

TI-83/TI-83 Plus Procedure 23: Curve Fitting with Residuals

Example

Compare the data and the model by graphing. Determine if the quadratic model is a good fit. (The year 1980 is set equal to zero for this data.)

Cellular Phone Industry

Year	Revenue (billions)
11	5.7
12	7.8
13	10.9
14	14.2
15	19.0

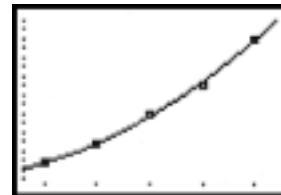
Source: USA Today

STEP 1: Enter the years in L1, and the revenues in L2.

L1	L2	L3	2
11	5.7		
12	7.8		
13	10.9		
14	14.2		
15	19.0		

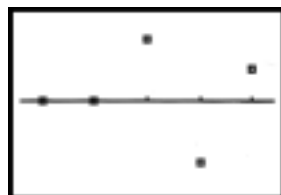
L2(6) =

STEP 2: To find a quadratic fit of L1 and L2, press **STAT** **5** **2nd** **[L1]** **2nd** **[L2]** ***** **ENTER**. Store this fit as Y1 by pressing **Y=** **CLEAR** **VARS** **5** **1**. Press **2nd** **[STATPLOT]** **1** **ENTER** to turn on Plot1. Select the scatter plot at **Type:**; press **2nd** **[L1]** at **Xlist:** and **2nd** **[L2]** at **Ylist:**. Press **ZOOM** **9** to see the data and the fit.



STEP 3: When the TI-83 finds any fit, it stores the residuals in the list RESID. Plot the residuals by pressing **2nd** **[STATPLOT]** **1**. Move the cursor to **Ylist:** and press **2nd** **[LIST]** and select **RESID**. Press **ZOOM** **9**. Since the pattern is random and does not resemble any function, the model is a good fit.

Plot1 Plot2 Plot3
On Off
Type: SCAT
Xlist:L1
Ylist:RESID
Mark: *



*Note: By default, the TI-83/TI-83 Plus looks for **Xlist** and **Ylist** in L1 and L2, respectively. Therefore L1 and L2 do not need to be included in the command 'QuadReg'.

Exercises

Graph the data and the suggested model to fit. Tell whether the fit is a good fit.

1. Linear:

Growth of Cellular Phone Customers

Year (1980 = 0)	Customers (millions)
11	7.6
12	11.0
13	16.0
14	24.5
15	33.8

Source: USA Today

2. Cubic:

World Copper Production

Year (1980 = 0)	Copper (millions of tons)
5	9.2
7	9.6
9	9.9
11	10.0
13	10.4

Source: USA Today