Working with Power Functions … Set 2

GUIDED PRACTICE for Examples 1, 2, and 3

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

1. (1, 6), (3, 24)
2. (2, 8), (3, 32)
3. (3, 8), (6, 64)

4. **WHAT IF?** In Examples 2 and 3, how would the exponential models change if the scooter sales were as shown in the table below?

Year, x	1	2	3	4	5	6	7
Number of scooters sold, y	15	23	40	52	80	105	140

WRITING POWER FUNCTIONS Recall from Lesson 6.3 that a power function has the form $y = ax^b$. Because there are only two constants (a and b), only two points are needed to determine a power curve through the points.

EXAMPLE 4 Write a power function

Write a power function $y = ax^b$ whose graph passes through (3, 2) and (6, 9).

Solution

STEP 1 **Substitute** the coordinates of the two given points into $y = ax^b$.

$2 = a \cdot 3^b$ Substitute 2 for y and 3 for x.

$9 = a \cdot 6^b$ Substitute 9 for y and 6 for x.

STEP 2 **Solve** for a in the first equation to obtain $a = \frac{2}{3^b}$, and substitute this expression for a in the second equation.

$9 = \left(\frac{2}{3^b}\right)6^b$ Substitute $\frac{2}{3^b}$ for a in second equation.

$9 = 2 \cdot 2^b$ Simplify.

$4.5 = 2^b$ Divide each side by 2.

$\log_2 4.5 = b$ Take $\log_2$ of each side.

$\frac{\log 4.5}{\log 2} = b$ Change-of-base formula

$2.17 \approx b$ Use a calculator.

STEP 3 **Determine** that $a = \frac{2}{3^{2.17}} \approx 0.184$. So, $y = 0.184x^{2.17}$.

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GUIDED PRACTICE for Example 4

Write a power function $y = ax^b$ whose graph passes through the given points.

5. (2, 1), (7, 6)
6. (3, 4), (6, 15)
7. (5, 8), (10, 34)

8. **REASONING** Try using the method of Example 4 to find a power function whose graph passes through (3, 5) and (3, 7). What can you conclude?