Chapter 1

Using TI-Nspire for the First Time

In This Chapter

- Understanding the philosophy behind TI-Nspire
- Using TI-Nspire to explore mathematical concepts
- Understanding the document model
- Relating TI-Nspire to things you do on a computer
- Comparing the TI-Nspire product line
- Taking TI-Nspire out of the box and getting started

If you are brand new to TI-Nspire, I encourage you to start with this chapter. In this chapter, you begin to gain an appreciation of how TI-Nspire can help you understand mathematical concepts in a new way. You also find out about the different TI-Nspire products available and see some of the first steps to get up and running with TI-Nspire technology.

The Philosophy behind TI-Nspire

The best way to understand the philosophy behind TI-Nspire is to read this book and start playing with the device. However, let me whet your appetite now with a few thoughts about how TI-Nspire works and describe some things you can do with TI-Nspire that really showcase its capabilities.

Multiple representations

It has been demonstrated that students learn mathematical concepts more quickly and in greater depth when concepts are presented in multiple ways — that is, in algebraic, graphical, geometric, numeric, and verbal ways. TI-Nspire technology is all about multiple representations. In fact, TI-Nspire can display up to four different representations on a single screen.

Furthermore, these representations are dynamically linked. As you see in the next section, changes to one representation automatically affect the other representations, in real time, right on the screen. This highly interactive approach allows students to "see" the math, which enhances their ability to make mathematical connections and solve problems.

Figure 1-1 shows a simple example in which three representations of a concept are displayed. In the first screen in Figure 1-1, I give the algebraic representation of a given word description. In the second screen in Figure 1-1, I give the geometric representation and the numeric representation. Notice that the second screen contains two different applications on the same screen. With TI-Nspire, you have the option of displaying up to four different applications on one screen.

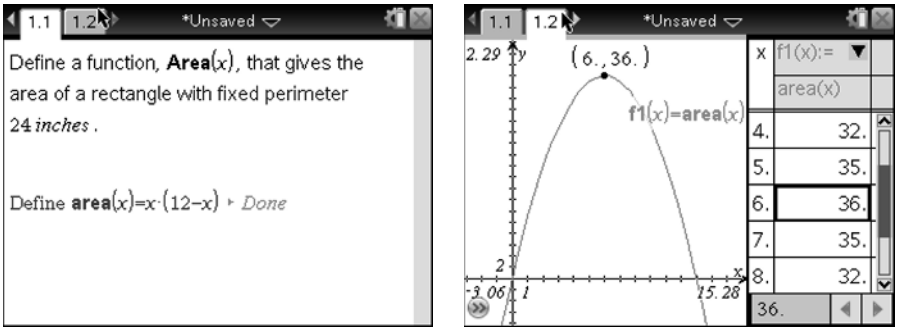


Figure 1-1: Multiple representations.

Linking representations

The idea of linking representations is another core feature that separates TI-Nspire from other calculators or handhelds.

Although it's nice to see multiple representations of a mathematical concept, it's really cool to have the option of manipulating one representation and watching the corresponding effect on another representation.

In the first screen in Figure 1-2, I change the size of a circle and watch the corresponding changes in *radius* and *area* measurements plotted on the coordinate plane in real time. The second screen in Figure 1-2 shows the radius and area data that automatically populates the Lists & Spreadsheet application as the circle is resized. This data represents the coordinates of each point that comprise the scatter plot.

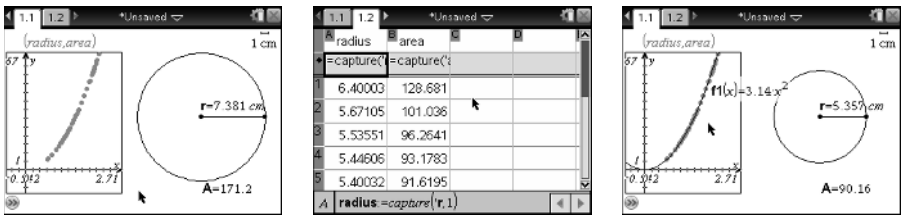


Figure 1-2: Linking representations.

Grab and move

The previous example helps to illustrate the grab-and-move philosophy inherent to TI-Nspire. You can also grab and move certain graphed functions and manipulate the axes themselves.

Imagine graphing $y = x^2$ in the previous example. TI-Nspire gives you the ability to grab the graph itself and change its shape. As you do this, the displayed equation on the screen updates automatically, again, in real time. Match the function to the scatter plot, and observe that the equation approximates $y = 3.14x^2$. Refer to the third screen in Figure 1-2.

The interactive feedback from this simple scenario allows students to explore and identify patterns and to make conjectures based on their observations. What a wonderful and interactive way to demonstrate the formula for the area of a circle!

The document model

In Chapter 2, you find out how TI-Nspire uses documents to engage students in interactive activities. A *document* is a TI-Nspire file that contains problems and pages. With TI-Nspire, you can create, edit, save, and review your documents using many of the same commands and file storage methods you use on a computer.

The document model provides students with three distinct advantages:

- Students can interact with the mathematics rather than just read about the mathematics in a static textbook.
- Students can pick up where they left off after leaving class.
- Students can work at home, either on their handhelds or on their computers.

As an educator, the document model provides you with these advantages:

- Teachers can prepare documents in advance and transmit them to students for use individually or in groups.
- Complicated constructions can be prepared in advance, thereby allowing students to focus on the math.
- Teachers can use multiple representations and the dynamic nature of TI-Nspire to really understand the underlying concepts behind the math.

The Computer Connection

If you are at all familiar with a PC, you should find the transition to TI-Nspire quite smooth. For starters, TI-Nspire documents consist of one or more pages, much like a document you might prepare using a word processor. As for working with your documents, you will find out about a variety of shortcuts that are virtually identical to those that you may already be using on your PC. For example, pressing the key sequence ctrl S saves your work, pressing tab moves you to the next field in a dialog box, pressing ctrl menu pulls up the context menu (the equivalent of a right-click menu on your computer), and so on. As for the right-click reference, get used to me talking about that feature. It's an incredible time-saver that you simply must take advantage of!

The more you remind yourself of this computer connection, the faster you will travel along the learning curve.

TI-Nspire versus TI-Nspire CAS

The TI-Nspire product line includes TI-Nspire and TI-Nspire CAS (both in the handheld and as a computer application). The TI-Nspire Handheld device performs numerical or *floating-point* calculations, much like those performed by the TI-83 and TI-84 product line. The TI-Nspire CAS Handheld has all the functionality of the TI-Nspire technology with two notable differences:

- TI-Nspire CAS technology has a built-in computer algebra system, which allows symbolic representation of numerical calculations — and the manipulation of algebraic expressions and processes (that is, you can expand binomials, find derivatives of algebraic expressions, and so on). For example, the solution to $x^2 = 12$ is given as

  $x = -2\sqrt{3}$

  and

  $x = 2\sqrt{3}$

- TI-Nspire CAS Handheld does not include the snap-in TI-84 Plus Keypad (TI-Nspire CX does not have an interchangeable keypad either).

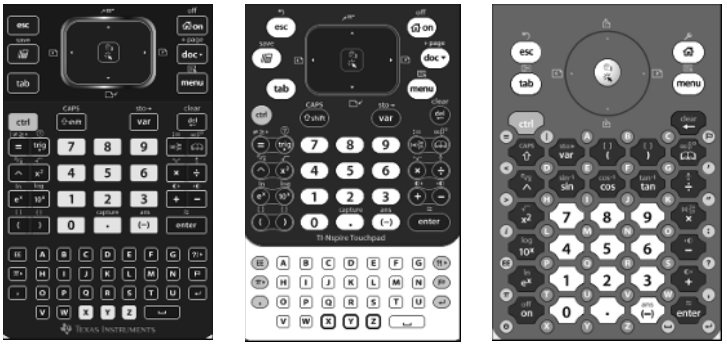
Because these devices have so much in common, this book can serve as a valuable resource for either handheld. I've included two chapters (Chapters 8 and 10) that specifically address some of the key features unique to TI-Nspire CAS. Throughout the book, I also occasionally point out some key differences between the two handhelds.

TI-Nspire versus TI-Nspire CX

The TI-Nspire product line has expanded once again! This time, color is the newest, coolest thing. Each of the seven applications has color display capabilities. Color is more than just a gimmick. The use of color on Data & Statistics pages makes it easy to compare one set of data with another. Multiple functions on the same Graphs page become much easier to distinguish when color is used. And, I cannot lie, I love accenting important terms with splashes of color on Notes pages.

The sleek new look of the TI-Nspire CX involves a slight rearrangement of the keys on the keypad. Compared to the TI-Nspire, the TI-Nspire CX has lost the bulk. TI-Nspire CX is more durable, thanks to a screen similar to what you may see on a touchscreen phone.

Figure 1-3 compares the keypads of the three generations of TI-Nspire Handhelds. You can see that with each new model has come a sleeker, more organized, and easier-to-see keypad. But, even if you have the TI-Nspire Clickpad, it is fully functional with the latest operating system from Texas Instruments.



TI-Nspire CX | TI-Nspire Touchpad | TI-Nspire Clickpad

Figure 1-3: Three generations of TI-Nspire Handhelds.

Installing Batteries

If you are like I am, you can't wait to finally open the box and start playing with your TI-Nspire Handheld. First, though, you must install the batteries, which are included when you purchase a TI-Nspire Handheld. Here's how to install AAA batteries in the TI-Nspire (Touchpad or Clickpad):

1. **On the back of the device, slide the tab to the right to release the keypad.**
2. **Slide the keypad down about ¼ inch and lift it out to reveal the battery compartment.**
3. **Insert the batteries, making sure that the + side of each battery faces toward the bottom of the device.**
4. **Place the keypad gently back in place, leaving about a ¼-inch gap at the top.**
5. **Slide the keypad up toward the display screen, applying enough pressure to snap it into place**.

An icon near the upper-right part of the screen indicates the battery status. When the battery status gets low, a small warning symbol appears. I usually wait to replace the battery until I see the warning symbol.

TI-Nspire CX and TI-Nspire Touchpad can be powered by a lithium battery. The TI-Nspire Rechargeable Battery is a lithium battery (similar to that for a cell phone), with each charge providing up to 100 hours of handheld power. The original TI-Nspire Clickpad handheld devices are not equipped to accept a TI-Nspire Rechargeable Battery. Here are the steps to install the battery:

1. **Use a small Phillips screwdriver to remove the two screws near the top of the back of the handheld.**
2. **Insert the TI-Nspire Rechargeable Battery, making sure to securely connect the white end of the battery wires to the handheld.**
3. **Screw the battery cover back in place.**

You can power your TI-Nspire Touchpad in three different ways. Similar to the way a hybrid car can use gas, electricity, or a combination of both, here are the different ways to power your TI-Nspire:

- The TI-Nspire Rechargeable Battery only
- The TI-Nspire Rechargeable Battery and four AAA alkaline batteries combined
- Four AAA alkaline batteries only

It can get really expensive to provide batteries for a classroom set of calculators (I know from personal experience). Wouldn't it be great to never have to buy batteries again?

TI-Nspire CX is powered solely by the TI-Nspire Rechargeable Battery. There are three convenient ways to charge the lithium battery:

- Use the adapter to plug into a wall outlet.
- Use the cord (that came with your TI-Nspire purchase) to plug in to your computer's USB.
- Use the TI-Nspire Docking Station (see below).

Another innovative Texas Instruments product, the TI-Nspire Docking Station, can provide easy recharging, document transfer, and OS updates for a classroom set of handhelds. Both the TI-Nspire Rechargeable Battery and TI-Nspire Docking Station can be purchased at instructional dealers or at the TI online store.

Turning on the Unit and Going through the Initial Setup of TI-Nspire

To turn on your TI-Nspire device, press the [on] key.

After pressing [on] for the first time, you see a progress bar indicating that the operating system is loading. Eventually, you are greeted by a screen that prompts you to choose a language, giving you your first experience with a dialog box featuring drop-down menus.

To select the language, do the following:

1. **Press the center click key ([ctrl]) to reveal the drop-down menu.**
2. **Use the ▲▼ keys on the Touchpad to highlight the language.**
3. **Press [tab] to highlight the OK button (as indicated by a dark outline) and press [enter].**

If you are happy with the default settings of any dialog box, press [enter] and the settings take effect and close the dialog box at the same time. You don't need to tab through each field.

Next, you are prompted to select a font size. I happen to like the default medium font. However, if you want to change the font size, feel free to do so by following the same steps used for choosing a language.

Finally, you are greeted by a welcome screen, which describes some of the basic features of your TI-Nspire. Feel free to scroll through this document by pressing the ▼ key. Press enter to display the TI-Nspire Home menu.

The Three Zones of the TI-Nspire Keypad

The redesigned keypad is organized into three zones: Navigation, Math & Numeric Keys, and Alpha Keys. Keeping this in mind may help you as you get acquainted with TI-Nspire. A basic understanding of the TI-Nspire keypad helps you understand how to start navigating through documents quickly and efficiently.

The Touchpad and the ten keys near the top of the keypad make up the Navigation zone. The keys in the Navigation zone perform a variety of functions that you will find are quite similar to their computer counterparts. Here's a brief description of what each of these keys can do:

- esc **Escape:** This key removes menus or dialog boxes from the screen. For example, imagine that you have just activated the Perpendicular tool on a Graphs page. To remove this tool and activate the Pointer tool, just press the esc key.
- **Scratchpad:** Allows you to do calculations and graphs without having any effect on the document. Your calculations or graphs can be saved into existing documents.
- tab **Tab:** This key allows you to move to the next entry field in a dialog box. It also allows you to move around in certain applications. For example, pressing the tab key in the Graphs application moves you from the entry line to the work area. In the Lists & Spreadsheet application, the tab key moves you from one cell to the adjacent cell.

  Try pressing and holding shift (Shift key) followed by the tab key. This key sequence moves you backward through a dialog box, just as it does on a computer.
- on **Home:** This key displays the Home screen. The Home menu is where you can create a new document, access existing documents, and add pages to existing documents. It's also where you can adjust your system settings.
- doc **Documents:** This key activates the Documents management menu. Saving changes to documents, editing, and changing the page layout are just of few of the tasks that can be accomplished with this key.

- menu **Menu:** This key displays the menu associated with the current application (called the *application menu*). If you are on a Graphs page, you see one menu. If you are on a Lists & Spreadsheet page, you see a completely different menu.

  Try pressing ctrl followed by the menu key. This key sequence acts just like a right-click on a computer mouse — it provides you with access to the *context menu,* a list of the specific options available based on the current cursor location or active object. This is the second time I've mentioned this feature and certainly not the last!

- ctrl **Control:** This key provides access to the secondary function or character located on a given key. For example, pressing ctrl on turns off your TI-Nspire Handheld.

- **Touchpad arrow keys:** In the middle of the Navigation zone of the keypad is the Touchpad (see Figure 1-4). If you look closely, you see the ▲ ▶ ▼ ◀ symbols clockwise from the top of the Touchpad. Simply put, pressing these keys allows you to move the cursor or pointer in any direction. Try swiping your finger lightly across the top of the Touchpad, which has the same effect as moving a mouse around on a mouse pad.

- **Click:** Pressing this key selects objects on the screen, much like the Click button on your computer mouse. Press ctrl then to grab objects. Alternatively, you can press and hold the key momentarily to grab an object. This key will get a ton of use, because you have many clickable areas on TI-Nspire.

- del **Delete:** This key works just like the Backspace key on your computer. It deletes a single character of text or an entire selected object. Press ctrl del to clear the entire contents of a field.

- shift **Shift:** Pressing this key changes a lowercase letter to an uppercase letter. Pressing ctrl shift works like a Shift Lock key on a computer.

The Navigation Zone | The Math & Numeric Zone | The Alpha Keys Zone

Figure 1-4: Three zones on the TI-Nspire keypad.

The Math & Numeric zone is centrally located on the keypad. The numeric keys are surrounded on both sides by math keys. These math keys have different functionality depending on whether you press the left or right part of the rocking keys. Many of these keys have secondary functions listed in small print above the keys.

The Alpha Keys zone is located near the bottom of the keypad. On each side of the alphabetical keys are special character keys. You may wonder why the keys are arranged in alphabetical order instead of like the keys on your computer. Most standardized tests require that calculators not have QWERTY (standard) keyboards.

Accessing menus and submenus

As I've already mentioned, the menu key gives you access to the menu options available in the current application. Pressing it once shows the top-level menu options. Some of these menu options have an arrow to their right, indicating that submenu options are available. To access a submenu, press ▼ to scroll down to the desired top-level menu option and then press ▶ to reveal the submenu. You may even find a third level of menu options, as shown in Figure 1-5.

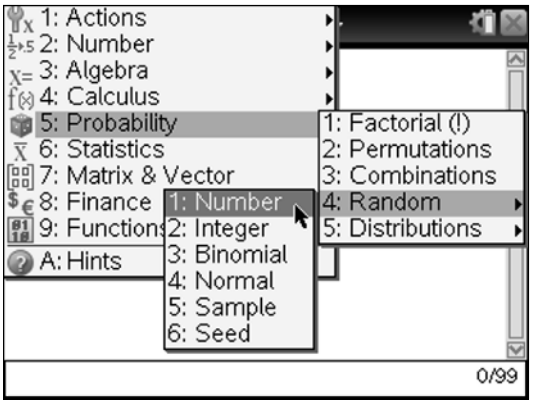


Figure 1-5: Menus and submenus.

To move back out of a series of submenus, just press esc. You need to press esc three times to remove the layers of menus shown in Figure 1-5.

Using the Scratchpad

The Scratchpad consists of two parts: Calculate and Graph. Pressing ctrl once accesses one part, and pressing ctrl again toggles to the other part. Alternatively, click (ctrl) the tabs at the top of the Scratchpad to toggle from one to the other. The Scratchpad can also be accessed from the Home menu.

The Calculate part of the Scratchpad behaves exactly like a Calculator page, with the exception of not being able to access the Program Editor. See the first screen in Figure 1-6. The advantage of using the Scratchpad to do calculations is that it is available from anywhere! You don't even have to be in a document to access the Scratchpad.

The Graph part of the Scratchpad is a Graphs page that does not have any geometry functionality. My students love being able to do quick calculations or graphs by using the Scratchpad. Because the Scratchpad is completely separate from the document that is open, they won't have any record of their work (even if they save their document). However, you can always save your Scratchpad calculations and/or graphs by clicking (⬚) the ▾ arrow at the very top of the screen. Choose the Save to Document option to have a record of your work (in either a new document or the current document). See the second and third screens in Figure 1-6.

If your Scratchpad gets too cluttered, you can clear the Scratchpad. Click (⬚) the ▾ arrow at the top of the screen and choose Clear Scratchpad. Both the Calculate and Graph parts of the Scratchpad will be cleared.

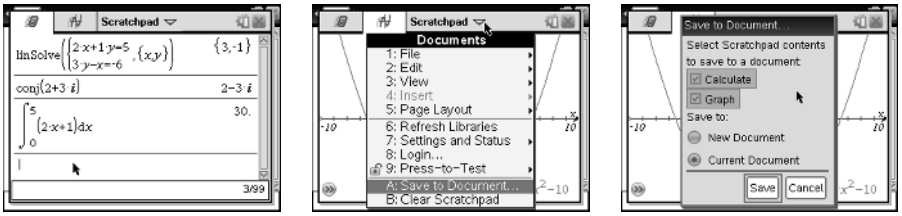


Figure 1-6: Using the Scratchpad.

Configuring the Settings

Okay, now that you know a bit about the TI-Nspire keypad, it's time to configure the settings. To access the settings, press [on] ⇨Settings. The first screen in Figure 1-7 shows six choices. Choosing Handheld Setup is a good place to start. The second and third screens in Figure 1-7 show some of the resulting choices you have. If you want to conserve battery life, consider changing the Power Standby field (which turns off your handheld after the specified time of inactivity), the Hibernate field (similar to a computer, it will take an extra-long time to turn on your handheld because you must reboot the OS), and the Auto Dim field (the screen will not turn off, but will dim slightly to save power after a specified time of inactivity). To make a change to the Handheld Setup screen, use the Touchpad arrow ▸ to expand the selection and click (⬚) to make your selection. I recommend selecting (⬚) the Enable Tapping to Click check box, which allows you to tap the Touchpad instead of clicking

it to make a selection. To make your changes effective, press tab (or ▼) to navigate to the OK button and then press ctrl or enter.

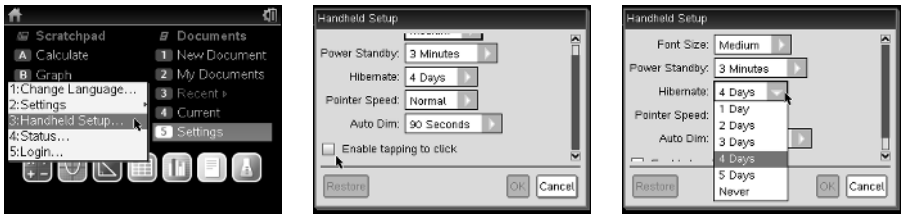


Figure 1-7: The Handheld Setup screen.

Pressing on➪Settings➪Status shows you the version of the operating system currently running on your handheld. You will also see a battery status for up to three types of batteries: AAA Batteries, Handheld Rechargeable Battery, and Cradle Rechargeable Battery (only used with TI-Nspire Navigator).

To access the General Settings screen on your handheld, press on➪Settings➪Settings➪General. See the first screen in Figure 1-8. I strongly recommend pressing Make Default when making changes to these settings. When you do, the following prompt will appear: `Apply your settings to open document and save them as default for new documents and Scratchpad?` Click (ctrl) OK to set the same settings to your Scratchpad. Trust me, it could get really confusing if your calculator is set to Radian and your Scratchpad is set to Degree!

Pressing the Restore button defaults to the original TI-Nspire factory settings.

Now that the Calculator settings have been changed to your liking, it is time to change the Graphs application settings. Press on➪Settings➪Settings➪Graphs & Geometry. Changing the Display Digits field affects the precision of the points that are found in the Graphs environment. Notice that the Graphing Angle field (a graphed function) and the Geometry Angle field (a geometric construction) are considered different settings. See the second screen in Figure 1-8.

Four check boxes can be selected on the Graphs & Geometry Settings screen. See the third screen in Figure 1-8. Here is an explanation of each:

- **Automatically Hide Plot Labels:** The default setting on TI-Nspire is to label all functions that are graphed in a Graphs page. If you would like to disable this feature, click (ctrl) to select this box.
- **Show Axis End Values:** The end values on a Graphs page are the *x* and *y* maximum and minimum values. If you would not like for these to appear on the ends of the *x* and *y* axes, click (ctrl) to deselect the box.

- **Show Tool Tips for Function Manipulation:** I strongly recommend not selecting this box. If you do (and you have been warned), a message will appear every time you grab and move an object.
- **Automatically Find Points of Interest:** You will love this feature! On a Graphs page, this feature can help you find the zeros, maximums, minimums, and so on.

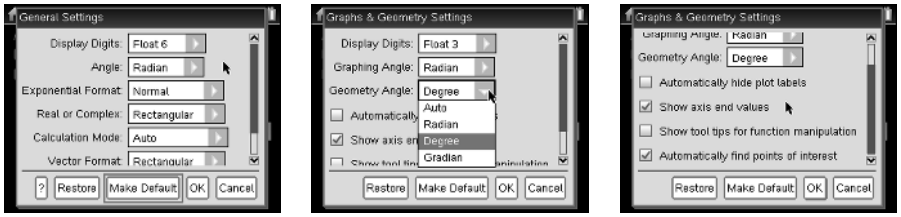


Figure 1-8: The Graphs & Geometry Settings screen.

Press enter at any time to select the current configuration and close the system settings dialog box.

Switching Keypads

The TI-Nspire (Touchpad or Clickpad) can operate with two different keypads (not at the same time): the TI-Nspire keypad and a TI-84 Plus Keypad. When the TI-Nspire keypad is installed, you are using TI-Nspire. When the TI-84 Plus Keypad is installed, your handheld device works exactly like any TI-84 Plus Silver Edition device. This means that you actually have two handheld devices!

If a TI-84 Plus Keypad was not included with the purchase of your TI-Nspire, you may be able to acquire one at no additional cost. Log on to `education.ti.com/84keypad` and complete the online form.

To change the current keypad, follow these steps:

1. **On the back of the device, slide the tab to the right to release the keypad.**
2. **Slide the keypad down about ¼ inch and lift it out to reveal the battery compartment.**
3. **Place the new keypad gently in place, leaving about a ¼-inch gap at the top.**
4. **Slide the keypad up toward the display screen, applying enough pressure to snap it into place.**

Each time that you change keypads and turn on the unit, you must wait for the new operating system to load (as indicated by a progress bar).

Updating the operating system on your TI-Nspire automatically updates the operating system on the TI-84.

I work only with the TI-Nspire keypad in this book. If you are interested in finding out more about the TI-84, refer to *TI-84 Plus Graphing Calculator For Dummies,* by C. C. Edwards (published by Wiley).