Name: _____

6.1D3 ~ Constant Percent Rate

Past due on: _____ Period: _____

1. Determine the growth and decay factors and/or the growth and decay rates (written as a percent) in the following tables.

GROWTH FACTOR	GROWTH RATE
1.626	
	8.7%
2.0125	
	52%
1.0082	

DECAY FACTOR	DECAY RATE
0.145	
	8.7%
0.817	
	31.4%
0.9134	

Tell whether the function is an exponential growth function or an exponential decay function, and then find the constant percentage rate of growth or decay.

2. $P(t) = 3.5(1.09)^t$

3. $P(t) = 4.3(1.018)^t$

4. $f(x) = 78{,}963(0.968)^x$

5. $f(x) = 5{,}607(0.9968)^x$

6. $g(t) = 247(2)^t$

7. $g(t) = 43(0.05)^t$

Determine an exponential function of the form $y = a(b)^t$ that satisfies the given conditions.

8. Initial value of 5, increasing at a rate of 17% per year

9. Initial value of 16, decreasing at a rate of 25% per month

10. Initial value of 5, decreasing at a rate of 0.59% per week

11. Initial population of 502,000 increasing at a rate of 1.7% per year

12. Initial height of 18 cm, growing at a rate of 5.2% per week

13. Initial mass of 15 grams, decreasing at a rate of 4.6% per day

14. 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 rate from the equation.

    b. Use the model to determine the population of the United States in 2010.

15. Suppose the inflation rate is currently 5% per year and remains the same for the next 7 years. The cost of a pair of sneakers is currently $65.
    a. Let $C(t)$ represent the cost of a pair of sneakers t years from now. Determine the exponential function that models the cost.

    b. Determine the cost of the sneakers in 7 years.

16. The 2000 population of Jacksonville, Florida was 736,000 and was increasing at the rate of 1.49% each year.
    a. Write an exponential function that models the population, $P(t)$, as a function of the number of years, t, since 2000.

    b. Has the <u>current</u> population reached 1 million? Explain why or why not?

17. The population of Smallville in the year 1890 was 6,250. Assume the population increased at a rate of 2.75% per year.
    a. Write an exponential function that models the population, $P(t)$, as a function of the number of years, t, since 1890.

    b. What was the population of Smallville when Superman arrived in 1938?

18. In 2005, the U.S. Census Bureau estimated the population of Boston, Massachusetts, as 609.7 thousand people and the population of Detroit, Michigan, as 921.1 thousand people. Since 2005, Boston's population has been increasing at approximately 0.62% per year. Detroit's population has been decreasing at approximately 3.82% per year. Complete the table comparing the populations of the two cities.

BOSTON		DETROIT
	POPULATION IN 2005	
	GROWTH OR DECAY?	
	GROWTH/DECAY RATE	
	GROWTH/DECAY FACTOR	
Let $P(t)$ represent the population t years after 2005. Determine an exponential function that models the population of each city.		
	EXPONENTIAL FUNCTION	
	POPULATION TODAY	