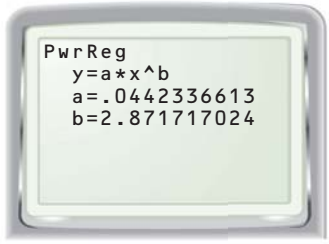
POWER REGRESSION A graphing calculator that performs power regression uses all of the original data to find the best-fitting model.

EXAMPLE 6 Use power regression

BIOLOGY Use a graphing calculator to find a power model for the data in Example 5. Estimate the weight of a bird with a wingspan of 4.5 feet.

Solution

Enter the original data into a graphing calculator and perform a power regression. The model is $y = 0.0442x^{2.87}$.



Substituting $x = 4.5$ into the model gives $y = 0.0442(4.5)^{2.87} \approx 3.31$ pounds.

GUIDED PRACTICE for Examples 5 and 6

9. The table below shows the atomic number x and the melting point y (in degrees Celsius) for the alkali metals. Find a power model for the data.

Alkali metal	Lithium	Sodium	Potassium	Rubidium	Cesium
Atomic number, x	3	11	19	37	55
Melting point, y	180.5	97.8	63.7	38.9	28.5

7.7 EXERCISES

HOMEWORK KEY

○ = **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 11, 23, and 33

= **TAKS PRACTICE AND REASONING** Exs. 27, 33, 35, 37, and 38

SKILL PRACTICE

1. VOCABULARY Copy and complete: Given a set of more than two data pairs (x, y), you can decide whether a(n) __?__ function fits the data well by making a scatter plot of the points $(x, \ln y)$.

2. WRITING *Explain* how you can determine whether a power function is a good model for a set of data pairs (x, y).

EXAMPLE 1 on p. 529 for Exs. 3–10

WRITING EXPONENTIAL FUNCTIONS **Write an exponential function $y = ab^x$ whose graph passes through the given points.**

3. (1, 3), (2, 12)
4. (2, 24), (3, 144)
5. (3, 1), (5, 4)
6. (3, 27), (5, 243)
7. (1, 2), (3, 50)
8. (1, 40), (3, 640)
9. (−1, 10), (4, 0.31)
10. (2, 6.4), (5, 409.6)

EXAMPLE 2 on p. 530 for Exs. 11–14

FINDING EXPONENTIAL MODELS **Use the points (x, y) to draw a scatter plot of the points $(x, \ln y)$. Then find an exponential model for the data.**

11. (1, 18), (2, 36), (3, 72), (4, 144), (5, 288)
12. (1, 3.3), (2, 10.1), (3, 30.6), (4, 92.7), (5, 280.9)
13. (1, 9.8), (2, 12.2), (3, 15.2), (4, 19), (5, 23.8)
14. (1, 1.4), (2, 6.7), (3, 32.9), (4. 161.4), (5, 790.9)