Sample problem set:

The growth of a bacterial population *x* can be described by the following equation:

$$x(t) = x_0 \exp(\beta t)$$

where x_0 is the starting number of individuals in the population and β is the growth rate.

1. Consider a population with a starting size of 200 individuals and a growth rate of 0.5 hr^{-1}. Plot the growth curve for the first five hours. What are the limitations of this simplistic model?
2. Give an analytical expression for the population doubling time. Does this time depend on the initial population size?