

Review:

From previous lessons, name 2 characteristics of an exponential function.

1. _____
2. _____

In this lesson, you will be able to:

1. _____
2. _____

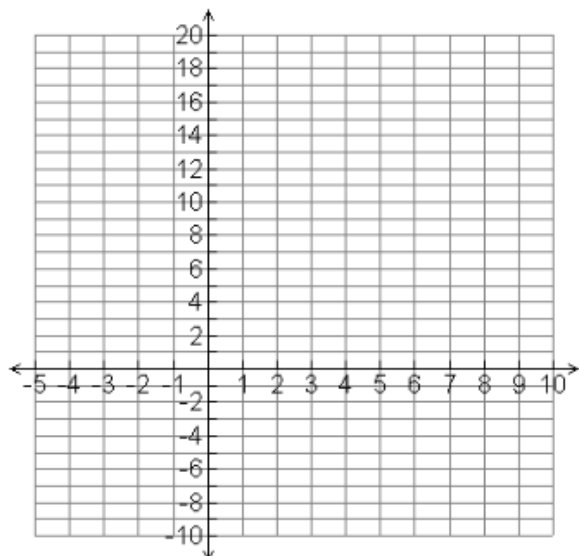


Any quantity that grows or decays by a fixed percent at regular intervals is said to have exponential growth or exponential decay.

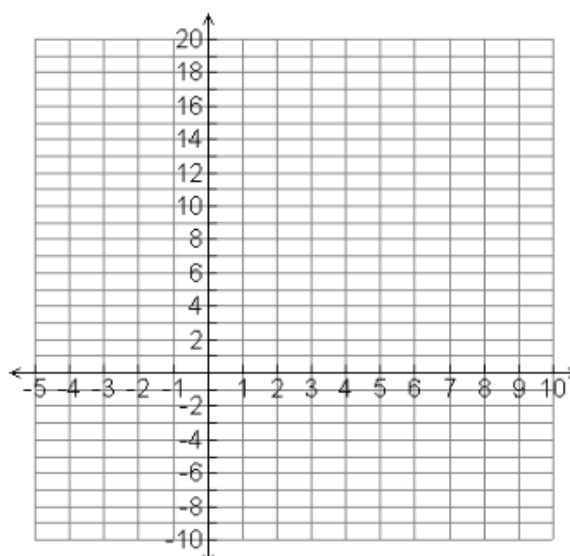
Exploring Exponential Growth and Decay Functions

Graph the following:

1. $y = 1(2)^x$



2. $y = 2(3)^x$

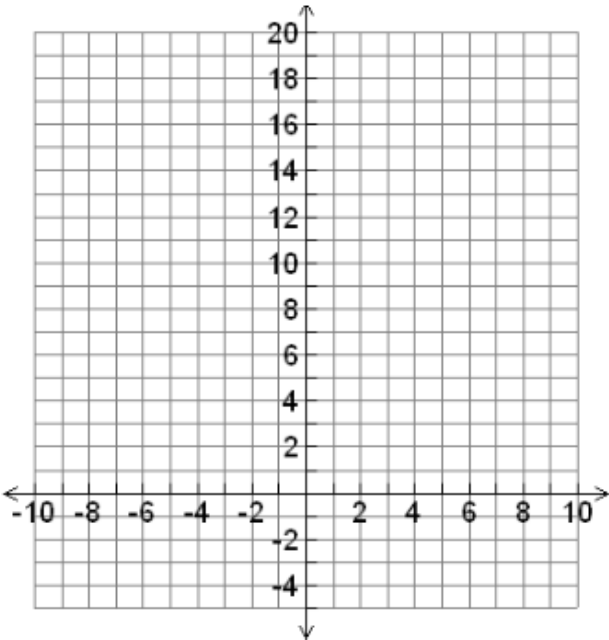


What do you notice about both graphs? _____

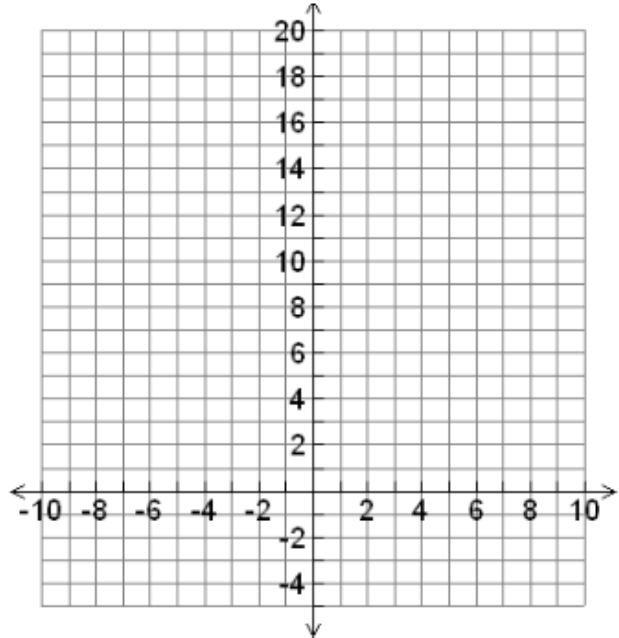
Exploring Growth and Decay Functions (continued)

Graph the following:

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



4. $y = 2(.4)^x$



What do you notice about both graphs? _____

Compare equations 1 & 2 with equations 3&4. What did you discover????

Exponential Growth Functions

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

When _____ and,

_____ the graph will be increasing (growing).

Exponential Decay Functions

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

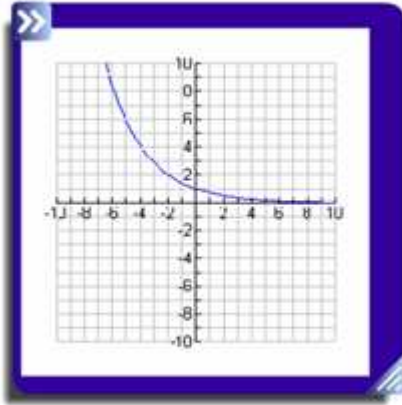
When _____ and,

_____ the graph will be decreasing (Decaying).

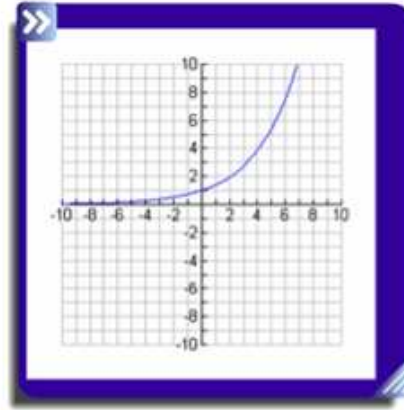
EXAMPLES

Tell whether the following graphs represent an exponential growth or Decay.

a.



b.



Tell whether the following equations represent an exponential growth or Decay.

c. $y = 0.7\left(\frac{3}{2}\right)^x$

d. $y = 3(1.2)^x$

e. $y = 2^x$

f. $y = 4\left(\frac{1}{4}\right)^x$

g. $y = 0.5^x$

Give two examples of each:

Exponential Growth

1. _____

2. _____

Exponential Decay

1. _____

2. _____

Parts of an Exponential Function

The general equation for an exponential GROWTH function is:

$$y = a(b)^x \text{ where,}$$

a: _____

If b > 1: _____

then b: _____

and r: _____

The general equation for an exponential DECAY function is:

$$y = a(b)^x \text{ where,}$$

a: _____

If b > 1: _____

then b: _____

and r: _____

EXAMPLES

Identify the initial value, the growth or decay factor, and the growth or decay rate of the exponential function.

1. $y = 3(1.8)^x$

Growth or decay _____

Initial value _____

Growth or decay factor _____

Growth or decay rate _____

2. $y = 2.1(1.04)^x$

Growth or decay _____

Initial value _____

Growth or decay factor _____

Growth or decay rate _____

Identify the initial value, the growth or decay factor, and the growth or decay rate of the exponential function.

3. $y = 9(.8)^x$

Growth or decay _____

Initial value _____

Growth or decay factor _____

Growth or decay rate _____

4. $y = 2(.94)^x$

Growth or decay _____

Initial value _____

Growth or decay factor _____

Growth or decay rate _____

5. $y = 0.3^x$

Growth or decay _____

Initial value _____

Growth or decay factor _____

Growth or decay rate _____

6. $y = 3(2)^x$

Growth or decay _____

Initial value _____

Growth or decay factor _____

Growth or decay rate _____

7. The Johnson Company calculates the value of its stock each year by using the function $y = 120 (.98)^x$.

Growth or decay _____

Growth or decay factor _____

Initial value _____

Growth or decay rate _____

8. Selena's starting salary for her new marketing management job is \$32,000. She calculates her projected salary for the next 5 years by using the function $y = 32,000(1.12)^x$.

Growth or decay _____

Growth or decay factor _____

Initial value _____

Growth or decay rate _____