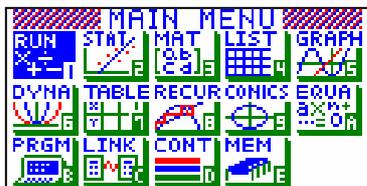# Graph Drawing in RUN mode.

This resource was written by Derek Smith with the support of CASIO New Zealand. It may be freely distributed but remains the intellectual property of the author and CASIO.

Select RUN mode from the main menu by using the arrow keys to highlight the RUN icon or pressing 1.

The functions listed (and there are many more) have been 'installed' into the calculator for quick graphing. Each has its own unique pre-set domain and range values.
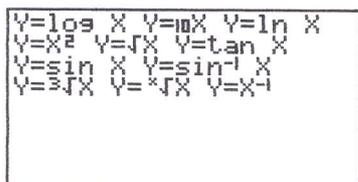
Example:
Draw the graph of y = √ x

Key	Result
Highlight **RUN mode** and press EXE	
SHIFT F4	
F5	
F1	
SHIFT x^2	
EXE	

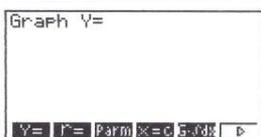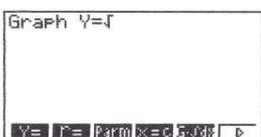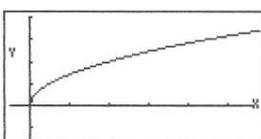**[N.B. There is no need to include the 'X'.]**

The graph, as it appears on the screen gives a clear idea of the shape, but no indication of the values on the horizontal or vertical axis, (x , y) except for ------+------ marks on the axis.
In order to find information on the axes you can use the 'trace' SHIFT F1 then use the ◄ ► arrows.
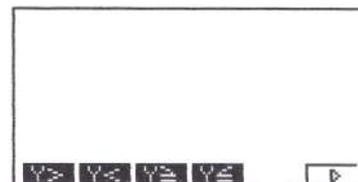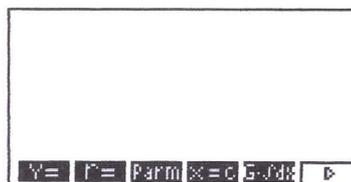
Key	Result
SHIFT F3 to view the domain and range values: **View Window**	

This display tells the user that on the x-axis the scale is 12, and hence the marks on the x axis are 0, 2, 4, 6, 8, 10. The y axis has a scale of 1 and hence the marks on the y axis are -1, 0, 1, 2, 3, 4.

Key	Result
Clearing the Screen Cls **SHIFT F4 F1 EXE** After each graph has been drawn then **F1** followed by **EXE** is necessary to clear the previously drawn graph otherwise it will be superimposed.	

Note:
Numerous graphs can be superimposed, allowing linear programming. Separating each graph equation with a ':' (colon) provides functions that can be traced and if necessary zoomed in on to find vertices that define the feasible region (points of intersections) etc.

Graphs may need to have the Domain and Range edited.

Key	Result
SHIFT VARS F6 F3 **F1** **F5** for the ':' symbol	

Changing the values in the V-Window is easily executed.

For example:
For the graph y = (x-1)/(x+2) a suitable range could be -4<x<3 and -6<y<6

Key	Result
-4	**EXE**
3	**EXE**
1	**EXE**
-6	**EXE**
6	**EXE**
1	**EXE**

Varying the **Domain** and **Range** is a necessary skill when developing the connections between the graphical, symbolic and numerical aspects of the graphs and equations.

Tracing Functions
The interpretation of the graphed functions is supplemented by the use of the Trace key.
The (x , y) values of points on the curve are displayed underneath the drawn graph.

For example:
For the graph y = x^2, a suitable range could be
-4 < x < 3 and -6 < y < 6

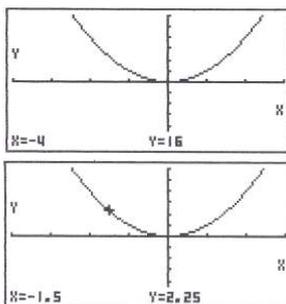| Key	Result
Graph y =^{2}	
SHIFT F4 F5 F1 X^2	
SHIFT F1 then use	
◀ ▶	

Using the left and right arrows, you can trace over the graph and give accurate x and y values of many points on the curve.
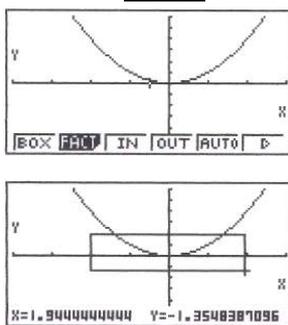
Zooming In and Out
The 'zooming' is easily initiated when parts of a graph needs to be seen in more detail - 'roots' to the equation, maximum / minimum points or other aspects under investigation.

Key	Result
SHIFT F2	
F1	

By choosing the **BOX** you can decide for your self what 'new' domain and range values will be used for the V-Window. To make the **BOX,** use the arrows to determine where a vertex of the **BOX** is to be then press **EXE**. Use the arrows again to complete the **BOX**. When you are satisfied with its position, **EXE** again and the new view of the contents of the **BOX** will be drawn.

Note:
The different 'menu bars' 'Fact' scale factor for V-Window for IN and OUT
'IN'
'OUT'
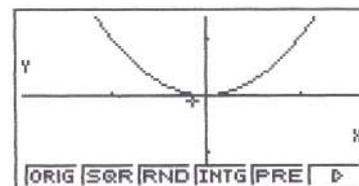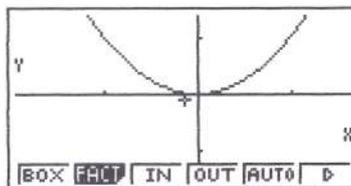'AUTO' the calculator will zoom in on centre of screen

' ▶ ' next selection window
'ORIG' the original graph drawn before zooming in or out
'SQR'
'RND'
'INTG'
'PRE'

Plotting Points and joining them with a line
Plotting points from tables for example is easy to do, as is drawing a line between these points.

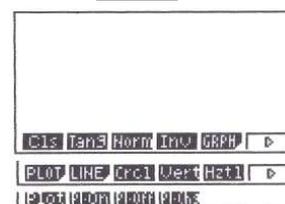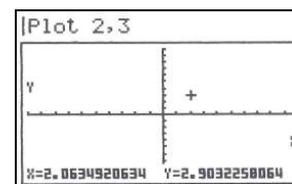| Key	Result
SHIFT	
F4	
F6	
F1	
F1	

Key in your points 2,3.

SHIFT	
F6	
EXE	
F1	

Key in your points 5,6.

EXE	
SHIFT	
F6	
EXIT	
F2	
F1	
EXE	