



hp calculators

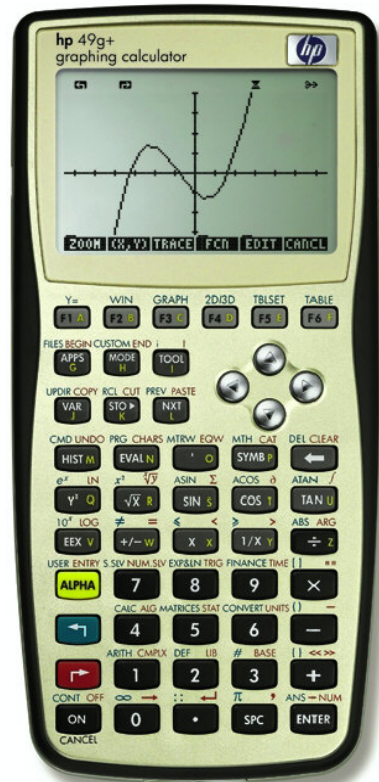
HP 49G+ The basics of plotting functions

Plotting on the HP 49G+

The 2D/3D (PLOT SETUP) Form

The WIN Form

Examples of plotting functions



Plotting on the HP 49G+

The HP 49G+ calculator provides a host of plots to allow the user to visualize data or relationships between them. The GREEN shifted functions of the top row of keys on the HP 49G+ allow access to many of the input forms where plotting specifications may be entered.

The 2D/3D (PLOT SETUP) Form

The 2D/3D (PLOT SETUP) Form is accessed from the LEFT shifted function of the F4 key by pressing and holding down F4 and then pressing F4 , to access 2D/3D . When pressed, a form is displayed with a number of choices related to plotting.

```

RAD XYZ BIN R= 'V'
<HOME>
PLOT SETUP
Type:Function      d:Rad
EQ: SIN(T)+T.i

Indep:'T'      _Simult  ☒ Connect
H-Tick:10.  V-Tick:10.  ☒ Pixels
Choose type of plot
CHOOS  AXES  ERASE  DRAW
  
```

Figure 1

The first choice deals with choosing the plot type. The selections for plot type are displayed by pressing F2 , which has the label TYPE right above it. The plot types include plotting functions, polar plots, parametric plots, differential equation plots, conic plots, truth plots, histograms, bar charts, scatter charts, slopefield charts, fast 3D charts, wireframe plots, Ps-contour plots, Y-slice plots, gridmap plots, and Pr-surface plots. A CHOOSE Box appears as shown below.

```

RAD XYZ BIN R= 'V'
<HOME>
Type:Function      Rad
EQ:S               Parametric
Inde               Conic
H-Ti               Truth
Choo               Histogram
                   CANCEL  OK
  
```

Figure 2

The Plot Setup form also allows the user to specify the equation being plotted if the cursor is placed on the EQ: field and the EQ menu label is pressed – this invokes the EquationWriter to allow for the construction of the equation to be plotted. The form also allows the angle measure used and the independent variable to be specified (note: the default is often 'X', but for parametric plots, this will be changed to 't'). In addition, several check boxes that are used to indicate whether the plotted points should be automatically connected together by the calculator and the horizontal and vertical tick marks used for the graph. The form also allows for the plotting of more than one function at a time.

The WIN Form

The WIN form allows for the plot window specifications to be entered and changed. The lower and upper horizontal and vertical values displayed on the graph can be changed. The lower and upper value for the independent variable can also be specified on this form. To open the WIN form, press and hold down F4 and press F2 , which is WIN . The following form appears:

```

RAD XYZ BIN R= 'V'
<HOME>
PLOT WINDOW - PARAMETRIC
H-View:1.          1.
V-View:-.942477    6.283185
Indep Low: 0.      High:6.28318
Step: Default     _ Pixels

Enter minimum horizontal value
EDIT  AUTO  ERASE  DRAW
  
```

Figure 3

The menu label EDIT will discard the results of a previous plot and the menu label DRAW will begin the plot.

Examples of plotting functions

Example 1: Plot $Y = X^2 - 4$ from $X = -3$ to $+3$. Display values of Y from -6 to $+6$.

Solution: (do not forget to press AND hold the key while pressing the key)

```
RAD XYZ BIN R~ 'X'
<HOME>
-----
PLOT SETUP
Type:Function      d:Rad
EQ: X^2-4

Indep:'X'          Simult  Connect
H-Tick:10.  V-Tick:10.  Pixels
Plot Functions simultaneously?
EDIT ✓CHK  AXES ERASE DRAW
```

Figure 4

```
RAD XYZ BIN R~ 'X'
<HOME>
-----
PLOT WINDOW - FUNCTION
H-View:-6.          6.
V-View:-6.          6.
Indep Low: -3.      High:3.
Step: Default      Pixels
Enter indep var increment
EDIT  AUTO ERASE DRAW
```

Figure 5

Answer: The plot is displayed.

```
RAD XYZ BIN R~ 'X'
<HOME>
-----
200M (X,Y) TRACE Fcn EDIT CANCEL
```

Figure 6

To move the cursor along the graph and read the (X,Y) coordinates of the cursor's position, press and (which is actually displayed as (X,Y) in the reverse menu label font on the calculator screen) then move the cursor using the and arrow keys. Press to bring the menu labels back on the screen. To get out of the Plot Environment press .

Example 2: Plot the equation $Y = \sin(X)/X$ from -2π to $+2\pi$. Assume Radians angle mode.

Solution: (do not forget to press AND hold the key while pressing the key)

```
RAD XYZ BIN R~ 'X'
<HOME>
-----
PLOT SETUP
Type:Function      d:Rad
EQ: SIN(X)
      X
Indep:'X'          Simult  Connect
H-Tick:10.  V-Tick:10.  Pixels
Plot Functions simultaneously?
EDIT ✓CHK  AXES ERASE DRAW
```

Figure 7



Figure 8

Answer: The plot is displayed.

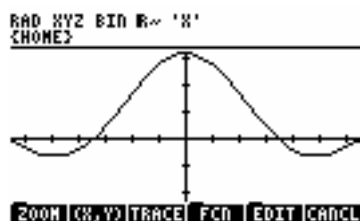


Figure 9

To move the cursor along the graph and read the (X,Y) coordinates of the cursor's position, press and (which is actually displayed as (X,Y) in the reverse menu label font on the calculator screen) then move the cursor using the \leftarrow and \rightarrow arrow keys. Press F_2 to bring the menu labels back on the screen. To get out of the Plot Environment press .

Example 3: Plot the equation $Y = \ln(X)/\tan(X)$ from 0 to $+2\pi$. Assume Radians angle mode. Display the horizontal view from 0 to $+2\pi$. Display the vertical view from -10 to $+10$.

Solution: \leftarrow 2D/3D \rightarrow \triangle ENTER (do not forget to press AND hold the \leftarrow key while pressing the 2D/3D key)
 ∇ \rightarrow CLEAR LN TAN \times \div TAN \times ENTER \times ENTER



Figure 10

ENTER \leftarrow WIN 0 ENTER 2 \leftarrow π \times \rightarrow NUM ENTER / 0 $\frac{\pi}{L}$ ENTER / 0 ENTER
 0 ENTER 2 \leftarrow π \times \rightarrow NUM ENTER



Figure 11

Answer: The plot is displayed.

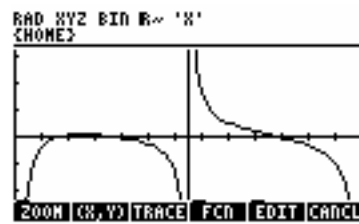


Figure 12

To move the cursor along the graph and read the (X,Y) coordinates of the cursor's position, press and (which is actually displayed as (X,Y) in the reverse menu label font on the calculator screen) then move the cursor using the and arrow keys. Press to bring the menu labels back on the screen. To get out of the Plot Environment press .