TI Technology Guide for Humidity makes air feel even hotter

TI-83 Plus and TI-84 Plus Families

Creating Lists of Data, Displaying the Graph, Identifying r and r2, Using the Regression Capabilities of the Calculator, and Finding the Intersection between Graphs.

Creating Lists of Data
To enter the data from the Snapshot in the activity, press and select 1:Edit to access the List Editor window. Be sure to clear any existing data in the lists by highlighting the list name and pressing CLEAR ENTER. If you see a list other than L1 through L6, press STAT and select 5:SetUpEditor, ENTER and then follow the above instructions.

Move the cursor to the first data position in L1 and enter the air temperatures shown in the USA TODAY Infograph "Humidity makes air feel even hotter" and then move the cursor to the first position in L2 and enter the corresponding heat index values for the air temperatures for 5% relative humidity. Enter the air temperatures in L3 and the corresponding heat index values for the air temperatures in L4 for 25% relative humidity.

Displaying the Graph
Access the STAT PLOTS menu screen by pressing 2nd Y=. Select 1:Plot1 (press ENTER or the number 1) to get the screen shown. Notice that Plot1 and On are highlighted. To turn on or off any plot, place the cursor over the name, press ENTER, then select either On or Off, and press ENTER again. This process acts like a toggle switch to turn the plots on and off the graphing display. Plot1 should have the same settings as shown at the right.

Move the cursor to Plot2 at the top of the screen and press ENTER. Repeat the procedure above for Plot2 with the settings shown at the right.

To insure that all the data points are visible, press WINDOW and enter values for the x-axis and y-axis that contain the range of values from both sets of data shown in the graphic (see suggested values at the right).

```
WINDOW
 Xmin=60
 Xmax=150
 Xscl=10
 Ymin=50
 Ymax=150
 Yscl=10
 Xres=1
```

Press Y= and clear any equations listed. Press GRAPH to view both scatter plots. Press TRACE and use the ◄ or ► keys to read the values of the data points. Use the ▲ or ▼ to move between the scatter plots.
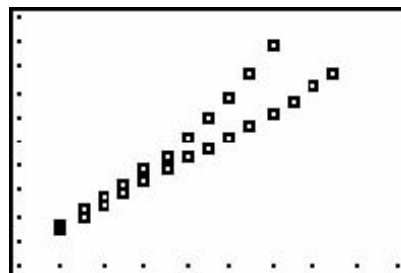
Another way to set the window for a scatter plot is to press ZOOM 9. This will select 9:ZoomStat which will automatically set the viewing window and display all the data points from both scatter plots.

```
WINDOW
 Xmin=63.5
 Xmax=141.5
 Xscl=10
 Ymin=51.25
 Ymax=151.75
 Yscl=10
 Xres=1
```

Identifying r and r^2

To activate the values of r (correlation coefficient) and r^2 (coefficient of determination) press 2nd 0 x^{-1} and use the ▼ to find DiagnosticOn and press ENTER ENTER. These values should help you decide which is the best model.

```
CATALOG          ▯
 Degree
 DelVar
 DependAsk
 DependAuto
 det(
 DiagnosticOff
▶DiagnosticOn
```

Using the Regression Capabilities of the Calculutor

To use the regression capabilities, press STAT to access the CALC menu. The regression models are 3 through C and the arguments for each regression model are the same. To use the linear regression model select 4:LinReg(ax + b) from the STAT CALC menu and enter 2nd 1 , 2nd 2 , VARS ► ENTER ENTER to include all arguments shown in the screen shot. These commands will calculate the best fit model for the scatter plot of L1 and L2 then paste the model in the Y= register in Y1.

```
LinReg(ax+b) L₁,
L₂,Y₁■
```

Press ENTER to have the calculator create the best fit model for the scatter plot.

```
LinReg
  y=ax+b
  a=.9573626374
  b=-2.843956044
  r²=.998846954
  r=.9994233107
■
```

Repeat the above procedure to determine the model for the other scatter plot using L3, L4, and Y2 for the arguments when creating the regression model. Press GRAPH. The regression lines and the scatter plots are displayed simultaneously.
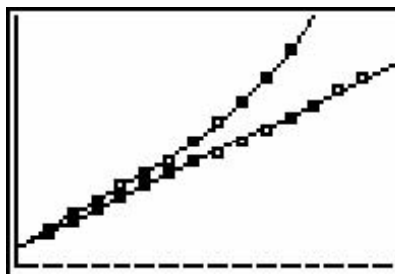
Press Y= to view the functions. Notice that Plot 1 is highlighted, which indicates that the data points for L1 and L2 are showing on the graph. The = beside Y1 is also highlighted, which indicates that the function determined by the regression capabilities is also showing on the graph. Pressing ENTER when the cursor is in either of these highlighted areas acts as a toggle to turn on or off the display of that component on the graph.

```
Plot1 Plot2 Plot3
\Y1■.95736263736
264X+ -2.84395604
3957
\Y2■3.10800310800
48E-4X^3+ -.0754
3123543127X^2+7.
17871017871^3X+ -1
```

Finding the Intersection between Graphs

To determine the air temperature when the graph of each model would enter the Extreme caution category enter 90 in the Y= register as Y3.

Press 2nd TRACE and select 5:intersect. At the bottom of the screen the prompt appears identifying the curves that intersect. Use the up or down arrow keys to switch between the curves. Press ENTER when prompted to identify the First curve.
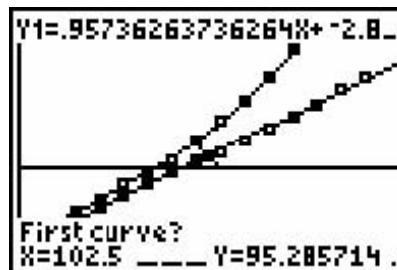
Press ENTER again when prompted to identify the Second curve. Press ▲ or ▶ to move to Y3. You may have to use ▶ or ◀ to see the cursor moving on Y3. Notice that when the cursor has jumped to the other curve the equation changed in the upper left-hand corner.

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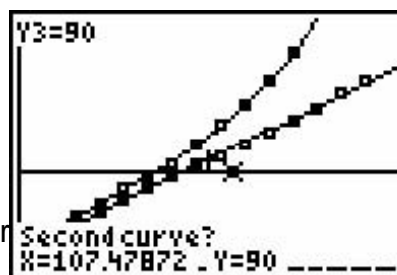
When prompted to Guess, use the ◀ or ▶ to move the cursor near the point of intersection that you are trying to find, then press ENTER. The coordinates of the intersection are displayed at the bottom of the screen.


```
Intersection
X=96.97888 _ Y=90 _ _ _ _ _
```
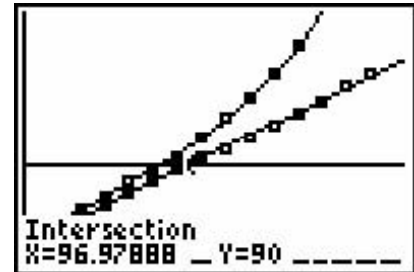
Repeat the above process to determine the intersection between Y1 and Y3.