted.



Note: If other cells contain formulas that refer to the deleted row or column, those cells show an error. Relative references to cells whose positions have changed because of a deletion adjust accordingly.

Copying rows or columns

1. Select the column or row that you want to copy.

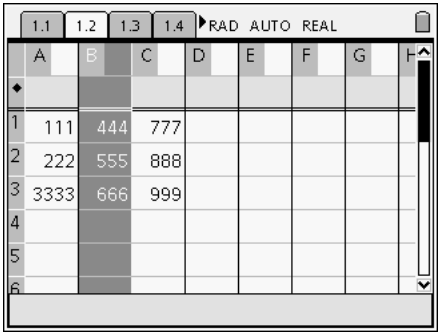
2. If you are copying more than one row or column press ⇧, and then press ▲, ▼, ◀, or ▶ to select an additional item.
3. Press ctrl C to copy the selected items.

   The selected rows or columns are copied to the Clipboard.
4. Move to any cell in the row or column where you want to insert the copied item.
5. Press ctrl V to paste the selection.

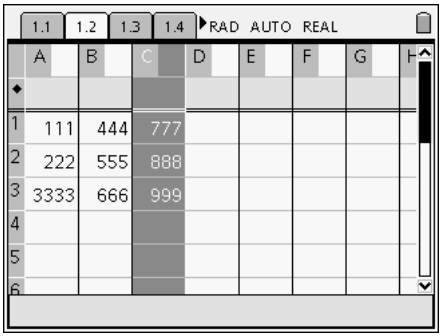
   The copied row or column is pasted in place, replacing the previous contents.

Moving a column

1. Select the column that you want to move.



2. Press menu to display the Lists & Spreadsheet menu.
3. On the **Actions** menu, select **Move Column**. An insertion bar appears.
4. Press ◀ or ▶ to place the insertion bar at the column's new position, and then press enter.



Note: Relative references to any cell whose position is affected by the move adjust accordingly.

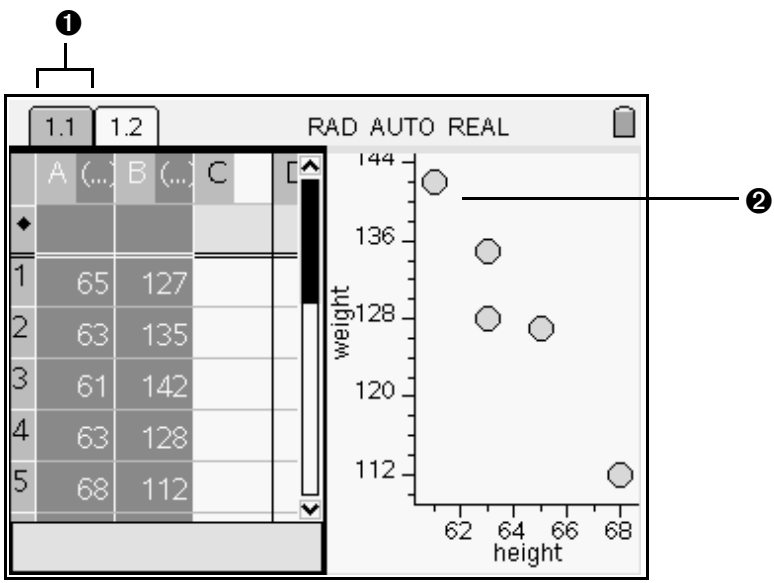
Using Data & Statistics

Getting Started with Data & Statistics

The Data & Statistics application provides tools to:

- visualize sets of data in different types of plots.
- directly manipulate data sets to explore and visualize data relationships. Data changes in one application are dynamically applied to all linked applications.
- explore central tendency and other statistical summary techniques.
- fit functions to data.
- create regression lines for scatter plots.
- graph hypothesis tests and results (z- and t-tests) based on summary statistics definitions or data.

Note: In the following example, Lists & Spreadsheet is shown along with Data & Statistics. This represents a typical page set-up.



❶ Problem/Page number counter

❷ Sample Data & Statistics work area

The Tool menu

Press (menu) to open the Tools menu. These menus and tools enable you to graph and explore data, modify data presentations by using different plots, as well as perform and plot statistical analyses.

The following tables describe what each tool does in the Data & Statistics work area.

Tool menus

Menu	Overview of Tool Actions
Plot type	Provides access to the different plot types available in the Data & Statistics application.
Plot properties	Allows you to specify how the plot displays
Actions	Lets you add/remove items to your work area. This includes movable lines for manually fitting data, regression curves and functions.
Window/Zoom	Lets you specify a zoom factor for the window, or determine min and max values for the horizontal and vertical axes.

Plot Types Menu Tools

Tool name	Tool function
Dot Plot	Depicts data in a dot plot. This is the default plot type for a single variable of the data set.
Box Plot	Displays data in a box plot.
Histogram	Displays data in a histogram.
Scatter Plot	Displays data in scatter plot form. This is the default plot type for two variables of the data set.
X-Y Line Plot	Displays data as an x-y line plot.

Plot Properties Menu Tools

Tool name	Tool function
Connect Data Points	Draws a line between each point on a scatter plot. Lines are connected in the order of data entry in the horizontal axis data set. This is the same as the X-Y Line plot type
Histogram Scale:	Determines how the histogram data displays in the work area.
Count	Displays data in the histogram by occurrence in the data set.
Percent	Displays data in the histogram by each bin's percent value of the whole data set.
Density	Displays data in the histogram by data density.
Extend Box Plot Whiskers/ Show Box Plot Outliers	Extend Box Plot Whiskers extends the whiskers to the min and max of the data. Show Box Plot Outliers stops at 1.5* Interquartile Range and shows outliers as individual dots. Note: If there are no points outside of 1.5* Interquartile Range, there may appear to be no whisker change.
Remove X Variable	Removes the display of the variable assigned to the horizontal axis without changing the vertical axis.
Remove Y Variable	Toggles the display of the variable assigned to the vertical axis without changing the horizontal axis.

Actions Tool Menu

Tool name	Tool function
Select all Points	Selects all points in the work area.

Add Movable Line	Adds a line you can position and reposition in the work area. This can be used for manual fit.
Remove Selected	Removes the selected object. Changes to Remove Movable Line, Remove Regression, Remove Plotted Value, Remove Plotted Function, depending on what is selected.
Lock Intercept at Zero/Unlock Movable Line Intercept	Locks the intercept of the movable line at zero. **Note:** This tool is only available when a movable line or regression line is present in the work area.
Regression	The regression tools perform the selected regression calculation and then plot the regression model. Regressions are only available on Scatter plots or X-Y line plots.
Show/Hide Linear (mx+b)	Calculates and displays the linear regression line in the format, m*x*+b, for the plotted data.
Show/Hide Linear (a+bx)	Calculates and displays the linear regression line in the format, a+b*x*, for the plotted data.
Show/Hide Median-Median	Calculates and displays the Median-Median regression line for the plotted data.
Show/Hide Quadratic	Calculates and displays the Quadratic regression model for the plotted data.
Show/Hide Cubic	Calculates and displays the Cubic regression model for the plotted data.
Show/Hide Quartic	Calculates and displays the Quartic regression model for the plotted data.
Show/Hide Power	Calculates and displays the Power regression model for the plotted data.
Show/Hide Exponential	Calculates and displays the Exponential regression model for the plotted data.
Show/Hide Logarithmic	Calculates and displays the Logarithmic regression model for the plotted data.

Show/Hide Sinusoidal	Calculates and displays the Sinusoidal regression model for the plotted data.
Show/Hide Logistic (d=0)	Calculates and displays the Logistic regression model where D=0, for the plotted data.
Show/Hide Logistic (d≠0)	Calculates and displays the Logistic regression model where D≠0, for the plotted data.
Show/Hide Residual Squares	Displays the squares of residuals. **Note:** This tool is only available when a regression line or movable line is present in the work area.
Show Normal PDF	Graphs the normal distribution function of the data currently plotted.
Plot Value	Lets you graph a statistical value on the axis. Examples of values that can be plotted are mean, median, standard deviation.
Plot Function	Lets you graph a function in the work area.
Start Over	Erases the content on the page without saving any work. This enables you to start your work again.

Window/Zoom Menu Tools

Tool name	Tool function
Window Settings	Displays a Window Settings dialog that enables you to enter the *x*-min, *x*-max, *y*-min, and *y*-max values for the axes.
Zoom - Data	Adjusts the zoom factor so that all plotted data appears in the work area.
Zoom In	Enables you to zoom in on a plot based upon the selection of a center point. The Zoom In factor is approximately 2.
Zoom Out	Enables you to zoom out on a plot based upon the selection of a center point. The Zoom Out factor is approximately 2.

Working with Data & Statistics

The Data & Statistics application is designed as a place to explore and visualize data and graph inferential statistics. It is, therefore, best used in conjunction with a numerical application like Calculator or Lists & Spreadsheet.

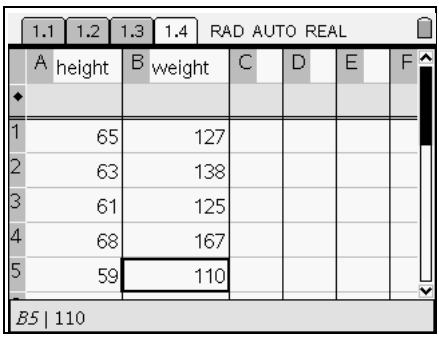
Creating plots from spreadsheet data

The Quick Graph feature of Lists and Spreadsheet is the easiest way to plot data using the columns in a spreadsheet.

Plotting data from Lists & Spreadsheet

1. Create or display data to be plotted in Lists & Spreadsheet. You can plot one or two columns of data.

   The example below illustrates two named columns, **height** and **weight**.

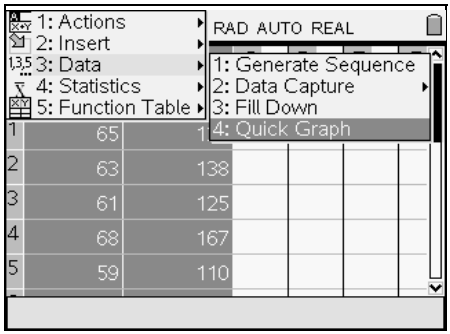


   Important: You must name each column of data in Lists & Spreadsheet in order to plot the data in Data & Statistics.

2. Highlight at least one column of data in Lists & Spreadsheet.

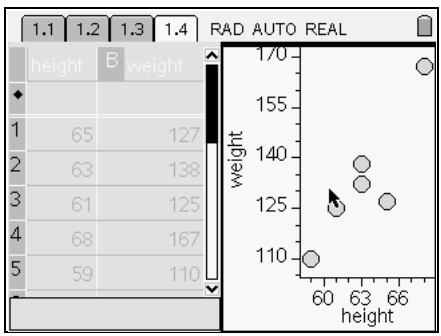
3. From the Lists & Spreadsheet Data menu 1,3,5..., select the Quick Graph tool.

   Press: menu 3 4.



The data plot displays in the Data & Statistics work area.

The example below illustrates the plot of two columns of data, which display as a scatter plot. The leftmost column of data in the spreadsheet becomes the horizontal axis values, and that column name becomes the horizontal axis label.



If you select only one column of data, it displays as a dot plot on the horizontal axis. The column name appears as the horizontal axis label.

If there are less than four work areas on the page, TI-Nspire adds a new work area with Data & Statistics active on it.

If four work areas are already defined on the page, TI-Nspire adds a new page to the problem with Data & Statistics active on it.

Note: If a list is defined with a formula in Lists & Spreadsheet, the points in Data & Statistics may not move, due to the formula's restriction. The dots in Data & Statistics will only move in directions allowed by their definition, so if they are just data they will move freely. If the points are y=x, they will move along the line.

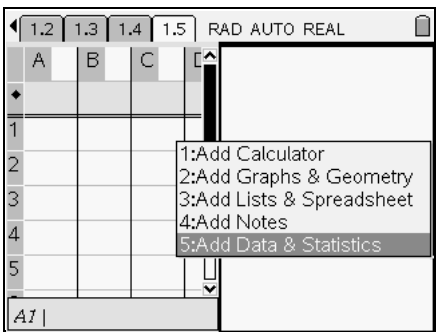
Creating a split page with Data & Statistics and Lists and Spreadsheet

1. Add the Lists & Spreadsheet or Calculator application to a new page or problem.

2. Click Page Layout and select Layout 2 , to split the page into two work areas.

   Press: ctrl 6 2 2

3. Click to add the Data & Statistics Application to the right side of the work area.



More Information

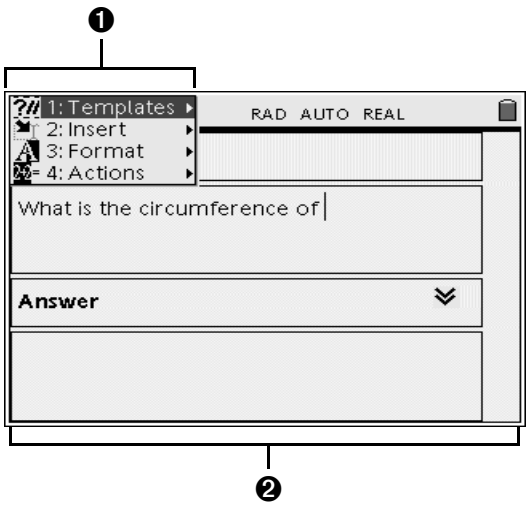
More in-depth information, step-by-step instructions, and examples of all the Data & Statistics features are contained in the Data & Statistics chapter of Part 2 of the user guide, available on the CD that came with your handheld, or on the web site at http://education.ti.com/guides. Please refer to this material to gain a thorough understanding of all the capabilities of the application.

Using Notes

Getting started with the Notes application

The Notes application provides text editing functions that allow you to create and share documents with others using the TI-Nspire™ handheld and computer software.

You can use the Notes application as a tool to create study notes to reinforce your understanding of classroom concepts and to review for exams. The Notes application allows you to assign different roles to individuals using your document, so that any edits appear in a different text format, making it easy to edit collaboratively.



❶ Notes tool menu – This menu is available anytime you are in the Notes work area. Press (menu) to display the menu.

❷ Notes work area -- The area where you enter and format text.

The Notes tool menu

The Notes tool menu lets you select a Notes template, format text, and evaluate expressions. The table below describes the menu items and their functions.

Menu Name	Menu Option	Function
Templates		
	Q&A	Creates a template to enter question and answer text.
	Proof	Creates a template to enter statement and reason text.
	Default	Lets you enter freeform text.
Insert		
	Expression Box	Lets you insert a math expression.
	Shape	Marks the selected text as an angle, triangle, circle, line, segment, ray, or vector.
	Comment	Lets you enter text that is italicized and prefaced with **Teacher** or **Reviewer**.
Format		
	Keyword	Toggles the selected text between bold and not bold, and removes all other formatting.
	Title	Toggles the selected text between underlined and not underlined, and removes all other formatting.
	Sub-heading	Toggles the selected text between italic and not italic, and removes all other formatting.

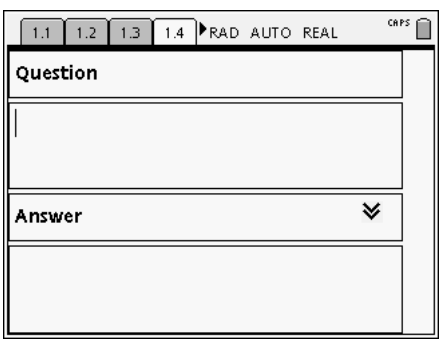
Subscript	Toggles the selected text between subscripted and not subscripted, and removes all other formatting.
Superscript	Toggles the selected text between superscripted and not superscripted, and removes all other formatting.
Actions	
Evaluate selection	Replaces the selected math expression with the result of the expression.
Show or Hide Answer	Shows or hides the answer in a Q&A template.

Before you begin

- Turn on the handheld, and add a Notes application to a document.

The Notes work area

The Notes work area is where you enter and format text.



Notes templates

The Notes application provides templates for creating three types of notes:

- **Q&A** for questions and answers, with the answer shown or hidden
- **Proof** for an outline structure containing statements and reasons
- **Default** for open-formatted text entry

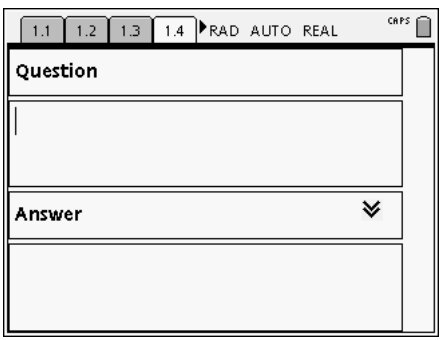
Applying a Notes template

1. While in the Notes work area, press (menu) to display the Notes menu.
2. On the **Templates** menu, select the specific template to apply.

Using the Q&A Template

Use the Q&A template to create questions and answers. You have the option to show or hide the answer, so you can create questions for review and hide the answers. When you use the document as a study aid, you can verify that your answers are correct.

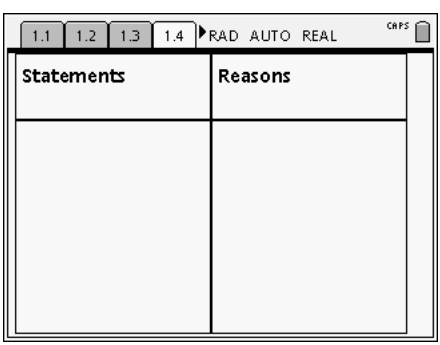
Press (tab) to move the text cursor between the **Question** and **Answer** areas of the template.



Using the Proof Template

The proof template provides an outline structure for statements and corresponding reasons.

Press (tab) to move the text cursor between the **Statements** and **Reasons** areas of the template.

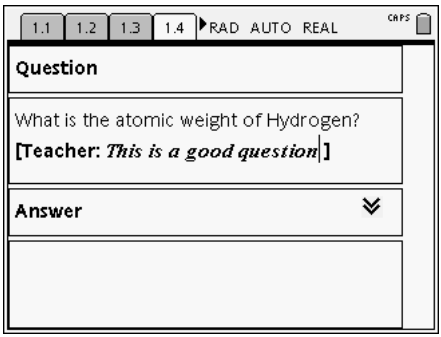


Inserting comments

You can insert Teacher or Reviewer comments into a Notes application. Comments are easily identifiable and easy to distinguish from the original text.

1. While in the Notes work area, press (menu) to display the Notes menu.
2. On the **Insert** menu, select **Comment**, and then select **Teacher** or **Reviewer**.
3. Enter your text.

   Text that you enter appears in italics.



Formatting Notes text

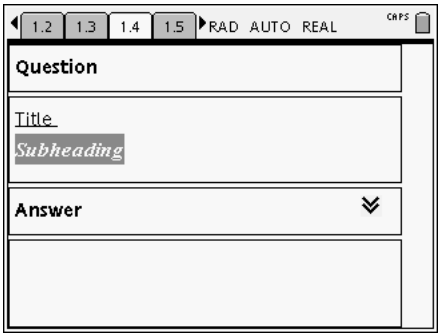
Notes allows you to format text to add context to your documents. Use the tools on the Text options menu to specify text as a keyword, title or subheading, or to format text as subscript or superscript.

Selecting text

1. If you are using the Q&A or Proof template, press (tab) to place the cursor in the area containing the text.
2. Use the NavPad to place the cursor at the start or end of the text to be selected.
3. Hold down (CAPS), and use the NavPad to select the text.

Applying a text format

1. Select the text in the Notes work area.
2. Press (menu) to display the Notes menu.
3. On the **Format menu,** select the name of the format to apply.

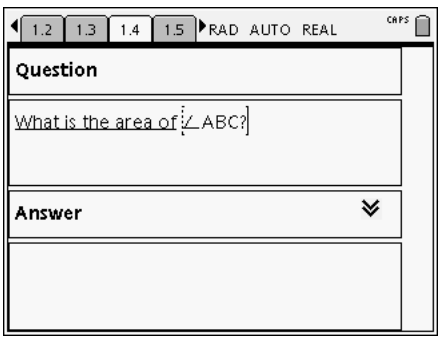


Note: You can restore the text to normal by reapplying the same format.

Inserting geometric shape symbols

You can use geometric shape symbols to designate selected text as geometric objects, such as an angle, circle, or line segment.

1. Position the cursor where you want to insert a shape symbol.
2. Press (menu) to display the Notes menu.
3. On the **Insert** menu, select **Shapes**, and then select the shape to apply.



Entering and evaluating expressions

You can include math expressions in Notes text, using the same tools as in other TI-Nspire™ applications. You can also evaluate an expression and display the result.

Entering an expression

1. In the Notes work area, place the cursor where you want the expression.
2. Press (menu) to display the Notes menu.
3. On the **Insert** menu, select **Expression Box**.
4. Type the expression. You can use the Catalog, if necessary, to insert a function, command, symbol, or expression template.

Evaluating an expression

Note: The result of the expression will replace the expression. If you need both the expression and its result, make a copy of the expression and then evaluate the copy.

1. Select the entire expression.
2. Press (menu) to display the Notes menu.
3. On the **Actions** menu, select **Evaluate Expression**.

   The result replaces the expression.

Data Collection

The Data Collection tool enables you to collect experimental information from a sensor and automatically display it in a table and/or graph for analysis. It uses the Lists & Spreadsheet and Graphs & Geometry applications to do this.

Compatible sensors

Data Collection is capable of interacting with the following sensors:

- Vernier EasyTemp®
- Texas Instruments CBR2™ Motion Detector
- Vernier Go!®Temp
- Vernier Go!®Motion

Experimental data

The Data Collection tool currently collects distance or temperature data points at regular intervals over time. Units of measure cannot be changed.

The table below shows the number of samples and sampling interval for the sensors currently supported.

Sensor	Number of Samples	Sampling Interval	Test Duration
Vernier EasyTemp®	180	1 second	180 seconds
Texas Instruments CBR2™ Motion Detector	100	0.05 second	5 seconds
Vernier Go!®Temp	180	1 second	180 seconds
Vernier Go!®Motion	100	0.05 second	5 seconds

Starting the Data Collection tool

The Data Collection tool can be started automatically or manually.

- ▶ An automatic start occurs when a sensor is connected to either a TI-Nspire™ handheld or a computer running TI-Nspire™ computer software. The connected sensor will be configured to work with the Data Collection tool in an open Graphs & Geometry page, or if Graphs & Geometry is not on the active page, a new page will be opened and the page will display Graphs & Geometry and Lists & Spreadsheet.
- ▶ The Data Collection tool can be manually added to any Graphs & Geometry application page. When the tool is added, it will try to

configure itself using the first available sensor. Any sensor that is already being controlled by a Data Collection tool is considered unavailable.

Data Collection controls

The Data Collection tool controls available are:

Icon	Name	Function
	Start Data Collection	Initiates data collection.
	Stop Data Collection	Stops data collection. The graph of existing data points is shown, and for motion experiments, velocity and acceleration data for the points are also available.
	Close	Close button. Completely closes the control box. If this button is selected when data collection is in progress, all data collection stops. The plot is erased. If Lists & Spreadsheet is on the page, the data points collected are shown in the columns. For motion experiments, velocity and acceleration data is not provided.

Running an experiment and collecting data

1. When the desired sensor is connected and the Data Collection page is set up as desired, press the Start icon ( ).
2. If Lists & Spreadsheet is on your page, you see each sample collected populate the rows in the table. The sampling data points are plotted on the graph.
3. When all data points are collected, Data Collection automatically stops. If desired, you can press Stop ( ) prior to the end of the experiment.
4. To rerun the experiment without retaining the current data, press START ( ). The data displayed is erased when the new experiment is started.

Data Collection names

The naming system for Data Collection data includes a group designator and a member designator (group.member). For example, in a temperature versus time experiment, the data is named *run0.temp_C* and *run0.time_s*. Remember that TI-Nspire™ computer software is case insensitive: *RUN0.TEMP_C* and *run0.temp_c* reference the same set of data.

Storing collected data

To save the current data before rerunning an experiment, use the following instructions.

To save temperature data

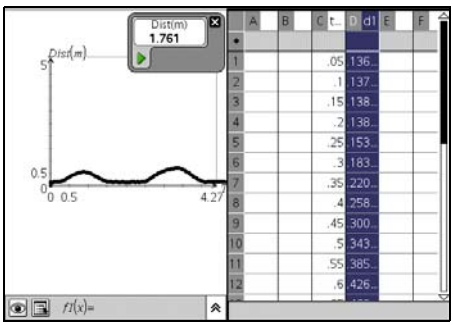
1. Cut and paste each column of data into new columns. The first two columns (Columns A and B) will be reused by the next run of the experiment.
2. Rename each moved column.

Repeat the steps for each data sample you want to save. To permanently save a set of data generated by an experiment, save the document.

To save motion data

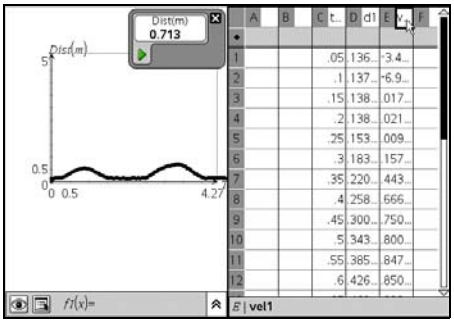
1. Cut and paste each column of data into new columns.

   The first two columns (Columns A and B) will be reused by the next run of the experiment.
2. Rename each moved column.

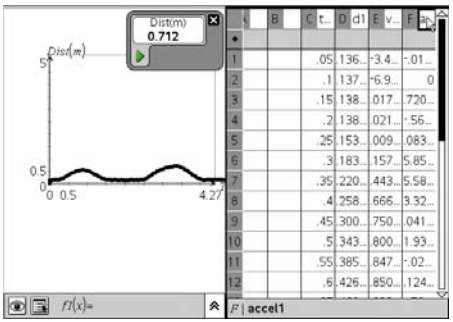


3. To save velocity data, select a third column. Highlight the column, and select **var**. Select Link to: and choose the velocity variable.

   The column is filled with the velocity values for the experiment. Rename the column with a unique name.



4. Repeat this procedure to save acceleration data.



5. Repeat the steps for each experimental data set you want to save.

To permanently save a set of data generated by an experiment, save the document.

Appendix: Service and Support

Texas Instruments Support and Service

For general information

For more information about TI products and services, contact TI by e-mail or visit the TI Internet address.

E-mail inquiries: ticares@ti.com

Home Page: education.ti.com

Service and warranty information

For information about the length and terms of the warranty or about product service, refer to the warranty statement enclosed with this product or contact your local Texas Instruments retailer/distributor.

Service

Refer Servicing to Qualified Service Personnel under the Conditions Listed Below:

- If liquid has been spilled or objects have fallen into the product.
- If the product has been exposed to rain or water.
- If the product does not operate normally as per the operating instructions.
- If the product has been dropped or the case has been damaged.

Battery Precautions

Take these precautions when replacing batteries.

- Do not leave batteries within the reach of children.
- Do not mix new and used batteries. Do not mix brands (or types within brands) of batteries.
- Do not mix rechargeable and non-rechargeable batteries.
- Install batteries according to polarity (+ and -) diagrams.
- Do not place non-rechargeable batteries in a battery recharger.
- Properly dispose of used batteries immediately.
- Do not incinerate or dismantle batteries.

Disposing of Batteries

- Do not mutilate, puncture, or dispose of batteries in fire. The batteries can burst or explode, releasing hazardous chemicals. Discard used batteries according to local regulations.

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