



# Graphing Calculator Investigation

A Follow-Up of Lesson 6-2

Sharp EL-9600c

## Modeling Real-World Data

You can use a Sharp EL-9600c 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 |

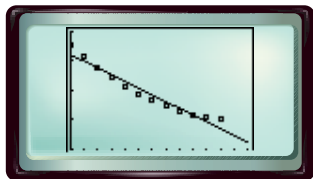
### Step 1 Find a linear regression equation.

- 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.

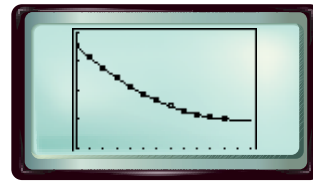


[0, 260] scl: 20 by [25, 45] scl: 5

### 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= VARS ALPHA [H]  
ENTER ALPHA [B] 1 GRAPH



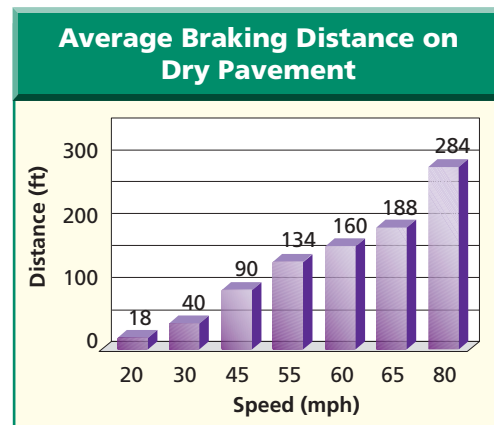
[0, 260] scl: 20 by [25, 45] scl: 5

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?



Source: Missouri Department of Revenue

[www.algebra2.com/other\\_calculator\\_keystrokes](http://www.algebra2.com/other_calculator_keystrokes)