Math 151 at the University of Tennessee, Knoxville - Chat for September 20, 2015 with the course instructor, Louis Gross.

I will be online starting at 7:30PM and will be happy to answer questions regarding any aspect of the course, assignments, etc. You can type in this document to ask questions - note that you need to be logged into your UTK Google Drive account to be able to type in this.

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 8:30PM but will stay on longer if there are still questions.

So I am going through the practice exam again and I am finding that I still have a lot of questions. I would really like to make a good grade but right now I feel extremely unprepared despite doing all the homework & paying attention in class.
On question 1 part B to find the estimate of the linear regression line could you use any points on the line to solve this? For example I chose the two points farthest away from each other, so (90,15) and (135,60) with a slope of 1 and equation for the line y=x-75.
On question 6 I don't really know where to even begin the problem/solve either part at all.
On question 8 part B how would you find the equation?
Finally in question 9 I'm not quite sure how to start both parts B and C.

I'll go through your questions 1 at a time:
1B - yes you can choose any two reasonable points that would be on a line that you "eyeball" - the two you mention are reasonable
On problem 6 you should note that the scales are already in log for each variable, so you just use the two points given in the equation
log(ML) = m log(MR) + b
to find m and b, then plug these values into this equation and solve for ML to get the answer on the answer sheet. For part B you use this same equation MLA for species A and MLB for species B where MRA = 2 MRB then you will see that ML for species A is 1.58 times ML for species B.
For question 8, the equation is the equation of a line on semi-log plots so that if D is drug concentration and T is time then log(D) = m T + b and then you use two points to find the m and b. For example if your two points are:
(2, 10) and (8,2) then the equations to find m and b are
log(10) = 2 m + b and log(2) = 8 m + b
solve these for m and b and then take 10 to the two sides of
log(D) = m T + b

to get the equation for D in terms of T
For part a of problem 8, just look at the graph to see that the initial concentration just after the drug was given is 20 mg/ml
For part c of the problem , use your equation with D = .05 (20) = 1 and solve for T

For problem 9, the scales are already in ln measurements, so the points that you use will have values ln for each - so if you use the points (4,4) and (10,8) these are already
ln scaled so the equation is
ln(DEE) = m ln(M)+b
and the equations are then
4 = 4 m +b   and   8 = 10 m + b
solve these for m and b.   - I see I called the slope a in the original sample exam though - same solution approach though.

then to get part (c) you take e raised to both sides of the equation to get the answer on the answer sheet
Lou

Please go over all of question 8 and 9
I understand how to get the equations for number 8 but am still confused as to how to solve them

OK - let me go through it step by step then:
log(10) = 2 m + b   and   log(2) = 8 m + b
are the same as
1 = 2 m + b   and   this gives   b = 1 - 2m
so use this in the second equation to get
log(2) = 8m +1 - 2m
so that m = (log(2) -1) / 6 = -.11
then b = 1 - (log(2) -1)/3 = .57
then you get
10^(log(DEE) = DEE = 10^mT 10^b = 10^(-.11T) 10^(.57)

For number 9, how did you get the two points (4,4) and (10,8)?

If you look at the graph the point (4,4) corresponds to a value of ln mass of 4 g and ln DEE of 4 KJ/day so i am looking at the lower scale and the left hand scale, not the ones of the top and the right sides - if I were to use the top[and right side scales I'd need to read the values using those scales and then take the logs since those are not transformed to log scales. Similarly for the point (10,8)

How can we come back and look at this after the chat is over?

I am not removing it - it is still posted. I will take it and create a pdf file from it and post it on the course page though.

Thanks for above

Very confused on #6. Please work it out and explain.

Ok - suppose we start with the fact that we are told that there are two points and we are to use them. The two points are already transformed to log scale because the axes specifically note that these are log(MR) and log(ML) so this means when we plug in these two points in the equation
log(ML) = m log(MR) + b
we do not take the log of the values - they are already log scaled. So you plug in the two points as I did above
-2 = -2 m + b   and   0 = 1 m + b

so that b = -m   and m = 2/3

then the equation is

ML = 10 ^(-⅔) MR^(⅔)

and for part b you can use
MLA = 10 ^(-⅔) MRA^(⅔)

and MLB = 10 ^(-⅔) MRB^(⅔)

No, please go over #5 :)
For #5 we are told to assume the tilapia growth is exponential and we are told that N(0) = 200 and we are told that N(2) = 500 so we have two points to plug into the equation given for N(t) - this gives
N(2) = 500 = a b ^2   but N(0) = 200 = a b^0 = a so the equation is
500 = 200 b ^2   so b = sqrt(500/200) = sqrt(2.5)

for part b we set N(t) = 1800 = 200 sqrt(2.5) ^t and solve for t to
get log(9) = log(sqrt(2.5)) t so t = log(9) / log(sqrt(2.5))

When You reach a point you can answer my question, I am having difficulties discerning between Log and Semi-log such as in question 8. Are semi-logs the opposite of allometric or is that a separate difference?

Semi-log graphs have only the vertical axis on a log scale and the horizontal axis is on the standard arithmetic scale. In this case the graph of a straight line has form
log(y) = m x + b and the equivalent equation is
y = 10^b 10^(mx)

so the variable on the horizontal axis is in the power

For straight line on a log-log graph (so that both the x and y variables are plotted on a log scale) the equation for the line is
log(y) = m log(x) + b and the equivalent equation is

y = 10^b x^m so that the variable is not in the power but us raised to a power.

The last equation is called an allometric relation (so the y variable is found by taking the x variable to a power) and is also called a “power law” relation

could you go over 3b and 3c?

For 3 b take ln of both sides of the equation to get

ln3 + ln (e^(-2y)) = ln(15)
which is the same as
ln(3) -2y = ln(15) so that
y = (ln(3) - ln(15))/2 or equivalently y = - ½ ln(5)

For 3 c

raise e to both sides to get

e^(ln(4+x^2)) = e^3

or 4 + x^2 = e^3

or x = sqrt (e^3 - 4)

For 7a, I thought the boundaries were not supposed to include data points ie, 35-- I set the lower boundary at 34.5 … ?

You are correct that the way Matlab plots this (I used Matlab rather than plotting it by hand) doesn't show the fact that the boundaries between classes are supposed to be ½ of the distance between the upper class limit of one class and the lower class limit of the other class. Matlab actually does this but the plot doesn't show the upper and lower class limits - it just uses these as the same. For our purposes in this course, we simply want to point out the formal way to do this in general so you realize that different software (e.g. if you use Excel rather than Matlab) may produce somewhat different histograms but they should all be of very similar structure. For the exam, we will not reduce the score for a problem if the exact edges between the histogram bars are as Matlab does it or as we describe in the text.

Why are you putting 2MRB when its 2MRA? for number 6 (b)

now we know MRA = 2 MRB so that
MLA = 10 ^(-⅔) (MRA)^(⅔) = 10 ^(-⅔) (2MRB)^(⅔) = 2^(⅔) MLB
and since 2^(⅔) = 1.58 then MLA is 1.58 times MLB

how do you get the values .34 ML for species A and .54 ML for species B
maybe i am doing the calculation wrong. i will work it out again

This is problem 6 b and we are told that MRA = 2 MRB in part b of the problem. So where I have MRA in the equation, I replace it with 2 MRB.

I'm not sure what your question is here - in the equation for
ML = 10 ^(-⅔) (MR)^(⅔) if you calculate 10 ^(-⅔) it is .215

Note that if you are trying to use the formula to get an explicit value for
MLA or MLB then you are not given sufficient information - all you are told is that MRA= 2 MRB -

we can’t actually calculate MLA or MLB

I am going to go offline unless there is something else anyone wishes to ask

Can we bring scratch paper into the exam? also, what is your policy on showing out work? do we need to write out whole equations, process, etc?Will points be deducted for not doing so?

As I said on the sample Exam:

…….never mind, sorry, just looked at top of practice. Sorry about that. I have nothing else.Thank you very much.