Quiz 3 – Stat 230

1. See cc326 –cc329 for "Comparing Two Population Proportions: Independent Samples" in "Hypothesis Test – Two Sample" of Videos-Topics In Stat 230. Note that π is the symbol for population proportion, instead of p, in cc documents and H1, not Ha, is the alternative hypothesis. State Ho and Ha before you begin the analysis.

Problem A consumer advocacy group wants to determine whether there is a difference between the proportions of the two leading automobile models that need major repairs (more than $500) within 2 years of their purchase. A sample of 400 two-year owners of model 1 is contacted, and a sample of 500 two-year owners of model 2 is contacted. The numbers x_1 and x_2 of owners who report that their cars needed major repairs within the first 2 years are 53 and 78, respectively. Test the null hypothesis that no difference exists between the proportions in populations 1 and 2 needing major repairs against the alternative that a difference does exist. Use $\alpha = .10$.

2. Chi-Sqr Independence Test. Is vaccine effective in treating MN Strain of HIV? α=.05.

7 Efficacy of an HIV vaccine. New, effective AIDS vaccines are now being developed using the process of "sieving" (i.e., sifting out infections with some strains of HIV). Harvard School of Public Health Statistician Peter Gilbert demonstrated how to test the efficacy of an HIV vaccine in *Chance* (Fall 2000). As an example, Gilbert reported the results of VaxGen's preliminary HIV vaccine trial using the 2 × 2 table below. The vaccine was designed to eliminate a particular strain of the virus, called the "MN strain." The trial consisted of 7 AIDS patients vaccinated with the new drug and 31 AIDS patients who were treated with a placebo (no vaccination). The table (saved in the **HIV1** file) shows the number of patients who tested positive and negative for the MN strain in the trial follow-up period.

	MN Strain		
Patient Group	Positive	Negative	Totals
Unvaccinated	22	9	31
Vaccinated	2	5	7
Totals	24	14	38

3. Use the appropriate calculations in SF1 – SF6 of "Videos-Topics In Stat 230" to compute F(test) = MST/MSE. Then enter the data for each treatment into EXCEL and compute the ANOVA table and compare your results. State Ho, Ha and your conclusions.

The data in the next table resulted from an experiment that used a completely randomized design.

Treatment 1	Treatment 2	Treatment 3
3.8	5.4	1.3
1.2	2.0	0.7
4.1	4.8	2.2
5.5	3.8	
2.3		

a. Use statistical software (or the appropriate calculation formulas in Appendix C) to complete the following ANOVA table:

Source	df	SS	MS	*F*
Treatments				
Error				
Total				

b. Test the null hypothesis that $\mu_1 = \mu_2 = \mu_3$, where μ_i represents the true mean for treatment i, against the alternative that at least two of the means differ. Use $\alpha = .01$.

4. Linear Regression: determine the best fit equation, y=mx+b, and the coefficient of correlation for the following data set. What is the predicted death rate for age 35?

Age	No. of Driver Death per 100,000
17.5	38
22.0	36
29.5	24
44.5	20
64.5	18