To Buy a Hybrid or Not…That is the Question

by John Hinojosa

Activity Overview

In this activity, you will determine if the operating costs of a hybrid vehicle outweigh the price when compared to a non-hybrid vehicle

Concepts

Typing data in a spreadsheet, evaluating linear regressions using the data in spreadsheets, graphing the functions determined from the regression equations and finding the intersection point.

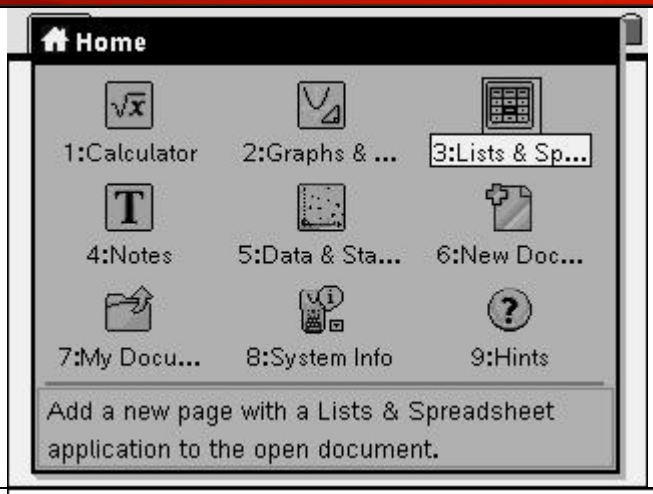
TI-Nspire Applications

Lists and Spreadsheets
Graphs and Geometry

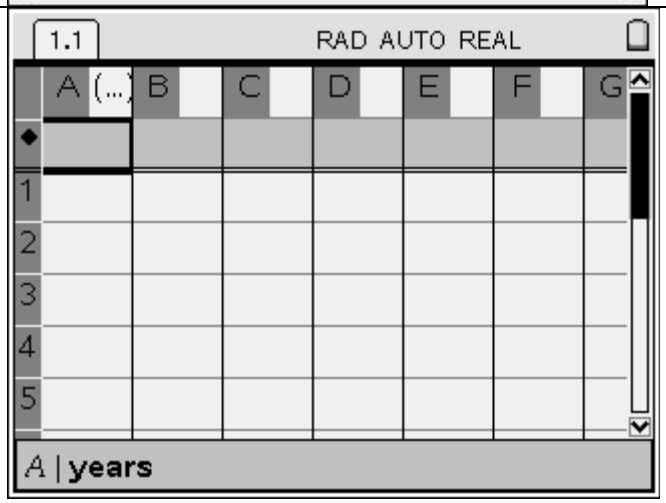
Materials needed:

TI Nspire calculator
WORD Document (with information)
Computer for extended activity (Internet Research)

Press the "Menu" button and open a new **Lists and Spreadsheets** document

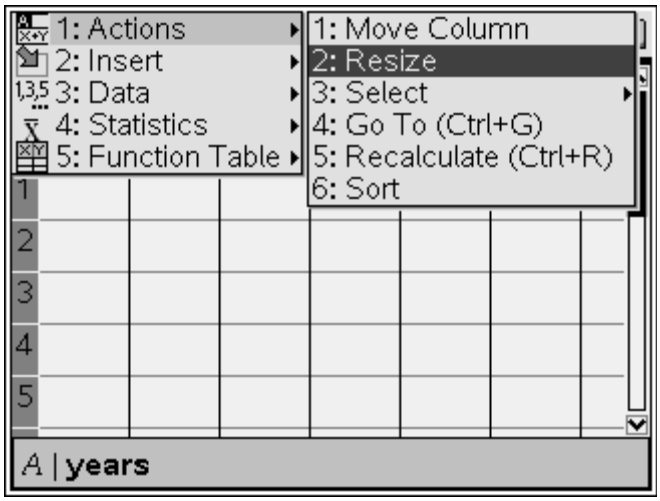


You will now use the "Nav Pad" to move the cursor up to the text box next to the letter "A" in the first column. You will now label the column "years"

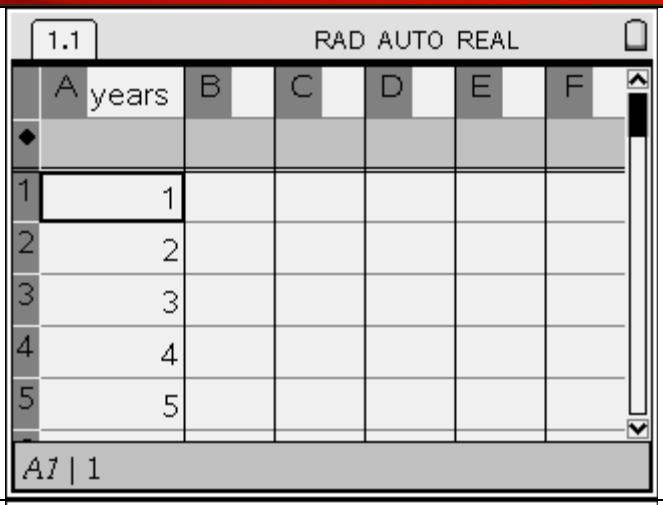


If you want to resize the row, click on the menu button, select "Actions", 2:Resize, and then 1: Resize Column Width.

Then press the right side of the "Nav pad" to widen the column.
Once set to desired size, click the middle of "Nav pad" and then press bottom of "Nav pad."

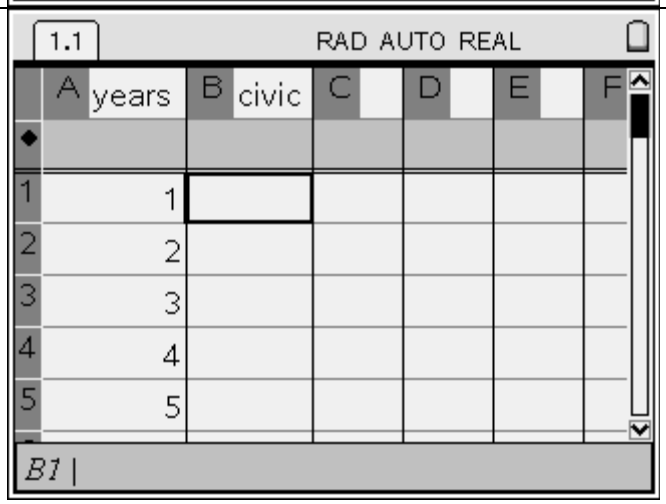


Beginning with A1, you will now enter the number of years from 1 to 25. This can be done manually or with the fill down feature.

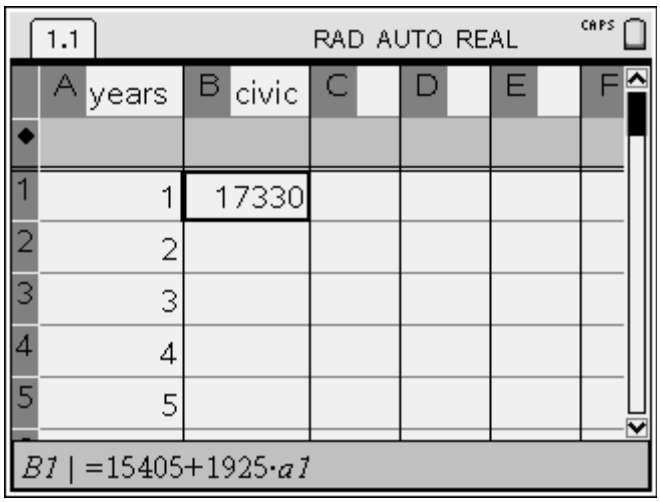


Once completed, you will need to use the "Nav pad" to move the cursor to the text box next to the letter "B". Label the column "Civic"

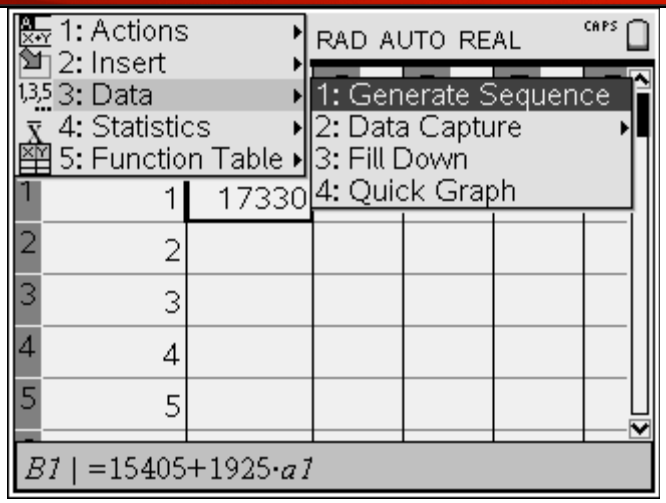
Resize as needed.



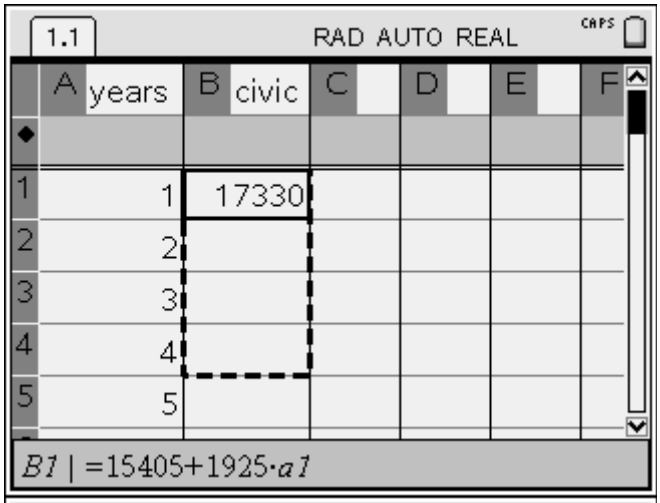
In cell B1, enter the following equation: =15405+1925A1. The equation describes the cost of the vehicle plus the yearly cost for gas.



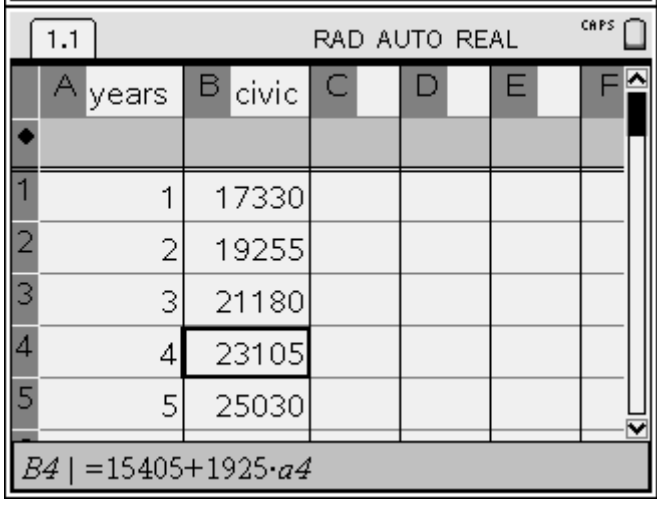
You will now use the Fill Down option to paste the formula in the following cells. Select "Menu", "Data" and go to "3:Fill Down".



You will highlight the cells up to B25and select "Enter".

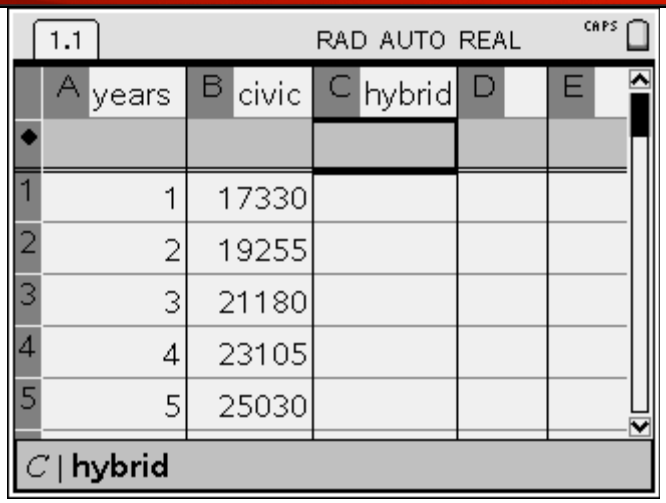


Your data is now filled in on all cells

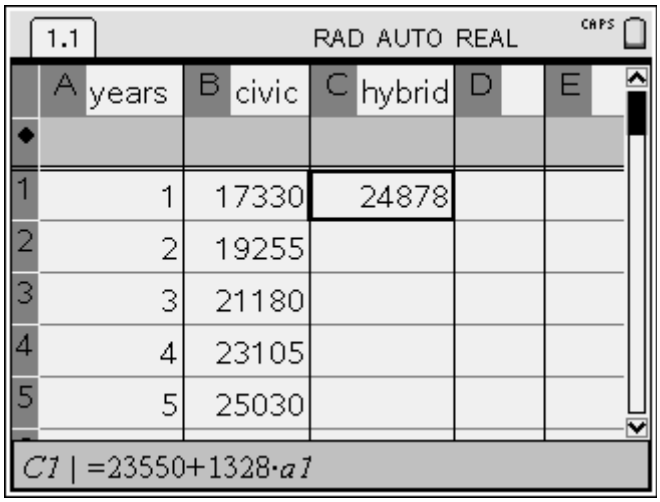


You will need to use the “Nav pad” to move the cursor to the text box next to the letter “C”. Label the column “Hybrid”

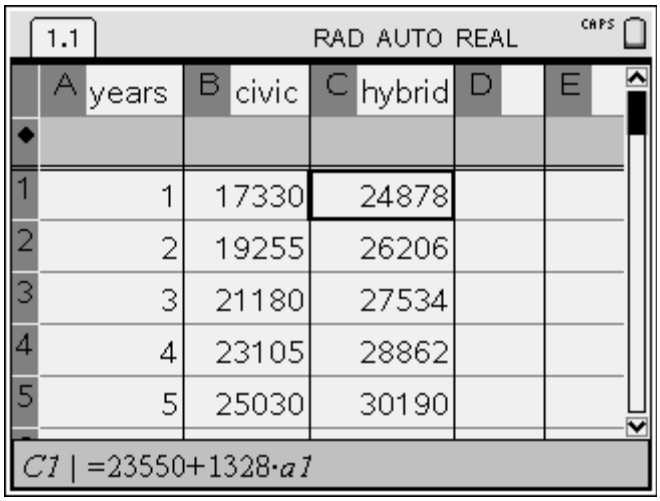
Resize as needed.



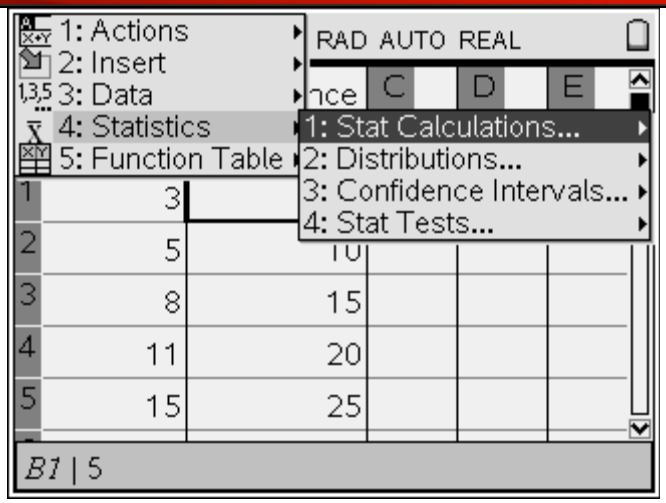
In cell C1, enter the following equation: =23550+1328A1. The equation describes the cost of the hybrid vehicle plus the yearly cost for gas.

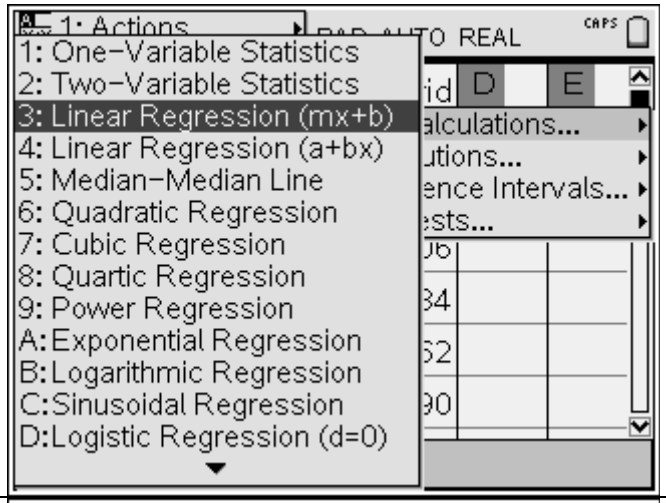


You will now use the Fill Down option to paste the formula in the following cells as previously directed.



While in “Lists and Spreadsheet”, press the “Menu” button. Select “4: Statistics”, “1: Stat Calculations” and then select Linear regression (mx+b).





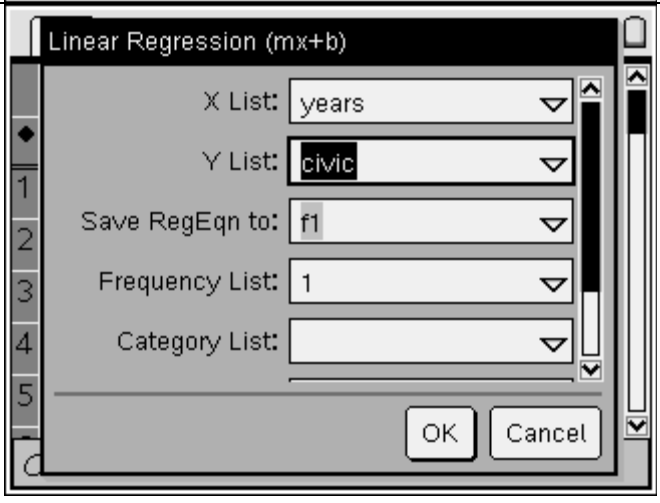
You will now select the parameters of the linear regression.

On the “X List:” press down with your “Nav pad” and select “years”.

Tab to the next item “Y List:”. Again press down with your “Nav pad” and select “civic”

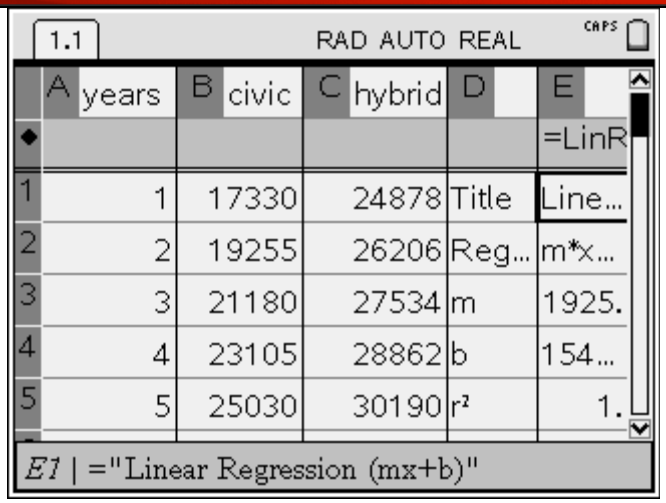
Tab to the next item “Save RegEqn to:” and make sure *f1* is selected.

Tab to the last item, “1st Result Column” and make sure that “c[]” is selected.

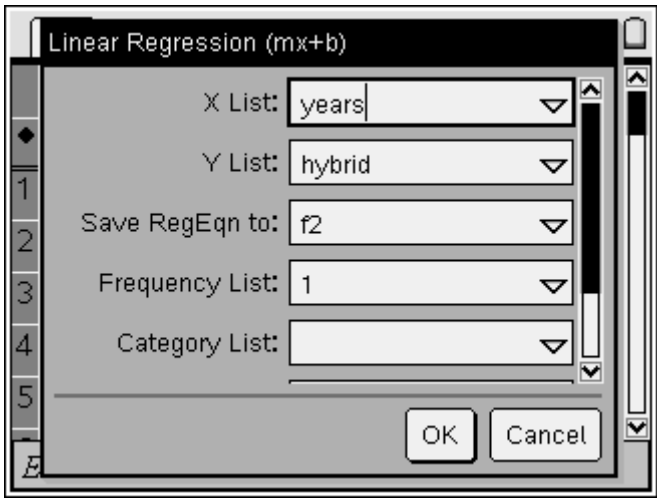


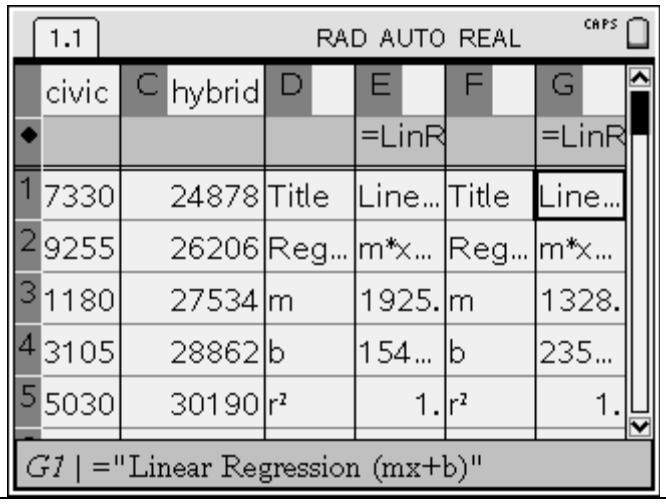
Select “OK” and your Linear Regression Equation will be listed and labeled using columns D and E.

Once again, you may resize column widths.

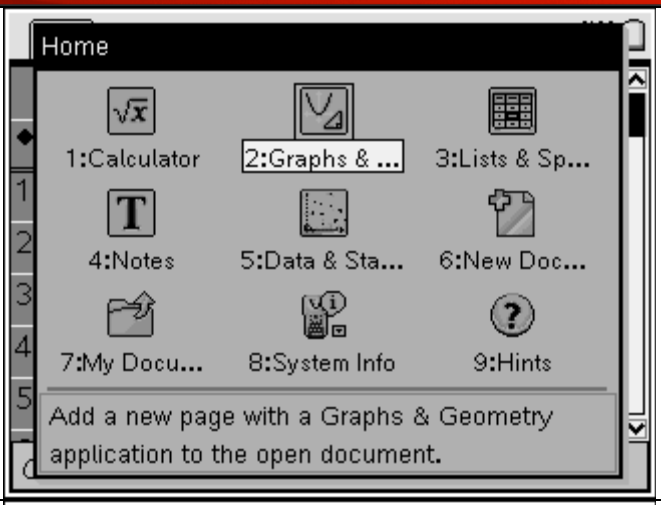


Find the linear regression using “years” and “hybrid” as my x-list and y-list, respectively. Make sure to save your equation to f2.

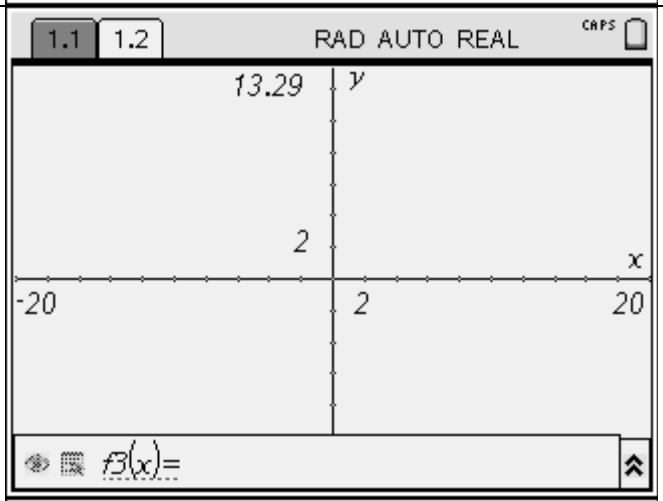


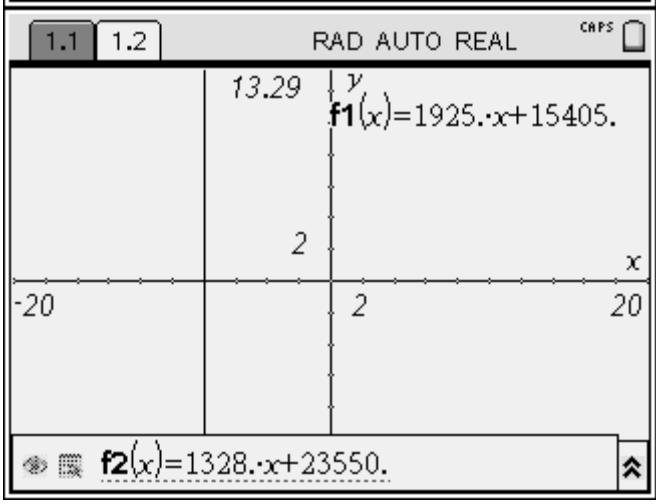


We will now select the Home button and add a new page with a “Graphs and Geometry” Application to the open document.

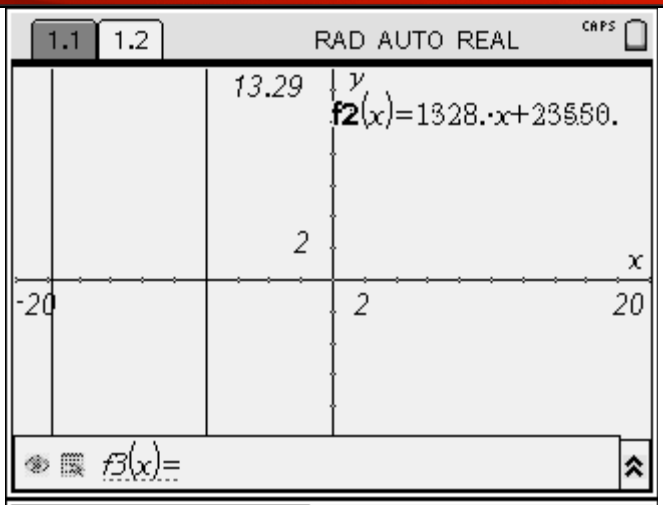


You will now graph function 1 by selecting it.

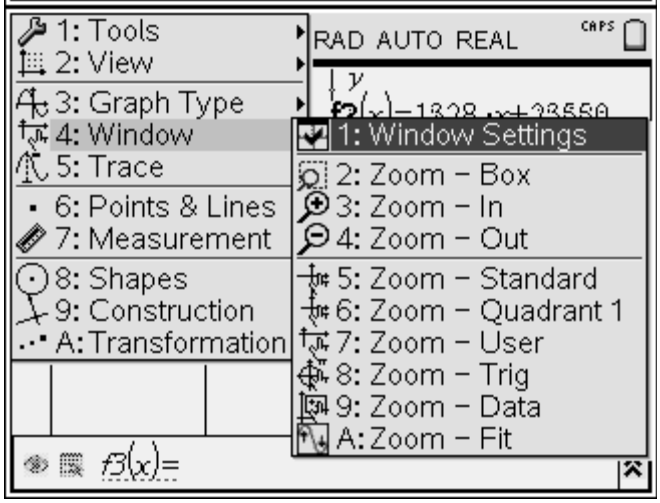




You will now graph function 2.

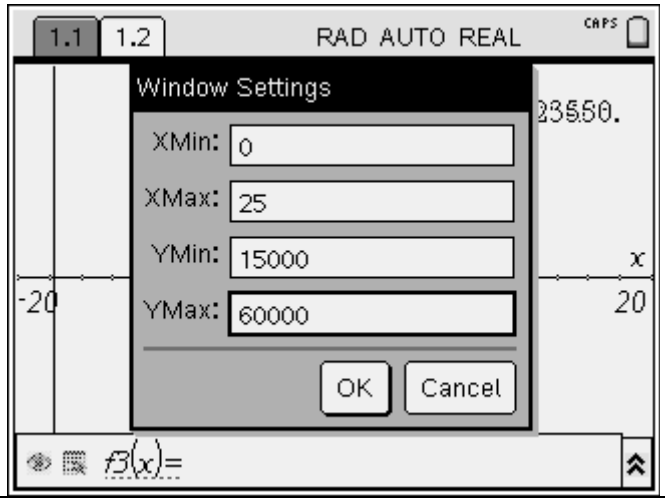


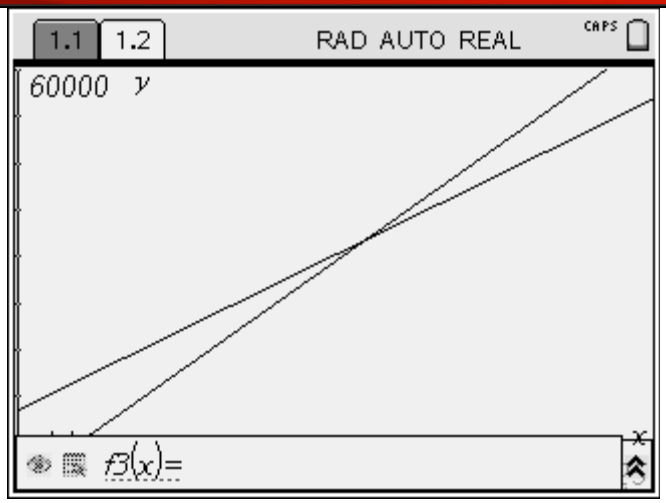
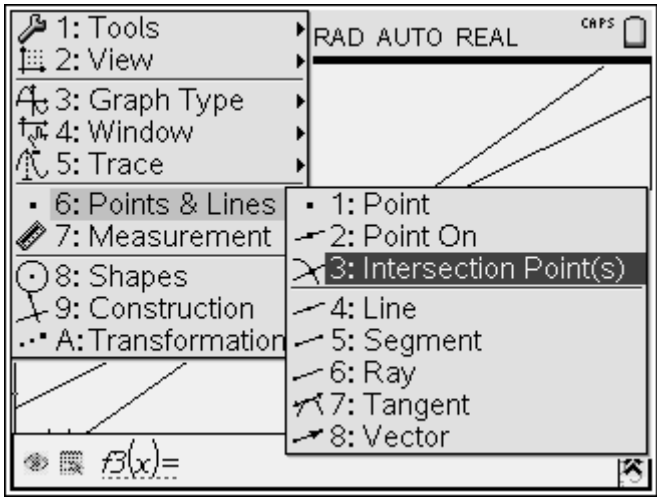
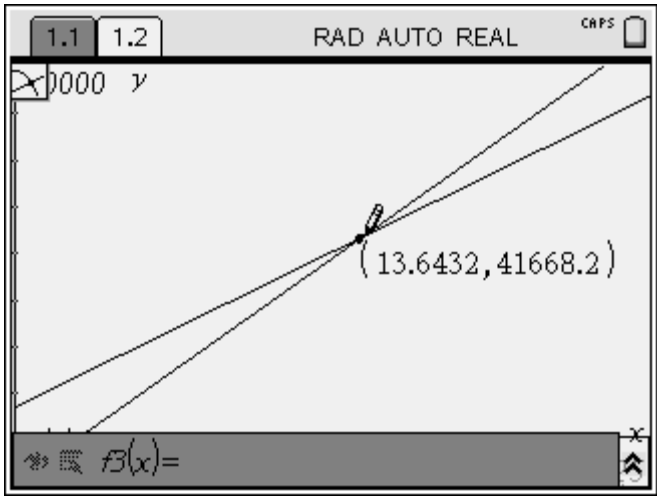
At this point, you need to change the window to view the point of intersection. Select "Menu", "Window" and "1: Window Settings".



Suggested window settings:

XMin: 0
XMax: 25
YMin: 15000
YMax:60000



Your graph should look like the following.	
Find the point of intersection. Select "Menu", "6:Points and Lines", and "3: Intersection Point(s)" and select Enter.	
Move the cursor until both lines are selected (blinking) and select Enter.	

Discovery Question: What does the point of intersection mean? How many years will it be before a hybrid is cost effective? What other factors does a consumer need to take into consideration.	
Enrichment: Go online and research other vehicles and hybrids and compare the initial cost to their fuel savings.	