A female patient, 57 years of age, 5'6" in height and 100 kg in weight had an infection requiring vancomycin treatment. Her serum creatinine was 0.8 mg/dL. What would be the recommended initial dosage of vancomycin based on the nomogram above? Using this dosing regimen, compute the expected steady-state C\text{max} and C\text{min} values for both IV bolus administration and IV infusion (assuming 1 hr infusion time). Is the therapeutic goal attained (i.e. trough concentration between 15 and 20 mg/L)?
While on vancomycin, a male patient, 46 years of age, 6'3" in height, weighing 147 kg, had a loss of volume of distribution of 10% and a corresponding increase in serum creatinine level by 30%. Adjust his vancomycin dosage, assuming that his previous serum creatinine was 1.3 mg/dL. The MIC of vancomycin against his infection was 0.5 mg/L. Compute the steady state Cmax and Cmin based on IV bolus administration.

With the dosing regimen that you have recommended, are the first dose Cmin and the steady state Cmin values consistently above MIC? Do you need to adjust the dosing frequency based on the computation that you have obtained so that the trough is below 25 mg/L and between 15 to 20 mg/L?

Estimate the AUC to MIC ratio of vancomycin for the patient’s altered condition, assuming that vancomycin is administered as an IV bolus and follows a 1 compartment body model (Hint: use the equation $AUC = \frac{C_{ss,\text{max}}}{k_e}$ to estimate this ratio.)
A female patient, 49 years of age, 78 kg in weight, is started on intravenous phenobarbital sodium. The normal therapeutic range for this medication is between 10 and 30 mg/L. A loading dose was administered to achieve a drug plasma concentration at t=0 of 30 mg/L. Calculate what the loading should be to achieve a target concentration of 30 mg/L and the daily maintenance dose to produce an average steady state phenobarbital concentration of 25 mg/L. Note that the dose should be computed for phenobarbital sodium.
A 59 year old male patient of 87 kg weight is to receive carbamazepine regimen. Compute the daily oral dose (for immediate release formulation) to achieve an average steady state plasma concentration of 6.0 mg/L, assuming monotherapy (i.e. no concomitant medication).

In the second scenario, the same male patient received 1.5 mg/kg by body weight phenobarbital q12h for the past 12 months without any success in controlling his seizures. The medical practitioner decided to start this patient on a concomitant therapy with carbamazepine. Compute the daily maintenance dose to achieve a target steady state concentration of 6.0 mg/L using the immediate release formulation. His blood sample after being on a maintenance regimen of carbamazepine showed a level of 11 mg/L carbamazepine. Compute the dose adjustment so that the patient gets the desired plasma concentration of 6.0 mg/L.