1. While on vancomycin, a male patient 70 years of age, 6’3” in height, weighing 209 pounds had a loss of volume of distribution of 20% and a corresponding increase in serum creatinine level by 20%. Adjust his vancomycin dose, assuming that his previous serum creatinine was 1.8 mg/dL. Compute the steady state Cmax and Cmin for an intravenous bolus for his new condition. With the dosing regimen that you have recommended, is the therapeutic goal achieved with this dosing regimen (i.e. trough concentrations between 15 and 25 mg/L)? **(4 points)**

If the therapeutic goal is not achieved, estimate the next dose based on a desired steady-state concentration between 15 and 45 mg/L. Evaluate whether the 24-h AUC/MIC ratio is greater than 400 for the new dose assuming that the MIC for vancomycin against *S. pneumoniae* is 1 mg/L. Use a one-compartment body model to compute the AUC. **(2 points)**

![Table](image)

Figure 1. Detroit Receiving Hospital and University Health Center vancomycin dosing nomogram. (Updated 5/99)
2. You are told that vancomycin pharmacokinetic is best described by a 2-compartment model. The drug is administered as an intravenous bolus and its pharmacokinetic profile is best characterized by this equation: 
\[ C(t) = 60 \exp(-0.145t) + 35\exp(-0.097t) \], where the concentration is in mg/L and time is in hour. Compute the area under the curve and determine whether the AUC/MIC ratio is greater than 400 if the MIC against the infection for vancomycin is 1 mg/L. Use the following equation to compute the AUC: 
\[ AUC = \frac{A}{\alpha} + \frac{B}{\beta} \].
(2 points)
3. Use the following graph to answer the question regarding temafloxacin against \textit{S. pneumoniae} in neutropenic mice based on the graph below:

Explain which parameter(s) you will use to evaluate efficacy of temafloxacin against the infection of \textit{S. pneumoniae} in neutropenic mice, based on the graph above. Estimate the value of your selected parameter that is required to achieve a minimum efficacy, if the target is 7.2 Log\(_{10}\) CFU/Thigh at 24 hours. Also estimate the minimum value of this parameter that achieves the maximum efficacy. Discuss how the drug relates to bactericidal versus bacteriostatic killing of antibiotics. (2 points)