 Name: _____

6.1D2 ~ Exponential Functions

Past due on: _____ Period: _____

Determine a formula, of the form $y = a(b)^x$, for the exponential function whose values are given.

1.

x	–2	–1	0	1	2
$g(x)$	$\frac{2}{25}$	$\frac{2}{5}$	2	10	50

2.

x	–2	–1	0	1	2
$h(x)$	48	12	3	$\frac{3}{4}$	$\frac{3}{16}$

3.

x	–2	–1	0	1	2
$h(x)$	200	20	2	0.2	0.02

4.

x	–2	–1	0	1	2
$g(x)$	$\frac{5}{9}$	$1\frac{2}{3}$	5	15	45

5.

x	–2	–1	0	1	2
$g(x)$	$1\frac{3}{4}$	$3\frac{1}{2}$	7	14	28

6.

x	–2	–1	0	1	2
$h(x)$	100	20	4	0.8	0.16

7. Suppose the depth of a lake (in meters) can be described by the function $D(w) = 334(0.976)^w$, where w represents the number of weeks from today.
   a. Identify b. Is it a growth factor or a decay factor?
   b. What is the initial depth of the lake?
   c. What will the depth of the lake be in 6 weeks?
8. A ball rolling down a slope travels continuously faster. The function $S(t) = 1.3(1.41)^t$ represents the speed of the ball, S (in inches per minute), after t minutes.
   a. Identify b. Is it a growth factor or a decay factor?
   b. How fast will the ball be rolling in 15 minutes?
9. According to industry reports, the total global sales of smartphones can be modeled by the equation, $P(t) = 132.2(1.49)^t$, where t represents the number of years since 2008 and $P(t)$ represents global smartphone sales measured in millions of units.
   a. What is the value of b? Is b a growth or decay factor?
   b. What is the total global sales of smartphones today?
10. According to the U.S. Census Bureau, the population of the United States (in millions) can be modeled by the exponential function $P(t) = 123.3(1.0118)^t$, where t represents the number of years since 1930.
    a. Determine the annual growth factor from the equation.
    b. Use the model to determine the population of the United States in 2010.

Assume that y is an exponential function of x. For each exponential set: complete the table given the growth or decay factor and write an exponential equation of the form $y = a(b)^x$. *Round to 3 decimal places, if necessary.*

11. Growth factor: 1.25

x	0	1	2	3
y	10.5			

12. Decay factor: 0.75

x	0	1	2	3
y	12			

The following tables represent exponential functions. Use successive ratios to find the growth factor or decay factor. Complete the table and write an exponential equation of the form $y = a(b)^x$. *Round to 3 decimal places, if necessary.*

13.

x	0	1	2	3	4
y	3.00	6.12			

14.

x	0	1	2	3	4
y	4.50	3.15			

15.

x	0	1	2	3	4
y	0.25	4			

16. The population of Clarksville, Tennessee, from 2006 to 2012 is given in the following table:

Year	2006	2007	2008	2009	2010	2011	2012
Population (thousands)	114.1	119.6	120.3	124.6	133.7	136.2	142.5

a. Let b be the ratio between the population of Clarksville in 2009 & 2008. Find b; round the three decimal places. Is b a growth or decay factor?
b. Let 2006 correspond to t = 0. Determine an exponential function of the form $P(t) = a(b)^t$ to represent the population of Clarksville.
c. Use the function to predict the population of Clarksville, Tennessee, today.

17. The population of Las Vegas, Nevada, from 2000 to 2006 is given in the following table:

Year	2000	2001	2002	2003	2004	2005	2006
Population (thousands)	478.4	490.0	502.2	514.1	526.6	539.1	552.5

a. Let b be the ratio between the population of Las Vegas in 2001 & 2000. Find b; round the three decimal places. Is b a growth or decay factor?
b. Let 2000 correspond to t = 0. Determine an exponential function of the form $P(t) = a(b)^t$ to represent the population of Las Vegas.
c. Use the function to predict the population of Las Vegas, today.

18. As a radiology specialist, you use the radioactive substance iodine-131 to diagnose conditions of the thyroid gland. Your hospital currently has a 20-gram supply of iodine-131. The following table gives the number of grams remaining after a specified number of days.

Number of days, t	0	1	2	3	4	5	6
Number of grams remaining, N	20.00	18.34	16.82	15.42	14.14	12.97	11.89

a. Let b be the ratio between number of grams remaining between days 1 & 0. Find b; round the three decimal places. Is b a growth or decay factor?
b. Determine an exponential function of the form $N = a(b)^t$ to represent the number of grams remaining after t days.
c. Use the function to determine the number of grams of iodine-131 remaining after 2 months.