

TI Technology Guide for *Population on the Move*

TI-83 Plus and TI-83 Plus Silver Edition

Creating Lists of Data, Displaying the Graph, Using the Regression Capabilities of the Handheld, Using Equation Solver, Using Science Tool App

Press **[STAT]** 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, then pressing **[CLEAR]** **[ENTER]**.

L1	L2	L3	1
-----	-----	-----	
L1(1)=			

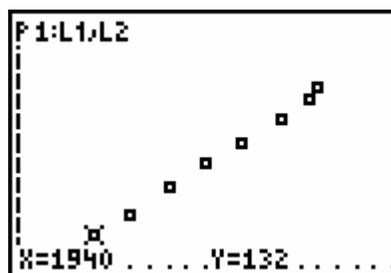
Move the cursor to the first data position in L1 and enter the years from the "More of U.S." graphic. Move the cursor to the first data position in L2 and enter the corresponding population values (in millions).

L1	L2	L3	2
1940	151	-----	
1950	179		
1960	203		
1970	227		
1980	249		
1990	269		
1998	269		
L2(1)=132			

To insure 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 the graphic (see screenshot for example values).

WINDOW
Xmin=1920
Xmax=2020
Xscl=1
Ymin=100
Ymax=310
Yscl=1
Xres=1

Press **[GRAPH]** to view the data. L1 (year) is on the horizontal axis, and L2 (population) is on the vertical axis. Press **[TRACE]** and use the arrow cursor keys to display the values of the data points.



To use the regression capabilities, press $\boxed{\text{STAT}} \rightarrow$ to access the CALC menu. Select **4:LinReg(ax+b)**, since the graph appears to best be described as linear.

```

EDIT  [CALC] TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7↓QuartReg
  
```

At the blinking cursor, press

$\boxed{2\text{nd}} \boxed{\text{STAT}} \mathbf{1: L1} \boxed{\text{ENTER}}$

$\boxed{\text{.}}$ (above the $\boxed{7}$)

$\boxed{2\text{nd}} \boxed{\text{STAT}} \mathbf{2: L2} \boxed{\text{ENTER}} \boxed{\text{.}}$

$\boxed{\text{VARS}} \rightarrow \boxed{\text{ENTER}}$ to display the VARS Y-VARS FUNCTION secondary menu, and then select **1:Y1**. L1, L2, and Y1 are pasted to the home screen as arguments to LinReg(ax+b).

```

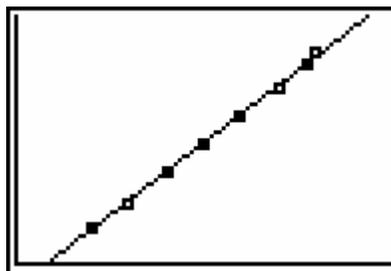
LinReg(ax+b) L1,
L2, Y1
  
```

Press $\boxed{\text{ENTER}}$ to execute LinReg(ax+b). The linear regression for the data in L1 and L2 is calculated. Values for a and b are displayed on the home screen. The linear regression equation is stored in Y1.

```

LinReg
y=ax+b
a=2.445065978
b=-4613.962708
  
```

Press $\boxed{\text{GRAPH}}$. The regression line and the scatter plot are displayed simultaneously.



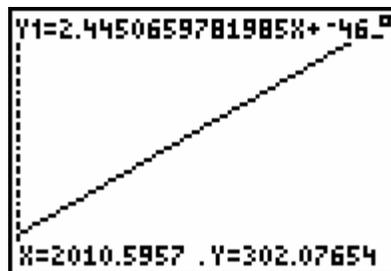
Press $\boxed{\text{Y=}}$ to view the equation. Notice that Plot 1 is highlighted, which indicates that the data points for L1 and L2 are showing on the graph. The = beside Y1 is also highlighted, which indicates that the linear function determined by the regression capabilities is also showing on the graph. Pressing $\boxed{\text{ENTER}}$ 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.

```

[204] Plot2 Plot3
\Y1=2.4450659781
985X+-4613.96270
79747
\Y2=
\Y3=
\Y4=
\Y5=
  
```

Deselect the Plot 1 so that only the linear function is graphed.

The predicted value of the population for 2010 can be viewed from the graph using **TRACE** and the right arrow cursor key until the x value is 2010. The corresponding y-value for the population can be read. (Values may vary slightly based on the screen pixel that the trace feature uses.)



The predicted value of the population can also be calculated using the Equation Solver. To access the solver, press **MATH** and select **0:Solver**. Since the solver places all variables on one side of the equal sign with the total value of 0, you need to enter the unknown value of Y and subtract Y1. Press **ALPHA** **[Y]** **[-]** **VAR** **Y-VARS, 1:Function, 1:Y1**.

EQUATION SOLVER
eqn: 0=Y-Y1

Move the cursor to the X= line and enter the date 2010. Move back up to the Y= line and press **CLEAR**.

Y-Y1=0
Y=
X=2010
bound=(-1E99, 1...

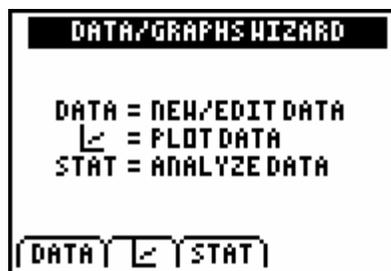
Now press **ALPHA** **[Solve]** to solve for Y when X=2010.

Y-Y1=0
▪ Y=300.61990820...
X=2010
bound=(-1E99, 1...
▪ left-rt=0

The Data/Graphs Wizard of the Science Tools App can be used to enter data into lists and graph the functions. Press **APPS** **[SciTools]**. On the SELECT A TOOL menu screen, select **3: DATA/GRAPHS WIZARD**.

SELECT A TOOL
1: SIG-FIG CALCULATOR
2: UNIT CONVERTER
3: DATA/GRAPHS WIZARD
4: VECTOR CALCULATOR
EXIT

Use the function keys under the tabs on the screen to select the action you want to take. Selecting DATA provides the List Editor screen. Follow the steps shown above for entering the data. To return to this main screen, press 2nd ENTER .



Pressing the PLOT DATA tab reveals 4 plot options. Select the SCATTERPLOT tab. Identify L1 as the independent variable and L2 as the dependent variable. The scatter plot will automatically be displayed. You can adjust the WINDOW as described above. Press TRACE to read the coordinate values of the data points.



Press 2nd Quit to access the CHOOSE A FIT METHOD menu. Select **1:LIN REG** to see the graph of the linear function that best fits the data.

Press Y= to view the equation. Press 2nd Quit until the EXIT tab appears. You can now exit the application and follow the steps above to use the Equation Solver.

