

Section 7 - Write and Apply Exponential and Power Functions

Example 1

Write an exponential function $y = ab^x$ whose graph passes through (1, 10) and (4, 80).

relationship between x & y
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 what are a & b ?

$$10 = a \cdot b^1$$

$$10 = a \cdot b$$

$$\frac{10}{b} = a$$

$$80 = a \cdot b^4$$

$$80 = \left(\frac{10}{b}\right) \cdot b^4$$

$$80 = 10b^3$$

$$\sqrt[3]{80} = \sqrt[3]{10b^3}$$

$$b = 2$$

$$10 = a \cdot 2$$

$$a = 5$$

$$y = 5 \cdot 2^x$$

Use the TI-Nspire calculator to create a scatter plot of the data. Then find an exponential model for the data.

Example 2

The table shows the number y of students enrolled in an elementary school during the x th year that the school has been open.

x	1	2	3	4	5
y	370	417	460	523	598

$$370 = a \cdot b^1$$

$$a = \frac{370}{b}$$

$$460 = a \cdot b^3$$

$$460 = \left(\frac{370}{b}\right) b^3$$

$$460 = 370b^2$$

$$\sqrt{\frac{460}{370}} = \sqrt{b^2}$$

$$b = \pm \sqrt{\frac{460}{370}} = \pm \sqrt{\frac{46}{37}}$$

$$370 = a \cdot \sqrt{\frac{46}{37}}$$

$$a = \frac{370}{\sqrt{46/37}}$$

$$a = 331.84$$

$$y = 331.84(1.12)^x$$

Example 3

A store sells motor scooters. The table shows the number y of scooters sold during the x th year that the store has been open. Find an exponential model for the data.

Year, x	1	2	3	4	5	6	7
Number of scooters sold, y	12	16	25	36	50	67	96

$$\frac{16}{b^2} = \frac{a \cdot b^2}{b^2}$$

$$a = \frac{16}{b^2}$$

$$36 = a \cdot b^4$$

$$36 = \left(\frac{16}{b^2}\right) b^4$$

$$36 = 16b^2$$

$$\sqrt{\frac{36}{16}} = \sqrt{b^2}$$

$$b = \frac{3}{2}$$

$$a = \frac{16}{1.5^2} = 7.11$$

$$y = 7.11(1.5)^x$$