

Property of Equality for Exponential Functions

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

$$\textcircled{1} 3^{2n+1} = 3^4$$

$$2n+1 = 4$$

$$2n = 3$$

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

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

$$3x+6 = 5x$$

$$6 = 2x$$

$$3 = x$$

Property of Inequality for Exponential Functions

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

$$1. 3^{2n+1} \leq 3^4$$

$$2n+1 \leq 4$$

$$2n \leq 3$$

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

$$\textcircled{2} 2^{4x} < 2^{3(x-1)}$$

$$4x < 3x-3$$

$$x < -3$$

2. (0,18) and (2,2)

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

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

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

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

$a \neq 0$
 $b > 0$
 $b \neq 1$

(0,a)

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

① (0,3) (-1,6)

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

$$(b)6 = \frac{3}{b}(b)$$

$$6b = 3$$

$$b = \frac{3}{6} = \frac{1}{2}$$

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

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 of Phoenix. Write the function in terms of x , the number of years since 2000.

$$\left(\underset{a}{0}, \underset{y}{1,321,045} \right) \quad \left(\underset{x}{4}, \underset{y}{1,331,391} \right)$$

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

$$\sqrt[4]{1.008} \approx \sqrt[4]{6^4}$$

4 ✓ Ans

prediction equation

$$1.002 \approx b \longrightarrow$$

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

Predict pop. in 2017 $\rightarrow x=17$

$$y = 1,321,045(1.002)^{17}$$