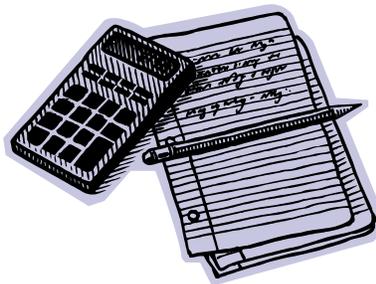


Academic Support Center

Using the TI-83/84+ Graphing Calculator PART I



Designed and Prepared by
The Academic Support Center
Revised June 2012

Using the Graphing Calculator (TI-83+ or TI-84+)

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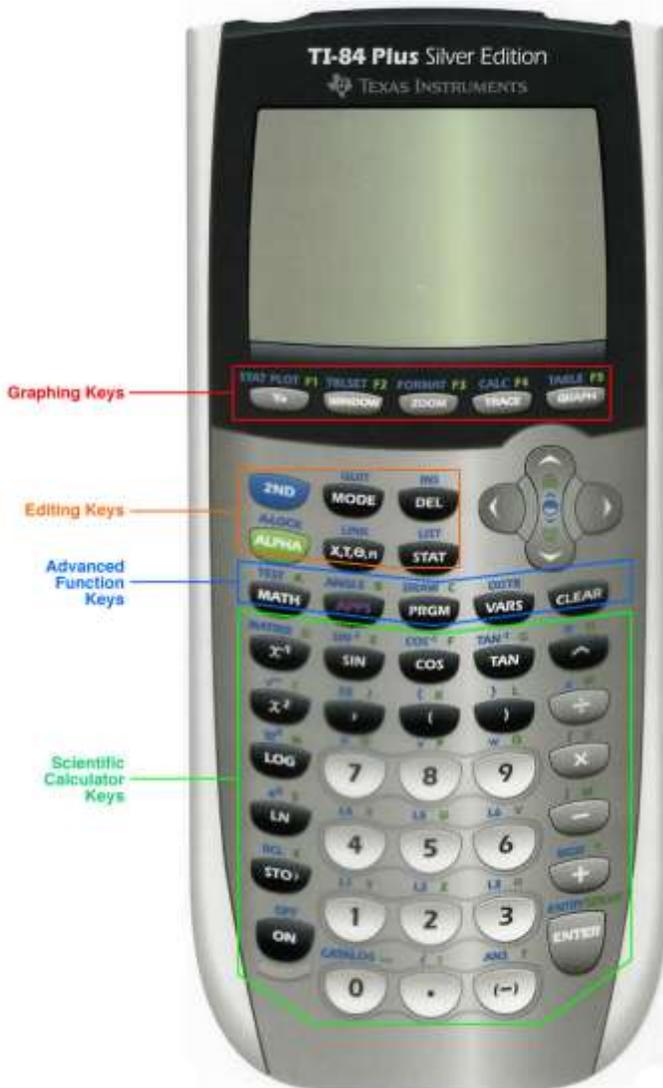
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The Basics: Characteristics of the TI-83+ & TI-84+



HOME SCREEN: This is where most calculations will take place. To access the home screen at any time-press **2nd QUIT**.

CONTRAST: If your screen is visually too light or too dark, adjust the contrast by pressing **2nd** and Cursor **UP** to darken or **DOWN** to lighten.

KEYPAD: The keys on the TI-83 and TI-84 have many functions. To access the options above the key use either the **2nd** or **ALPHA** key.

THE EQUALS SIGN: The TI-83 & TI-84 do not have your traditional = key. The **ENTER** key on the bottom right corner means =.

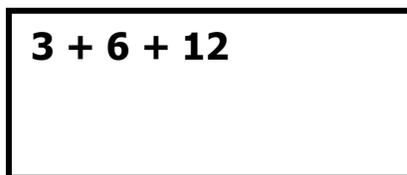
The Basics: Clearing an Entry or Error

1. If you have entered the wrong number or letter, set the cursor on the error and enter the correct information
2. If you need to delete a number or letter, set the cursor on the error, and press the **DEL** key, located next to the cursor.
3. To erase the entire line, press **CLEAR**, located underneath the cursor, once.
4. To clear the whole screen, press **CLEAR** twice.

EXAMPLE

$$3 - 6 + 12 =$$

Let's say your calculator looks like this:



To fix the problem, press **LEFT CURSOR** until it blinks over the + sign. Then, simply press **DEL** to correct the problem!

The Basics: Inserting a Character

To insert a number or letter, set the cursor on the character to the right and then press **2nd INS** (above DEL). You may enter as many characters at that point as you wish without pressing INS again.

EXAMPLE

Enter $2^2 + 4$

Change it to read $21^2 + 4$

Move cursor to "2"

Press: **2nd INS**

Press: **1**

Press: **ENTER**

The Basics: Recalling Previous Entries

Sometimes, it may be necessary to recall a previous entry, or modify a calculation. By pressing **2nd ENTER**, you can access and edit prior actions.

EXAMPLE:

Suppose you just calculated 13^2 , and you wish to find 13^4 .

PRESS: **2nd ENTER**

Move the cursor to the ² position

PRESS: **^ 4**

Your calculator should look like this:

13^2	169
13^4	28561

By pressing **2nd ENTER** repeatedly; you can recall entries further back.

Entering Expressions

Expressions are usually entered as they appear in print. The calculator is programmed to follow the order of operations. The answer will appear on the right side of the screen.

EXAMPLE:

Evaluate $27a - 18b$, for $a=136$ and $b=13$

PRESS: **27 x 136 - 18 x 13 ENTER**

$27 * 136 - 18 * 13$	3438
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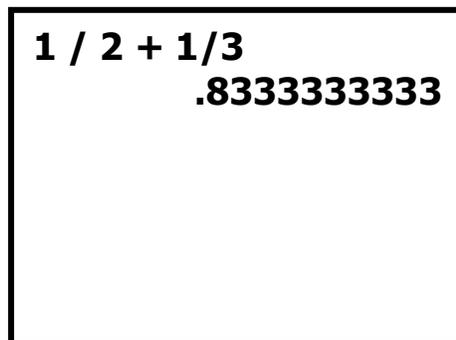
Adding & Subtracting Fractions

The TI-83 & TI-84 can perform operations with fractions. Often, the answer is expressed in decimal form, but it can easily be transformed back into a fraction.

EXAMPLE:

$$\frac{1}{2} + \frac{1}{3} =$$

PRESS: **1** **÷** **2** **+** **1** **÷** **3** **ENTER**



1 / 2 + 1/3
.8333333333

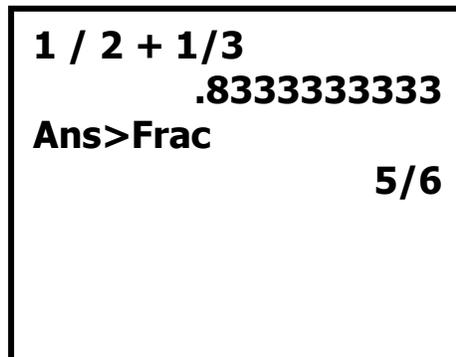
In order to change this answer back into a fraction:

Press: **MATH** key, located underneath the ALPHA key.

Press: **1** to select **>Frac**.

Press: **ENTER** to get the fractional equivalent.

Your screen should now look like this:



1 / 2 + 1/3
.8333333333
Ans>Frac
5/6

So, $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$

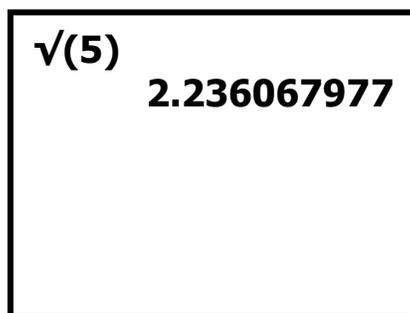
Finding and Using the $\sqrt{\quad}$ Key

To approximate square roots on the graphing calculator, you must place the $\sqrt{\quad}$ symbol **before** you enter the number. This is different than many scientific calculators. The $\sqrt{\quad}$ symbol is above the x^2 key and can be accessed by pressing 2^{nd} x^2 .

EXAMPLE

Find $\sqrt{5}$.

Press: 2^{nd} $\sqrt{\quad}$ 5) ENTER



A rectangular box representing a calculator display. Inside the box, the text $\sqrt{(5)}$ is on the top line, and the numerical result 2.236067977 is on the line below it.

So, $\sqrt{5} \approx 2.236067977$

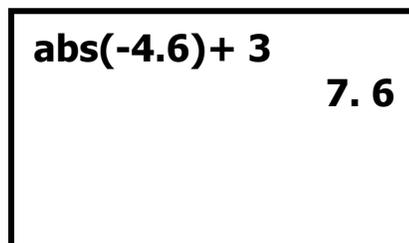
Finding and Using the $|||$ (Absolute Value) Key

The graphing calculator uses the notation $\text{abs}(\quad)$ to indicate absolute value. This operation is located in the MATH menu, and can be accessed by pressing **MATH**, **RIGHT CURSOR**, and **ENTER** to select $\text{abs}(\quad)$.

EXAMPLE

$$|-4.6| + 3 =$$

Press: **MATH** **RIGHT CURSOR** **ENTER** -4.6) + 3 **ENTER**



A rectangular box representing a calculator display. Inside the box, the text $\text{abs}(-4.6) + 3$ is on the top line, and the numerical result 7.6 is on the line below it.

So, $|-4.6| + 3 = 7.6$

Powers and the \wedge Key

To enter an exponential expression, you must enter the base first followed by the \wedge key and then the power.

EXAMPLE

$$4^5 =$$

PRESS: 4 \wedge 5 ENTER

Using the correct negative sign

On the TI-83 & TI-84, you may notice 2 negative signs. Don't worry; your calculator is not broken!

The - sign, located in the right column, is the subtraction sign. You use it for mathematical operations like $7 - 6$ and $34 - 45$.

The (-) sign, located to the left of the enter key, is the negative sign. It goes in front of a number to negate it. -4 would be entered by pressing $(-)$ then 4 .

This may take some time to get used to. If your calculator shows **ERR: SYNTAX** after you press enter, you have probably used the wrong sign! This error gives you two options: 1) QUIT and 2) GO TO. QUIT brings you to the home screen whereas GO TO brings you directly to the error.

EXAMPLE

$-5+3-6=$ should be entered as:

$(-)$ 5 $+$ 3 $-$ 6 ENTER

$-5 + 3 - 6$	-8
--------------	------

So, $-5 + 3 - 6 = -8$

Using Parentheses Correctly

On the TI-83 & TI-84, grouping symbols, like the fraction bar, must be replaced by parentheses. This is true for both numerical and algebraic expressions.

EXAMPLE:

$$\frac{11(8-6) + 4 \times 2}{2^3 + 2} =$$

To enter this on the calculator:

PRESS: (11 (8 - 6) + 4 x 2) ÷ ((2 ^ 3) + 2) ENTER

*****Note:** Parentheses can be tricky- when in doubt, put parentheses around everything!

Evaluating Expressions using the **TABLE** function

The TI-83 & TI-84 have a table feature that enables the calculator to evaluate a variable expression for different x values.

EXAMPLE

Evaluate $4x+3-x^2$ for $x = 0,1,2,3$

PRESS: **Y=** and enter the equation using the **x,T,θ,n** for x.

PRESS: **2nd Tblset** (above window key)

Make sure: TblStart=0, ΔTbl=1 and Indpnt. and Depend. are set to auto.

PRESS: **2nd Table** (above graph key)

Your screen should look like this:

X	Y₁	
0	3	
1	6	
2	7	
3	6	
4	3	

Scientific Notation

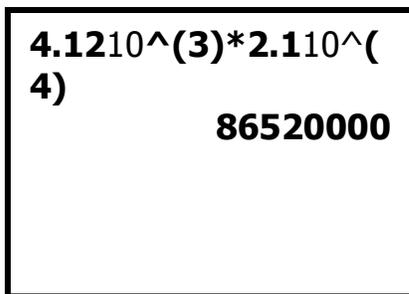
The calculator can perform operations using scientific notation. You can use either the **10^x** key or the **EE** key for this.

EXAMPLE

$$(4.12 \times 10^3)(2.1 \times 10^4) =$$

Option1- Using 10^x key by pressing 2nd LOG.

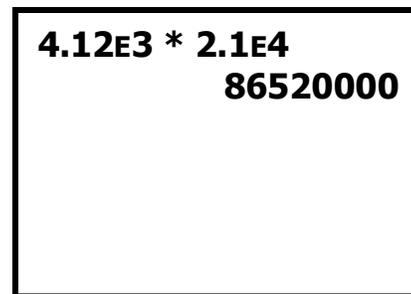
Your calculator should look like this:



4.1210^(3)*2.110^(4)
86520000

Option2- Using EE key by pressing 2nd , .

Your calculator should look like this:



4.12E3 * 2.1E4
86520000

Entering Linear Equations using Y= key

To graph an equation on the TI-83 & TI-84, the equation must be in Y= form. Once the equation is in the proper form, the equation can be graphed easily.

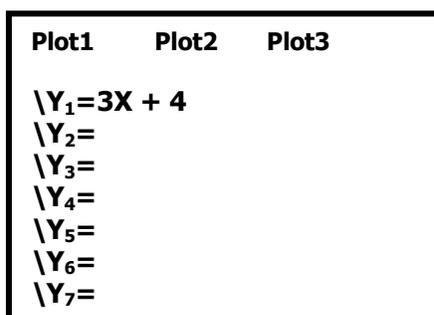
EXAMPLE

Graph $y=3x+4$ on your calculator

PRESS: **Y=** and then enter equation. Use **x,T,θ,n** key for x.

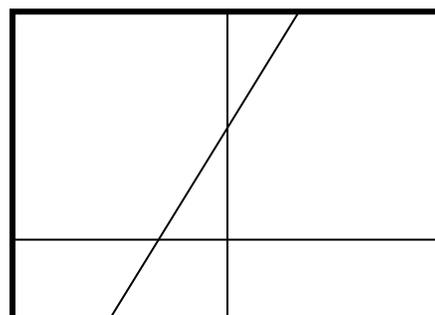
PRESS: **ZOOM** **6** (Standard)

...and then you'll have your graph!



Plot1 Plot2 Plot3
|Y₁=3X + 4
|Y₂=
|Y₃=
|Y₄=
|Y₅=
|Y₆=
|Y₇=

Press:
GRAPH



EXAMPLE

Graph $2x+4y= 8$ on your calculator

Solving for Y produces the equation $y= -\frac{1}{2}x + 2$, so that is what needs to be entered on the Y= screen.

This may take some practice, but ultimately using the graphing utility will help you greatly!

Trigonometry: Converting Angles

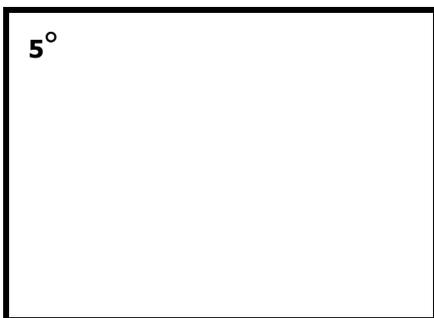
The calculator can convert angles in Degree, Minutes, and Seconds (D°M'S") notation to decimal degree form and vice-versa.

Converting from (D°M'S") Notation to Decimal Degree Form:

EXAMPLE

Convert $5^{\circ}42'30''$ to decimal degree form.

1. PRESS: **MODE**. Make sure that **Degree** is highlighted. If not highlighted, move to Degree and press **ENTER**.
2. Return to the main screen. Enter the number of degrees first, in this case 5. Then PRESS **2nd APPS** (ANGLE) and PRESS **1** for the degree symbol.



3. Enter the amount of minutes next, 42 in this example. Then PRESS **2nd** **APPS** (ANGLE) and PRESS **2** for the minutes symbol.

5°42'

4. Enter the amount of seconds next, in this example, 30. Then Press **ALPHA** and PRESS **+** (the addition sign) for the seconds symbol.

5°42'30"

5. PRESS **ENTER**.

5°42'30" 5.708333333

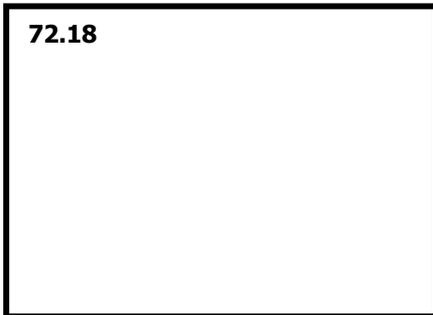
6. Round to the nearest hundredth of a degree. Your Answer is: 5°42'30"= 5.71°.

Converting Decimal Degree Form to (D°M'S") Notation:

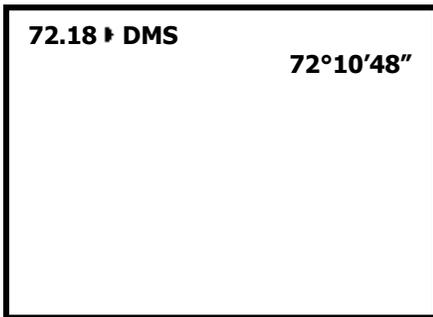
EXAMPLE

Convert 72.18° to D°M'S" notation.

1. PRESS: **MODE**. Make sure that **Degree** is highlighted. If not highlighted, move to Degree and press **ENTER**.
2. To convert decimal degree form to D°M'S" form, we enter 72.18 into the main screen.



3. PRESS **2nd APPS** (ANGLE) and PRESS **4** for DMS. Then PRESS **ENTER**.



4. Your Final Answer is: $72.18^\circ = 72^\circ 10' 48''$