

Graphing Calculator Tips....and Basics TI 82/83

HIGHLIGHTS

1. Know the keyboard.....

The keys are color coded. The color of the **2nd** key matches those functions for which it is needed to hit **2nd**. The **ALPHA** key will allow the input of letters A to Z onto the screen and will perform a few other specialized operations.

2. **Know your menus and functions.** In the back of the manual is a listing of all the functions and where to find them. The index also will give you a listing of functions and where to get help. There is also a function listing and a description of each function in the back of the manual.

CLEAR

3. **y=** This will clear the entire screen if in the main calculation area. If the calculator is in the screen, then it clears just the line which has the blinking cursor.

TI 82

TI 83

```
Y1=  
Y2=  
Y3=  
Y4=  
Y5=  
Y6=  
Y7=  
Y8=
```

```
Plot1 Plot2 Plot3  
Y1=  
Y2=  
Y3=  
Y4=  
Y5=  
Y6=  
Y7=
```

4. **DELETE** This will clear one character at a time, from right to left. **2nd** [INS] will allow a character to be inserted at the cursor

5. **STO⇒** **Using storage.** There are 26 storage areas on the calculator. Each is designated by a letter of the alphabet.. To store 5 in the letter A Press

5

STO⇒

ALPHA

[A]

Enter

(The A is above **MATH**).

Now every time A is used in a problem, the value 5 will be used. Examples Below:

```
5→A  
A²  
9A+6  
5  
25  
51
```

```
9→W: 5→L  
L+W  
2L+2W  
5  
14  
28
```

Notice the use of \therefore . This allows the input of more than one command per line.

6. Recalling previous entries to edit

2nd **Enter** Repeatedly pressing this sequence will recall all the past entries and allow a particular line to be reused with or without editing. To clear all previous entries press **2nd** **[MEM]** 3: Clear Entries (on the 83 only)

7. Basic Graphing

To enter a function to graph hit **y =** and type the function. Then hit **GRAPH**. The calculator is capable of holding 10 functions. The graphic images can be turned on and off using the cursor. Pressing **Enter** while the cursor is blinking on the '='s will turn the function off.

```
Plot1 Plot2 Plot3
\Y1=X^2
\Y2=2X-3
\Y3=J((-3)/2)
\Y4=6/X
\Y5=ln(X-3)-
\Y6=
\Y7=
```

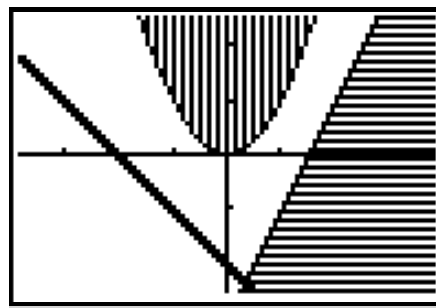
This example has Y2, Y4, and Y5 turned on while Y1 and Y3 are off and will not be displayed when the **GRAPH** button is entered.

```
Plot1 Plot2 Plot3
Y1=X^2
Y2=2X-3
-Y3=J((-3)/2)
0Y4=6/X
\Y5=ln(X-3)-
Y6=abs(X-6)
\Y7=
```

On the TI 83 placing the cursor over the \ to the left of the function will change how the function is displayed on the on the graphing screen, bold line, shading, regular line, or animated

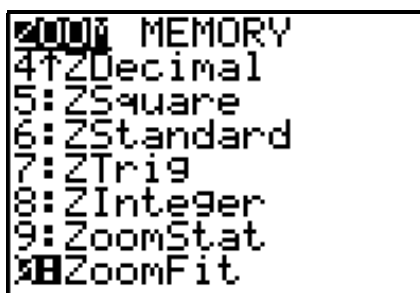
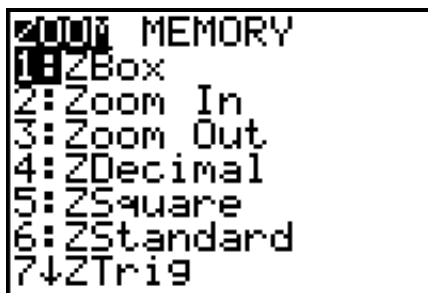
```
Plot1 Plot2 Plot3
Y1=X^2
Y2=2X-3
Y3=-X-2
\Y4=
\Y5=
\Y6=
\Y7=
```

displays as



8. ZOOM

This feature will allow the graph to be seen from different perspectives, i.e.. different viewing windows.



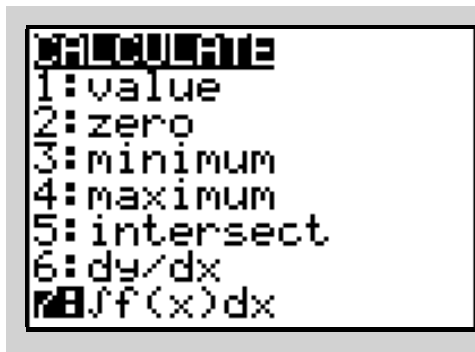
There are 9 choices on the TI82 and 10 on the TI83, the difference being the last one **ZoomFit** which will for most graphs automatically size the window to fit the graph. Each one of these is described in the Manual that came with the calculator. Basically:

1. **ZBox** will allow the choosing of a viewing window by the user
2. **Zoom In** will give a close up version centered around a point of choice
3. **Zoom Out** will allow for a larger viewing area, more or less a "bird's eye view"
4. **ZDecimal** replots the graph within a predefined window of $x = \pm 4.7$ and $y = \pm 3.1$. It can be used with good results when graphing rational functions.
5. **ZSquare** replots the graph immediately so that a circle will look like a circle.
6. **ZStandard** replots so that x and y are both ± 10
7. **ZTrig** is used for trigonometric functions
8. **ZInteger** changes the scale feature to 10.
9. **ZoomStat** redefines the viewing window so that statistical plots can be seen.

Trace

9. Will trace the function pixel by pixel and give both the x and y coordinates. If you type in a number while in TRACE the calculator will evaluate it on the graph screen. (TI 83 only)

10. [Calc]



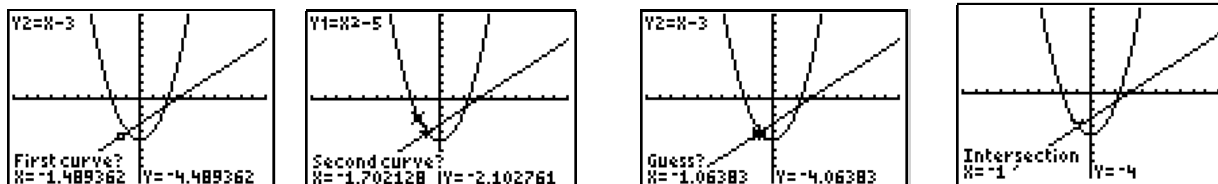
1: value will calculate the value of a function at a desired point.

2: zero (root on an TI82) will find the value of a root or a function, i.e. where it crosses the x -axis. The calculator will prompt for an upper bound, lower bound and a guess, then give the coordinates of the point.

3: maximum

4: minimum will find the value of a maximum or minimum within user defined ranges. The calculator will prompt for an upper bound, lower bound, and a guess, then give the coordinates of the desired point.

5. intersect The calculator will find the intersection of two functions on the graph prompting for a point on the first curve and another on the second curve and then a guess



6. and 7. deal with calculus

11. [TABLE] (above **GRAPH**)

The table feature displays a table of values for the functions listed on the function screen. The user may set up the table using [TBLSET] to set the difference between the values of the independent variable.

| X | Y1 | Y2 |
|-----|----|----|
| -3 | 4 | -6 |
| -2 | -1 | -5 |
| -1 | -4 | -4 |
| 0 | -5 | -3 |
| 1 | -4 | -2 |
| 2 | -1 | -1 |
| 3 | 4 | 0 |
| X=3 | | |

| | | |
|------------------|--|--|
| TABLE SETUP | | |
| TblStart=-3 | | |
| ΔTbl=.5 | | |
| Indnt: Auto Ask | | |
| Depend: Auto Ask | | |

| X | Y1 | Y2 |
|------|-------|------|
| -3 | 4 | -6 |
| -2.5 | 1.25 | -5.5 |
| -2 | -1 | -5 |
| -1.5 | -2.75 | -4.5 |
| -1 | -4 | -4 |
| -.5 | -4.75 | -3.5 |
| 0 | -5 | -3 |
| X=-3 | | |

Table can be used for many different functions including finding a point of intersection. Notice in the above figures that when $x = -1$ $y = -4$ for both $y1$ and $y2$, which agrees with the intersection in the previous example also.

12. **VAR**

This key on the TI 83 and the [YVARS] on the TI 82 will allow the "cutting and pasting" of function names to be used in other screen areas.

For example, to graph a circle $x^2 + y^2 = 16$ on the TI 83. First solve for y .

Enter Y= , type in $\sqrt{16 - x^2}$. However this will only graph the upper semicircle on the screen. To get the bottom half, one could type in $-\sqrt{16 - x^2}$ for **Y2**.
Instead cut and paste **-Y1** on that line as illustrated below.

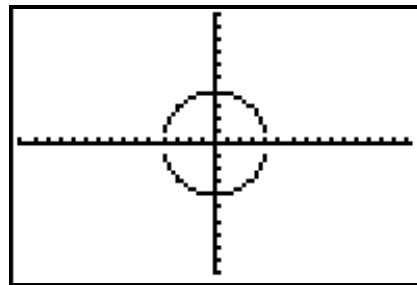
Press Y= . For **Y2** enter $(-)$, then **VAR** \rightarrow to [YVARS], **Enter** **Enter**

NOTE: (For the TI 82 [YVARS], **1: Function, 1:Y1**

```

Plot1 Plot2 Plot3
Y1=√(16-X²)
Y2=-Y1
Y3=
Y4=
Y5=
Y6=
Y7=

```



The TI 83 also has a [CATALOG] key from which pasting function names can also be done. Type the letter of the function and that list appears alphabetically.

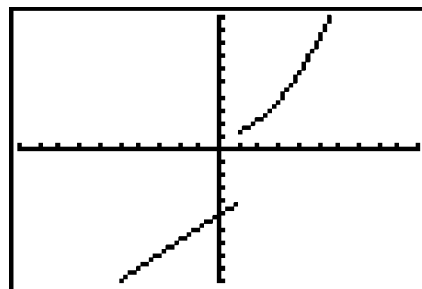
13. **Piecewise Functions.** it is possible to graph piecewise functions on the calculators.

Enter each function in parentheses, and after each function type in the restrictions also in parentheses. The symbols for $=$, $<$, $>$, \leq , \geq , and \neq can be found on the [TEST] menu

```

Plot1 Plot2 Plot3
Y1=(.3X²+1)/(X≥1)
Y2=(X-5)/(X<1)
Y3=
Y4=
Y5=
Y6=

```



| X | Y1 | Y2 |
|------|-------|------|
| .4 | 0 | -4.6 |
| .6 | 0 | -4.4 |
| .8 | 0 | -4.2 |
| 1 | 1.3 | 0 |
| 1.2 | 1.432 | 0 |
| 1.4 | 1.588 | 0 |
| 1.6 | 1.768 | 0 |
| X=.4 | | |

Look at the table to see where the function is discontinuous.

Using Equation Solver

Math 0

EQUATION SOLVER
eqn: 0=

TI 83

2^X-6=0
X=3
bound={ -1E99, 1...

2^X-6=0
■ X=2.5849625007...
bound=...1E99, 1■...
■ left-rt=0

Type in equation ,(make sure it is all equal to 0) then hit enter , then guess (*we guessed 3*), and while the cursor is on the guess, press Alpha Enter (*solve in green*)

Note: it will find only the root closest to your guess if there is more than one. The TI 83 also can solve equations with more than one variable such as $A^2 + B^2 - C^2 = 0$

Math 0

TI 82

Enter

First, rewrite the equation in the form of $f(x) = 0$, then use the following syntax:
EX.

($2^x - 6$, then comma, what variable you are solving for, (here it is x) and then comma, a guess (we guessed 2)., then hit Enter. Note: it will find only the root closest to you

solve(2^X-6,X,2)
2.584962501