

Property of Equality for Exponential Functions

If $2^x = 2^8$, then $x = 8$

$$3. \quad 5^{3x+6} = 5^{5x}$$

$$3x+6 = 5x$$

$$6 = 2x$$

$$3 = x$$

Property of Inequality for Exponential Functions

If $2^x > 2^8$, then $x > 8$

$$3^x \leq 3^4$$

$$x \leq 4$$

$$(1) \quad 3^{2n+1} \leq 3^4$$

$$2n+1 \leq 4$$

$$2n \leq 3$$

$$n \leq \frac{3}{2}$$

2. $(0, 18)$ and $(2, 2)$
 $(0, a)$ x, y

$$y = a(b)^x$$

$$a \neq 0$$

$$b > 0$$

$$b \neq 1$$

$$\frac{2}{18} = \frac{18(b)^2}{18}$$

$$\sqrt{\frac{1}{9}} = \sqrt{b^2}$$

$$\frac{1}{3} = b$$

$$y = 18\left(\frac{1}{3}\right)^x$$

① $(0, 3)$ $(-1, 6)$

$$y = a(b)^x$$

$$\frac{6}{3} = \frac{3(b)^{-1}}{3}$$

$$2 = b^{-1}$$

$$(b)2 = \frac{1}{b}(b)$$

$$2b = 1$$

$$b = \frac{1}{2}$$

$$a = 3$$

$$y = 3\left(\frac{1}{2}\right)^x$$

3. Example #3 p. 500

POPULATION In 2000, the population of Phoenix was 1,321,045, and it increased to 1,331,391 in 2004.

- a. Write an exponential function of the form $y = ab^x$ that could be used to model the population y of Phoenix. Write the function in terms of x , the number of years since 2000.

$$\left(0, \underbrace{1,321,045}_a \right) \quad \left(4, 1,331,391 \right)$$

$$\frac{1,331,391}{1,321,045} = \frac{1,321,045(b)^4}{1,321,045}$$

$$\sqrt[4]{1.008} \approx \sqrt[4]{b^4}$$

$$1.002 \approx b$$

$$y = 1,321,045(1.002)^x$$

predict population in 2010

$$x = 10$$

$$y = 1,321,045(1.002)^{10}$$