SINUSOIDAL REGRESSION Another way to model sinusoids is to use a graphing calculator that has a sinusoidal regression feature. The advantage of this method is that it uses all of the data points to find the model.

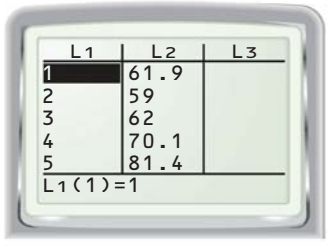
EXAMPLE 3 Use sinusoidal regression

ENERGY The table below shows the number of kilowatt hours K (in thousands) used each month for a given year by a hangar at the Cape Canaveral Air Station in Florida. The time t is measured in months, with $t = 1$ representing January. Write a trigonometric model that gives K as a function of t.

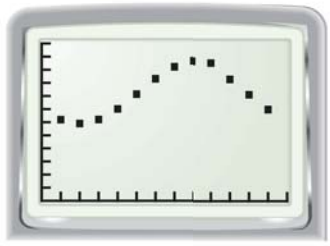
t	1	2	3	4	5	6	7	8	9	10	11	12
K	61.9	59	62	70.1	81.4	93.1	102.3	106.8	105.4	92.9	81.2	69.9

Solution

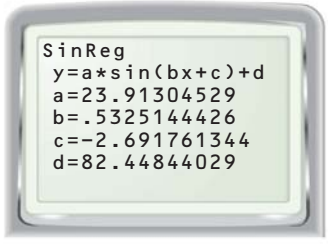
STEP 1 **Enter** the data in a graphing calculator.



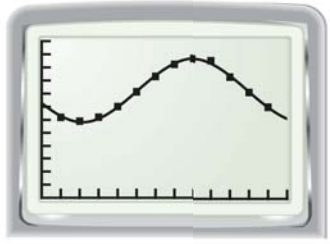
STEP 2 **Make** a scatter plot.



STEP 3 **Perform** a sinusoidal regression, because the scatter plot appears sinusoidal.



STEP 4 **Graph** the model and the data in the same viewing window.



▶ The model appears to be a good fit. So, a model for the data is $K = 23.9 \sin (0.533t - 2.69) + 82.4$.

GUIDED PRACTICE for Example 3

4. **METEOROLOGY** Use a graphing calculator to write a sine model that gives the average daily temperature T (in degrees Fahrenheit) for Boston, Massachusetts, as a function of the time t (in months), where $t = 1$ represents January.

t	1	2	3	4	5	6	7	8	9	10	11	12
T	29	32	39	48	59	68	74	72	65	54	45	35