7-2B Writing Equations of Exponential Functions

$(0, a)\ (x, y)$

$$y = a \cdot b^x$$

- plug in the y-intercept for the a-value.
- plug in x and y from the other ordered pair.
- solve for base b.
- rewrite as an exponetial function.

Write an exponential function whose graph passes through the given points.

1. (0, -5) and (-3, -135)

$y = a \cdot b^x$

$\frac{-135}{-5} = \frac{-5 \cdot b^3}{-5}$

$27 = b^3$

$\sqrt[3]{27} = \sqrt[3]{b^3}$

$3 = b$

$y = -5\left(\frac{1}{3}\right)^x$

2. (0, 2) and (3, 54)

$y = a \cdot b^x$

$54 = 2 \cdot b^3$

$\sqrt[3]{27} = \sqrt[3]{b^3}$

$3 = b$

$y = 2(3)^x$

32. $(2^{-1})^{4x+1} = (2^3)^{2x+1}$

$-4x-1 = 6x+3$

36. $\left(\frac{2}{3}\right)^{5x+1} = \left(\frac{3}{2}\right)^3$

$\left(\left(\frac{2}{3}\right)^{-1}\right)^3$

3. Kristin starts an experiment with 7500 bacteria cells. After 4 hours, there are 23,000 cells. Write an exponential function that could be used to model the number of bacteria after x hours.

(4, 23,000) (0, 7500)

$23{,}000 = 7500\,b^4$

$\sqrt[4]{3.06} = \sqrt[4]{b^4}$

$b = 1.32$

$y = 7500(1.32)^x$

How many bacteria can be expected after 12 hours?

$y = 7500(1.32)^{12}$

216,302.22

Attachments

10-1A Key.notebook