Math151 at the University of Tennessee, Knoxville - Chat for Wednesday December 2, 2015

with the course instructor, Louis Gross.

I will be online starting at 7PM and will be happy to answer questions regarding any aspect of the course, assignments, etc. You can type in this document to ask questions.

When you ask a question, please do not use your name because this document will be saved and publicly posted after we close it. I will be on-line at least until 8PM but will stay on longer if there are still questions. Note that I do not know the identity of anyone posting questions - each participant shows up as “Anonymous” animal.

I am online - Lou

The test is friday, right?

Yes the Final Exam is 8-10AM on Friday in the large classroom - WLS M307

Okay, thanks! And could you go over part b on number 1 on the sample final exam?

Sure - are you OK with finding the answer to part (a) - since we need that for part (b)??

Yes

Um, Could you go over part a on 1 please?

Ok - part (a) says assuming exponential decay of the drug in the body what fraction will decay away (not what fraction is left) after 5 hours given the half life is 10 hours. So starting with the equation for exponential decay and writing D(t) as the amount of drug in the body at time t hours, then the amount remaining after t hours is D(t)/D(0) where D(0) is the amount in the body at time t=0. The faction which has decayed away is 1 - D(t)/D(0) and this is what we want to find. So we can use the information on half life to find the decay constant k in the equation $D(t) = D(0)e^{-kt}$

if you remember that $k = \frac{ln2}{t_{1/2}}$ where $t_{1/2}$ is the half-life and in this case it is 10 hours. So the amount of drug in the body is $D(t) = D(0)e^{-t\frac{ln2}{10}}$

so $1 - \frac{D(t)}{D(0)} = 1 - e^{-t\frac{ln2}{10}}$ is the fraction which decayed away after t hours and if we let t=5 which is the time between doses we get .2929 for this.

Is this Ok for part (a) or are there still questions about this?

this is good, thank you

OK - on to part (b) then. We now want to find the dosage so that the amount of drug just before a dose is given is at the lower end of the effective range which is 10 mg drug/kg BW and the patient has 70 kg BW so the lower end of the effective range is 700mg. Now at equilibrium (that is, after the patient has been on the drug for a few doses and the amount in the body has reached a dynamic equilibrium (this means that the amount just before giving the dose is the same each time the dose is given) then the amount of drug that decays between doses must be exactly the same as the dose of the drug given. The formula for amount of drug just after the n+1st dose is $x_{n+1} = ax_n + b$ and the a is the fraction remaining of the previous amount which in our case is 1-.2929 = .7071
at equilibrium, the amount of drug in the body at the peak is b/(1-a) and the amount of this left just before the next dose is a times this or ab/(1-a) so this is the amount we want to be = 700.
so $b = 700\frac{a}{1-a}$ and we plug in a=.7071 to get b = 290

that is part (b) - are there questions about any of this?

I understand, thanks. Could you also show me on number 5a how you go m and b to be 2?

OK - first you look at the graph and realize it is a straight line on log-log scale which means that the equation for the line is $log(M_L) = mlog(D_S) + b$ where m is the slope of the line and b is the constant (typically called the y-intercept). To find m and b we use the two points were were given which are values not for M_L and D_S but for the logs of these. The points are (-1.5,-1) and (-.5,1) so when we plug these into $log(M_L) = mlog(D_S) + b$ we get two equations $-1 = -1.5m + b$ and $1 = -.5m + b$ and then we solve these two equations for m and b to get m=2 and b=2.

Finally we need to write the equation for M_L and to do that we use

$log(M_L) = mlog(D_S) + b$

and raise 10 to the power of each side so that we get $M_L = 100D_S^2$

is the last step OK or do I need to go through it in detail?

Can you just go through the steps in this part: $-1 = -1.5m + b$ and $1 = -.5m + b$ and then we solve these two equations for m and b to get m=2 and b=2. Everytime I do it I keep getting weird numbers.

OK - lets use the first equation to solve for b we get

b=-1+1.5m

now let's plug this in for b in the second equation to get

1=-.5m -1+1.5m

which is the same as 2=m

then if we plug m=2 into the equation we got for b we get b=-1+1.5 (2) = 2

Is this OK?

I kept trying to divide it, but I get it now, thanks!

Is there any other topic that we should review that isn't on the sample final?

Good question - yes there are definitely problems that were of types I did not put on the sample final but were on previous exams. For example, I did not put a semi-log problem on the sample final but this was on the first exam. It is best to look over the previous exams and samples - they will cover any question on the final. As I was asked in class though, some of the earlier exams had matlab code questions - I will NOT put these types of questions in the Final since you have now done several projects using matlab.

Where do we turn in the extra credit?

Turn these in on the day of the Final when you arrive - leave them with us at the front of the room please do not email them - we need hard copy so we can effectively grade them.

Also, what different types of questions can we expect on the final other than the ones in the practice exam?

As I said above, the questions will be similar to those on previous exams and practice exams. For example, I did not put on the practice final one of teh problems on transfer diagrams like problem #6 on Sample Exam 2.

Is there any way you could have another session tomorrow? There is no room I can use since finals start
. However Athma will be in all day in his office in Austin Peay 403 and I will be around the afternoon

Sorry, I meant another google doc tomorrow. Is there any way that would be possible?

I could do this in the evening tomorrow (Thursday) but not as early as 7PM - I have a meeting that will go until about 8 and then need to get home. So I could be online by 8:30 PM or so.

I feel like that would be very helpful if you could, anytime you're free would work.

OK - I'll send out another announcement through Blackboard and plan to be online Thursday night as well.

Thank You

Anything else for tonight from anyone?

OK - I am going offline - good night.