

# Getting Started with the TI-89

## HOME

When you turn on your TI-89, the **HOME** screen should appear. If it does not, press the **HOME** button.

From the **HOME** screen, you can access the CAS menus by pressing the **F1** to **F6** buttons. The **F6** menu can be accessed by the arrow keys or by pressing **2<sup>nd</sup> F1**

### F1 Tools

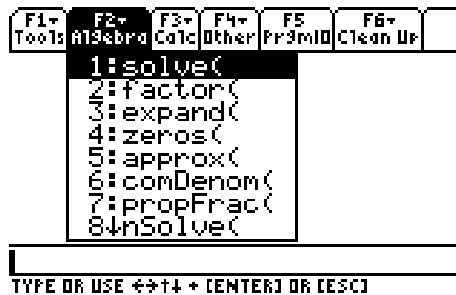
This is similar to a conventional File or Edit menu on a computer program.



Option **8 Clear Home** is useful to clear the HOME screen of previously used expressions.

### F2 Algebra

This has many of the CAS commands.



An example of each Algebra command is listed in the table below:

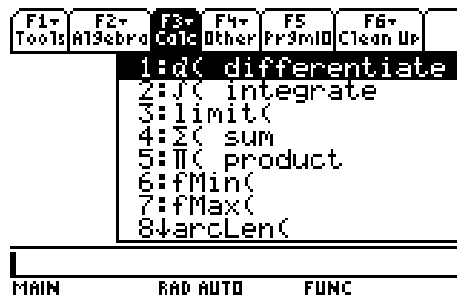
Example	Solution
$\text{solve}(x^2-9=0,x)$	$x = -3$ or $x = 3$
$\text{factor}(x^2-16)$	$(x - 4)(x + 4)$
$\text{expand}(x*(x-5))$	$x^2 - 5 \cdot x$
$\text{zeroes}(x^2-5x+6,x)$	$(2 \ 3)$
$\text{approx}(\pi)$	3.14159
$\text{comDenom}(x^2/2+x/5)$	$\frac{5 \cdot x^2 + 2 \cdot x}{10}$

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propFrac((5x <sup>2</sup> +2x)/10)	$\frac{x^2}{2} + \frac{x}{5}$
nSolve(3x-5=0,x)	1.66667
Trig tExpand(sin(2x)) tCollect(2cos(x) <sup>2</sup> -1)	2·sin(x)·cos(x) cos(2·x)
Complex cSolve(x <sup>2</sup> +9=0,x) cFactor(x <sup>2</sup> +9,x) cZeroes(x <sup>2</sup> +9,x)	x = 3·i or x = -3·i (x + -3·i)·(x + 3·i) (3·i -3·i)
Extract getNum(x <sup>2</sup> /2+x/5) getDenom(x <sup>2</sup> /2+x/5) left(x <sup>2</sup> -2x=8) right(x <sup>2</sup> -2x=8)	x·(5·x + 2) 10 x <sup>2</sup> - 2·x 8

### F3 Calc

This has many of the calculus commands:

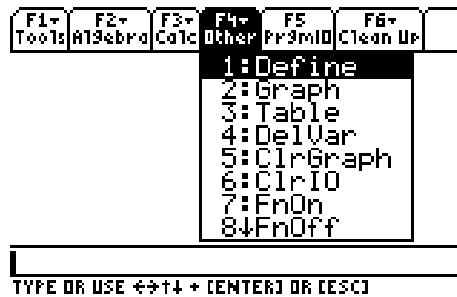


An example of each Calculus command is listed below:

Example	Solution
d(x <sup>3</sup> +4x <sup>2</sup> ,x)	3·x <sup>2</sup> + 8·x
∫(3x <sup>2</sup> +8x,x)	x <sup>3</sup> + 4·x
lim(x <sup>2</sup> -4,x,1)	-3
Σ(x <sup>2</sup> ,x,1,5)	55
∏(x <sup>2</sup> ,x,1,5)	14400
fMin(x <sup>2</sup> -2x,x)	x = 1
fMax(-x <sup>2</sup> +4,x)	x = 0
arcLen(√(9-x <sup>2</sup> ),x,-3,3)	9.42478
taylor(e <sup>x</sup> ,x,5)	$\frac{x^5}{120} + \frac{x^4}{24} + \frac{x^3}{6} + \frac{x^2}{2} + x + 1$
nDeriv(x <sup>3</sup> ,x,h)	3·x <sup>2</sup> + h <sup>2</sup>
nInt(x <sup>2</sup> ,x,1,5)	41.33333
deSolve(y''+2y'+y=x <sup>2</sup> ,x,y)	y=(@1 ·x + @2) · e <sup>-x</sup> + x <sup>2</sup> - 4·x + 6 (this is a general solution)

### F4 Other

This has miscellaneous commands.



A few examples of useful commands in this menu are listed below:

Example	Solution
Define $f(x)=x^4-4$	Done
$f(-1)$	-3
Define $ab=5$	Done
$ab$	5
DelVar $ab$	Done
$ab$	$ab$

Another useful feature from this menu is the ability to turn the graph plots on and off using the **FnOn** and **FnOff** selections.

### F5 PrgmID

This menu accesses CAS programs. This screen will be blank until programs are written or imported.

### F6 Clean Up



Selecting Option **1 Clear a-z** is recommended to clear the variables before starting a new session.

## 2D Plotting

The 2D plotting features are similar to those of a TI-83 or TI-83+. The green options above the **F1** to **F5** buttons allow you to perform these operations. To access them, press the green **Ⓢ** button first. You can also access the **Y=Editor**, **Graph** and **Table** applications by first pressing the **APPS** button.

## Statistics

To access the Data Editor:

- press the **APPS** button
- select option **6: Data/Matrix Editor**
- select **3: New**



Enter the following numbers into lists **c1** and **c2**.

F1+ Tools	F2 Plot Setup	F3 Cell Header	F4 Calc	F5+ Util	F7 Stat
DATA					
	c1	c2	c3		
1	1	3			
2	2	4			
3	3	6			
4	4	4			
r4c2=4					
MAIN RAD AUTO FUNC					

There are seven menus available for the Data Editor.

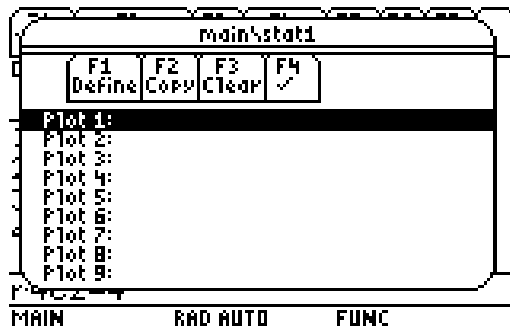
### F1 Tools menu

This is similar to a conventional File menu on a computer.



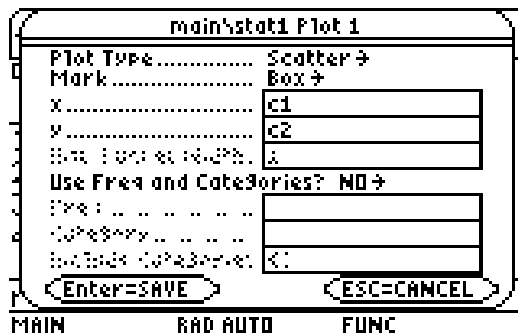
## F2 Plots Setup

Select F2 to enter the Plots Setup screen



Once you are viewing this screen, select **F1 Define** to set up a statistical plot.

- Keep the **Plot Type** on **Scatter**
- Keep the **Mark** on **Box**
- In the **x** box, enter **c1**
- In the **y** box, enter **c2**



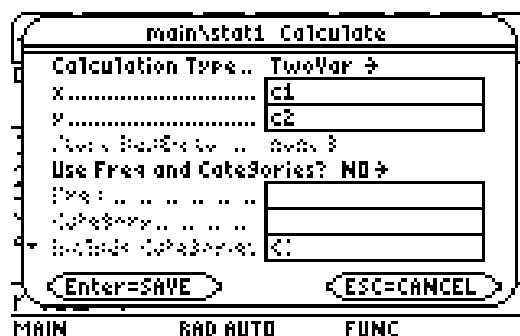
Press **Enter** twice to return to the Data Editor

**F3 Cell** takes you to a specific cell. Select **ESC** to return to the Data Editor

**F4 Header** allows you to change the header of each column. eg You could change the header **c1** to read **time**.

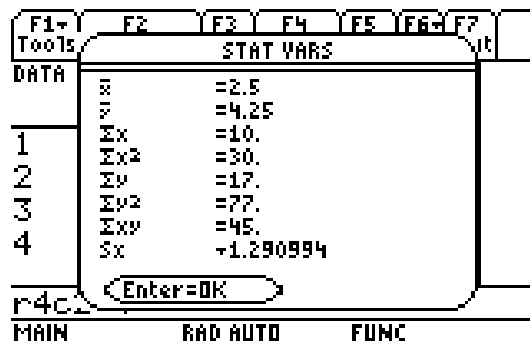
**F5 Calc** takes you to the calculate screen

- Set **Calculation Type** to **TwoVar**
- In the **x** box, enter **c1**
- In the **y** box, enter **c2**

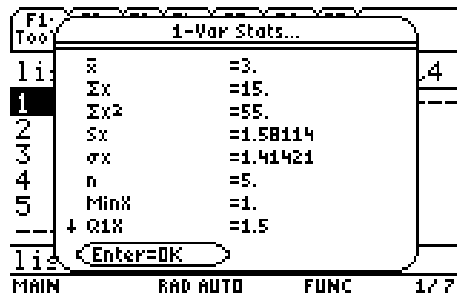


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Press **Enter** to get the Two Variable Statistics. Use the up and down arrow keys to scroll through the statistics.



Press **Enter** to return to the Data Editor.



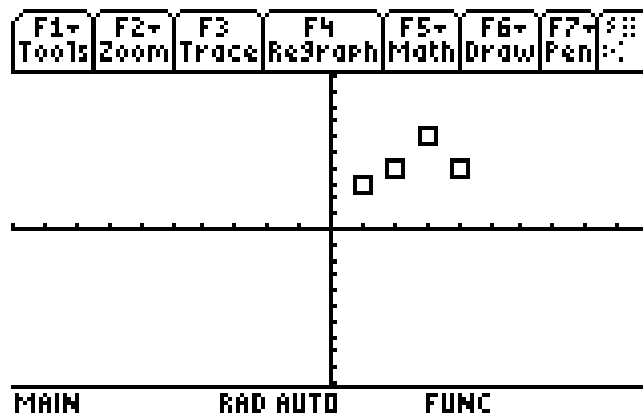
Scroll down with the arrow keys to view the rest of the **1-Var Stats** data. Press **F5** again to experiment with the other calculation types such as OneVar, CubicReg, ExpReg, etc.

**F6 Util** (or 2<sup>nd</sup> F1) accesses the utilities such as Delete, Sort and Clear.

**F7 Stat** (or 2<sup>nd</sup> F2) displays the statistics that were set using the **F5 Calc** menu.

## Statistical Plotting

Select the Graph button (green  $\blacklozenge$  F3) to plot the data.



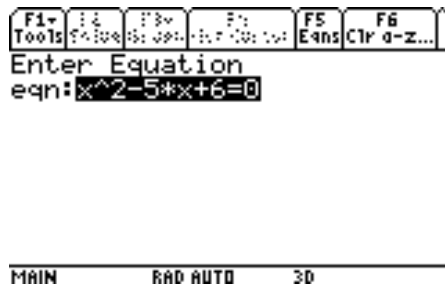
If previous graphs appear on the screen, you can select **Y=** (green ♦ F1) button and clear the functions. Alternatively, you can turn off the functions by selecting **HOME** → **F4 Other** → **8 FnOff**.

## Numeric Solver

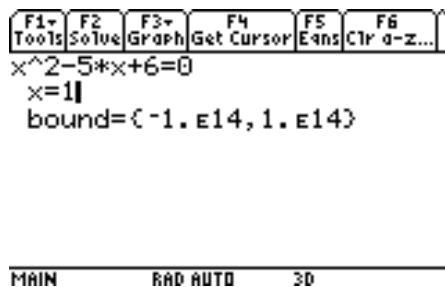
Return to the opening screen by selecting **APPS**

Select **Numeric Solver**

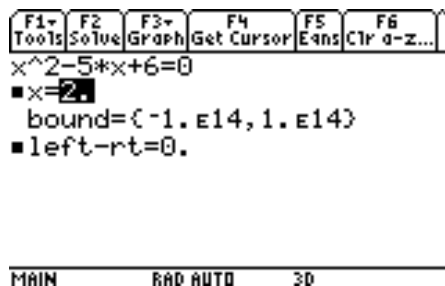
Enter the equation  $x^2 - 5x + 6 = 0$



Select **Enter** and make an estimate of  $x=1$



Select **F2 Solve** to get the solution  $x = 2$ .



Repeat with a guess of  $x = 4$  to get the other solution of  $x = 3$ .

## 3D Plotting

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Press the **MODE** button and use the arrow keys to change the **Graph** setting to **3D**. Use the same buttons that are used for 2D graphing to enter and graph the equations. Be aware that there can be a considerable time delay involved with each 3D plot.

Try  $z1 = y^2 - x^2$