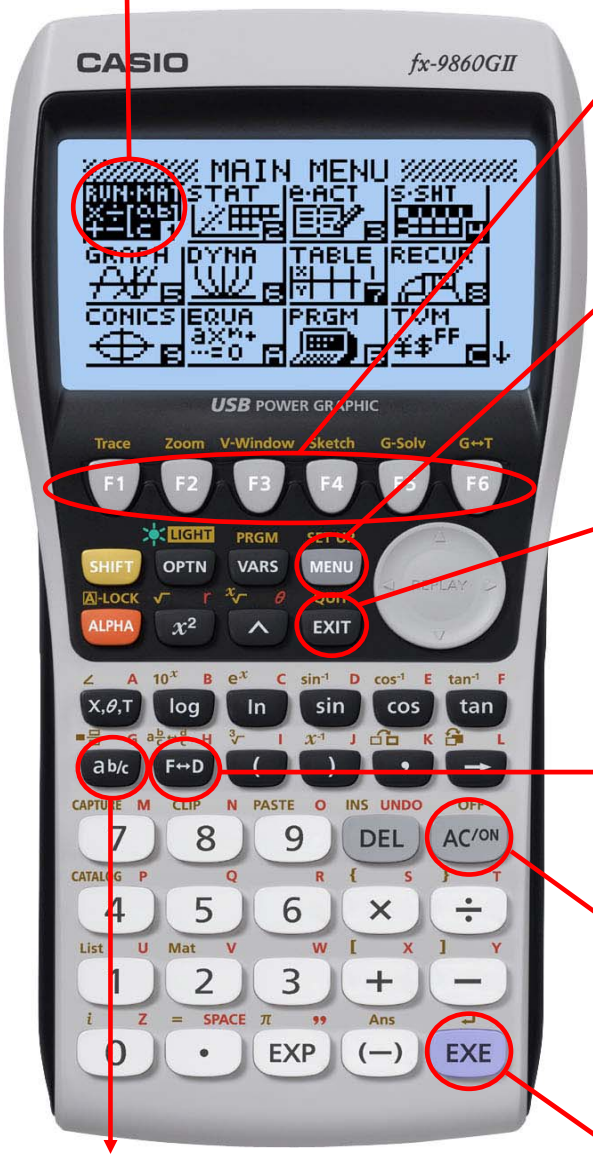
CASIO EDUCATION

QUICK REFERENCE CARD

fx-9860GII

Selecting the RUN icon will allow you to perform general computations and arithmetic.



The function keys allow you to access the tab (soft key) menus that will come up at the bottom of the screen. When an appears above the F6 key, selecting F6 will offer more on-screen choices.

The MENU key displays every mode the calculator has. To select a mode, you may to the desired icon and press EXE or press the number or letter in the lower right hand corner of the icon.

The EXIT key operates like the back arrow on a web browser; it will take you back one screen each time you select it. The EXIT key will not take you to the icon menu.

The F↔D key is a toggle key that will change answers or entered numbers back and fourth from decimal to fraction form.

The AC/ON key will power the unit on. To turn the unit off, press the yellow SHIFT key, then AC/ON key.

The EXE key executes operations. When data is entered, the EXE button must be pressed to store the data.

The a b/c key is used to obtain a fraction bar. To obtain a mixed number, press a b/c after inputting the whole number.

www.casioeducation.com

PUT VALUE BACK IN THE EQUATION.

AFFORDABILITY FUNCTIONALITY SUPPORT

CASIO EDUCATION

BASIC FUNCTIONALITY

fx-9860GII

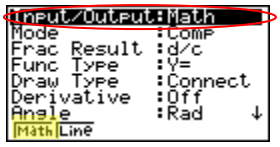
The following explains the meaning of each icon on the fx-9860GII main icon menu.

ICON	Menu Name	Description
	RUN	This icon menu is used for general computations, including binary, octal, decimal, and hexadecimal functions and matrices.
	STATISTICS	This icon menu is used to perform single-variable (standard deviation) and paired variable (regression) statistical calculations, to perform tests, to analyze data and to draw statistical graphs.
	eACTIVITY	eActivity lets you input text, math expressions, and other data in a notebook-like interface. Use this mode when you want to store text, formulas, or built-in application data in a file.
	Spreadsheet	This icon menu is used for creating spreadsheets.
	GRAPH	The icon menu is used to draw, store and calculate information of functions.
	DYNAMIC GRAPH	This icon menu is used to draw multiple versions of a graph by changing the values in a function.
	TABLE	This icon menu is used to store functions, to generate a numeric table of different solutions as the values assigned to variables in a function change, and to draw graphs.
	RECURSION	This icon menu is used to store recursion formulas, to generate a numeric table of different solutions as the values assigned to the variables in a function change, and to draw graphs.
	CONICS	This icon menu is used to graph parabolas, circles, ellipses, and hyperbolas. You can input a rectangular or polar coordinate function or a parametric function for graphing.
	EQUATION	This icon menu is used to solve linear equations with two through six unknowns, and high-order equations from 2nd to 6th degree.
	PROGRAM	This icon menu is used to store programs in the program area and to run programs.
	TIME VALUE OF MONEY	This icon menu is used to perform financial calculations and to draw cash flow and other types of graphs.
	Data Analyzer Link	This icon menu is use to control the optionally available EA-200 Data Analyzer. For information about this icon menu, download the E-CON2 manual from http://edu.casio.com.
	LINK	This icon menu is used to transfer memory contents or back-up data to another unit or PC.
	MEMORY	This icon menu is used to manage data stored in memory.
	SYSTEM	This icon menu is used to initialize memory, adjust contrast, reset memory, and to manage other system settings.
	GEOMETRY	This mode allows you to draw, analyze and animate geometric objects.

RUN

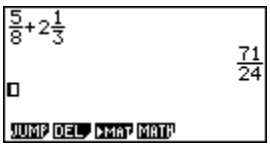
This section is an overview of the Run Icon. To select an icon from the icon menu system, use the ◀ ▶ ▲ ▼ to highlight the desired icon, then press [EXE] or press the number/letter in the lower right corner of the icon. For the Run menu, press [1] to display the initial screen.

Note: All operations in this handout will utilize the "Math" input mode, which allows natural input and display of certain functions, just as they appear in a textbook. To make sure your calculator is in "Math" mode, press [SHIFT] [MENU] [F1] [EXIT].

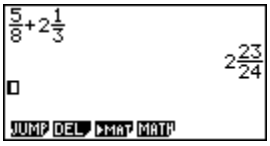


1. When performing general computations, you can press [a b/c] to enter fractions and mixed numbers. To solve the problem, $\frac{5}{8}+2\frac{1}{3}$ input the following:

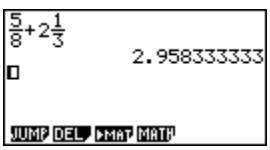
   - [a b/c] [5] [▼] [8] [▶] [+] [SHIFT] [a b/c] [2] [▶] [1] [▼] [3] [EXE]



2. To change the answer, $\frac{71}{24}$, to a mixed number, press [SHIFT] [F↔D] [(a b/c ↔ d/c)].

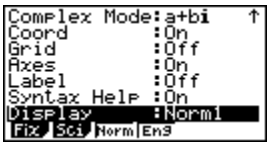


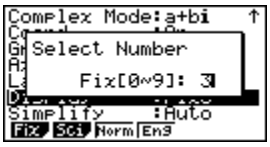
3. To change the answer to decimal form, press [F↔D]. [F↔D] is a toggle key that will switch entered data or answers from fraction to decimal form or decimal to fraction form.

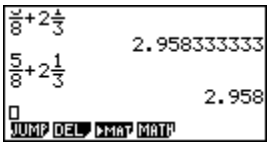


4. To change the number of decimal places displayed, enter the set up menu by pressing SHIFT MENU. ▼ to Display, select F1 (Fix) and enter the desired amount of decimal places followed by EXE. For this example, 3 decimal places are used.

- SHIFT MENU ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼ F1 3 EXE EXIT EXE F↔D







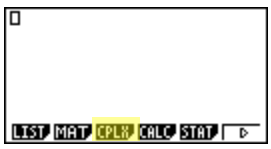
From the Run menu many calculations can be entered by selecting OPTN. For example: hyperbolic, probability/distribution, numeric (including differential and integration), conversion, engineering, complex number and binary, octal, decimal and hexadecimal calculations.

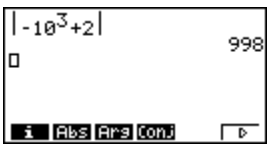
5. To calculate the possible number of different arrangements using 4 items selected from among 10 items, enter the following from the Run home screen:

- OPTN F6 F3 1 0 F2 4 EXE

6. To calculate $\left|-10^3+2\right|$, enter the following from the Run home screen:

- OPTN F3 F2 (−) 1 0 ^ 3 ▶ + 2 EXE

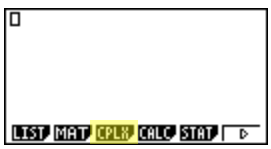


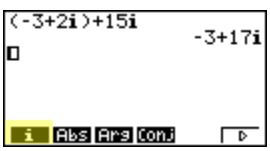


Calculations can be performed with complex numbers and answers can be displayed in a+bi form.

7. To calculate $(-3+2i)+15i$; enter the following:

- OPTN F3 cos (−) 3 + 2 F1 tan + 1 5 F1 EXE

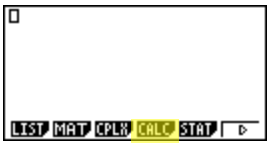


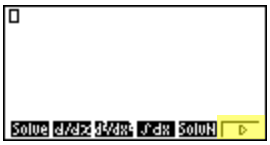


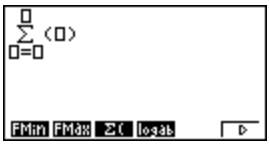
Sigma calculations can also be performed in the Run menu.

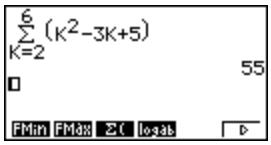
8. To calculate $\sum_{k=2}^{6}(k^2-3k+5)$; enter the following:

- OPTN F4 F6 F3 ALPHA , x^2 3 ALPHA , + 5 ▶ ALPHA , ▶ 2 ▲ 6 EXE





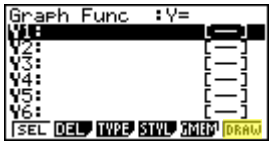




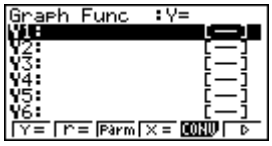
GRAPH

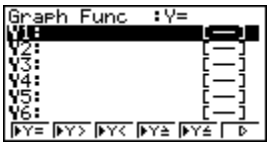
Various icon (Run, Table, Dynamic, Recursion & Conics) will allow you to graph or analyze the graphs of given information. This section is an overview of the GRAPH Icon and will highlight some basic features of this mode.

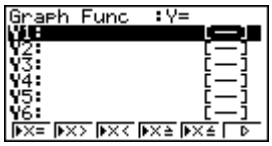
The initial screen allows immediate input of functions set equal to zero. You may begin inputting data into **Y1:** pressing [EXE] to store. To draw your function, select [F6].

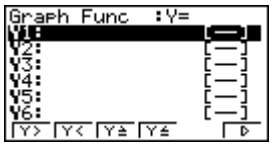


You can change the type of graph (r = polar coordinate, parametric functions, x =, and inequalities) by select the corresponding function button and then press ▶ to begin inputting.



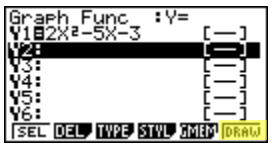


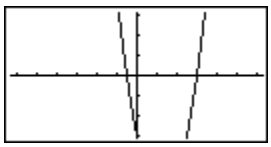




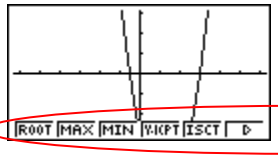
1. To draw the graph of the function $y = 2x^2 - 5x - 3$ from the Icon Menu system, input the following:

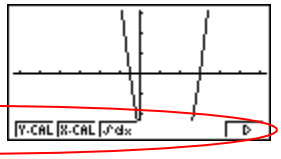
   - [5] [2] [X,θ,T] [x^2] [−] [5] [X,θ,T] [−] [3] [EXE]



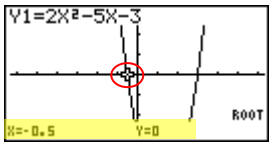


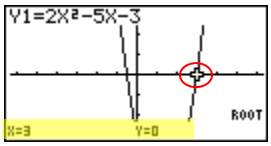
To analyze features of this graph (roots, maximum and minimums, y-intercepts, intersections, determine coordinates, and integrals) select [F5] (G-Solv).





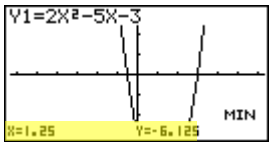
2. [F1] (Root):





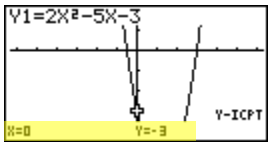
Note: The left-most root will always display first. Select ▶ to display the next root.

3. F3 (Minimum):

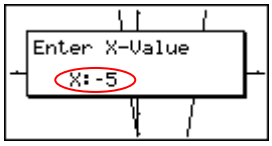


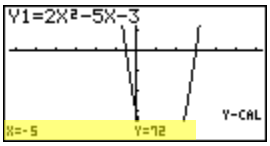
Note: As long as the x-value of your vertex is in the viewable domain; you do not need to see the vertex to calculate the minimum value. However, you can change the viewing window by selecting F3 (V-Window)in the graph window. You can also change the window manually by using ◀ ▶ ▲ ▼.

4. F4 (y-intercept):

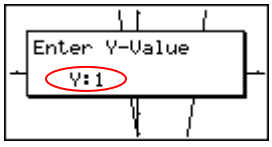


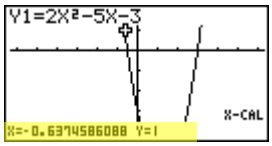
5. F1 (y-calculation): What is the value of y when x is -5?

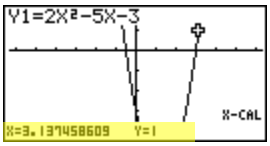




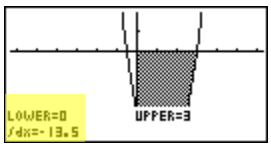
6. F2 (x-calculation): What is the value (s) of x when y is 1?







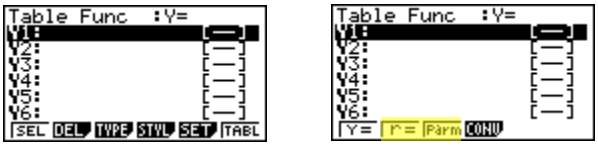
7. F3 (integral): Determine the integral value at (0,3) for the function $Y1 = 2x^2 - 5x - 3$.



TABLE

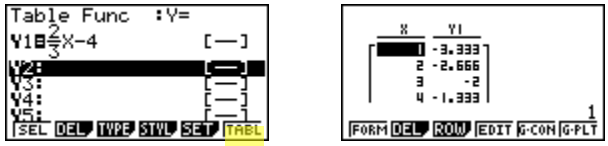
This section is an overview of the TABLE icon. To select this icon, you may highlight it and press EXE or press 7.

The initial screen allows immediate input of functions that are set equal to 0. To change the type of expression to be entered, select F2 for polar coordinates or F3 for parametric functions.

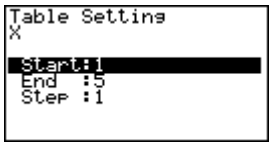


1. To see a table for the function $y = \frac{2}{3}x - 4$, highlight **Y1:** and input the following

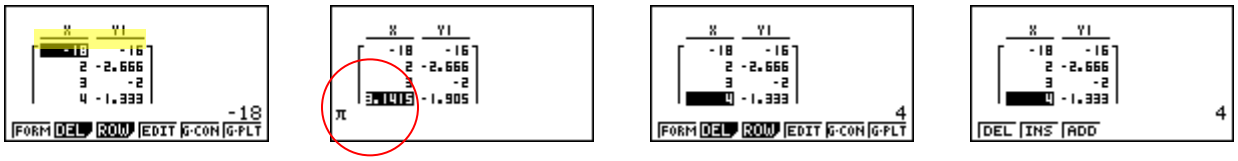
- $\alpha\frac{b}{c}$ 2 ▼ 3 ▶ X,θ,T − 4 EXE F6



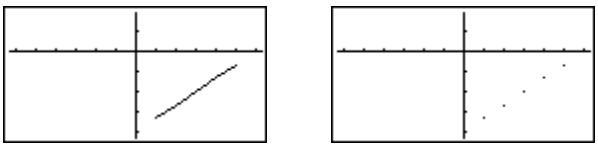
2. The default setting for tables is: X starts at 1, ends at 5, and increases by increments of 1. You change this by pressing EXIT or F1 (FORM) to return to the initial screen and then select F5 (SET).



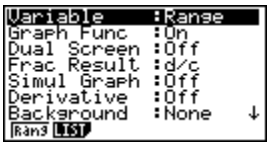
3. However, you can enter a number anywhere in the x-column of the table and press EXE to see the corresponding y-value (including fractions, decimals, even π). You can insert and delete rows in this view by pressing F3 (ROW).

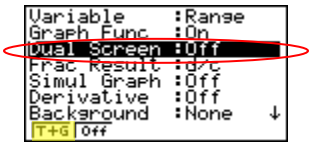


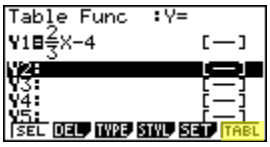
4. From the table view screen, you can press F5 (G-CON) to see a connected plot or F6 (G-PLT) to see a plot graph for the function you entered.

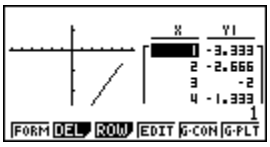


5. To see a split screen of your table and graph, press SHIFT MENU to enter the setup menu for the table icon and ▼ to Dual Screen, select F1 (T + G), EXIT, then F6.



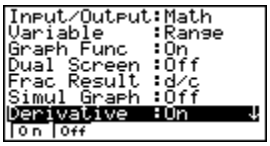


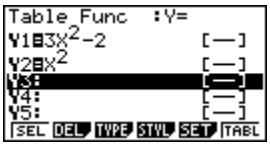


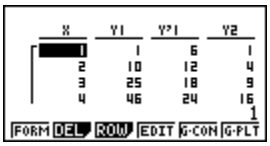


To generate a differential number table, press SHIFT MENU to enter the setup menu for the table icon and ▼ to Derivative, select F1 (On), EXIT, and then F6.

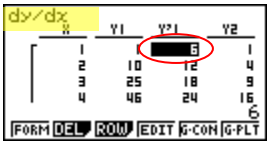
6. For this example, enter **Y1**: $3x^2 - 2$ and **Y2**: x^2 then F6 to view the differential number table.

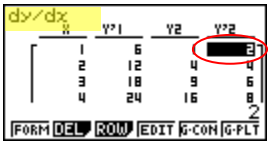






Note: Locating the cursor at a differential coefficient displays "dy/dx" in the top line, which indicates differential.

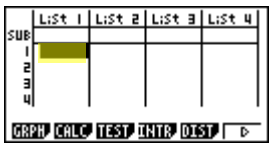




STATISTICS

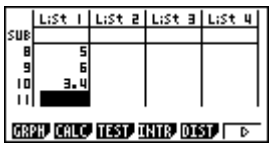
This section is an overview of the STAT icon; it will highlight just a few of the features for single-variable data and paired-variable data. To select this icon, you may highlight it and press EXE or press 2.

The initial screen is the List Editor Screen that allows input of statistical data and performs numerous statistical calculations. To input a list of single-variable data, highlight the first cell under List 1 and enter each number followed by EXE.

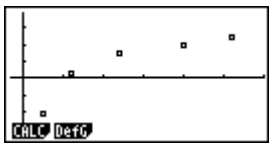


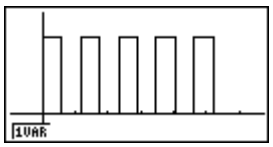
1. For this example, input this set of data:

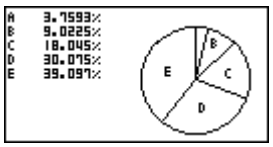
   - 1, 0.5, 1.2, 4, -1, 1, 3, 5, 6, 3.4

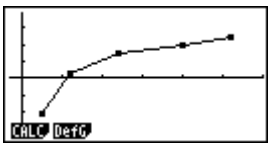


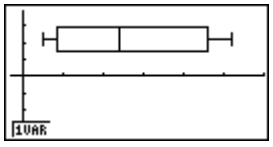
2. From this screen you can display various graphs depending on whether you have single or paired-variable data (scatter-plot, line, normal probability, histogram, median box, mean box, normal distribution, broken line, and regression: linear, quadratic, cubic, quartic, logarithmic, exponential, power, sinusoidal and logistic).

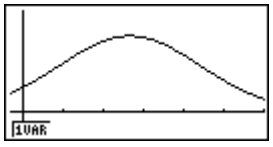


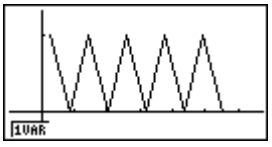




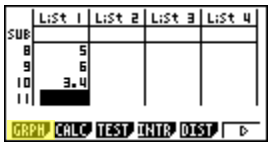


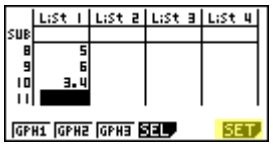


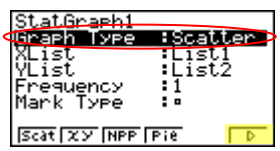


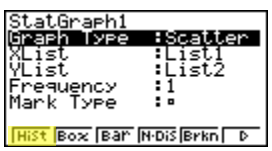


3. The initial default graph is a scatter-plot. To change the type of graph you would like to use, press F1 (GRPH), then F6 (SET), arrow down to Graph Type:, for this set of data, we will use a histogram, press F6, and then F1 for histogram.

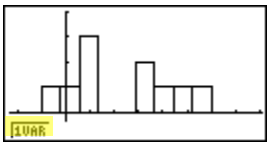




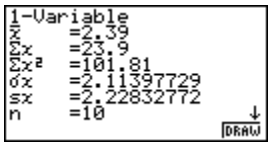


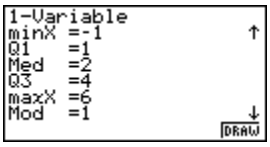


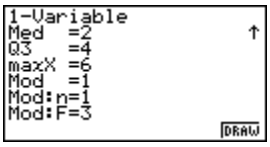
4. Press EXIT to take you back to your list of data and select F1 (GPH1) and then EXE to see your graph.



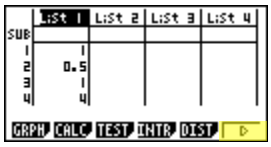
5. The following screen shots show what one-variable calculations can be obtained by pressing F1.

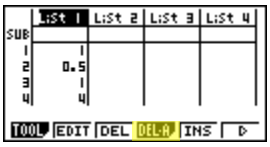


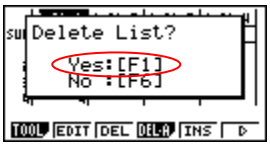


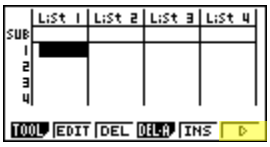


6. To delete this set of data, press EXIT until you return to the initial List Editor screen. Select F6 for more options, arrow up until List 1 is highlighted, select F4 (Del-A), then F1.





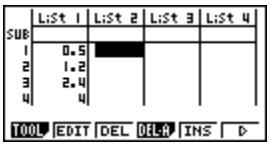


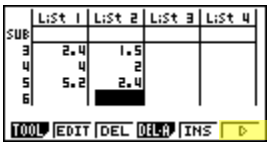


7. For paired variable data, use the following:

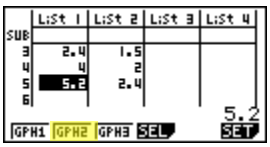
List 1: 0.5, 1.2, 2.4, 4.0, 5.2
List 2: -2.1, 0.3, 1.5, 2.0, 2.4

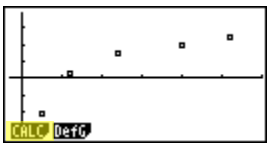
Enter List 1 first, and then ▶ and begin entering List 2.



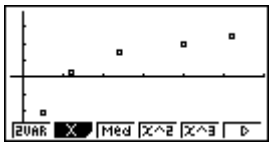


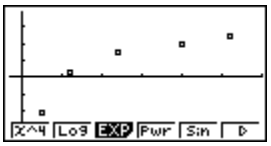
8. To see a scatter-plot of these data, you can go through and change back GPH 1 using the process above, or select F2 (GPH 2) from the List Editor screen whose default is also a scatter-plot.

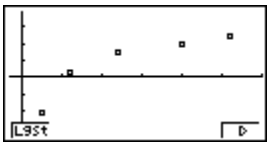




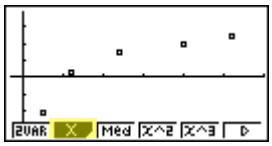
9. From the scatter-plot screen, pressing F1 will show all the calculations that can be obtained from this set of data.

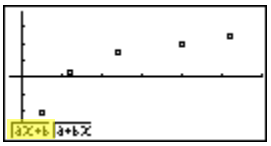


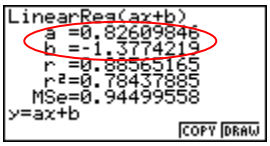




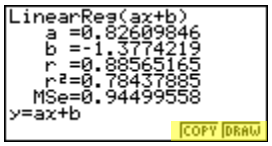
10. To calculate linear regression, select F2 from the first set of options and then press F1 for $y = ax + b$ form.







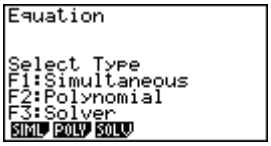
11. From this screen, you select F5 (COPY) to copy and then paste the equation into the initial graph screen or select F6 (DRAW) to show the linear regression.



EQUATION

This section is an overview of the EQUATION Icon. To select this icon, highlight it and press EXE or press X,θ,T.

The initial Equation Editor screen has three modes to choose from, Simultaneous, Polynomial, and Solver; this section will give an overview of each mode.



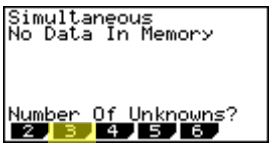
The Simultaneous mode allows you to solve simultaneous linear equations with two to six unknowns.

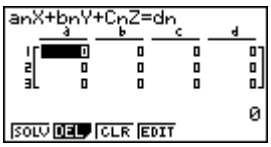
1. Solve the following system of equations:

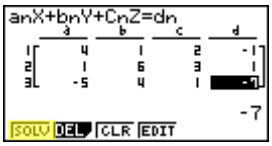
$$\begin{cases} 4x + y - 2z = -1 \\ x + 6y + 3z = 1 \\ -5x + 4y + z = -7 \end{cases}$$

Press F1 to select the Simultaneous mode and press F2 for three unknowns. The calculator will display a matrix where the coefficients and constants can be entered in to as long as each equation is in standard form. To enter this system of equations (already in standard form) input the following:

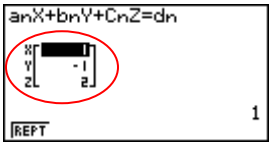
- 4 EXE 1 EXE (–) 2 EXE (–) 1 EXE
- 1 EXE 6 EXE 3 EXE 1 EXE
- (–) 5 EXE 4 EXE 1 EXE (–) 7 EXE







There are four options at the bottom of the screen, press F1 (SOLV). The solution to this system is (1, -1, 2).

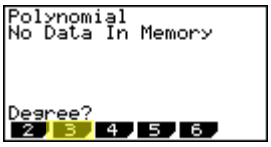


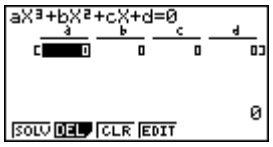
Press EXIT to return to the previous screen, press F1 (REPT) to edit this problem or continue solving simultaneous equations with three unknowns. To edit just one of the numbers in the system, arrow to the number and press F4 (EDIT) or highlight the number to be edited and input the new number and press EXE.

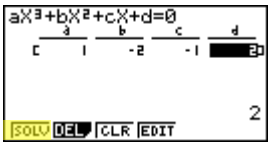
Press EXIT until the Equation Editor screen is displayed. The second mode is Polynomial F2 and can be used to solve second to sixth degree polynomial equations (in standard form).

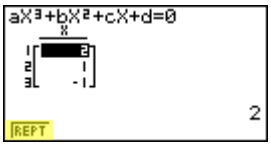
2. To solve the equation $x^3 - 2x^2 - x + 2 = 0$, input the following from the Equation Editor screen:

   - F2 F2 1 EXE (–) 2 EXE (–) 1 EXE 2 EXE F1

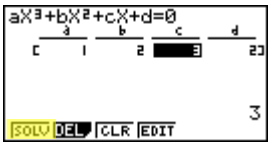


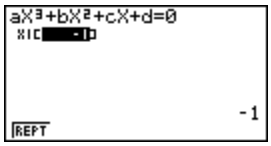




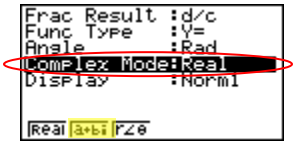


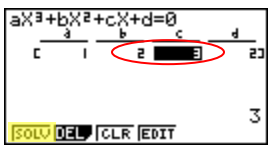
3. To change the equation to $x^3 + 2x^2 + 3x + 2 = 0$, select F1 (REPT) and change the b-value to 2, the c-value to 3 and press F1 (SOLV).

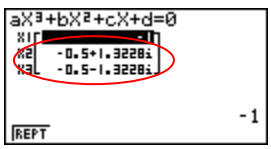




4. The default setting is for real numbers, to change the display to a+bi form, press SHIFT MENU for the Polynomial Set-Up menu, select F2 (a+bi), EXIT, and then F1 (SOLV).



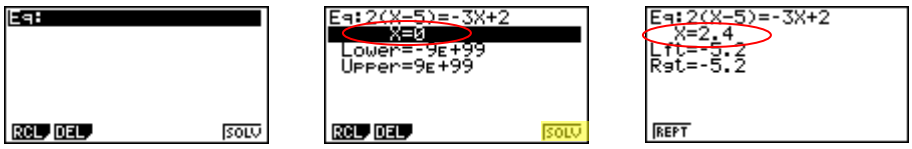




The third function, Solver [F3], allows you to determine the value of any variable in a formula or equation. You can input any formula exactly as it appears using [ALPHA] for any variables. We will take a look at solving a linear equation and a formula.

5. To find the value of x in the following equation: $2(x - 5) = -3x + 2$, input the following starting from the Equation Editor Screen:

- [F3] [2] [cos] [X,θ,T] [−] [5] [tan] [SHIFT] [•] [(−)] [3] [X,θ,T] [+] [2] [EXE] [F6]

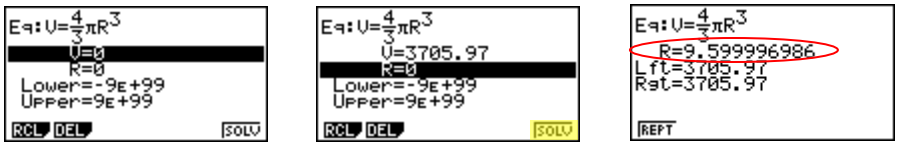


Note: In the last screen, "Lft" and "Rgt" represent the values of the left and right sides of the equation using the value of the solution; this is the calculator's way of checking the solution.

You can also enter a formula, assign values and solve for specific variables using the Solver function of the Equation Editor.

6. Find the radius (to the nearest hundredth) of sphere, whose volume is 3705.97 cm^3.
To enter the formula $V = \frac{4}{3}\pi r^3$ input the following in to the calculator:

- [F1] [▲] [ALPHA] [2] [SHIFT] [•] [a b/c] [4] [▼] [3] [▶] [SHIFT] [EXP] [ALPHA] [6] [^] [3] [EXE]

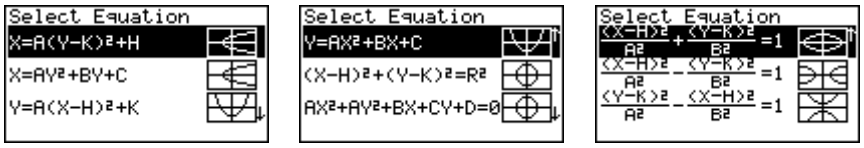


Note: selecting [F1] will take you back to the previous screen where you can edit and re-solve the previous equation or begin a new problem.

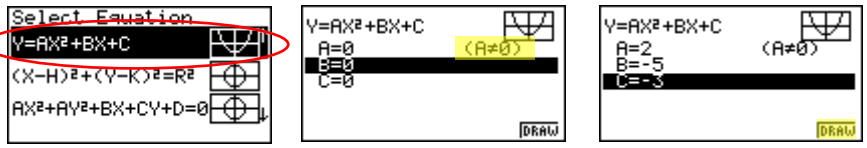
CONICS

This section is an overview of the CONICS Icon. To select this icon, you may highlight it and press EXE or simply press 9.

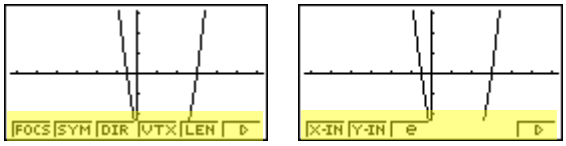
The initial screen allows you to choose from various conic functions. You may use the ▲ or ▼ to select the equation of the function in accordance with the type of graph you want to draw. Once you have chosen the conic function that you would like to graph, you will need to enter the coefficients of the function and then press DRAW F6.



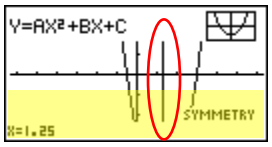
1. To view the graph of the conic: $y = 2x^2 - 5x - 3$, select the $Y = AX^2 + BX + C$ form from the Conics formula menu.



In the Conics modes, when you press F5 (G-Solv), although you are still graphing a parabola like in the graphing section, notice how the vocabulary and options have changed.



2. For example, you can now examine the line of symmetry for this parabola and the equation of that line will be displayed.



You can continue to analyze different areas of this graph and the line of symmetry will still be displayed.