



3.6 Using Quadratic Regression to Find a Curve of Best Fit with a TI-83 Plus Calculator

The TI-83 Plus can draw a curve of best fit for data on a scatter plot. The calculator can also provide the equation of the quadratic relation for this curve.

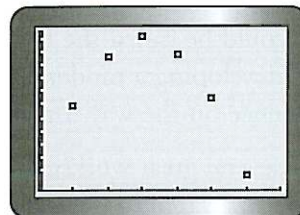
This table gives the height of a baseball above the ground, from the time it was hit until it touched the ground.

Height of a Baseball After Being Hit

Time (s)	0	1	2	3	4	5	6
Height (m)	2	27	42	48	43	29	5



1. Create a scatter plot by entering the time values into L1 and the corresponding height values into L2. Press **[STAT]** **[1]** to edit the lists.



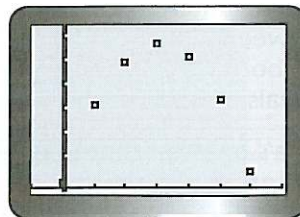
step 1

2. Once you have entered all the values into the appropriate lists, create a scatter plot by turning on the first Stat Plot: press **[2nd]** **[Y=]** **[1]** followed by **[ENTER]**. Make sure that you have the Type set for a scatter plot (☐) and that Xlist is L1 and Ylist is L2 as shown.



step 2

3. To see the graph press **[ZOOM]** **[9]**.



step 3

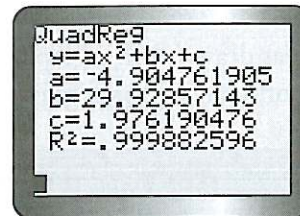
4. The data is clearly nonlinear. To find the equation of the curve of best fit you can use **quadratic regression**.

Press **[STAT]** and scroll over to **CALC**.
Press **[5]** to enable QuadReg.



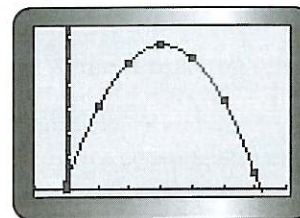
step 4

5. Enter the names of the lists you wish to analyze. Press **[2nd]** **[1]**, **[,]**, **[2nd]** **[2]**, **[VARS]**. Scroll over to Y-VARS, then press **[1]** followed by **[1]** again. This stores the equation of the curve of best fit in the equation editor under $Y_1=$. Press **[ENTER]** to display the results.



step 5

6. To display the curve of best fit press **[GRAPH]**. The coefficients a , b , and c define the general quadratic equation $y = ax^2 + bx + c$ for the curve of best fit. R^2 indicates the percentage of the data that is represented by this model.



step 6

For this relation, the approximate equation is $y = -4.90x^2 + 29.93x + 1.98$.

Practise 3.6

For each set of data, create a scatter plot and use quadratic regression to determine the equation of the curve of best fit.

(a)

x	-2	-1	0	1	2	3	4	5	6
y	4	1	0	1	4	9	16	25	36

(b)

x	-4	-3	-2	-1	0	1	2	3	4
y	44	23	8	-1	-4	-1	8	23	44

(c)

x	-1	0	1	2	3	4	5	6	7
y	-12	-6	-2	0	0	-2	-6	-12	-20

- (d) Time spent every day by teenagers watching television

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997
Time (min)	189	195	196	190	187	185	182	169	174

Source: Nielsen Media Research