



Graphing Calculator Investigation

A Follow-Up of Lesson 6-2

Sharp EL-9900

Modeling Real-World Data

You can use a Sharp EL-9900 to model data points whose curve of best fit is quadratic.

FALLING WATER Water is allowed to drain from a hole made in a 2-liter bottle. The table shows the level of the water y measured in centimeters from the bottom of the bottle after x seconds. Find and graph a linear regression equation and a quadratic regression equation. Determine which equation is a better fit for the data.

Time (s)	0	20	40	60	80	100	120	140	160	180	200	220
Water level (cm)	42.6	40.7	38.9	37.2	35.8	34.3	33.3	32.3	31.5	30.8	30.4	30.1

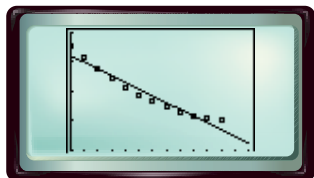
Step 1 Find a linear regression equation.

- Enter the times in L1 and the water levels in L2. Then find a linear regression equation.

KEYSTROKES: Review lists and finding a linear regression equation on page 87.

- Graph a scatter plot and the regression equation.

KEYSTROKES: Review graphing a regression equation on page 87.

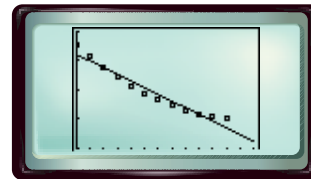


[0, 260] scl: 20 by [25, 45] scl: 5

Step 2 Find a quadratic regression equation.

- Find the quadratic regression equation. Then copy the equation to the Y= list and graph.

KEYSTROKES: **STAT** **ALPHA** [D] 04 **ENTER**
Y= **2nd** F [VARS] **ALPHA** [H]
ENTER **ALPHA** [B] 1 **GRAPH**



[0, 260] scl: 20 by [25, 45] scl: 5

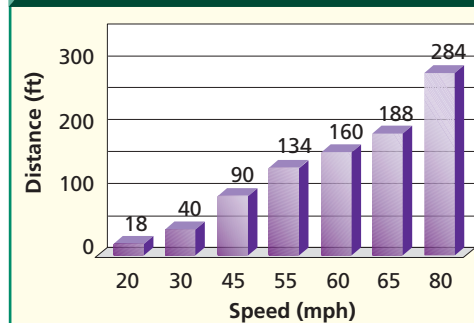
The graph of the linear regression equation appears to pass through just two data points. However, the graph of the quadratic regression equation fits the data very well.

Exercises 1–4. See margin.

For Exercises 1–4, use the graph of the braking distances for dry pavement.

- Find and graph a linear regression equation and a quadratic regression equation for the data. Determine which equation is a better fit for the data.
- Use the CALC menu with each regression equation to estimate the braking distance at speeds of 100 and 150 miles per hour.
- How do the estimates found in Exercise 2 compare?
- How might choosing a regression equation that does not fit the data well affect predictions made by using the equation?

Average Braking Distance on Dry Pavement



Source: Missouri Department of Revenue

www.algebra2.com/other_calculator_keystrokes