Math 041 Assignment 3.4   Name_____

DIRECTIONS   To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided on the test paper.

1.   Find the value of a $20,000 investment after 5 years
        if the interest is compounded

a.   quarterly at 6%.   Ans_____

b.   Compounded continuously at 6%   Ans_____

2.   Determine the time t necessary for $700 to double if it is invested at interest rate r = 5%
        compounded annually, monthly, daily, and continuously.

b.   quarterly   Ans_____

c.   continuously   Ans_____

3.   In year 2000, the population of my home town was   Ans_____
        500,000 and the rate of growth per year was 2% .
        If we assume exponential population growth at the same rate,
        Predict the population of my home town in 2015.

4.   In 1995, the population of the United States was   Ans_____
        264 millions and the exponential growth
        rate was 1% per year Predict the United States
        population in 2002.

5.   The value V (in millions of dollars) of a famous painting can be modeled by the equation
        $V = 10e^{kt}$, where t represents the year, with t = 0 corresponding to 1970. In 2002, the
        same painting was sold for $50 million.

a.   Find the value of k.   Ans_____

b.   Use the value of k to predict the value of the painting in 2013.   Ans_____

6.   After discontinuing all advertising for a tool kit in 2004, the manufacturer noted that sales
        began to drop according to the model

$$S = \frac{500,000}{1 + 0.6e^{kt}}$$

        where S represents the number of units sold and t = 4 represents 2004. In 2009, the
        company sold 300,000 units.

a.   Complete the model by solving for k.   Ans_____

b.   Estimate sales in 2016.   Ans_____