1. A patient is admitted with an acute theophylline overdose. This patient is a 55 year old male who smokes. A serum level is measured at 44 μg/mL. Assuming a 5 hour half-life and no further drug absorption, how long does it take for the serum level to drop to the upper limit of the therapeutic range (20μg/mL)?

2. Please answer the following questions with true or false:
   a) for high extraction drugs:
   1) In case of a increasing fraction unbound, the extraction ratio of the drug stays the same,
   2) In case of increased hepatic blood flow, the clearance stays the same
   b) for low extraction drugs:
   1) In case of increasing fraction unbound, the extraction ratio of the drug stays the same,
   2) In case increasing hepatic blood flow, the clearance of the drug stays the same.

3. K.M. is a 50 year old male weighing 70 kg with a subtherapeutic theophylline level (5μg/mL). Base on population pharmacokinetic parameters (Vd=0.5L/kg, t1/2=8hours) calculate an IV bolus loading dose and a daily maintenance dose to increase the level to 12 μg/mL.
   b) If this drug were to be given as aminophylline dehydrate(S=0.8) what would be the maintenance dose?

4. A drug is given via continuous IV infusion for 24 hours. It is infused at a rate of 50 mg/hr. The clearance for this drug is 7.5 L/hr and the volume of distribution is 0.25L/kg (the patient weighs 70kg). The concentration-time profile is presented below.
A. What would the concentration-time profile look like if the volume of distribution were doubled?

B. What would the concentration-time profile look like if the clearance were doubled?