Math 112 Written Homework: Exponential Functions Student Name:_____

Instructor: Laird

Math 112 Section: 062

<u>Directions</u>: Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.

1. Charla would like to save $15,000 for a down payment for her first house. She currently has $10,000.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   At what interest rate, compounded annually, would she need to invest her money in order to have the required $15,000 in 5 years?

2. A city's population has been growing exponentially over the past several years. In 2010, the population was 120,000 people. In the year 2016, it was 150,000 people.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Express the population as a function of the number of years since 2010.

   What is the predicted population in the year 2020?

3. A cup of coffee contains approximately 175 mg of caffeine. The half-life of caffeine is 6 hours.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Determine a function to represent the amount of caffeine in your bloodstream after drinking a cup of coffee, as a function of the number of hours.

   If you had a cup of coffee at 6:00 pm, how much caffeine will remain in your bloodstream at 11:00 pm?

4. A car with an initial value of $30,000 depreciates exponentially. The value of the car after 4 years is estimated to be $18,000.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Write an exponential function to model the value of the car after t years.

   What does your model predict the value of the car to be after 10 years?