Linear Regression

Concepts

- Fitting data to a linear regression line

Materials

- TI-84 Plus
- *EasyData*™
- *DataMate*

Overview

The sample data in this activity was collected in the °C to °F activity. Alternate data sets may by used. The procedure described below is the "standard" way to fit data to a linear regression line. Linear regression lines can also be determined using *EasyData*™ and *DataMate*.

Procedure

1. Use the [STAT] editor to enter the following data into lists L1, L2, and L3 OR use your data from the °C to °F activity (Figure 1).

L1 (Time, sec)	L2 (Temp, °F)	L2 (Temp, °C)
0	34.4	1.8485
10	53.825	11.846
20	65.771	19.881
30	69.886	21.738
40	75.786	24.023
50	78.473	25.318
60	80.349	26.14

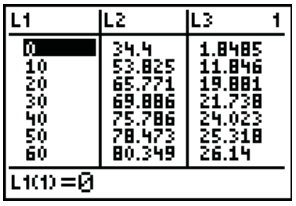

Figure 1

2. Press [2nd] [STAT PLOT] [ENTER] to open the Plot1 Menu (Figure 2).

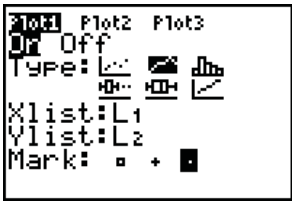

Figure 2

3. Make the changes shown in Figure 3.

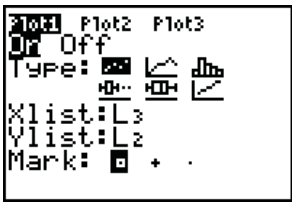

Figure 3

4. Press [ZOOM] 9:ZoomStat to see a graph of °F vs. °C (L2 vs. L3) (Figure 4).

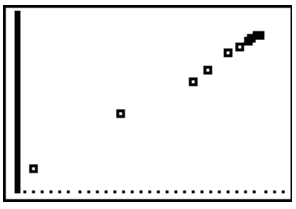

Figure 4

5. The next step is to calculate the linear regression line.

- Press [STAT] [▶] to the CALC menu, and select 4:LinReg(ax+b) (Figure 5).

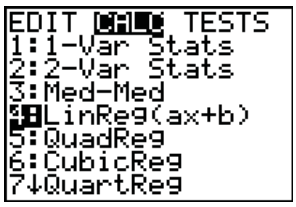

Figure 5

6. Press [ENTER] [2nd] [L3] [,] [2nd] [L2] [,] [VARS] [▶] (to Y-VARS) [ENTER] (for 1:Function) [ENTER] (for 1:Y1) (Figure 6).

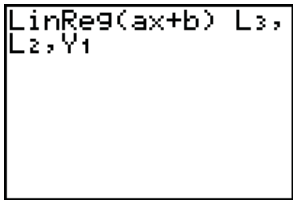

Figure 6

7. Press [ENTER] to do the linear regression fit (Figure 7).

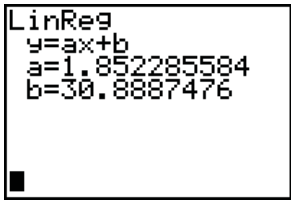

Figure 7

8. Then press [GRAPH] to see the graphical fit (Figure 8).

- The experimental results are close to the standard conversion equation for ^{o}C to ^{o}F, $^{o}F = 1.8(^{o}C) + 32$.
- Considering the experimental setup and how the data was collected, how might you explain the differences?

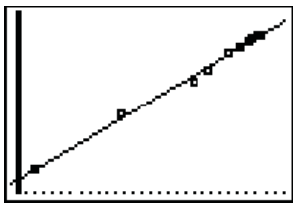

Figure 8

