Question #1

100mg drug A was administered to a patient as a single I.V bolus dose. The plasma drug concentration was measured $t_1$ hours after the drug was administered, and it turned out to be $C_1$ mg/L, $t_2$ hours after $t_1$, the plasma drug concentration was observed to be $C_2$ mg/L ($C_2 < C_1$). Suppose the drug follows one compartment body model with first order elimination, calculate the following PK parameters. (Your answer should only include $t_1$, $t_2$, $C_1$, $C_2$ and the units of parameters)

1.1. Calculate the elimination rate constant $K_e$ and half-life ($t_{1/2}$). [1pt]

1.2. Calculate the initial plasma drug concentration $C_0$. [1pt]

1.3. Calculate the volume of distribution $V_d$. [1pt]

1.4. Use trapezoidal rule to calculate the area under the curve $AUC_{0\rightarrow\infty}$. [2pt]

1.5. What’s the elimination rate constant $K_e$ and half-life ($t_{1/2}$) if the doctor double the original dose? [1pt]

Question #2

The one compartment body model is frequently used in clinical practice. In the analysis of one compartment model with single I.V bolus dose, what are the assumptions we make to depict the body as a kinetically homogenous unit? [2pt]

Question #3

3.1. T F  Blood serum is blood plasma without fibrinogen or other clotting factors. [.5pt]

3.2. T F  The AUC is of particular use in estimating bioavailability of drugs, and in estimating total clearance of drugs. [.5pt]

3.3. T F  The amount of drug in the body affects the change in amount of drug in the body, therefore, the elimination rate constant $K_e$ also depends on the amount of drug in the body. [.5pt]

3.4. T F  For a zero-order elimination process, the amount of drug eliminated per time unit is changing. [.5pt]