**Using Exponential Functions to Solve Problems**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A function of the form f(n) = P(1 + r)n is used to model the amount of money in a savings account that earns 8% interest, compounded annually, where n is the number of years since the initial deposit. What is the value of r? What does it mean in terms of the savings account? What is the meaning of the constant P in terms of the savings account? Explain your reasoning. Will n or f(n) ever take on the value 0? Why or why not?
2. Suppose Kevin had $10,000 to invest in a CD account paying 8% interest compounded yearly. Write an exponential equation to model this situation. How much money will Kevin have in ten years?
3. A single bacterium is placed in a test tube and splits in two after one minute. After two minutes, the resulting two bacteria split in two, creating four bacteria. If this process continues, how long will it take for there to be over 1,000 bacteria?

**Independent Practice**

1. In the book *Alice’s Adventures in Wonderland* by Lewis Carroll, Alice grows when she eats a piece of cake. If her original height is 4ft 6in and her height doubles every time she takes one bite of cake, how tall will she be after 8 bites of cake? Write and use an exponential equation to answer this question.
2. The population of North Carolina in 2012 was 9,752,073 with an annual population change of about 1%. (<http://quickfacts.census.gov/qfd/states/37000.html>) If this growth rate continues, what will be the population in North Carolina in 2020? Write and use an exponential equation to answer this question.
3. A local pond is having a problem with its fish population. So many people have been fishing in this pond that a wildlife specialist says that the fish population has declined 2% each year for the past several years. If the current population of the fish is estimated to be about 1000, how many fish will be in the pond ten years from now if this rate of decrease continues? Write and use an exponential equation to answer this question.