Name _____ Date _____ Class _____

LESSON 7-1

Practice A

Exponential Functions, Growth, and Decay

Complete each statement.

1. A function of the form $f(x) = ab^x$ is called an exponential _____ function when b is greater than 1.
2. A function of the form $f(x) = ab^x$ is called an exponential _____ function when b is a number between 0 and 1.

Tell whether the function shows growth or decay. Then graph.

3. $f(x) = 3(2.5)^x$

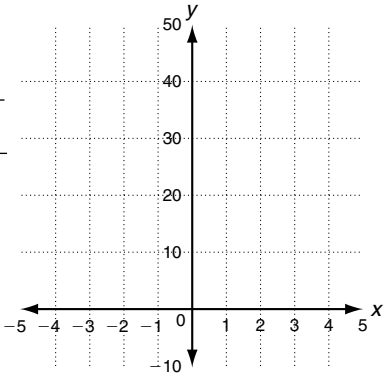
   a. Find the value of the base. _____

   b. Does the function show growth or decay? _____

   c. Make a table of values for the function.

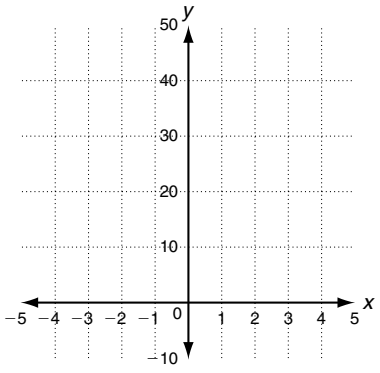
x	−2	−1	0	1	2	3
$f(x)$						

   d. Graph the function.



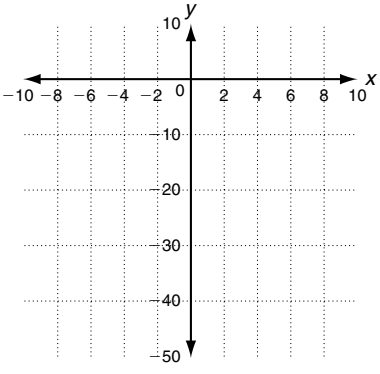
4. $g(x) = 2(0.2)^x$

_____



5. $j(x) = -(1.5)^x$

_____



Solve.

6. Some real estate agents estimate that the value of a house could increase about 4% each year.

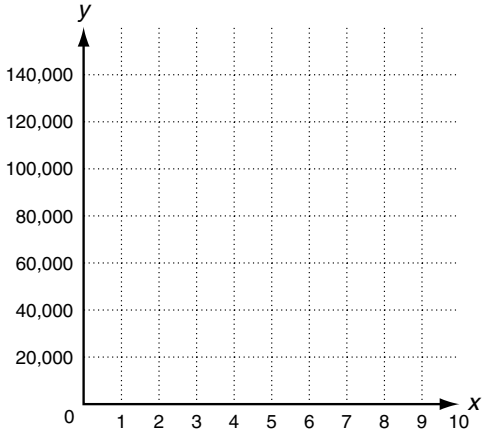
   a. Write a function to model the growth in value for a house valued at $100,000.

   _____

   b. Graph the function.

   c. A house is valued at $100,000 in 2005. Predict the year its value will be at least $130,000.

   _____



LESSON 7-1

Practice A

Exponential Functions, Growth, and Decay

Complete each statement.

1. A function of the form $f(x) = ab^x$ is called an exponential function when b is greater than 1. **Growth**

2. A function of the form $f(x) = ab^x$ is called an exponential function when b is a number between 0 and 1. **Decay**

Tell whether the function shows growth or decay. Then graph.

3. $f(x) = 3(2.5)^x$

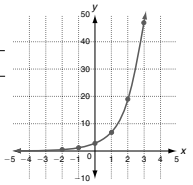
   a. Find the value of the base. **2.5**

   b. Does the function show growth or decay? **Growth**

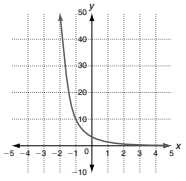
   c. Make a table of values for the function.

x	−2	−1	0	1	2	3
$f(x)$	0.48	1.2	3	7.5	18.75	46.875

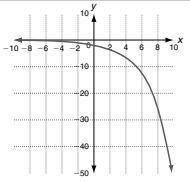
   d. Graph the function.



4. $g(x) = 2(0.2)^x$ **Decay**



5. $j(x) = -(1.5)^x$ **Growth**



Solve.

6. Some real estate agents estimate that the value of a house could increase about 4% each year.

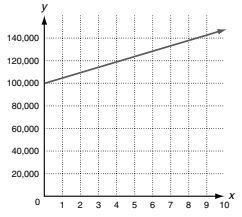
   a. Write a function to model the growth in value for a house valued at $100,000.

   $y = 100{,}000(1.04)^x$

   b. Graph the function.

   c. A house is valued at $100,000 in 2005. Predict the year its value will be at least $130,000.

   2012



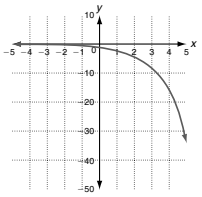
LESSON 7-1

Practice B

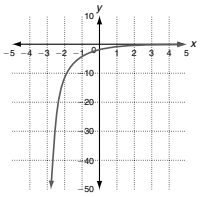
Exponential Functions, Growth, and Decay

Tell whether the function shows growth or decay. Then graph.

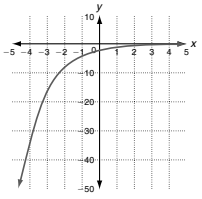
1. $g(x) = -(2)^x$ **Growth**



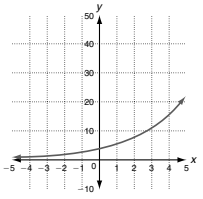
2. $h(x) = -0.5(0.2)^x$ **Decay**



3. $j(x) = -2(0.5)^x$ **Decay**



4. $p(x) = 4(1.4)^x$ **Growth**



Solve.

5. A certain car depreciates about 15% each year.

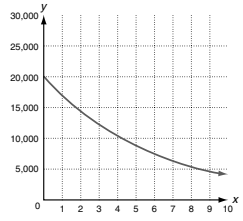
   a. Write a function to model the depreciation in value for a car valued at $20,000.

   $y = 20{,}000(0.85)^x$

   b. Graph the function.

   c. Suppose the car was worth $20,000 in 2005. What is the first year that the value of this car will be worth less than half of that value?

   2010



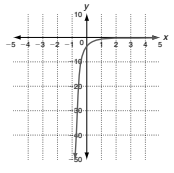
LESSON 7-1

Practice C

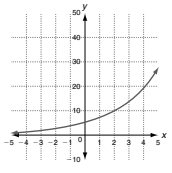
Exponential Functions, Growth, and Decay

Tell whether the function shows growth or decay. Then graph.

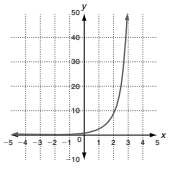
1. $j(x) = -3(0.04)^x$ **Decay**



2. $k(x) = 5(1.4)^x$ **Growth**



3. $p(x) = 0.25(6)^x$ **Growth**



Tell whether the function is an exponential function. Write *yes* or *no*.

4. $f(x) = -2x^5 - 9$ **No**

5. $g(x) = -0.2(5)^x$ **Yes**

6. $h(x) = 10(2.2)^x$ **Yes**

Solve.

7. Colleen's station wagon is depreciating at a rate of 9% per year. She paid $24,500 for it in 2002. What will the car be worth in 2008 to the nearest hundred dollars? **$13,900**

8. Kyle estimates that his business is growing at a rate of 5% per year. His profits in 2005 were $67,000. Estimate his profits for 2010 to the nearest hundred dollars. **$85,500**

9. A parcel of land Jason bought in 2000 for $100,000 is appreciating in value at a rate of about 4% each year.

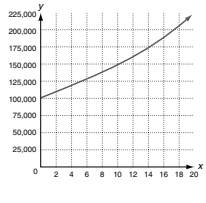
   a. Write a function to model the appreciation of the value of the land.

   $y = 100{,}000(1.04)^x$

   b. Graph the function.

   c. In what year will the land double its value?

   2018



LESSON 7-1

Reteach

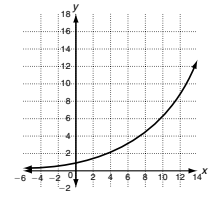
Exponential Functions, Growth, and Decay

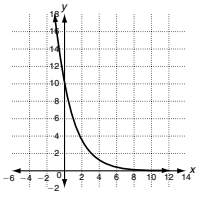
The **base** of an exponential function indicates whether the function shows growth or decay.

Exponential function: $f(x) = ab^x$

- a is a constant
- b is the base. The base is a constant.
  If $0 < b < 1$, the function shows decay.
  If $b > 1$, the function shows growth.
- x is an exponent.

$f(x) = 1.2^x$	$g(x) = 10(0.6^x)$
$a = 1$	$a = 10$
$b = 1.2$	$b = 0.6$
$b > 1$, so the function shows *exponential growth.*	$0 < b < 1$, so the function shows *exponential decay.*



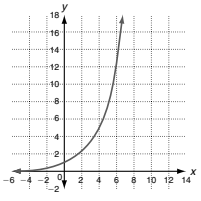


Tell whether each function shows growth or decay. Then graph.

1. $h(x) = 0.8(1.6^x)$

   $a =$ **0.8** $b =$ **1.6**

   $h(x)$ shows exponential growth.



2. $p(x) = 12(0.7^x)$

   $a =$ **12** $b =$ **0.7**

   $p(x)$ shows exponential decay.