

QUADRATIC REGRESSION In Chapter 2, you used a graphing calculator to perform linear regression on a data set in order to find a linear model for the data. A graphing calculator can also be used to perform *quadratic regression*. The model given by quadratic regression is called the **best-fitting quadratic model**.



EXAMPLE 4

TAKS REASONING: Multi-Step Problem



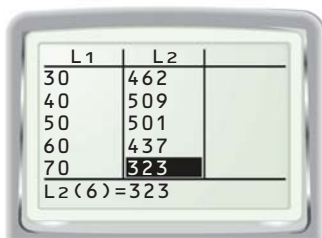
PUMPKIN TOSSING A pumpkin tossing contest is held each year in Morton, Illinois, where people compete to see whose catapult will send pumpkins the farthest. One catapult launches pumpkins from 25 feet above the ground at a speed of 125 feet per second. The table shows the horizontal distances (in feet) the pumpkins travel when launched at different angles. Use a graphing calculator to find the best-fitting quadratic model for the data.



Angle (degrees)	20	30	40	50	60	70
Distance (feet)	372	462	509	501	437	323

Solution

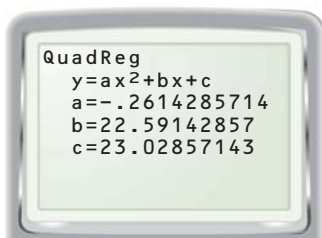
STEP 1 Enter the data into two lists of a graphing calculator.



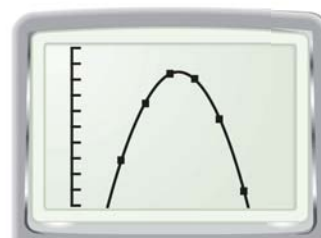
STEP 2 Make a scatter plot of the data. Note that the points show a parabolic trend.



STEP 3 Use the quadratic regression feature to find the best-fitting quadratic model for the data.



STEP 4 Check how well the model fits the data by graphing the model and the data in the same viewing window.



► The best-fitting quadratic model is $y = -0.261x^2 + 22.6x + 23.0$.



GUIDED PRACTICE for Example 4

7. **PUMPKIN TOSSING** In Example 4, at what angle does the pumpkin travel the farthest? *Explain* how you found your answer.