

## Sample questions on microbial growth

The following questions are designed to allow you to practice with several of the equations that are commonly used to model populations, including that of microbes. For our purposes assume that the microbial populations in question are in the exponential portion of the growth curve (the rate of growth is constant).

1. A population of *Staphylococcus aureus* are growing on the nasal mucosa of a patient. When the patient is first admitted to the emergency ward, you sampled the nasal mucosa and found that the population of *S. aureus* =  $2.5 \times 10^5$  microbes/ml. Three hours after being admitted to the emergency ward, the population of microbes in the patients nasal mucosa has shot up to  $3.6 \times 10^8$  microbes/ml.

a. Calculate (in minutes) the mean generation time (doubling time) for the population of *S. aureus*.

b. Assuming a constant rate of growth what would be the estimated population concentration (in microbes/ml) if you were to have sampled the patient 3.5 hours after being admitted to the emergency room?

c. How many generations would be needed for the population of *S. aureus* to get the value calculated in part b?