

THE TI 89

MODE Press **MODE**. The default settings are:

Page 1	Page 2	Page 3
Graph.....Function	Split Screen.....Full	Unit System.....SI
Current Folder.....Main	Split 1 App.....Home	
Display....Float 6		
Angle.....Radian		
Exponential.....Normal		
Complex...Real		
Vector.....Rectangular	Exact/Approx.....Auto	
Pretty Print.....On	Base.....Dec	

You won't need to know about most of these. To change a setting, scroll to the setting, type **▶**, and type the desired number. Hit **ENTER** twice. To move from one page to the other, follow the instructions on the screen.

DARKEN OR LIGHTEN SCREEN

Hold down the green diamond (which we'll denote by **♦**) and press the black minus key (to lighten) or the addition key (to darken).

HOME SCREEN

The top row of buttons is called the **Toolbar**.

The large space in the middle is called the **History Area**-it contains the results of calculations.

The narrow band just below the History Area is called the **Entry Line**-it's where you enter calculations that you want the TI-89 to perform.

SAMPLE CALCULATIONS

Example: Find $\cos(\pi / 6)$. Type **2nd cos 2nd π \div 6) ENTER**

Example: Find $\cos^{-1}(1/2)$. Type **♦ \cos^{-1} 1 \div 2) ENTER**

FORM OF ANSWER

In Auto Mode the calculator gives you an exact answer (such as $\frac{\sqrt{3}}{2}$ or $\frac{\pi}{6}$) instead of a decimal approximation. However, if any of the numbers you enter contain a decimal point, the calculator will give you a decimal answer.

In Auto Mode you can convert an exact answer to a decimal by typing **♦ \approx .**

CLEARING AND EDITING THE ENTRY LINE: VIEWING AND CLEARING THE HISTORY AREA

To clear the Entry Line hit CLEAR. If that doesn't work, hit CLEAR twice.

To edit the Entry Line first use the blue arrow keys to move to the desired position.

To insert an entry simply type that entry.

To delete an entry place the cursor just after the entry and use the black arrow key (the one that points to the left).

You can move the cursor into the History Area by using ▲. To see calculations that are too long for one line, use ▲ until the desired calculation is highlighted and then use ►. To see calculations which have scrolled off the screen, continue to use ▲. To return to the Entry Line, press ESC or use ▼ repeatedly.

To clear the History Area (and all previous screens) press F1 8.

SAMPLE CALCULATIONS USING THE F2 (ALGEBRA) TOOL

EXAMPLE: Factor $x^3 - 2x^2 + 4x - 8$.

F2 2 x ^ 3 - 2 x ^ 2 + 4 x - 8) ENTER

EXAMPLE: Find $\frac{1}{x} + \frac{x}{x^2 - 4}$

F2 6 1 ÷ x + x ÷ (x ^ 2 - 4)) ENTER

EXAMPLE: Find $(2x+y)^4$

F2 3 (2 x + y) ^ 4) ENTER

EXAMPLE: Write $\frac{x^3}{x^2+1}$ in a form that doesn't involve improper fractions.

F2 7 x ^ 3 ÷ (x ^ 2 + 1)) ENTER

DEFINING AND EVALUATING A FUNCTION

Suppose we want to define y_1 to be \sqrt{x} . First type \blacklozenge F1. Then make sure the marker is on y_1 and hit CLEAR if there is already a function there. Then type

2nd $\sqrt{\quad}$ x) ENTER

To return to the Home Screen type 2nd QUIT

To evaluate y_1 at a number (say 9) type y 1 (9) ENTER

STOPPING A CALCULATION

To stop a calculation press ON. Then press ESCAPE.

BUILDING A TABLE

Suppose we want to obtain a table which shows the values of $y_1 = \sqrt{x}$ at various values of x (say 1.1, 1.2, and 1.3).

- (1) Press \blacklozenge F4 to make sure the INDEPENDENT category is on ASK. If it is on AUTO, move the cursor to AUTO and hit \blacktriangleright Press 2 and then ENTER.
- (2) Hit \blacklozenge F5.
- (3) If the table needs clearing type F1 8 ENTER
- (4) The marker should be on the 1ST entry under x . Type
1.1 ENTER \blacktriangledown 1.2 ENTER \blacktriangledown 1.3 ENTER
- (5) To return to the Home Screen type 2nd QUIT

GRAPHING

Suppose we want to graph $y_1 = (.5)^x$ and $y_2 = x^2$ in the viewing window $-3 \leq x \leq 3, -1 \leq y \leq 5$.

Press \blacklozenge F1 and enter the two functions under y_1 and y_2 . Make sure you hit ENTER after each.

Press \blacklozenge F2 and type in -3 for XMIN, 3 for XMAX, -1 for YMIN, and 5 for YMAX.

Press \blacklozenge F3

When the graph is shown there is a menu at the top of the screen. To trace along the graph, press F3 and use \blacktriangleright or \blacktriangleleft to move along the graph. To move to the point with a specific value of x , type that x value and then type ENTER. If you have graphed several functions and the trace cursor is not on the function you want, type \blacktriangledown or \blacktriangle The function number is shown on the screen.

To zoom in or out at a particular point press F2 and type 2 (zoom in) or 3 (zoom out). Then move the cursor to the desired point and press ENTER.

FINDING THE INTERSECTION OF TWO FUNCTIONS

On the graph screen the MATH menu at the top of the screen has a number of useful items. Let's demonstrate one of these by finding the intersection of the two graphs from the previous section.

From the graph screen type F5 and then type 5. Select the first function that you want (using ▲ or ▲ as necessary) and press ENTER. Select the second function that you want (using ▼ or ▼ as necessary) and press ENTER. Then set the lower bound for x (either type the x value or use ► or ◀ to move to the desired lower bound). Press ENTER. Set the upper bound in the same way. The desired point will then be displayed.

SOLVING EQUATIONS

There are several ways to solve equations on the TI-89. Suppose we want to solve $(.5)^x = x^2$. From the Home Screen we type F2 and then type 1. We then type $(.5) \wedge x = x \wedge 2, x)$ ENTER. The calculator will determine as many exact solutions as possible and then use approximate numerical methods to find other solutions. You should obtain 3 solutions for the given equation. Here we are assuming that we are in AUTO mode (which is the default).

Another method of solving equations would be to let the left side of the equation be y1, let the right side be y2, and find the intersections of y1 and y2 by graphing both and using the INTERSECTION command from the MATH menu on the graph screen.

CATALOG

If you want to select a command and you don't know where it is, you can use the CATALOG key. The commands are in alphabetical order; commands that do not start with a letter are at the end. To move to the command you can use ▼ or ▲ to move one command at a time or you can type the first letter of your command (to get closer). In this case you would not press ALPHA when you type the letter. Press ENTER (or, to exit without selecting a command, press ESCAPE).