MATH 171 Activity #8: Applications of Exponential Functions

Homework: 5.5: 7, 15, 21, 23
5.6: 7, 11, 17, 39

1. The city of Clinton, IA has a population of 27,772 and grows at an annual rate of 3.5%.
   Iowa City has 62,226 citizens and grows 1.6% each year.

   Write out the formula that models the population growth for each city. When will Clinton's population surpass Iowa City's?

2. Tritium has a half-life of 11.52 years. The radioactive decay of Tritium is modeled by the function: $C(t) = C_0 e^{kt}$ where

   C_0 represents the initial amount of Cobalt
   t represents time
   k is a constant of decay (a negative number)

   Suppose a nuclear bomb is set off in the desert, making the area uninhabitable. If the residual tritium levels are 70 times higher than safe levels, how long will it take before people can live in that area of the desert?

   Hint: Use the half-life information to find *k*. Then solve the rest of the problem.

3. The World Heath Organization initially counted the number of SARS cases worldwide. Three years later, they counted 2317 cases. Five years after the initial count, there were 979 cases. Let C = the number of SARS cases at year t.

   Find a formula for C(t) assuming a linear model. Interpret the slope and y-intercept of this function.

   Find a formula for C(t) assuming an exponential model.