Math151 at the University of Tennessee, Knoxville - Chat for October 7, 2015 with the course instructor, Louis Gross.

I will be online starting at 7:30PM and will be happy to answer questions regarding recent assignments, particularly those in Chapters 5-8. I will not go over the problems on the past exam this evening. 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.

Can we ask you to go over problems on the Exam?

No - this is for issues first regarding the Chapters. If there is time at the end and/or no questions about the chapter problems, I can go over exam questions. Lou

OK - I'm not seeing any questions regarding HW problems or questions on matrices so if there is a question about the last exam, go ahead and ask. Lou

How do you do problem 7?

Let's start with part (a) - do you remember the equation for a straight line on a semi-log graph? Lou

Note that the vertical axis uses a log scale and the horizontal axis does not - so the equation for a line is
log(A(t)} = m t + b

then we just need to find m and b

we have two points and the slope of the line, using the log-scaled values for A(t) is

m = (log(500) - log(50))/ (12- 24)

and log(500) - log(50) = log(500/50) = log(10) = 1

so m= -1/12

then to find b we plug in one of the points, say we use the point (24,50)
to get

log(50) = -1/12 (24) +b

so b = log(50) +2 = 3.7

so the answer to (a) is obtained from this by raising 10 to the power on each side of the above to
get A(t) = 10^(mt) 10^b
where we plug in the values for m and b above

OK so far?

Assuming you got that - then

A(t) = 5000 10^(-t/12)

and for part (b) we already have it since
A(0) = 5000

For part (c) we set A(t) = 10 and solve for t

10 = 5000 10^(-t/12)

so solving this for t we get
t = 12 log(500) = 32 approximately

OK? Lou

thanks!

can you go over number 6?

OK - let's start with the equation for a straight line on a log log plot and note that teh data in the graph are not in log values but the original units of kg/km^2 so when we plug in points we are going to need to take the logs of these points.

Then the equation for a straight line is
log(R) = m log(P) + b
so we need to find m the slope and b

m = (log(50) - log(10))/(log(7000) - log(600)) = log(5) / log (70/6)

and then to find b we plug in one of the points so that

log(10) = m log(600) + b

but log (10) = 1 so

b= 1 - log(5) log(600) / log(70/6)

ok so far?

is it 1 - (log(5)log(600) all over log(70/6)?

Yes but be carefull - you first take each of log(5) and log (600) and then multiply them so it is .7 x 2.8 = 1.9 for the top and log(70/6) = 1.1 so

b = 1 - 1.9/1.1 = -.7 or so

OK?

thank you!

Is the rest of the problem OK for you?

could you go over the rest?

OK - so m = .64 approximately and b = -.7 approximately.

so the equation for R is obtained by taking the above equation for log(R) and raising 10 to both sides

R =   10^ (-.7) P^.64 = .2 P^.64

now the part (b) says

PA = 3 PB so

RA = .2 PA^.64 = .2 (3 PB)^.64 = .2 PB^.64 3^.64 = RB 3^.64 = 2 RB
so that preserve A has predator biomass that is about twice that of the predator biomass in preserve B , not three times as much

OK?

yes, thank you!

on number 3, how do you find the correlation coefficient

The correlation coefficient formula is given to you - it is a matter of plugging into the formula. Do you want me to go over how to plug into one of the formulas - which one don't you get if so.

how to plug into the formulas

OK _ lets start with the means xbar and ybar these are obtained by adding the x values
2 + 3 +1 + 4 + 5 = 15 and then dividing by the number of values (t5) to get xbar=3

similarly

ybar = (6+3+7+3+1)/5 = 4

then Sxx = (2-3)^2 + (3 - 3)^2 + (1-3)^2 + (4-3)^2 + (5-3)^2 = 1 + 4 +1 + 4 = 10

and

Syy = (6-4)^ + (3-4)^2 + (7-4)^2 + (3-4)^2 + (1-4)^2 = 4 + 1 + 9 + 1 + 9 = 24

OK so far?

good so far

OK then all tgaht is left is Sxy = (6-4)*(2-3) + (3-4)*(3-3) + (7-4)*(1-3) + (3-4)*(4-3) +(1-4)*(5-3)
so Sxy = -2+0 -6 -1 -6 = -14

and then the correlation coefficient is

-14/ sqrt(240) = -.9

OK

where did 240 come from?

it is from Sxx Syy - it is the product of these
thanks

got it!

could you go over part a) on number 4?

The simple way to look at this is that the panther population has doubled in 10 years from 30 to 60 individuals so counting t=0 as 1990 then
$N(t) = 30\ 2^t$ where t is measured in decades

so that $N(1) = 30 \times 2 = 60$

OK?

Then for part (b) we need to find
$N(2) = 30\ 2^2 = 120$ which is larger than the 110 estimated to be present in 2010 so the population has not grown as fast from 2000 to 2010 as it did earlier.

By the way, these are actual numbers for the Florida panther - they are not made up - they are obtained by a panther tracker (Roy McBride) from looking at photos and tracks of panthers across south Florida. Fun fact - there is a character in several of the best-selling books by the author Carl Hiaisson for whom Roy was the inspiration.

Anything else? if not I am going off-line now

good night