**STA 6166 – Fall 2012 – Exam 3 – PRINT Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Conduct all tests at  = 0.05 significance level**

Q.1. In a survey to analyze the coffee drinking habits of mean and women, a random sample of 400 males and 500 females was collected. Of the males, 200 said they drink decaffeinated coffee. Of the females, 300 said they drink decaffeinated coffee.

p.1.a. Give a 95% confidence interval for the population proportion of males who would say they drink decaffeinated coffee.

p.1.b. Is there significant evidence to indicate the population of males and the population proportion of females who would say they drink decaffeinated coffee are different? 

Q.2. An insurance company to determine if having a fire extinguisher in the kitchen had any influence on the dollar amount of damage in a kitchen fire. The selected a random sample of 300 claims where an extinguisher was present and 500 claims where there was no extinguisher present. The results were classified by the dollar amount of damage. A summary of the results in $ amount of damage:



p.2.a. Complete the table of expected values

p.2.b. Compute the Chi-square statistic and give the rejection region for testing whether the distribution of damages differs by extinguisher presence/absence (H0: No association):

Test Statistic\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Reject H0 if test statistic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q.3. A 95% Confidence Interval for the odds ratio of group1 relative to group 2 is reported as (0.80 , 0.90). The appropriate conclusion is, where pi= probability of success for population i (circle correct answer):

 p.3.i. p.3.ii. p.3.iii. 

Q.4. A researcher is investigating the relationship between use of stereo headphones and hearing loss in teenagers. She has kept records for n = 30 teenagers over a two year period and recorded X=TIME = average time spent listening per day and Y= LOSS = hearing loss for the two year period. Partial results from computer output are shown below.

The average value of TIME for the 30 teenagers was 4.0. She fits the simple linear regression model: E(Y) = 0 + 1X

p.4.a. She wishes to test whether increased TIME implies increased LOSS on average: H0: HA:

 

p.4.b. Complete the ANOVA table

p.4.b. Compute R2:

p.4.c. The fitted equation is what is the predicted value for a teenager who has listened with TIME=4.0

p.4.d. Compute a 95% Confidence Interval for the mean of all teenagers with TIME=4.0 (all numbers, no symbols):

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Q.5. In the production of a certain chemical it is believed the yield, Y, can be increased by increasing the amount of a particular catalytic agent. Twenty trials were made with different amounts of the catalyst. Analysis of the yields, measured in grams, and amounts of the catalyst, X, in milligrams gave:

‾x = 10 ‾y = 139.0 Σ(x - ‾x)2 = 500 Σ(y -‾y)2 = 895

 Σ(x -‾x)(y -‾y) = 350

p.5.a. Give estimates of the slope, intercept and variance and standard error of slope estimate.



p.5.b. Is there significant evidence the slope of the regression line is not zero? H0:  HA: ≠

Test Statistic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Reject H0 if test statistic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

p.5.c. Compute the Pearson correlation between Y and X