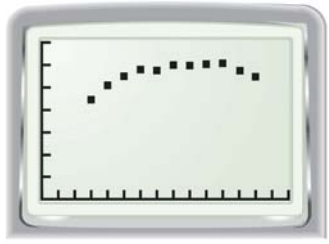
EXAMPLE 3 Use a quadratic model

FUEL EFFICIENCY A study compared the speed x (in miles per hour) and the average fuel efficiency y (in miles per gallon) of cars. The results are shown in the table. Use a graphing calculator to find a model for the data.

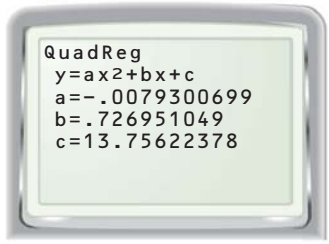
x	15	20	25	30	35	40	45	50	55	60	65
y	22.3	25.5	27.5	29.0	28.8	30.0	29.9	30.2	30.4	28.8	27.4

Solution

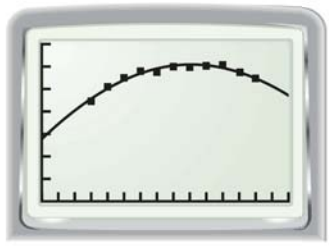
STEP 1 **Make** a scatter plot. The points form an inverted U-shape. This suggests a quadratic model.



STEP 2 **Use** the quadratic regression feature to find an equation of the model.



STEP 3 **Graph** the model along with the data to verify that the model fits the data well.



▶ A model for the data is $y = -0.00793x^2 + 0.727x + 13.8$.

CHOOSE A MODEL
The data in Example 3 can be modeled by both a quadratic function and a cubic function. When this occurs, it is often better to choose the simpler model.

GUIDED PRACTICE for Example 3

3. **FUEL EFFICIENCY** Use the model from Example 3 to predict the average fuel efficiency of a car traveling 70 miles per hour.

Use a graphing calculator to find a model for the data. Then graph the model and the data in the same coordinate plane.

4.

x	100	200	300	400	500	600	700
y	16	35	55	70	68	56	38

5.

x	−5	−4	−3	−2	−1	1	2
y	−20	0	3	0	−4	0	18