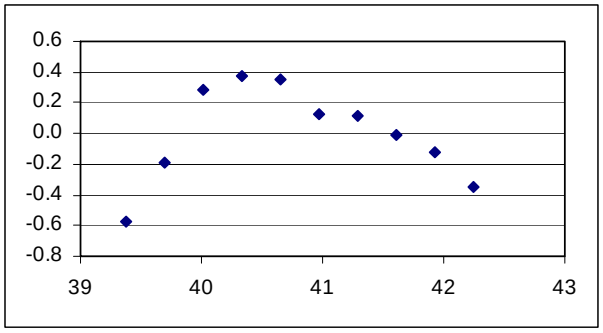
Biology 4605 / 7220 Name _____
Quiz #5b 16 October 2015

1. W.W. Daniel (*Biostatistics*. John Wiley, 1995 p 409) gives data for temperature in laboratory animals (T = deg C) at 10 successive time (t = hours after inoculation).

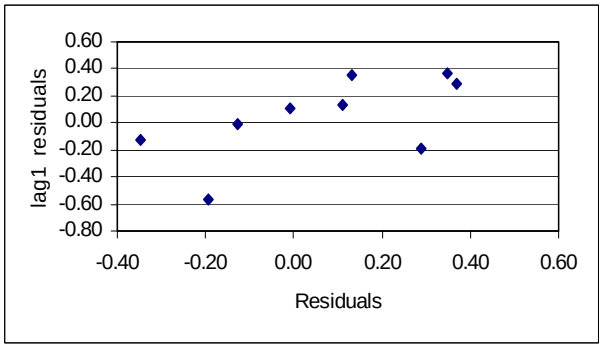
Using the symbols provided, write a general linear model for the relation of body temperature to time after inoculation by a pathogen, as estimated by linear regression. [5]



2. Here is a plot of residuals versus fitted values for regression analysis of the body temperature data. Is a straight line model appropriate for this data ?

_____[1]

Why or why not? [2]



Are the residuals independent? _____[1]

Why or why not? [2]

Comment on the use of this example in a chapter on regression in a text book. [2]

3. This textbook example asks for the linear regression equation and the F-ratio to test the null hypothesis of no relation. Obtain the F-ratio by completing the ANOVA table [6]

SOURCE	DF	SS	MS	F
Time	__	8.4160	_____	_____
Error	__	_____	_____	
Total	9	9.2890		

4. Give a reason why you would (or would not) use this F-ratio to test for a relation between body temperature and time after innoculation. [1]

The regression equation is HgBld = - 20.6 + 0.641 HgIn

Predictor	Coef	Stdev	t-ratio	p
Constant	-20.58	30.66	-0.67	0.517
HgIn	0.64075	0.07373	8.69	0.000

s = 46.37 R-sq = 88.3% R-sq(adj) = 87.1%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	1	162392	162392	75.53	0.000
Error	10	21500	2150		
Total	11	183892			

The regression equation is
degC = 37.5 + 0.0798 time

Predictor	Coef	Stdev	t-ratio	p
Constant	37.4564	0.3959	94.61	0.000
time	0.079849	0.009092	8.78	0.000

s = 0.3303 R-sq = 90.6% R-sq(adj) = 89.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	1	8.4160	8.4160	77.13	0.000
Error	8	0.8730	0.1091		
Total	9	9.2890			