# Appendix A:
## *Basics for Using Calculators in the TI-84 Plus Family*

More-extensive directions for using the TI-84 Plus family of calculators can be found in the user manual or online at http://education.ti.com.

Note: Unless the directions specifically say otherwise, "press the ___ button" means to press the button once and release it before pressing the next button.

### *Turning the Calculator On and Off* ● ● ●

- To turn the calculator on, press the ⊂ON⊃ button in the lower left corner.
- To turn the calculator off, press the ⊂2nd⊃ button (blue button in the upper left corner) and then the ⊂ON⊃ button.
- The calculator has an "auto-off" function that shuts it down automatically, to conserve battery power, if you do not push any buttons for 5 minutes. If your screen goes blank, you can restore it by pressing ⊂ON⊃.
- When the calculator shuts off (either automatically or because you have pressed ⊂2nd⊃ ⊂ON⊃, all information on the screen and in the memory is automatically saved. This means that, if the calculator shuts off during an experiment, you simply have to press ⊂ON⊃ and all of your calculations will be visible again. You won't lose any data.

### *Understanding the Directions in This Book* ● ● ●

- The procedures for each lab contain some images to help you follow the directions. When you need to press a certain button on your calculator, the text shows a small image of that button. For example, if you need to press the ENTER key, the text shows an image like this: ⊂ENTER⊃.
- Many of the procedures require that you select menu items from the calculator display. These menu items appear in two forms: as "tabs" and as "lists." A "tab" menu item appears on the bottom of the screen inside a small box. To select one of these items, push the button that is directly below the tab. In this book, "tab" menu items are shown as small images like this: ⌊Setup⌋ .
- "List" menu items appear on the screen in the form of a list. They are usually numbered. To select a numbered list item, press the appropriate number button on the calculator. To select a list item that is not numbered, use the arrow keys to highlight the item, and then press ⊂ENTER⊃. In this book, menu items are shown in a different font, like this: **2: Time Graph**.

### *The Arrow Keys, the Cursor, and Highlighting* ● ● ●

- The cursor is the blinking box that appears on your calculator screen. It shows you where your next entry will appear on the screen.
- The arrow keys are located in the upper right corner of your calculator keypad. They can be used to move the cursor around the screen.
- Many of the procedures in this book ask you to highlight certain options on the screen. Some options blink when they are highlighted. Other options are printed in reverse color (light writing on a dark background).

### *Using the ⊂2nd⊃ and ⊂ALPHA⊃ Buttons* ● ● ●

- Most of the buttons on the calculator have more than one function. For example, the ⊂ON⊃ button can be used to turn the calculator off also. The second (and third, if any) functions of the buttons can be accessed by pressing the ⊂2nd⊃ and ⊂ALPHA⊃ keys.
- To access a function written in blue above one of the calculator buttons, press the ⊂2nd⊃ key and then the button with the desired function above it. For example, to use the square root function, press ⊂2nd⊃ and then ⊂χ²⊃. When you press the ⊂2nd⊃ button, the cursor changes from a box to a blinking ↑ .

- To access a function written in green above one of the calculator buttons, press the (ALPHA) key and then the button with the desired function above it. Most of the (ALPHA) key functions are letters. You can use these letters to name variables, write programs, and assign functions. For example, to write D to your calculator screen, press (ALPHA) ($x^{-1}$). When you press the (ALPHA) button, the cursor changes to a blinking **A**.

### The Home and Main Screens ● ● ●

- The Home screen is the screen where you can enter expressions, numbers, and symbols. Most of the time, the screen that you see when you first turn on the calculator is the Home screen. The Home screen may be blank or it may show the last few calculations that you performed. In most cases, selecting **QUIT** by pressing (2nd) (MODE) will return you to the Home screen.
- If you connect a probe or sensor to your calculator's USB port when the calculator is turned off, it will automatically turn on and show you the probe or sensor's Main screen. This screen shows you the options you have for controlling the input to and output from the probe or sensor. In most cases, selecting (Main), (Cancl), or (OK) will return you to the Main screen.

### A Few More Important Points ● ● ●

- The TI calculators have different buttons for the negative sign and the minus sign. The (–) key inserts a minus sign. Use this key when you are subtracting two numbers (for example, to enter the expression 35 - 23). The ((-)) key inserts a negative sign. Use this key when you are inserting a negative number (for example, when entering the exponent part of $3.2 \times 10^{-2}$).
- Be sure to use parentheses (( ( ) and ( ) )) when you write complicated expressions. This helps ensure that the operations are carried out in the correct order.
- The TI graphing calculators use the **E** symbol for scientific notation. For example, the number $2.355 \times 10^5$ will display as 2.355**E**5.
- To type in a number in scientific notation, use (2nd) (,) to insert the **E** notation. For example, to enter the number $1.55 \times 10^{-3}$, first type 1.55, then press (2nd) (,) to insert the **E**, then type -3 (don't forget to use the ((-)) button, not the (–) button, to insert the negative sign).