

TABLE OF CONTENTS

Page 2	Main Menu
Page 3	RUN Icon
Page 5	STAT Icon
Page 8	LIST Icon
Page 11	GRAPH Icon
Page 14	TABLE Icon
Page 14	PROGRAMMING Icon
Page 14	CONTRAST Icon
Page 14	MEMORY Icon

ACTIVITIES

1)	Page 16	Four 4's	RUN Icon
2)	Page 18	Substituting Values & Solving Linear Equations	RUN Icon
3)	Page 20	Pen for the Pig	RUN Icon
4)	Page 22	How High Does it Bounce?	STAT Icon
5)	Page 24	Walk a Mile in my Shoes	STAT Icon
6)	Page 25	M up or M down?	STAT Icon
7)	Page 29	Spring Fling	GRAPH Icon
8)	Page 31	Characteristics of Lines	GRAPH Icon
9)	Page 33	Patterns in Linear Functions	GRAPH Icon
10)	Page 35	Graphs of Quadratic Equations	GRAPH Icon

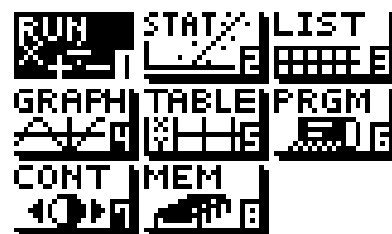
Additional Information

Page 37	FA-122 Program Link Examples
Page 38	CASIO Educational Products Regional Staff
Page 39	CASIO Educational Product Distributors
Page 40	Information for more Activities

MAIN MENU

**The icon that is highlighted is the one that is currently “selected”.

**To enter the mode that is highlighted, press [EXE], or the number in the bottom right corner of the icon.



What does each Icon do?

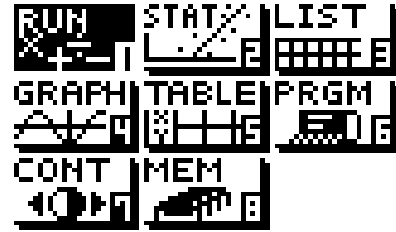
<u>RUN</u>	USED FOR ARITHMETIC AND FUNCTIONAL CALCULATIONS
<u>STAT</u>	USED TO PERFORM SINGLE AND PAIRED VARIABLE STATISTICAL CALCULATIONS, AND TO DRAW STATISTICAL GRAPHS.
<u>LIST</u>	USED FOR STORING AND EDITING NUMERIC DATA.
<u>GRAPH</u>	USED TO STORE GRAPH FUNCTIONS AND TO DRAW GRAPHS USING THE FUNCTIONS.
<u>TABLE</u>	USED TO GENERATE A TABLE OF NUMERIC VALUES FROM THE DIFFERENT FUNCTIONS.
<u>PRGM</u>	USED FOR WRITING, READING, AND EXECUTING PROGRAMS.
<u>CONT</u>	USED FOR ADJUSTING THE DISPLAY CONTRAST.
<u>MEM</u>	USED TO CHECK HOW MUCH MEMORY IS BEING USED AND HOW MUCH IS REMAINING. ALSO TO RESET CALCULATOR TO INITIAL PARAMETERS.

BASIC KEYS

[MENU]	Will always bring you back to the MAIN MENU screen.
[QUIT]	Will back-out of the last step performed, to leave an option you have chosen while remaining in the icon mode.
[F1...F4]	Function keys- control menu found on the bottom line of the calculator screen. Differ depending on which icon you are operating in.
[SHIFT]	Activates yellow operation written above keys.
[ALPHA]	Activates red operation written above keys.

RUN ICON

In the RUN MODE you can perform arithmetic calculations with decimal numbers as well as fractions. You can also perform calculations involving scientific functions.

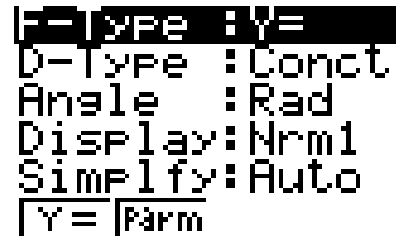


Select the RUN ICON- use arrows or press [1]

Check the RUN MODE “set-up”

Press [SHIFT] [MENU] (SET UP)

By pressing the down arrow key you can access the different choices . Use the F1 - F4 keys to select the different choices.



Press [QUIT] to exit out of the set up screen.

TO RECALL LAST EQUATION

Once several expressions are entered into the calculator, press the [AC/ON] key to clear the screen. To recall the previous expressions press the UP ARROW Key to scroll through the previous entries. When you come to the entry you want, press the right arrow key to enter the edit mode so you can change the expression if you wanted.

TO STORE A VALUE AS A LETTER and EVALUATE EXPRESSIONS

Press the number you wish to store, the [→] key (above the [AC/on]), [ALAPH] the letter you wish to store it as and [EXE].

Example: To store 5 as A and 6 as B and then add A + B do the following;

<p>[5] [→] [ALPHA] [A] [EXE]</p> <p>[6] [→] [ALPHA] [B] [EXE]</p> <p>[ALPHA] [A] + [ALPHA] [B] [EXE]</p>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; border-bottom: 1px solid black;">5→A</td> <td style="width: 20%; text-align: right;">5</td> </tr> <tr> <td style="border-bottom: 1px solid black;">6→B</td> <td style="text-align: right;">6</td> </tr> </table>	5→A	5	6→B	6	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; border-bottom: 1px solid black;">A+B</td> <td style="width: 20%; text-align: right;">11</td> </tr> </table>	A+B	11
5→A	5							
6→B	6							
A+B	11							

CHECKING THE SOLUTION TO A LINEAR EQUATION

Solve a linear equation on a piece of paper and get your answer. Input the linear equation into the RUN Menu, and press [EXE]. A “0” should appear. This means that the value of X in the calculator makes the equation false. Now, store the solution you got for the variable in the equation, and recall the equation as stated above. If a “1” appears on the screen after the [EXE] key is pressed the solution is correct, if a “0” appears on the screen after the [EXE] key is pressed the solution is incorrect.

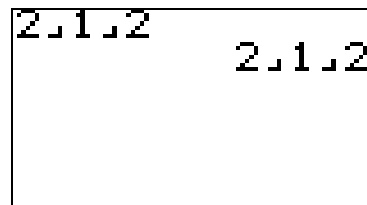
FRACTIONS

FRACTIONS CAN BE ENTERED BY USING THE [a b/c] KEY, ABOVE THE [7] KEY.

To enter $2\frac{1}{2}$ Press: [2] [a b/c] [1] [a b/c] [2]

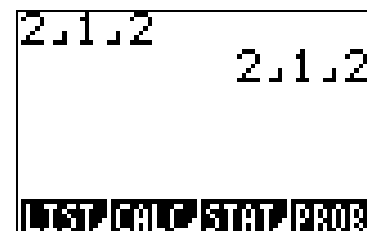
To toggle back and forth between fractions and decimals press the [F \leftrightarrow D] key.

To toggle between mixed numbers and improper fraction press the [SHIFT] [a b/c] key.



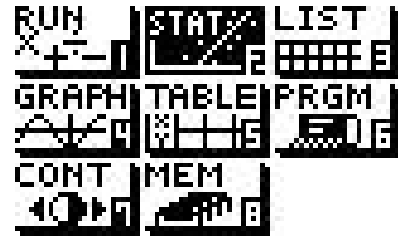
OPTIONS

The option key [OPTN] has several choices for additional features. These options change depending on which mode is active.



STAT ICON

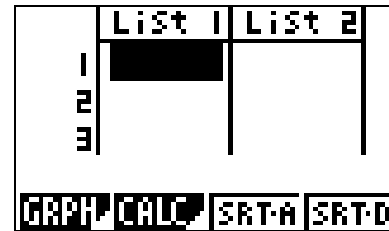
In this mode you can input statistical data into lists and calculate the mean, maximum and other statistical values. You can calculate single variable and paired variable statistical data. You will also be able to perform regression calculations and graphs.



Getting Started:

From the main menu screen select the STAT mode in order to input the statistical data. The “soft function” keys are as follows:

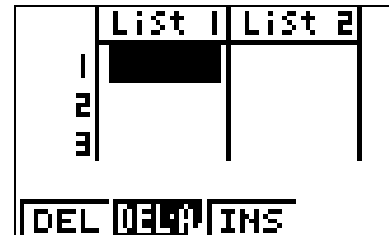
- [F1] (GRPH) ... Graph Menu
- [F2] (CALC) ... Statistical calculation menu
- [F3] (SRT*A)... Sort in Ascending order
- [F4] (SRT*D)... Sort I Descending order



By pressing the [] key you can access additional choices

- [F1] (DEL).....Deletes a single data item
- [F2] (DEL*A)....Deletes all data
- [F3] (INS).....Insert a data item

Press [] to return the previous menu.

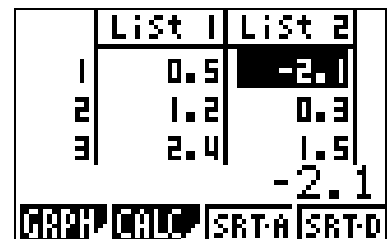


STATISTICAL CALCULATIONS

Input the following data:

LIST 1 0.5, 1.2, 2.4, 4.0, 5.2

LIST 2 -2.1, 0.3, 1.5, 2.0, 2.4

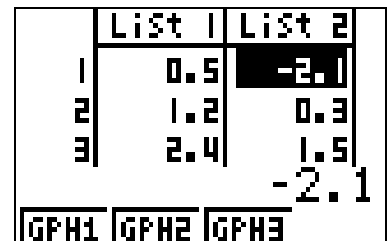


Use the cursor keys to move the highlighting to any cell in the lists for data input.

PLOTTING DATA:

After the data is entered into the lists, press [F1] (GRPH) to display the graph menu.

- [F1] (GPH 1).....DRAWS GRAPH 1
- [F2] (GPH 2).....DRAWS GRAPH 2
- [F3] (GPH 3).....DRAWS GRAPH 3



PRESS [\blacktriangleright] FOR MORE CHOICES

[F1] (SEL).....GRAPH SELECTION

[F2] (SET).....GRAPH SETTINGS (graph types, list assignments)

**The default graph type setting is for a scatter diagram with LIST 1 data as x -axis values and LIST 2 data as y -axis values

By using the set command you can change the GRAPH TYPE, LISTS USED, FREQUENCY, and MARK TYPE.

	List 1	List 2
1	0.5	-2.1
2	1.2	0.3
3	2.4	1.5
		-2.1
	SEL	SET

```
StatGraph1
G-type :Box
XList  :List2
Freq   :1
```

GPH1 | GPH2 | GPH3

To plot a scatter diagram press [F1] (GPH 1).

SELECTING THE REGRESSION TYPE:

Once the graph has been drawn the following soft menus appear:

[F1].....Linear regression

[F2].....Med-Med graph

[F3].....Quadratic regression graph

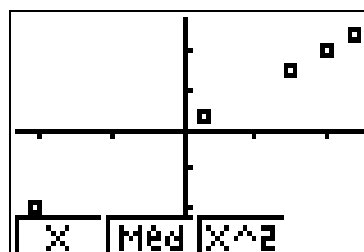
PRESS [\blacktriangleright] FOR MORE CHOICES

[F1].....Logarithmic regression

[F2].....Exponential regression

[F3].....Power regression

[F4].....Paired-variable statistical results



```
LinearReg
a=      1
b=      0
r=      1
y=ax+b
COPY DRAW
```

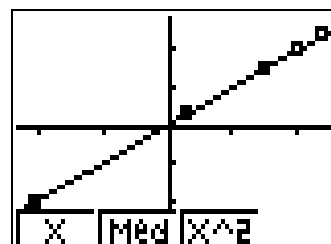
To display a linear regression for the data above press:

[\blacktriangleright] [F1] (X)

This will display the data used in writing the logarithmic regression. From this screen you are given two choices:

[F3] (COPY).....Stores the displayed regression formula as a graph function

[F4] (DRAW).....Graphs the displayed regression formula



CALCULATING SINGLE AND PAIRED VARIABLE STATISTICS:

Once the data is entered into the lists press the [CALC] key and select either [F1] (1 VAR) or [F2] (2 VAR). Either key will give you the statistical information you require.

SINGLE VARIABLE

Mean of Data
Sum of Data
Sum of Squares
Population standard deviation
Sample standard deviation
Number of data items
Minimum
First quartile
Median
Third quartile
Maximum
Mode

PAIRED VARIABLE

Mean of x list data
Sum of x list data
Sum of squares of x list data
Population standard deviation of x list data
Sample standard deviation of x list data
Number of x list data items
Mean of y list data
Sum of y list data
Sum of squares of x list data
Population standard deviation of y list data
Sample standard deviation of y list data
Sum of x list and y list data
Minimum of x list data
Maximum of x list data
Minimum of y list data
Maximum of y list data

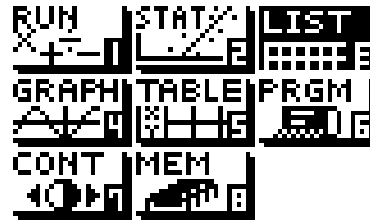
NOTE:

In the STAT Mode when the SET UP key is pressed you can change the window from [AUTO] to [MAN]. The difference is that the [AUTO] window will automatically set an appropriate viewing window for your statistical graph. With the manual window you must set the parameters for the viewing window.

LIST ICON

From the list mode we can perform the following functions:

- 1) LIST OPERATIONS
- 2) EDITING AND REARRANGING LISTS
- 3) MANIPULATING LIST DATA
- 4) ARITHMETIC CALCULATIONS USING LISTS



LIST OPERATIONS:

To input values one-by-one:

- Using the cursor keys highlight the cell that you wish to enter the data.
- Type in the number and press [EXE] to store the data into that cell.
- The cursor automatically moves down to the next cell for input.

To Batch input a series of values:

- Use the up arrow key to move the cursor to highlight the LIST name.
- Press [SHIFT] [{}] and then input the values you wish to enter, make sure you separate each value by a comma. EX. [SHIFT] [{}] [6] [,] [7] [,] [8] [SHIFT] [{}]
- Press [EXE] to store all of the values in the list.

EDITING AND SORTING LISTS

Changing list values:

To change a cell value:

- Highlight the cell where you wish to change the value and enter the new value.

To delete a cell:

- Highlight the cell you wish to delete.
- Press the [] key to display the cell operation menu
- Press [F1] (DEL) to delete the selected cell. This will cause the remaining cells to move up in the list.

To delete all cells in a list:

- Highlight the name of the list whose cells you want to delete.
- Press the [] key to display the cell operation menu
- Press [F2] (DEL-A) to delete the selected list. This will cause the function to change to confirm that you do want to delete the entire list.
- Press [F1] (YES) to delete all cells in the selected list, or [F4] (NO) to stop the delete operation without deleting anything.

To insert a new cell:

- Highlight the cell in the list where you want to insert the new data.
- Press the [▸] key to display the cell operation menu.
- Press [F3] (INS) to insert a new cell. The new cell will contain the number 0, causing everything else in the list to move down.
- Input the value you want into the new cell and press [EXE].

Sorting List Values:**To sort a single list:**

- From the LIST MODE press the [▸] key to display the Operation menu and then press [F1] (SRT-A). This command sorts the list in ascending order.
- The prompt “ How Many Lists?(H)” appears, to ask you how many lists you want to sort. Enter the number of lists and press [EXE].
- To sort in descending order simply press [F2] (SRT-D) when you first enter the list mode.

To sort multiple lists:

- With the lists on the screen press [F1] (SRT-A) or [F2] (SRT-D), depending on whether you want to sort ascending or descending.
- The prompt “ How Many Lists?(H)” appears, to ask you how many lists you want to sort. Enter the number of lists and press [EXE].
- The next prompt to appear is “Select Base List (B)”, this is the list used to sort either ascending or descending . All other lists will be sorted around this list.
- The next prompt to appear is “Select Second List (L)”, this allows you to enter the number of the list you want to link to the base list.

The values in List 1 and sorted in order , and the cells of List 2 are also rearranged in order to keep the same relationship with the cells in List 1.

Manipulating List Data

The following is the list of LIST data manipulation functions and what they are for:

- (DIM).....Count the number values
- (FILL).....Replace all cell values with the same value
- (SEQ).....Generate a sequence of numbers
- (MIN).....Find the minimum value in a list
- (MAX).....Find the maximum value in a list
- (MEAN)...Calculate the man of list values
- (MED).....Calculates the median values in a list
- (SUM)...Calculates the sum of the values in a list

Arithmetic Calculations Using Lists

Error Messages:

- A **DIM ERROR** message occurs when the two list you are using for your calculations do not have the same number of values. That is they have different *DIMENSIONS*.
- An **MA ERROR** occurs whenever an operation involving any two cells generates a mathematical error.

To perform calculations with lists:

- From the **RUN** or **PRGM MODE** press the [OPTN] key. This will display the Operation Menu.
- It will display the following:

- **[LIST] (F1)**
- **[CALC] (F2)**
- **[STAT] (F3)**
- **[PROB] (F4)**

- Press [F1] (LIST) to display the List Data Manipulation Menu
- Press [F1] (LIST) to display the List command and input the number of the list you want to specify.
- To multiply two lists together, List 1 and List 2, use the following sequence of key strokes:
 - **[OPTN] [F1] (LIST) [F1] (LIST) [1] [X] [F1] (LIST) [2] [EXE]**

RECALLING LIST CONTENTS:

- To recall the contents of List 1 perform the following keystrokes:
 - **[OPTN] [F1] (LIST) [F1] (LIST) [1] [EXE]**

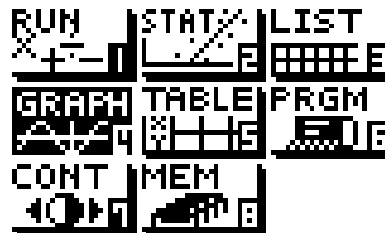
This will display the contents of the List specified and also stores them in ANS MEMORY.

To multiply the list contents in ANS MEMORY by 5 perform the following key strokes;

- **[OPTN] [F1] (LIST) [F1] (LIST) [SHIFT] [ANS] [X] [5] [EXE]**

GRAPH ICON

The fx-7400G Graphing Calculator has a large 79 x 47 dot display screen and is capable of drawing the following types of graphs:



- Rectangular coordinate (Y=) Graphs
 - Parametric Graphs
 - Inequality Graphs

In this section we will discuss:

- 1) View Window Settings
- 2) Graph Function Operations
- 3) Other Graphing Functions

To enter the graph mode either select the **GRAPH ICON** from the main menu screen by using the arrows to highlight it, or press the number **4**.

This menu allows you to enter up to 10 different equations and/or inequalities. By using the soft function keys you can select [F1] (SEL) an equation, you can delete [F2] (DEL) an equation, or draw [F4] (DRAW) an equation.



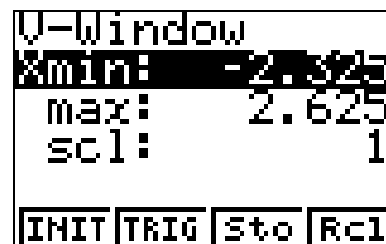
*****NOTE—once you enter an equation or inequality you must press [EXE] to store the equation into the graph mode.**

View Window (V-Window) Settings

Press [SHIFT] [F3] to display the View Window.

The soft menus on the bottom of your screen will be:

- [F1] (INIT).....Initial View Window Settings
- [F2] (TRIG).....Initial View Window Settings Using Specified Angle Unit
- [F3] (STO).....Store a Custom View Window setting in Memory
- [F4] (RCL).....Recall the Custom View Window from Memory



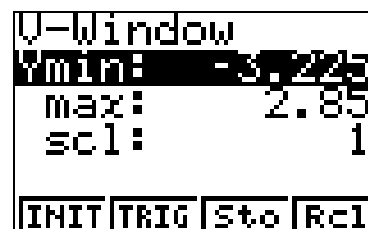
You can also see from this window the following:

X-min **Minimum x-axis value**

X-max **Maximum x-axis value**
X-scl **Spacing of x-axis increments**

Press the down arrow key to access the remainder of the values.

Y-min **Minimum y-axis value**
Y-max **Maximum y-axis value**
Y-scl **Spacing of y-axis increments**



To change any of the values, highlight the value you wish to change and type in the new value over it.

GRAPH FUNCTION OPERATIONS

SPECIFYING THE GRAPH TYPE:

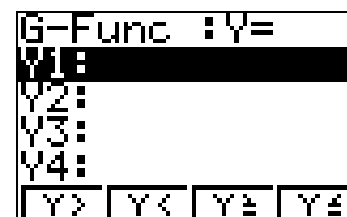
While the Graph function Menu is on the display press the Green Arrow Key next to the [F4] key. This will display the Graph Type Menu.

First you will see: [F1] (Y=) and [F2] (PARM)



By pressing the green arrow key again you can access the inequality menus.

Be sure that the top of the Graph function Screen specifies the type of graph you want to do. If it does not you will need to change the type. To do this press the soft function key for the type of equation or inequality that you want.



Storing Graph Functions and Inequalities

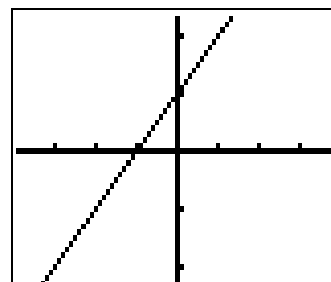
Once the equation or inequality is typed into the calculator, you **MUST** PRESS the [EXE] to store the function into the menu. You should notice that the [=] sign is highlighted. This indicates that the equation or inequality is "ON" and will graph. To turn it off press [F1] (SEL), this will toggle it back and fourth from on to off.



Drawing a Graph

Before you draw a graph the following steps should be done:

1. Check to be sure that you have a good viewing window.
2. Check to see if the equation or inequality you wish to graph has been selected, turned ON.
3. Press [F4] to draw the graph.



** Pressing the [G↔T] key (Graph to Text) will toggle back and fourth between the graph and the graph function menu.

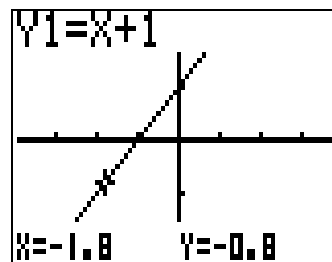
OTHER GRAPHING FUNCTIONS

From the calculators SET UP screen we can do the following:

- Change graph type from CONNECTED to PLOT.
- Turn the G-FUNCTION on or off
- Turn the Simultaneous Graph function on or off.
- Change the angle measure to either Degrees, Radians, or Gradians.

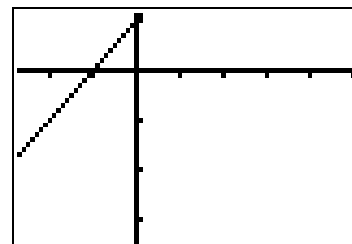
Tracing

- By pressing [F1] (Trace) while the graph is on the screen and pressing the right or left arrow keys you will notice that the cursor will move along the graph, giving the coordinates of the points that it passes.
- If there is more than one graph on the screen at once, you can toggle between the graphs by press the up or down arrow keys.
- **NOTICE THE FUNCTION YOU ARE TRACING APPEARS IN THE UPPER LEFT CORNER OF THE SCREEN AND THE COORDINATES APPEAR AT THE BOTTOM OF THE SCREEN.**



Screen Scrolling

- If your graph appears to be too close to the end on the screen and you do not want to change the view window, you can scroll the screen.
- By pressing one of the up, down, left, or right arrows the screen will move in that direction.



ZOOM

The ZOOM feature allows you to enlarge and reduce a graph on the display.

After you draw the graph press [F2] (ZOOM) to display the ZOOM Menu. This will give you the following choices:

- [F1] (BOX).....Graph enlargement using box zoom
- [F2] (FACT).....Displays screen for specifications of zoom factors
- [F3] (IN).....Enlarges graph using zoom factors
- [F4] (OUT).....Reduces graph using zoom factors
- []
- [F1] (ORIG).....Returns to original size

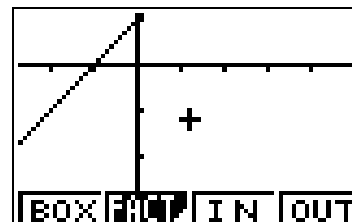
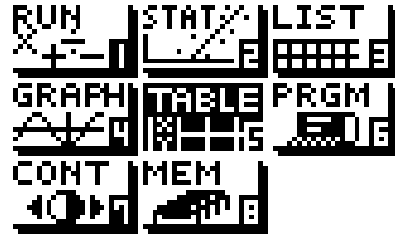


TABLE ICON

The table menu makes it possible to generate numeric tables from functions stored in memory. Since the Table Menu uses the same list of functions used in the Graph Menu there is no need to reenter the same functions into the different modes.

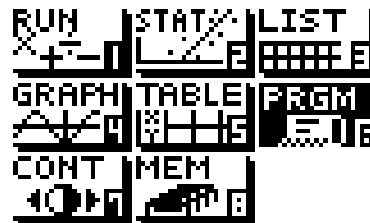


From the Table Mode you can do the following:

- Specify the range and increment of values assigned to variables for table value generation.
- Assign the list values to variables.
- In addition to graphing the stored function, you can also plot table values generated by the Table menu itself.
- Table values can be assigned to a list.

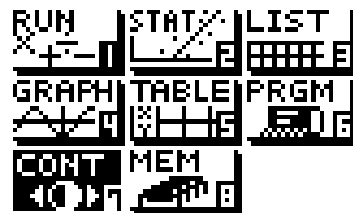
PROGRAMMING ICON

The programming function allows you to make complex and often-repeated calculations quick and easy. Chapter 8 in your FX-7400G owners manual has in depth programming instruction as well as some sample programs that you can enter into your calculator.



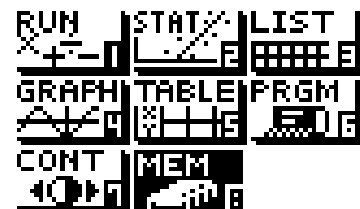
CONTRAST ICON

This menu allows you to change the contrast of the screen by pressing the right or left arrow keys.



MEMORY ICON

This menu allows you look at the how much data is stored in the different menus of the calculator. It also allows you to selectively delete those portions of memory that you no longer want or need.



There is also a Memory Reset button on the back of the calculator that will reset the entire memory.

****NOTE** to delete the memory it takes two steps. You must first select [F1] (DEL) and then either [F1] (YES) or [F4] (NO).

Activities for the CASIO
FX-7400G
Mini-Graphing Calculator

**Activities for
Pre-Algebra
&
Algebra 1 classes**

FOUR 4's**Order of Operations**

X

Use your calculator and what you know about the order of operations to insert the correct symbol in each blank to make the statement true. You may use any of the operations symbols as well as parentheses to fill in the blanks.

1. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 1$

2. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 2$

3. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 3$

4. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 4$

5. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 5$

6. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 6$

7. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 7$

8. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 8$

9. $4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 \underline{\hspace{2cm}} 4 = 9$

Now try the numbers from 10-20 using square roots and exponents as well as the four basic operations and parentheses.

Which solutions were the easiest to find? Hardest? Why?

Were there any numbers without solutions?

FOR THE TEACHER

FOUR 4's

Order of Operations

Using this Activity

Remind students to use the recall command to save time.

Encourage them to find patterns and to think of possibilities before pushing buttons.

Answers (Solutions may vary)

$4 + 4 \cdot 4 - 4 = 1$	$(4 + 4) \cdot 4 + 4 = 6$
$4 \cdot 4 + 4 \cdot 4 = 2$	$4 - 4 \cdot 4 + 4 = 7$
$(4 + 4 + 4) \cdot 4 = 3$	$4 + 4 + 4 - 4 = 8$
$(4 - 4) \cdot 4 + 4 = 4$	$4 + 4 + 4 \cdot 4 = 9$
$(4 \cdot 4 + 4) \cdot 4 = 5$	

$4 + 4 + 4 \cdot \sqrt{4} = 10$	$4 - 4 + 4 \cdot 4 = 16$	$4 + 4 + 4 \cdot 4 = 24$
$4^2 - 4 - (4 \cdot 4) = 11$	$4 \cdot 4 + 4 \cdot 4 = 17$	$4 + 4^2 + 4 + 4 = 28$
$4^2 - 4 \cdot (4 \cdot 4) = 12$	$4^3 \cdot 4 + 4 \cdot \sqrt{4} = 18$	$4^2 + \sqrt{4} + 4^2 - 4 = 30$
$4^2 - 4 + (4 \cdot 4) = 13$	$4^2 + 4 - 4 \cdot 4 = 19$	$4^2 \cdot \sqrt{4} - 4 \cdot 4 = 31$
$4 + 4 + 4 + \sqrt{4} = 14$	$4 + 4^2 + 4 - 4 = 20$	$4^2 + 4 + 4^2 - 4 = 32$
$4^2 - 4 \cdot \sqrt{4} \cdot \sqrt{4} = 15$	$4^2 + 4 + 4 \cdot 4 = 21$	$4^2 + 4^2 + 4 \cdot 4 = 33$

Try adding in factorials. Does this make any solutions easier or fill in some numbers without solutions?

Substituting Values & Solving Linear Equations

Using the RUN Icon

Use the CASIO FX-7400G Graphing Calculator to evaluate the following expressions.

Problem	Procedure
GIVEN: $a=-1$, $b=7$, and $c=2$	Open the run menu Use the \rightarrow to store values. $-1 \rightarrow a$, $7 \rightarrow b$, $2 \rightarrow c$
1. $2a - b =$ _____	Key in each expression using the alpha key
2. $c(a + b) =$ _____	
3. $4c - b + a =$ _____	
4. $a - b - c =$ _____	
5. $\frac{4a + 2b}{3c} =$ _____	
6. $a^2 + b =$ _____	Use the x^2 key on your calculator
7. $b^2 + 3c^2 =$ _____	
8. $2b^3 + 5a =$ _____	

Solve the following equations by the guess and check method. When you find the correct answer, place it in the blank provided.

Problems

Calculator Instructions

1. $x + 3 = 5$ $x =$ _____

2. $x - 7 = 8$ $x =$ _____

3. $3x = 21$ $x =$ _____

4. $4x - 1 = 15$ $x =$ _____

5. $8x + 15 = 31$ $x =$ _____

Key in your equation. To get =, press shift and decimal.

Store your guess using the arrow key as above, then press AC. Press the up arrow until you see your equation again. To check your guess, press [EXE]. If a 1 shows on your screen, your guess was accurate. If a 0 shows, then guess again by storing a new value in x.

FOR THE TEACHER

Name: _____ Date: _____

Substituting Values & Solving Linear Equations

Using the RUN Icon

Use the CASIO FX-7400G Graphing Calculator to evaluate the following expressions.

Problem	Procedure
GIVEN: $a=-1$, $b=7$, and $c=2$	Open the run menu Use the \rightarrow to store values. $-1 \rightarrow a$, $7 \rightarrow b$, $2 \rightarrow c$
1. $2a - b =$ <u>-9</u>	Key in each expression using the alpha key
2. $c(a + b) =$ <u>12</u>	
3. $4c - b + a =$ <u>0</u>	
4. $a - b - c =$ <u>-10</u>	
5. $\frac{4a + 2b}{3c} =$ <u>5</u> <u>3</u>	
6. $a^2 + b =$ <u>8</u>	Use the x^2 key on your calculator
7. $b^2 + 3c^2 =$ <u>61</u>	
8. $2b^3 + 5a =$ <u>681</u>	

Solve the following equations by the guess and check method. When you find the correct answer, place it in the blank provided.

Problems

Calculator Instructions

1. $x + 3 = 5$ $x =$ **2**

Key in your equation. To get =, press shift and decimal.

2. $x - 7 = 8$ $x =$ **15**

Store your guess using the arrow key as above, then press AC. Press the up

3. $3x = 21$ $x =$ **7**

arrow until you see your equation again. To check your guess, press [EXE]. If a

4. $4x - 1 = 15$ $x =$ **4**

1 shows on your screen, your guess was accurate. If a 0 shows, then guess again

5. $8x + 15 = 31$ $x =$ **2**

by storing a new value in x.

Name: _____ Date: _____

Pen for the Pig

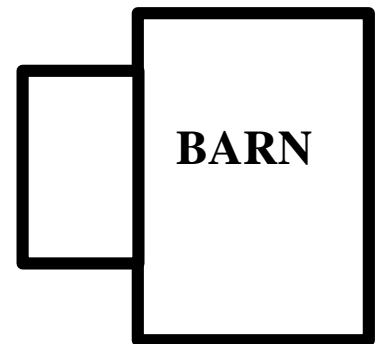
Perimeter and Area

A pig on Fern's uncle's farm has just had piglets and has given one to Fern.

1. If Fern and her father build a pen that is a rectangle 8 ft by 5 ft, what is the perimeter? What is the area?
2. Suppose that the fence is 6 ft on two sides and has a perimeter of 48 ft. What is the length of the other two sides?
3. Fern and her father decide to build the pen on the side of the barn. If two opposite sides are 5 ft and the total fencing needed is 25 ft, how long is the remaining side?

Fern's father has promised her that she may keep the pig if she can determine how big its pen needs to be. The pen will be built on the side of a barn with 72 feet of fencing.

4. What should the perimeter of the three sides of the fence be?
5. Label the sides of the fence appropriately?
6. What is the equation that represents the area of the pen?



7. Fern loves the pig and wants to have plenty of room. Find the dimensions of the pen in order to maximize the area.

FOR THE TEACHER

Pen for the PIG

Perimeter and Area

Using this Activity

This activity is based loosely on *Charlotte's Web* and could be integrated with a Language Arts unit on the story.

As an extension, have the students 'guess' at a possible answer and build their pen from sticks.

Answers

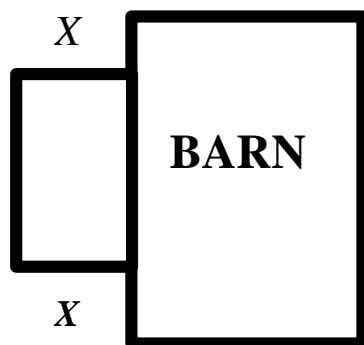
1. Perimeter = 26ft.
Area = 40 sq. ft.

2. 18 ft.

3. 15 ft.

4. 72 ft.

5. $72-2X$



6. $y1= x(72-2x)$

7. 18 ft. by 36 ft.

Name: _____ Date: _____

“ HOW HIGH DOES IT BOUNCE?”

Statistics and Linear Regression

This activity will enable you to collect ball bounce data by using the CASIO FX-7400G Mini Graphing Calculator. It will also detail how to expand this activity to include a group activity in which a comparison of the data collected can be made and graphed.

Equipment needed:

- a) CASIO FX-7400G Mini Graphing Calculator
- b) One tennis ball
- c) One Ping Pong Ball
- d) One Super Ball
- e) One Meter Stick, or tape measure

Purpose: To collect and record the bounce height of three different types of balls dropped from various heights, and then compare these results against each other and draw conclusions and make predictions for balls dropped from other heights.

STEP 1-- One person in the group should hold the meter stick straight. One person should stand in front of the meter stick so that he/she can see the ball bounce up in front of the meter stick. One person should stand to the side of the meter so that he/she will be able to drop the balls at the designated heights. The fourth person should act as the recorder

STEP 2-- Fill in the chart below with the data obtained from the activity. (HINT: Try a few practice drops with each ball before you record the height you want to record.)

DROP HEIGHT	TENNIS BALL BOUNCE HEIGHT	PING PONG BALL BOUNCE HEIGHT	SUPER BALL BOUNCE HEIGHT
20 cm			
40 cm			
60 cm			
80 cm			
100 cm			

STEP 3-- Once the data is recorded into the table, you must now enter the data into the lists in the **STAT Mode** of your calculator. Place the DROP HEIGHT into LIST 1, the TENNIS BALL BOUNCE HEIGHT into LIST 2, the PING-PONG BALL BOUNCE HEIGHT into LIST 3, and the SUPER BALL BOUNCE HEIGHT into LIST 4.

STEP 4--

Now that the data is entered into the lists, you must set up the graph option so that you can graph the type of graph you want. To do this press the F1 [GRPH] key. Next press the Green Arrow key and then press F4 [SET] to set up the graphs.

STEP 5--

The first line on the screen reads **StatGraph1** and is highlighted. Using the down arrow, go to the next line, Graph Type, and make sure it says SCATTER. (NOTE: To change the type, use the Green Arrow key to view additional choices and make your selection by pressing the appropriate F key.) The next line down, X-LIST should read LIST 1. The next line, Y-list, should read LIST 2. Frequency should read 1. Mark TYPE should be the open box.. You have now set up the calculator to draw a scatter plot for the data in LISTS 1 and 2, a graph of the bounce height of the Tennis Ball.

STEP 6--

Use the up arrow key to return to the top of the screen. Now we must set up the next Stat-graph. Press F2 [GRPH2] to graph the second STAT GRAPH, arrow down leaving the graph type and the X-List the same. Change the Y-List to LIST 3. Leave the Frequency the same. Change the mark type to an X.

STEP 7--

Use the up arrow key to return to the top of the screen. Press F3 [GRPH 3] to graph the third STAT GRAPH, arrow down leaving the graph type and the X-List the same. Change the Y-List to LIST 4. Leave the Frequency the same. Change the mark type to the DOT.

STEP 8--

Press the [QUIT] key. In order to graph one of the STAT GRAPHS at a time simply press the corresponding F key. (F1; Graph 1, F2; Graph 2, F3; Graph 3). If you would like to graph more than one of the graphs at once, press the Green Arrow key, then press the F1 [SEL] key. This allows you to turn on any, or all, of the STAT GRAPHS to graph at once. Do this by highlighting the Stat-Graph and press the F1 [ON] or F2 [OFF] key. Then press the F4 [DRAW] key to draw all of the graphs you selected.

STEP 9--

To draw the line of best fit for any, or all, of the Stat Graphs pick the appropriate regression model you want to use. In this case it would be linear [X]. Since there is more than one graph on the screen now you must pick which graph you would like to draw the line of best fit for. To do this, use the up and down arrow keys to change the selection as it appears in the upper right hand corner of the screen. Once the Stat Graph you want appears, press the [EXE] key. Now to draw the line press F4 [DRAW], or to copy the equation into the GRAPH FUNCTION menu press F3 [COPY].

STEP 10--

Now that we have copied equation into the graph function menu you can now use it to do predictions of different values. Example: What is the bounce height of the Tennis Ball if it were dropped from a height of 950cm? (HINT: Use the TABLE MENU to solve this problem easier.)

Name: _____ Date: _____

“Walk a Mile in my Shoes”

Statistics and Linear

Regression

Collect and record the shoe size and height of each group member in the chart below.
(For men’s shoe sizes add 1.5. For example, a men’s size 8 should be recorded as a 9.5.)

MEMBER	SHOE SIZE	HEIGHT

1. What about you notice about the shoe size of the taller students? About the shorter students? Why?

Enter your data into your calculator.

2. What is the mean (or average) shoe size? The mean height?

Draw a scatter plot of your data and find the line that best fits the data.

3. What is the equation and slope of the line?

4. Predict the shoe size of a 3’ tall child. What is it for a 9’ adult?

FOR THE TEACHER

Walk a Mile in my Shoes

Statistics and Linear Regression

Using this Activity

- The amount of teacher assistance will vary with the ability and experience of the class.
- Remind students that each men's size must be increased by 1.5 to match the statistics of the women's size.
- To get the most accurate measurements, whole class data is preferable. The statistics can be gathered several days prior to completion of the activity.

ANSWERS

1. The shoe size should get larger as the heights increase.
- 2.-4. Answers will vary.

5. Graph the scatter plot of the data collected and sketch a copy of the scatter plot on the given graph.



What type of function does the data resemble? _____

6. Try your guess by choosing the appropriate regression and drawing the graph. Sketch the graph on the given axes below.



What was the regression equation for your guess? _____

Did the regression you picked work well? _____

How can you tell? _____

7. If your regression equation didn't seem to work well, try others.

Which regression seems to "fit" the best? _____

Why? _____

How would the experiment change if we used fewer M&M's? _____

More M&M's? _____

FOR THE TEACHER

“M up or M down?”

Statistical Regression

Materials needed for this activity:

- Several large bags of M&M’s (Skittles work well also. Small snack size bags work well for letting students count out their own.)
- Small “Dixie Cup” cups to place the M&M’s in.
- A clean piece of paper to dump the M&M’s onto.

Using this activity:

- The teacher may wish to count out the candy in advance to save time in class and limit the amount of candy to buy.
- If this is the first time the students are using the STATS menu, the teacher may want to lead the students through the activity. This is also a GREAT small group activity.
- Since this is an exponential regression, the last point, or trial, will need to be eliminated. The teacher may wish to let the students try the exponential regression, get the math error and then discuss what about the data makes the exponential impossible to graph prior to actually eliminating the point.

Answers:

Since this activity involves student generated data, Answers will vary for the scatter plot, graph, and equation.

Name: _____ Date: _____

Spring Fling

Graphing and Exploring Equations

The 8th grade needs to raise money for its end of the year field trip. Team 8A wants to sell popcorn at the Spring Fling Carnival while team 8B wants to sell cotton candy. The cost to rent a popcorn machine is \$15.00 and a cotton candy maker costs \$25.00. The cost of additional supplies for the popcorn is \$.05 per bag. The additional cost for the cotton candy is \$.10 per stick. Team 8A will sell the bags of popcorn for \$.50 each and team 8B will sell their cotton candy for \$.75 a stick.

- a. Each team needs to raise \$100.00.

How many bags of popcorn will team 8A need to sell to reach this goal?

How many sticks of cotton candy will team 8B need to sell?

- b. What is the least number of items each team would need to sell in order to avoid losing money on the sales?
- c. At what point do both teams earn the same amount of profit?

FOR THE TEACHER

Spring Fling

Graphing and Exploring Equations

Using this activity:

Students will use the graph, zoom and trace feature of the graphing calculator to answer the questions in this activity.

Equations:

$$Y1 = .5x - (15 + .05x)$$

Y1 = Popcorn Revenue

x = number of bags

$$Y2 = .75x - (25 + .1x)$$

Y2 = Cotton Candy Revenue

x = Number of sticks

Suggestions:

1. Graphing the line $Y3 = 100$ will aid in finding the profit point.

2. A suggested range for part **a** is:

X-min—0

Y-min—50

X-max—400

Y-max—150

Scale—25

Scale—25

3. A suggested range for part **b** is:

X-min—0

Y-min—10

X-max—70

Y-max—15

Scale—10

Scale—5

Answers:

- Popcorn---256 bags
Cotton Candy---193 sticks (NOTE: Rounding up is necessary since fractional bags/sticks are not reasonable)
- Popcorn---34 bags
Cotton Candy---39 Sticks
- 50 units (Profit = \$7.50)

Characteristics of Lines

Graphing and Exploring

Equations

Carefully observe the graphs of the following groups of functions. Look for similarities and differences in the graphs. Then see if you can decide what it is about the equations that causes the similarities and differences to occur.

Enter all of the equations in the group. Then graph them all together.

Function	Similarities	Differences
$Y1=3X$		
$Y2=3X-2$		
$Y3=3X+1$		
$Y4=3X+4$		

Before Begging the next exercise, set the calculator view screen in the initialized screen.

Procedure: While in the GRAPH MODE, press shift F3. Then press F1.

Function	Relationship between lines
$Y1=(2/3)X$	
$Y2=(-3/2)X$	

Function	Relationship between lines
$Y1=(-5/2)X$	
$Y2=(2/5)X$	

Check your understanding:

Write the equations for two lines that are parallel. _____

Write the equations for two lines that are perpendicular. _____

FOR THE TEACHER

Name: _____ Date: _____

Characteristics of Lines

Graphing and Exploring

Equations

Enter all of the equations in the group. Then graph them all together.

Function	Similarities	Differences
$Y1=3X$	<u>Same Slope</u>	
$Y2=3X-2$	<u>Same Slope</u>	<u>Crosses the X axis further to the right</u>
$Y3=3X+1$	<u>Same Slope</u>	<u>Crosses the X axis further to the left</u>
$Y4=3X+4$	<u>Same Slope</u>	<u>Crosses the X axis further to the left</u>

Before beginning the next exercise, set the calculator view screen in the initialized screen.
 Procedure: While in the GRAPH MODE, press shift F3. Then press F1.

Function	Relationship between lines
$Y1=(2/3)X$	<u>These two lines are perpendicular to each other</u>
$Y1=(-3/2)X$	<u>And intersect at the origin.</u>

Function	Relationship between lines
$Y1=(-5/2)X$	<u>These two lines are perpendicular to each other</u>
$Y2=(2/5)X$	<u>And intersect at the origin.</u>

Check your understanding:

Write the equations for two lines that are parallel. (Answers vary) Ex: $y = 5x - 6$ and $y = 5x - 3$

Write the equations for two lines that are perpendicular. Ex: $y = \frac{3}{4}x - 2$ and $y = -\frac{4}{3}x - 2$

Name: _____ Date: _____

Patterns in Linear Functions Graphing and Exploring Equations

Identify the constant term in each equation in the table below. Graph the line, then identify where the graph crosses the Y-axis (the location of the line).

Equation	Constant term	Location of the Line
$Y=X$		
$Y=X+2$		
$Y=X-3$		
$Y=X+4$		
$Y=X-2$		

What conjecture can you make concerning the effect of the constant term on the appearance of the line?

Identify the coefficient of X in each equation below. Graph each line. Then make a remark about the orientation (slope or other factors) of the line. Your description of orientation may use a comparison with the line $Y = X$.

Equation	Coefficient	Orientation of Line
$Y=X$		
$Y=2X$		
$Y=3X$		
$Y=6X$		
$Y=.5X$		

Can you make a conjecture regarding the effect of the coefficient of X on the appearance of the graph of the line? _____

FOR THE TEACHER

Name: _____ Date: _____

Patterns in Linear Functions Graphing and Exploring Equations

Identify the constant term in each equation in the table below. Graph the line, then identify where the graph crosses the Y-axis (the location of the line).

Equation	Constant term	Location of the Line
$Y=X$	<u>0</u>	<u>0</u>
$Y=X+2$	<u>2</u>	<u>2</u>
$Y=X-3$	<u>-3</u>	<u>-3</u>
$Y=X+4$	<u>4</u>	<u>4</u>
$Y=X-2$	<u>-2</u>	<u>-2</u>

What conjecture can you make concerning the effect of the constant term on the appearance of the line?

The constant term determines where the line crosses the Y axis. The larger the number, the further to the left the line appears to move.

Identify the coefficient of X in each equation below. Graph each line. Then make a remark about the orientation (slope or other factors) of the line. Your description of orientation may use a comparison with the line $Y = X$.

Equation	Coefficient	Orientation of Line
$Y=X$	<u>1</u>	<u>Diagonal line in 1st and 3rd quadrant</u>
$Y=2X$	<u>2</u>	<u>Halfway between $Y=X$ & the Y axis</u>
$Y=3X$	<u>3</u>	<u>Closer to the Y axis than $Y=2X$</u>
$Y=6X$	<u>6</u>	<u>Closer to the Y axis than $Y=3X$</u>
$Y=.5X$	<u>.5</u>	<u>Halfway between $Y=X$ & X axis</u>

Can you make a conjecture regarding the effect of the coefficient of X on the appearance of the graph of the line? **The larger the number the steeper the slope, the smaller the number the shallower the slope.**

Name: _____ Date: _____

Graphs of Quadratic Equations (Parabolas)

Graphing and Exploring Equations

When an equation is in the form $y = ax^2 + c$, the vertex is a point that is either the highest point (MAXIMUM) or the lowest point (MINIMUM) in the curve of the parabola.

In the following equations, identify the constant term. Graph the Equation. Initialize your view screen. Then trace the curve. State the coordinates of the vertex.

Equation	Constant Term	Location of the Vertex
$y = x^2$		
$y = x^2 + 2$		
$y = x^2 - 3$		
$y = x^2 + 4$		
$y = x^2 - 5$		

Make a conjecture about the effect of the constant term of a quadratic equation on the appearance of the graph and the location of the vertex.

ANSWER: _____

In the following equations, identify the coefficient of the square term. Graph the equation. Then make a comment on the appearance of the graph compared to the graph of $y = x^2$.

Equation	Coefficient Term	Appearance of Graph
$y = x^2$		
$y = 2x^2$		
$y = 3x^2$		
$y = .5x^2$		
$y = .2x^2$		

Make a conjecture about the effect of the coefficient of the squared term on the appearance of the graph of a quadratic equation. _____

Write an equation that has a vertex at (0,9) and opens smaller than $y = x^2$. _____

FOR THE TEACHER

Name: _____ Date: _____

Graphs of Quadratic Equations (Parabolas)

Graphing and Exploring Equations

When an equation is in the form $y = ax^2 + c$, the vertex is a point that is either the highest point (MAXIMUM) or the lowest point (MINIMUM) in the curve of the parabola.

In the following equations, identify the constant term. Graph the Equation. Initialize your view screen. Then trace the curve. State the coordinates of the vertex.

Equation	Constant Term	Location of the Vertex
$y = x^2$	<u>0</u>	<u>(0,0)</u>
$y = x^2 + 2$	<u>2</u>	<u>(0,2)</u>
$y = x^2 - 3$	<u>-3</u>	<u>(0,-3)</u>
$y = x^2 + 4$	<u>4</u>	<u>(0,4)</u>
$y = x^2 - 5$	<u>-5</u>	<u>(0,-5)</u>

Make a conjecture about the effect of the constant term of a quadratic equation on the appearance of the graph and the location of the vertex.

ANSWER: *The larger the number the further up the Y axis the Vertex moves.*

In the following equations, identify the coefficient of the square term. Graph the equation. Then make a comment on the appearance of the graph compared to the graph of $y = x^2$.

Equation	Coefficient Term	Appearance of Graph
$y = x^2$	<u>1</u>	<u>N/A</u>
$y = 2x^2$	<u>2</u>	<u><i>Narrower than</i></u> $y = x^2$
$y = 3x^2$	<u>3</u>	<u><i>Narrower than</i></u> $y = x^2$
$y = .5x^2$	<u>.5</u>	<u><i>Wider than</i></u> $y = x^2$
$y = .2x^2$	<u>.2</u>	<u><i>Wider than</i></u> $y = x^2$

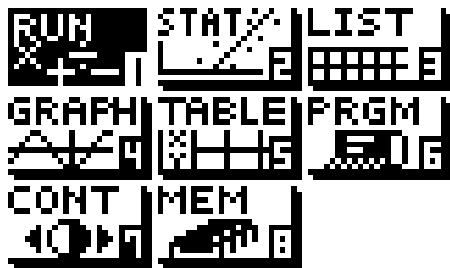
Make a conjecture about the effect of the coefficient of the squared term on the appearance of the graph of a quadratic equation: *The larger the number the narrower the graph, the smaller the number the wider the graph.*

Write an equation that has a vertex at (0,9) and opens smaller than $y = x^2$.

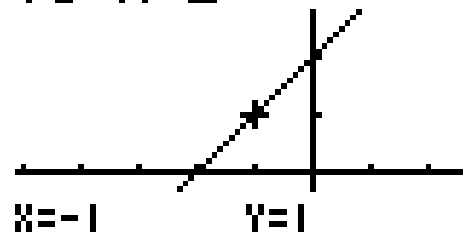
$y = 4x^2 + 9$ *Answers may vary*

FA-122 Program Link

The following is a sample of screen captures from the fx-7400G OH calculator. By using the CASIO FA-122 Program Link, screen images can be captured from an overhead calculator and imported into any word processing software.

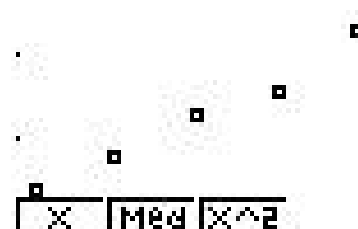
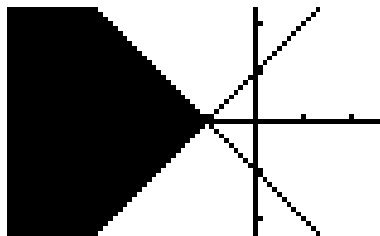
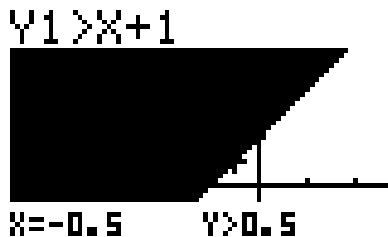
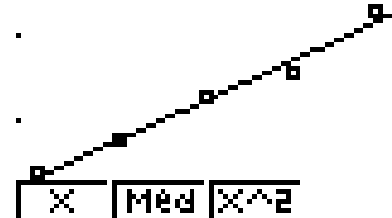
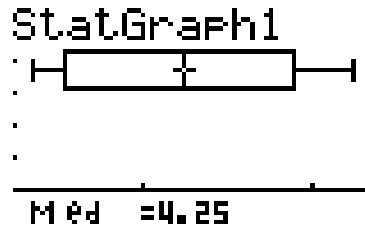


$$Y1 = X + 2$$



	List 1	List 2
1	1975	3.35
2	1980	3.75
3	1985	4.25
	1975	

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CASIO EDUCATIONAL PRODUCTS GROUP

	Director of Marketing		National Sales Mgr.	
	<i>JIM GROSS</i> (972) 378-0993 fax:(972) 378-0994 jjgross3@aol.com		<i>PHIL LEES</i> (314) 721-5916 fax:(314) 726-5914 pdlees@aol.com	
		REGIONAL MANAGERS		
<i>DAN BOUCHER</i> (Northeast) (609) 427-0877 fax:(609) 427-0899 danboucher@aol.com		<i>KEELIN MORAN</i> (Southeast/north central) (770) 640-1713 fax:(770) 594-8227 keelinb@aol.com		<i>LESA ZIMMERMAN</i> (West/South Central) (512) 833-5509 fax:(512) 833-5509 lczimm@aol.com
		SUPPORT SPECIALISTS		
<u>NORTHEAST</u>	<u>SOUTHEAST</u>	<u>NORTH CENTRAL</u>	<u>SOUTH CENTRAL</u>	<u>WEST COAST</u>
<i>Laurie Zimmerman</i> (614) 261-1635 fax:(614) 261-1638 lauriezimm@aol.com (OH, PA, WV)	<i>Dave Barron</i> (904) 740-8763 fax:(904) 740-8766 davbarron@aol.com (FL, MS)	<i>Mark Thompson</i> (314) 842-5843 fax:(314) 842-6695 marktacas@aol.com (IL, KS, MO, NE)	<i>Clay Moore</i> (713) 465-2336 fax:(713) 465-2743 jclaymoore@aol.com AZ, TX, LA	<i>Carmen Muldowney</i> (714) 544-0318 fax:(714) 544-0328 talk2car@aol.com Southern CA
<i>Mark Schmeling</i> (248) 547-1606 fax:(248) 547-1689 casiomark@aol.com (IN, MI)	<i>Corrie Cooley</i> (205) 435-1520 fax:(205) 435-1526 cooley@aol.com (AL, GA, TN)	<i>Marsha Crispin</i> (612) 898-5461 fax:(612) 898-5462 marshacris@aol.com (MN, ND, SD, WI)		<i>Kristen Melichar</i> (303) 761-8550 fax:(303) 761-8550 krmelichar@aol.com (CO, ID, UT, WA, WY)
	<i>Joe Schumaker</i> (704) 810-0948 fax:(704) 810-0826 jkschuma@aol.com (NC, SC)			<i>Mark Bornholdt</i> (415)956-5202 mholdt@aol.com (N.CA, OR, WA, NV, HI, AK)

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EDUCATIONAL PRODUCTS
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CASIO FX-7400G MINI Graphing Calculator
Contact

Paragon Publications
Doug Brumbaugh or David Rock
P.O. Box 100
Goldenrod, FL 32733
(407) 239-7579
Email: jar@magicnet.net

Or, contact CASIO directly:

CASIO, Inc.
570 Mt Pleasant Ave.
Dover, NJ 07801
(800) 582-2763
CASIO home page on the World Wide Web
<http://www.casio.com>