

**Handout 3****Extra Credit****MATH 140 Lab: Section 1****Lab Instructor (TA): Mohammed Kaabar**

Student's Name:-----

Student's ID:-----

*Note: This handout covers the applications of exponential and logarithmic functions.***Problem 1:** Assume that  $P(t)$  is the population of Pullman, WA after  $t$  years is given by the following model:  $P(t) = 4000e^{0.034t}$ . Suppose that  $t = 0$  is the year 1980.

- Find the initial population.
- Find the population in the year 2010.
- When will the population double to reach 8000?

**Problem 2:** Assume that  $M$  is the mass of a quantity of the radioactive radium-226. The amount of radium present after  $t$  years is given by:  $M = 30(0.5)^{\frac{t}{1620}}$

- a. Find the initial quantity of radium.
- b. Find the quantity present after 500 years.
- c. What is the half-life of radium-226?

**Hint:** The half-life of radioactive substance is the time required for half the mass to decay.