

A Guide to the TI-83



GETTING STARTED

On and Off

The **ON** button is at the lower left corner. Notice that OFF is written above **ON**. To turn the machine off, press **2nd** **OFF**. The calculator will shut off automatically after a few minutes without use, to conserve power.

Screen Contrast

To change the screen's contrast, press **2nd** **▲** to darken the screen or **2nd** **▼** to lighten the screen. If you hold the arrow keys down, the screen will continue to darken or lighten. The level of contrast is indicated by a number at the top right of the screen. One way to check your battery power is by setting your screen to maximum darkness. If the screen doesn't get black, then it's time to get new batteries.

Special Keys

The **2nd** and **ALPHA** keys are color coded with their commands written above the keys. When **2nd** is pressed, the cursor changes to an up arrow \uparrow . Once your **2nd** command is carried out, the calculator automatically goes back to its normal mode (in other words, you don't have to get out of **2nd** mode). If you hit a special key by mistake, simply press it again to get back to the normal mode.

Home Screen and Standard Settings

The home screen is where most expressions are entered and carried out. To return to it from other screens, press **2nd** **QUIT** (right next to the **2nd** button).

If your calculator shows strange settings, you can hit the **MODE** key and check that all the items on the left are highlighted. (If not, arrow the cursor down to them and press **ENTER** over the setting you wish to choose). You can also press **2nd** **FORMAT** and check that those settings are also on the left items.

Entering and Editing Expressions

Expressions are entered on the home screen. To carry them out, press **ENTER** at the bottom right corner (it is like an “=” key). To repeat a previous entry (or change it slightly) press **2nd** **ENTRY** (above **ENTER**), then edit it. Repeatedly pressing **2nd** **ENTRY** brings up successively earlier entries.

To edit these earlier entries, or a new entry that has a mistake, use the arrow keys, delete, and insert.

- The left arrow key **◀** will position the cursor back to parts of the expression you want to edit (and of course the right arrow key **▶** moves the cursor to the right).
- By default, the calculator is in overwrite mode, with a block cursor **█**.
- If instead you want to insert material, use **2nd** **INS**. The insert cursor is an underline **_** as opposed to the standard block cursor.
- The delete key, **DEL**, deletes items under the cursor.

The **CLEAR** button clears the line the cursor is on, or the whole screen if on a blank line. If you want to use **2nd** **ENTRY** to copy earlier entries, don't **CLEAR** them, because that clears them from the calculator's temporary memory.

Parentheses

The calculator uses only parentheses () for enclosures. Use repeated parentheses for multiple enclosures. Curly brackets { } are used for lists, and square brackets [] are used for matrices.

On a similar note, the calculator has a \div key, but it shows up as / . When doing complicated fractions, use parentheses freely because the division sign / can't be expanded to “show” what the numerators and denominators are.

Error Messages

When a command is entered improperly an error message will appear. It is a good idea to pay attention to what kind of error is described. Commonly a syntax error will appear, meaning that correct “grammar” wasn’t used. Two examples are using closed parenthesis “)” without an open parenthesis “(”, and confusing the negative sign “(-)” with the subtraction sign “-”. Another error message, Invalid Dim (invalid dimension), occurs with lists and matrices.

The calculator will give you two options, Quit and Goto. Goto is more useful because it will go to where the error occurred and let the user edit the command. Quit simply quits the problem and lets you start over.

Busy Indicator

When the calculator is busy with calculating, graphing, or a program, a moving “worm” indicator will appear in the upper right corner. You must wait for the calculator to finish before you can continue using it. There is the option to quit the process in the middle of its calculating. To do this, press the **ON** button.

EVALUATING ARITHMETIC EXPRESSIONS

Order of Operations

The most important thing to keep in mind is that the calculator knows order of operations. In other words, when you enter an expression it will do it in the correct order, but you must be careful to enter it properly.

Let’s look at some examples (from an Intermediate Algebra handout):

-8^2 is entered by pressing **(-)** then **8** then **x²**

(Note that **x²** and **x⁻¹** just put the exponent in the display, not the “x”.)

The calculator correctly computes the answer as -64, because order of operations tells it to do the exponent before the negative. So $-8^2 = -(8)(8) = -64$.

$(-8)^2$, with its parenthesis, can be written as $(-8)(-8)$. So the calculator will get the correct answer of 64.

Because two is the most common exponent (with its own name, “squaring”), it has its own button **x²**. Any exponent, however, can be entered using the caret key **^** (it means “raise to the power”). Let’s see some applications.

5^3 is entered as $\boxed{5}$, $\boxed{\wedge}$, and $\boxed{3}$. On the calculator it will look like "5^3". The answer will come out as 125.

$(-2 + 3 \cdot 4)^3$ would be entered as $(-2 + 3 \cdot 4)^3$.

$81^{1/2}$ is a bit tricky. We know that the whole 1/2 is in the exponent because we write it smaller, up, and to the right (it's called a superscript). But if you enter $81^{1/2}$ the calculator will do order of operations and do 81^1 first, then divide by 2, and get 40.5. What we really want is all of 1/2 in the exponent, so use parenthesis and enter it as $81^{(1/2)}$ and you will get the correct answer of 9.

$\sqrt[3]{125}$ is entered by going into the $\boxed{\text{MATH}}$ menu. From there, choose 4, which is $\sqrt[3]{}$. This brings up the cube root symbol, and from there enter the number 125. The answer is 5.

$\sqrt[4]{256}$ is a little harder. You actually have to enter the number 4 first. Then go to the $\boxed{\text{MATH}}$ menu again, choose number 5, $\sqrt[x]{}$, and enter the number 256. On your screen, it will look like $4 \sqrt[x]{256}$. The correct answer 4 should result. You can check your work by doing the opposite, 4^4 , and getting 256. In case you forget to put the root you want (here it's 4), the calculator will automatically put in ANS, which means the last answer. On the screen would appear $\text{ANS} \sqrt[x]{}$, at which point you could notice the error and just use the left arrow $\boxed{\leftarrow}$ to write 4 over ANS.

Getting answers in fraction form.

To get $1/2 + 1/3$ in fraction form, enter it the usual way. The calculator's answer should be .833333... From there, just press $\boxed{\text{MATH}}$, $\boxed{\text{ENTER}}$, and $\boxed{\text{ENTER}}$.

This brought up the first choice "► Frac". And since the calculator expected a number to convert to a fraction, it chose the last answer (here .8333...). On the screen it appeared as "Ans ► Frac" and the second $\boxed{\text{ENTER}}$ did the conversion.

| -14 | (absolute values)

The calculator doesn't have the vertical bars, it uses the symbol "abs". Press $\boxed{\text{MATH}}$, arrow right to NUM, and hit $\boxed{\text{ENTER}}$ to pick the already highlighted "1: abs". This puts "abs(" on the screen, and after entering "-14" and ")" the correct answer of 14 should result.