2 Pages

Math 484 Quiz 2 Fall 2016 Name___________

YOU ARE BEING GRADED FOR WORK, NOT JUST THE FINAL ANSWER.

Label	Estimate	Std. Error	t-value	p-value
Constant	-7736.26	2660.36	-2.908	0.0079
x2	0.180225	0.00503871	35.768	0.0000
x3	-1.89411	2.65789	-0.713	0.4832

Summary Analysis of Variance Table

Source	df	SS	MS	F	p-value
Regression	2	41380950140.	20690475070.	914.69	0.0000
Residual	23	520265969.	22620260.		

1) The output above was collected form 26 districts in Prussia in 1843. The goal is to study the relationship between Y = the *number of women married to civilians* in the district with the predictors x_2 = the *population* of the district and x_3 = *military women* = number of women married to husbands in the military. Do a 4 step ANOVA F test.

i) $H_0\ \beta_2 = \beta_3 = 0$ H_A not H_0 $\beta_2 + \beta_3$ at least −1

ii) $F_0 = 914.69$ fail to reject −15

iii) pval = 0

iv) reject H_0; There is an MLR relationship between # W married to civilians and the predictors pop and military W. Y and $x_2 x_3$ −4 no concl −11

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2) Dinosaur skeletons are seldomly intact. Let x_i be the length of the femur and let Y_i is the length of the humerus of the dinosaur (*Archaeopteryx*). Suppose that the least squares line for predicting Y from x is $\hat{Y} = -3.6596 + 1.1969x$. If the observed humerus length $Y_i = 92$ when $x_i = 80$, what is the residual when $x_i = 80$?

$\hat{Y} = -3.6596 + 1.1969(80) = 92.0924$ ← −15

$r_i = Y_i - \hat{Y}_i = 92 - 92.0924 = \boxed{-0.0924}$

+ −10

$\hat{Y} - Y$ −12

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Label	Estimate	Std. Error	t-value	p-value
Constant	0.117366	0.219094	0.536	0.5995
Dose	0.173551	0.286261	0.606	0.5528
LiverWt	0.00874187	0.0200852	0.435	0.6692

Summary Analysis of Variance Table

Source	df	SS	MS	F	p-value
Regression	2	0.00885691	0.00442846	0.54	0.5948
Residual	16	0.132017	0.00825105		

3) The output above was collected in an experiment in which 19 rats were injected with a *dose* of a drug approximately proportional to the rat's body weight. At the end of the experiment, the animal's *liver weight* was found, and the fraction of the response variable *drug recovered* in the liver was recorded. Do a 4 step ANOVA F test of Ho: $\beta_2 = \beta_3 = 0$.

i) H_0 $\beta_2 = \beta_3 = 0$ H_A not H_0

ii) $F_0 = 0.54$

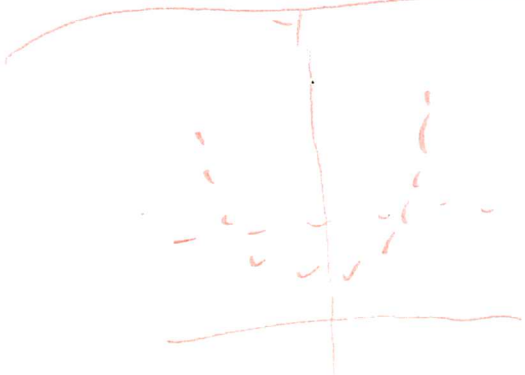
iii) pval $= 0.5948$

iv) Fail to reject H_0. There is not an MLR relationship between drug recovered and the predictors dose and liver weight.

reject H_0 −1.5

Y, x_1, x_2 −2

no concl −1



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