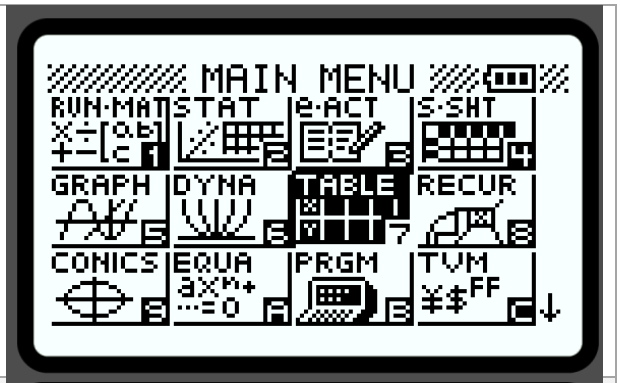
IM Algebra 1 – Unit 4: CASIO Technology Use at a Glance

Unit 4 – Functions

Unit 4: Functions	
Scientific Calculator Required	Lessons 15
Graphing Technology Recommended	Lessons 5 (optional activity), 8, 10, 14
Graphing Technology Required	Lessons 13, 15, 17, 18

Lesson 5a – Viewing the Table and Graphing Linear Equations.

(Example: IM Optional Activity 5.3: Function Notation and Graphing Technology)

1. This activity is a follow up to **Lesson 5.2: Data Plans**. Press [MENU] then [7] – [TABLE].	
2. Type in the function 10***x***+25 for **Y1**. Use the [X,θ,T] button to type in the variable "***x***" or use [ALPHA] then [+]. Press [EXE] when finished.	

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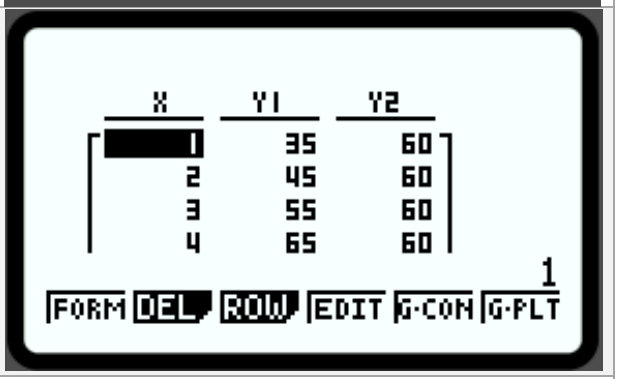
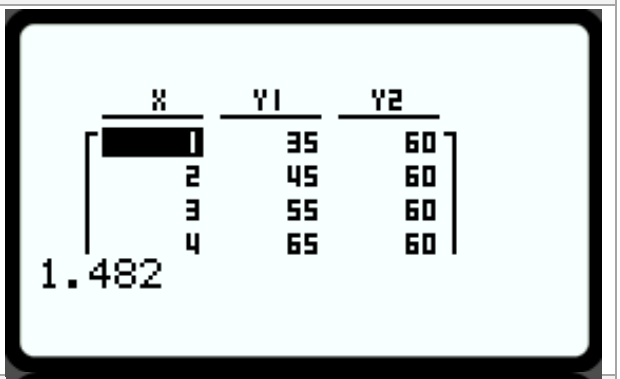
3. Type in 60 for **Y2**. Again, press [EXE] to enter.	
4. Press [F6]**–TABL** to see both tables for **Y1** and **Y2** displayed.	
5. The input values for the table are editable. The lesson asks to find the value of ***B*(1.482)** With an input value highlighted, type **1.482** as shown to the right.	
6. Press [EXE], now you can see the output value for **Y1** and **Y2** when the input is **1.482**.	

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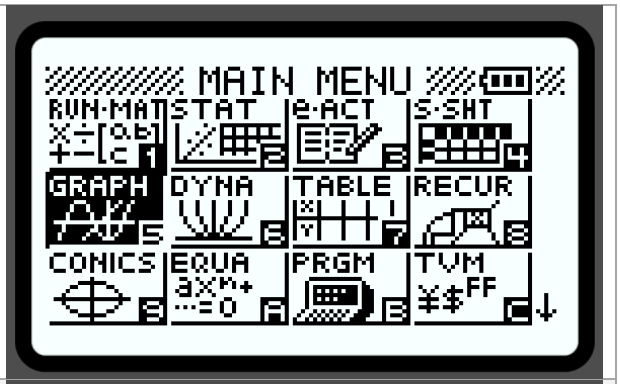
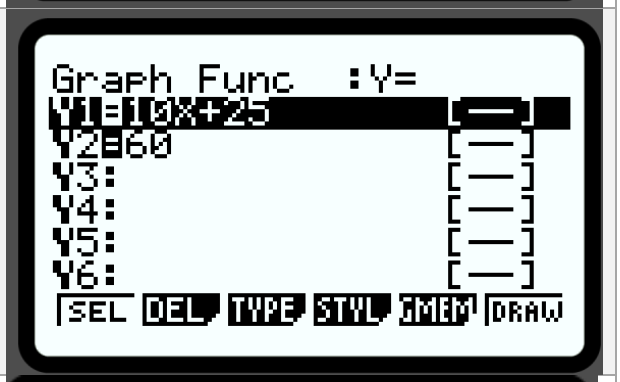
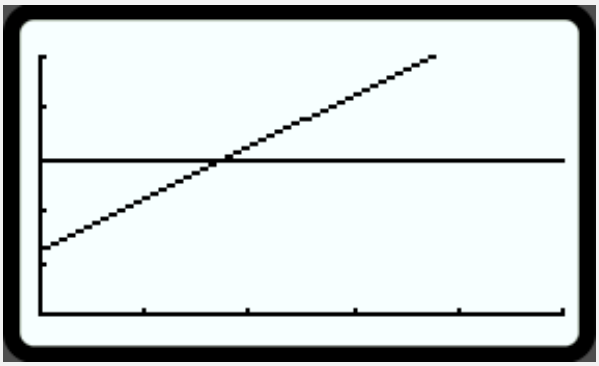
7. To see the graph of these functions, press MENU then 5 – GRAPH.	
8. Any functions entered in the **Table App** are automatically entered into the **Graph App**. These functions are also stored for **Y1** and **Y2** in the **Run-Matrix App**. Press F6 **– DRAW** to view the graphs.	
9. To adjust the viewing window manually, press SHIFT then F3 **– V-Window**. Change the values of **Xmin**, **max** and **scale** along with **Ymin**, **max,** and **scale** to the values shown to the right.	
10. Press EXIT to return to the **Graph Function** screen shown in **Step 8** above. Next press F6 **– DRAW** to view the graph. Remember, the **Trace** function of graph can also be used to determine the output for a desired input of a function.	

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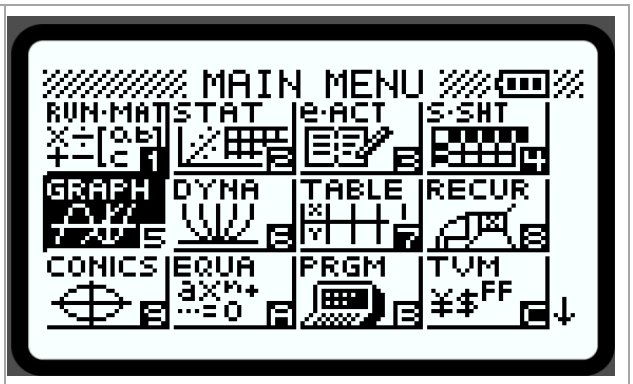
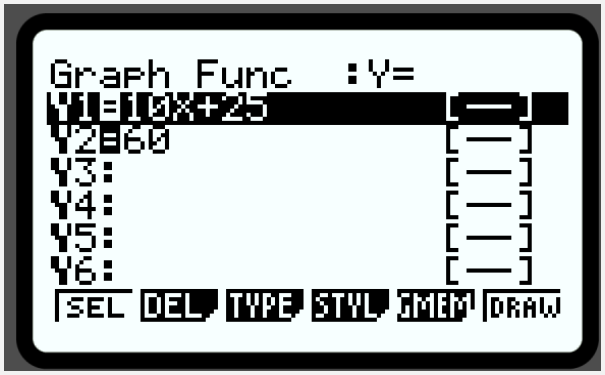
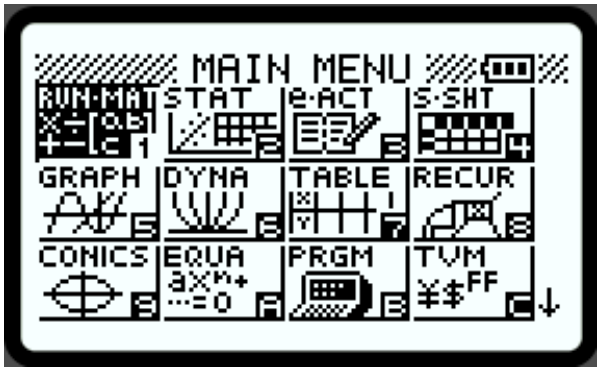
Lesson 5b – Using Function Notation in the Run/Matrix App.

(Example: IM Optional Activity 5.3: Function Notation and Graphing Technology)

1. Function notation can be used in the **Run-Matrix App** to evaluate a function after defining the function within the **Graph App** or **Table App**. Press MENU, then 5 – GRAPH.	
2. Enter function ***B*(*x*)** into **Y1**. Press EXE.	
3. Press MENU, then 1 – RUN to change to the **Run-Matrix App**.	
4. Press the VARS button to see the menu shown.	

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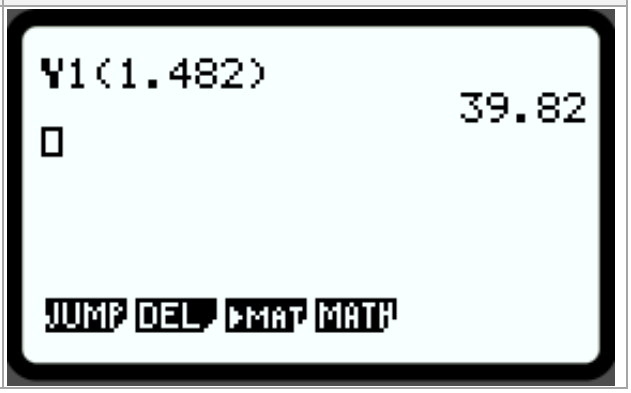
5. Now press [F4] – **GRPH** to see the function type options.	
6. Press [F1] –**Y**. Notice that this "**Y**" is different than the "**Y**" obtained by using the [ALPHA] key.	
7. Now, to evaluate ***B*(x) = Y1** when **x = 1.482**, we need to enter **Y1(1.482)**. Finish entering this and press [EXE]. We can now see that Option B phone plan will cost **$39.82** when **1.482 Gb** of data is used in a month.	

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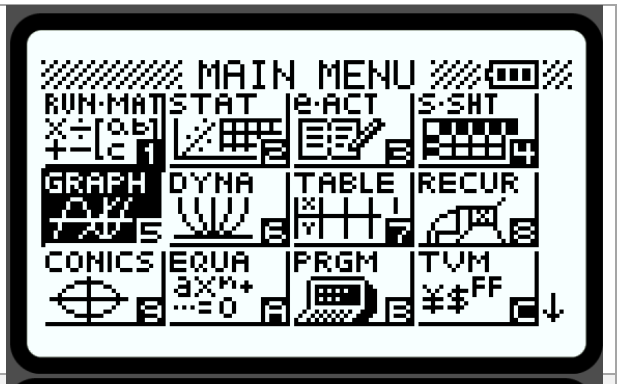
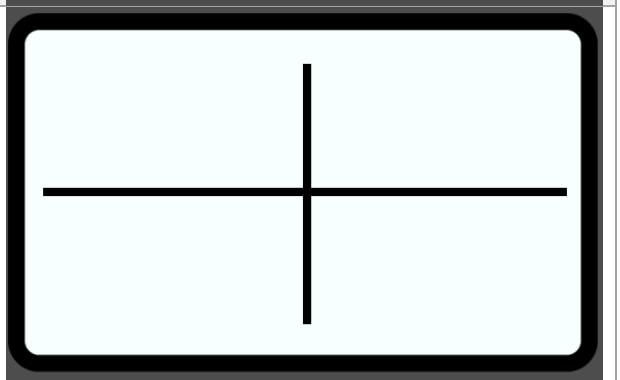
Lesson 8 - Graphing Linear Equations and Adjusting the Window.

(Example: IM Lesson 8.2: Raising the Flag (Part 1) Are you ready for more?)

8. Press [MENU], then [5] – [GRAPH].	
9. Type in the function (365*24*3600)***x*** in **Y1**. Then press [EXE] followed by [F6] – **DRAW**.	
10. If you see a blank graph you will need to adjust the view window. To adjust the window, press [F3] – **V-Window**.	
11. The graph is a slanted line when the ***x*-axis** is scaled from -0.0001 to 0.0001 years and the ***y*-axis** is scaled to ten thousand in both directions. When you type -0.0001, the calculator will show the value in scientific notation so it may look like "**-1E-04**" when you press [EXE].	

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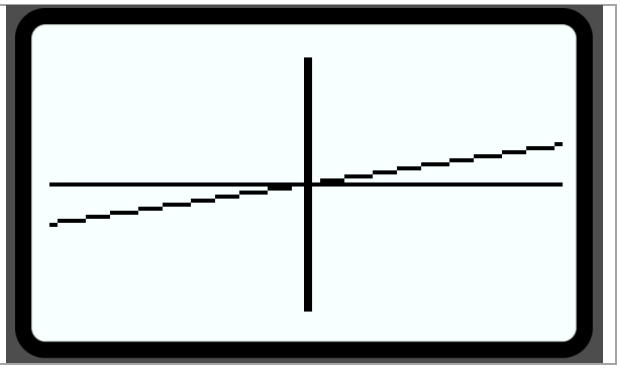
12. Once you adjust the window, press EXIT then press F6 – **DRAW**. You should see the graph shown to the right.	

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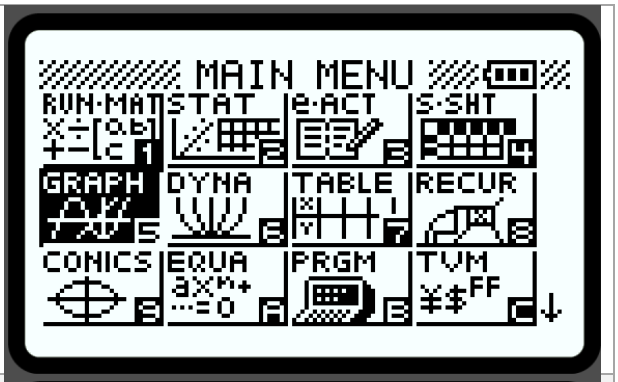
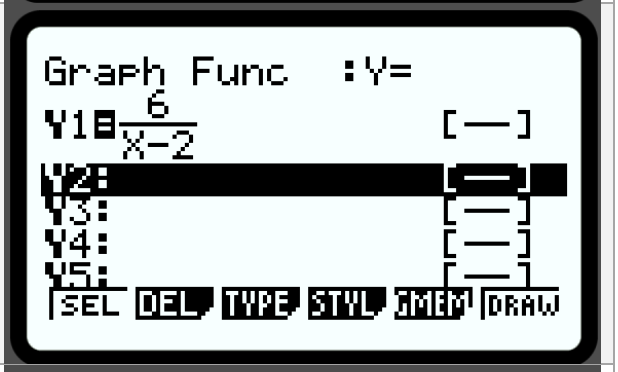
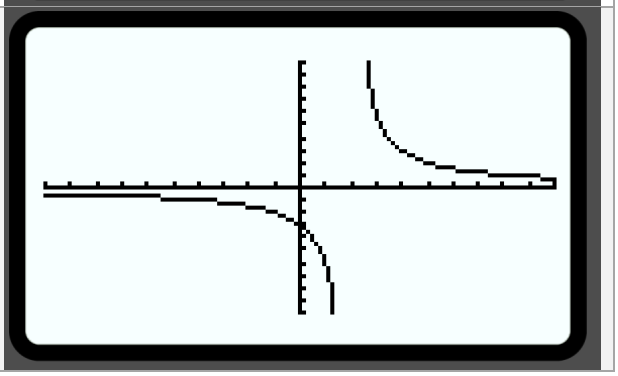
Lesson 10 - Graphing Function and Viewing the Table (Std Window).

(Example: IM Optional Activity 10.4: What Could Be the Trouble?)

1. Press [MENU], then [5] – [GRAPH].	
2. To enter the function $\frac{6}{x-2}$ for **Y1**, press the fraction button [▪/▪]. Enter the "**6**" in the numerator, then arrow down ([▼]) to enter the denominator "***x* – 2**". Press [EXE] when finished and then [F6] **– DRAW** to view the graph**.**	
3. If you may need to adjust your viewing window. Press [F3] **– V-Window** then again [F3] **– STD** to view in the standard viewing window. The window settings will be automatically changed to match those shown to the right.	
4. Press either [EXE] or [EXIT] to return to the graph entry window and then [F6] **– DRAW** to see the graph plotted in the standard window.	

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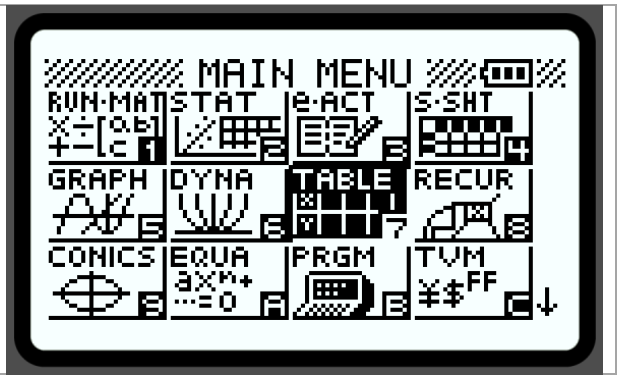
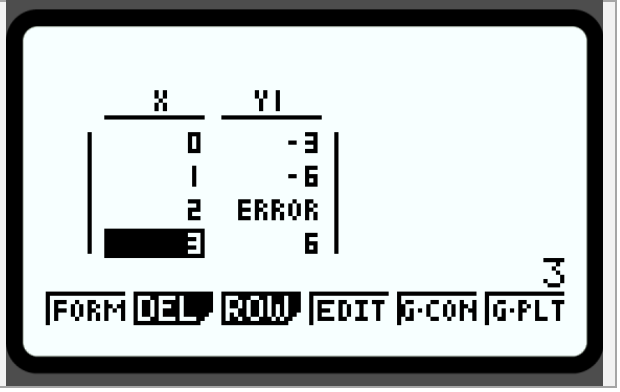
5. To view the table press MENU, 7 – TABLE. The function entered in **Y1** in the **Graph App** will be **Y1** in the **Table App**.	
6. Press F6 –**TABL** to see the table. Since **2** is not part of the domain of this function, it's output shows "**ERROR**" in the table.	

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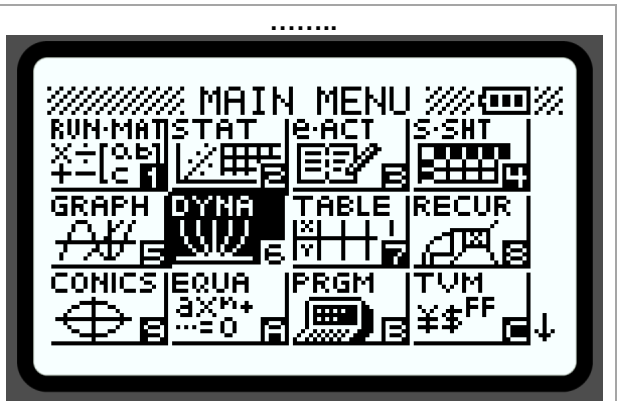
Lesson 14 - Using Dynamic Mode to Graph Absolute Value Functions.

(Example: IM Lesson 14.3: Moving Graphs Around)

1. To see how the "***a***", "***h***", and "***k***" values of the absolute value function affect the graph, we can go to the **Dynamic Graph App**.

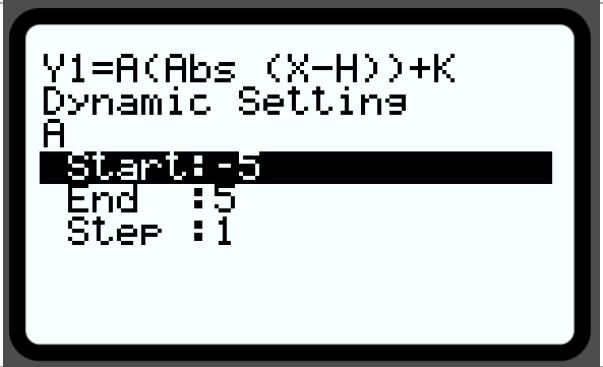
   Press [MENU] then [6] – [DYNA].



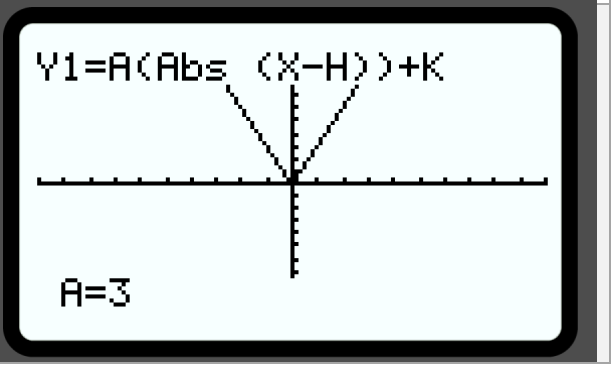
2. Type the general form of an absolute value; ***a*|x – *h*| + *k***; for **Y1**. The parameters "***a***", "***h***", and "***k***" are entered using the [ALPHA] button. To obtain the absolute value bars, press the [OPTN] button. Then press [F5] – **NUM** and [F1] – **Abs** for Absolute value.

3. Once the function is typed in for **Y1**, press [F4] –**VAR**, then [F2] – **SET**. Then set the following numbers:

   Start: -5
   End: 5
   Step: 1



4. From the **SET menu** press [EXIT] then press [F6] – **DYNA**. This will allow you to watch what happens when the "***a***" value changes from **-5** to **5** by steps of **1**.



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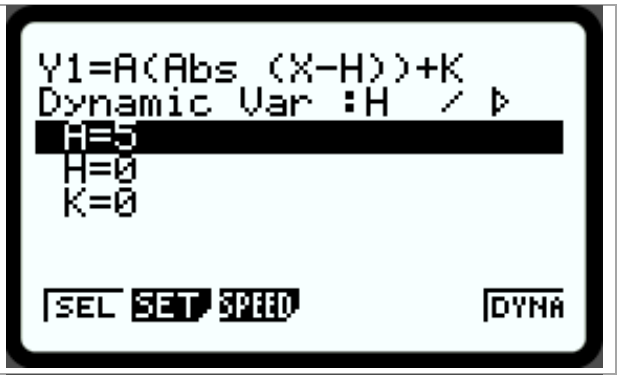
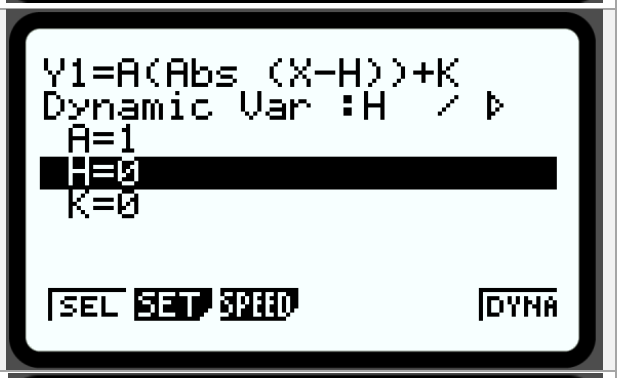
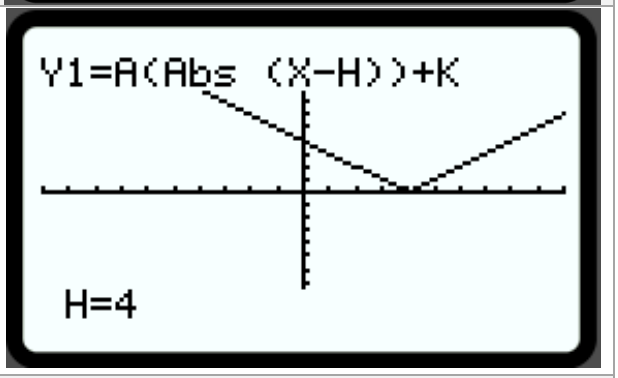
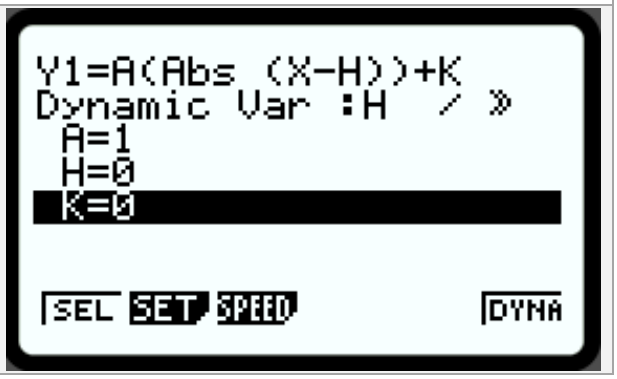
5. To exit the graph press the [AC/ON] button, then [EXIT]. You will be back at the main screen to change what variable you want to see next. Set "**A**" back to 1 if it is a different value. Highlight **A=** and type in 1. Press [EXE]. This will move the highlight to **H=**0.	
6. To see the effects of "***h***" changing, press the down arrow and highlight "***h***". Then press [F1] **– SEL**. **Note:** The **Start**, **End**, and **Step** values will remain the same as set in **Step 3**; -5, 5, and 1; respectively. To alter these values, press [F2] **– SET**. Then press [EXE].	
7. Now, press [F6] **– DYNA**. You will see the graph sliding horizontally as the value of "***h***" is changing. Again, to exit the graph press the [AC/ON] button, then [EXIT]. You will be back at the main screen to select the next variable, "***k***".	
8. Set "**H**" back to 0 if it is a different value. Highlight **H=** and type in 0. Press [EXE]. This will move the highlight to **K=**0, as shown to the right. Then press [F1] **– SEL**. 9. This will change the **Dynamic Var** to **:K**. Now, press [F6] **– DYNA** to view the effect changing "***k***" has on the graph. Once finished, press the [AC/ON] button to end, and then [EXIT].	

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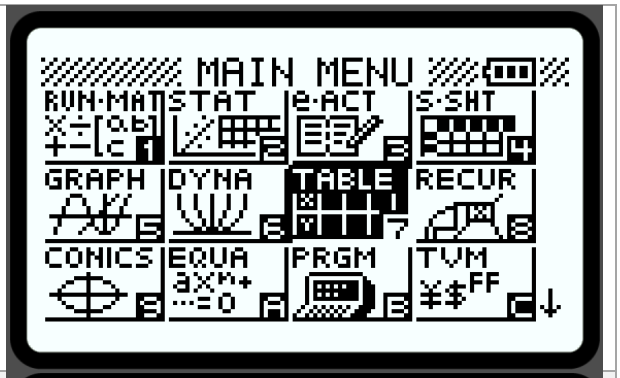
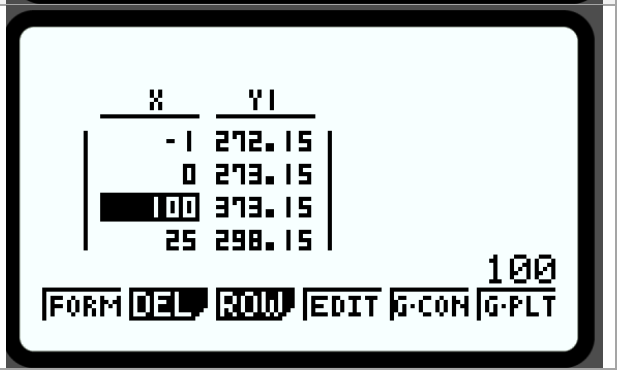
Lesson 15 – Editing Inputs in a Table.

(Example: IM Lesson 15.4: Cool Down- To and From Kelvin)

1. To fill out a table from a function rule, press [MENU], and then [7] – [TABLE].	
2. In **Y1**, type in ***x***+273.15; the conversion of "***x***" degree Celsius (**ºC**) into equivalent "***y***" degree Kelvin (**ºK**).	
3. To see the output when ***x*** =100, click on any ***x*** value in the table, then type 100 then [EXE]. The calculator will show the 100 in the table and the corresponding "**Y1**" value that the function will produce so you do not have to scroll down the entire table.	

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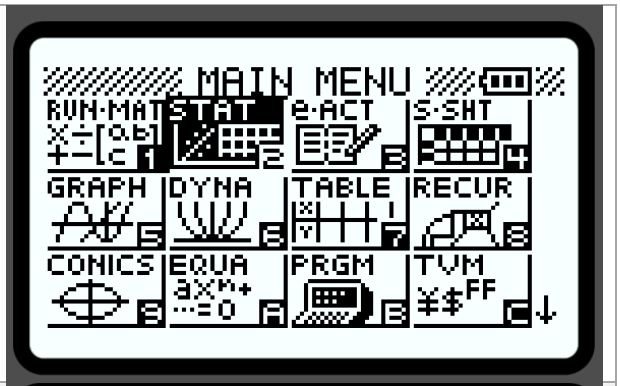
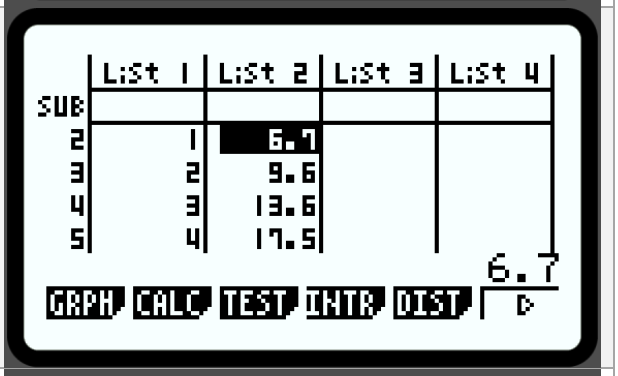
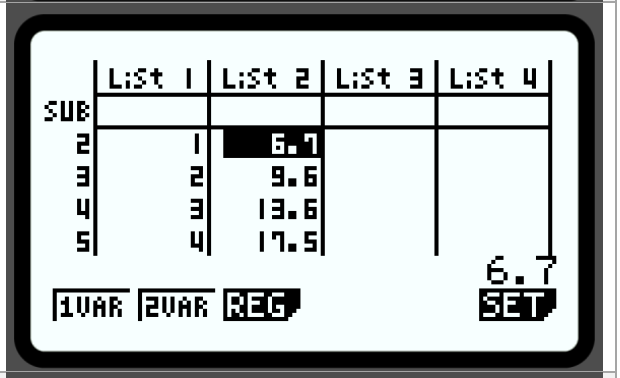
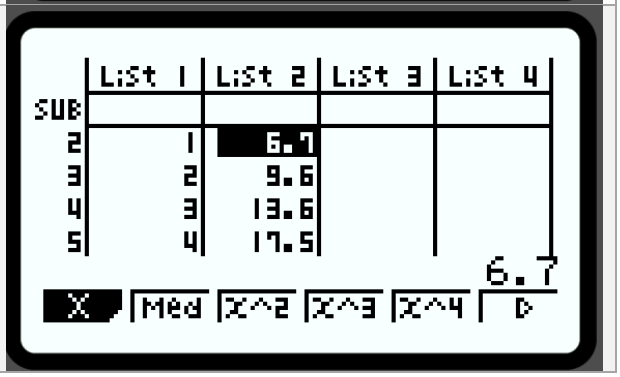
Lesson 17 – Using Linear Regression to Find Line of Best Fit.

(Example: IM Lesson 17.3: Phones in Homes)

1. Press MENU then 2 – STAT to go to the **Stats App**.	
2. Insert the data from the table under **List 1** and **List 2**.	
3. To find the equation of the line of best fit for this data, press F2 – **CALC**.	
4. Now, press F3 – **REG** for the Regression function keys; shown to the right.	

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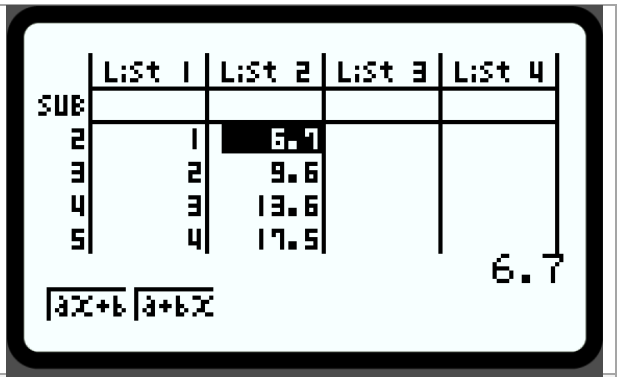
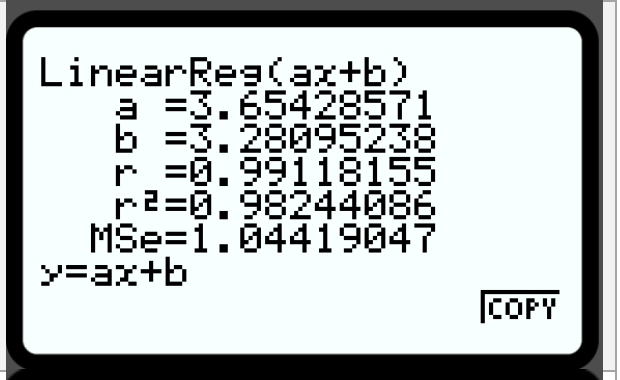
5. Next, press **F1 – X** for a **Linear Regression**, then **F1 – a*X*+b**.	
6. From this screen, you can see the "***a***" value which is the **slope** of the line of best fit. The "***b***" value is the **y-intercept** of the line of best fit. The equation for the line of best fit would ben be $y = 3.7x + 3.3$ (rounded to the tenths place). The **r-value** is also displayed, indicating a strong, positive correlation for the data.	
7. If predictions using this regression model were needed, press **F6 – COPY** to insert this line of best fit into the **Graph/Table Apps**. Here, the equation can be edited to round to the appropriate decimal places.	

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