PHA 5127 (Fall, 2008)
Homework #1 (10 points)

Please show your calculations and make sure your numerical answers have units!

Q1. 1000 mg of drug A was administered to a patient as a single i.v. bolus dose. The following plasma concentrations were observed. (4 points)

Time (hrs)	Conc. (mg/l)
0.5	12.8
1	12
5	8.8
10	6.4
15	4

a) Verify the first-order elimination process of this drug. (1 point)

b) Estimate the elimination rate constant (ke). (0.5 pts; -0.1 pts for no units)

c) Estimate the half-life (T1/2) (0.5 pts; -0.1pts for no units)

d) Estimate the initial plasma concentration (C_0) (0.5 pts; -0.1pts for no units)

e) Estimate the volume of distribution (0.5 pts; -0.1pts for no units)

f) Estimate the $AUC_{0\text{-}inf}$. (1 pts)

Q2. Mark each of the following statements True or False. (0.5 point each)

T F For a zero-order elimination process, change in amount of drug in the body depends on the amount of drug in the body.

T F For a first-order elimination process, the actual amount of drug eliminated per time unit is changing.

T F For a first-order elimination process, Ke and T1/2 do not change with dose.

T F Most lipophilic drugs are able to distribute throughout the body (entire extra- and intracellular space).

T F In a perfusion limited distribution, slower blood flow means slower uptake of drug into tissues.

T F In a permeability limited distribution, the degree of drug unionization will not affect the drug uptake.

T F Only free drug is able to interact with receptors and is therefore of pharmacological interest.

T F In general, we can assume free drug in plasma is in equilibrium with free drug in tissue.

T F Volume of Distribution (Vd) is a hypothetical volume which relates the amount of a drug in the body to its plasma concentration.

T F Vd can never exceed the total body water volume.

T F Drug plasma protein binding and drug tissue binding are the main factors determining how fast a drug gets into tissues.

T F A change in protein binding is especially important if the drug shows a high degree of protein binding.