

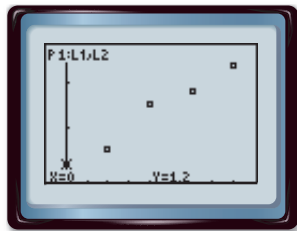
Graphing Calculator Lab

Curve Fitting

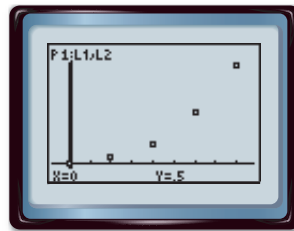
Casio FX-9750G

If there is a constant increase or decrease in data values, there is a linear trend.
If the values are increasing or decreasing more and more rapidly, there may be a quadratic or exponential trend.

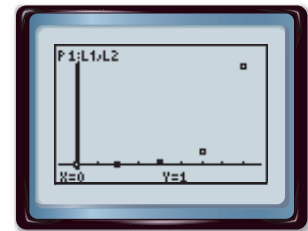
Linear Trend



Quadratic Trend



Exponential Trend



With a Casio FX-9750G, you can find the appropriate regression equation.

ACTIVITY 1

FARMING A study is conducted in which groups of 25 corn plants are given a different amount of fertilizer and the gain in height after a certain time is recorded. The table below shows the results.

Fertilizer (mg)	0	20	40	60	80
Gain in Height (in.)	6.48	7.35	8.73	9.00	8.13

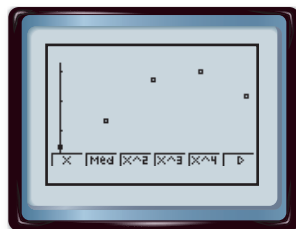
Step 1 Make a scatter plot.

- Enter the fertilizer in L1 and the height in L2.

KEYSTROKES: Review entering a list in your textbook.

- Use STAT PLOT to graph the scatter plot.

KEYSTROKES: Review statistical plots in your textbook. Use **F1** to graph.



$[-8, 88]$ scl: 5 by $[6.0516, 9.4284]$ scl: 1

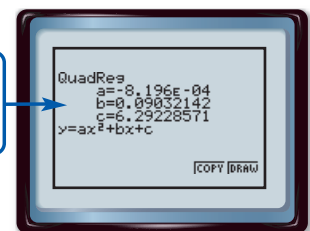
The graph appears to be a quadratic regression.

Step 2 Find the regression equation.

- Select QuadReg on the **STAT** **CALC** menu.

KEYSTROKES: **STAT** **▶** 5 **ENTER**

The equation is in the form $y = ax^2 + bx + c$.



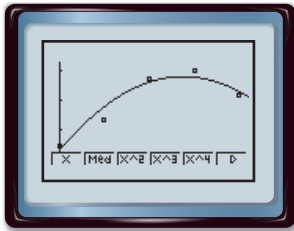
The equation is about $y = -0.0008x^2 + 0.1x + 6.3$.

R^2 is the **coefficient of determination**. The closer R^2 is to 1, the better the model. To choose a quadratic or exponential model, fit both and use the one with the R^2 value closer to 1.

Step 3 Graph the regression equation.

- Copy the equation to the Y= list and graph.

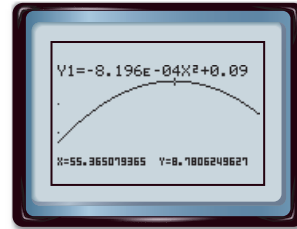
KEYSTROKE: **F6**



Step 4 Predict using the equation.

- Find the amount of fertilizer that produces the maximum gain in height.

KEYSTROKES: **SHIFT** [TRACE]



According to the graph, on average about 55 milligrams of the fertilizer produces the maximum gain.

EXERCISES

Plot each set of data points. Determine whether to use a *linear*, *quadratic*, or *exponential* regression equation. State the coefficient of determination.

1.

x	y
0.0	2.98
0.2	1.46
0.4	0.90
0.6	0.51
0.8	0.25
1.0	0.13

2.

x	y
1	25.9
2	22.2
3	20.0
4	19.3
5	18.2
6	15.9

3.

x	y
10	35
20	50
30	70
40	88
50	101
60	120

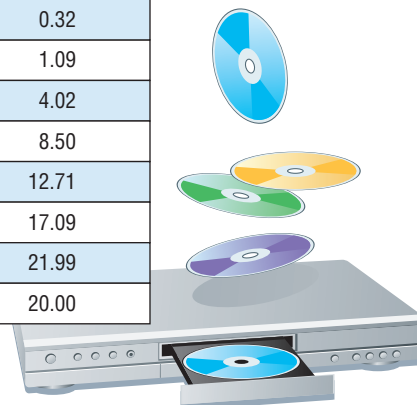
4.

x	y
1	3.67
3	5.33
5	6.33
7	5.67
9	4.33
11	2.67

TECHNOLOGY DVD players were introduced in 1997. For Exercises 5–8, use the table at the right.

5. Make a scatter plot of the data.
6. Find an appropriate regression equation, and state the coefficient of determination.
7. Use the regression equation to predict the number of DVD players that will sell in 2008.
8. Do you believe your equation would be accurate for a year beyond the range of the data, such as 2020? Explain.

Year	DVD Players Sold (millions)
1997	0.32
1998	1.09
1999	4.02
2000	8.50
2001	12.71
2002	17.09
2003	21.99
2004	20.00



Source: Consumer Electronics Association