

STAT 8010 Statistical Methods I

Homework 4

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Due Date: April 14, 9:30am

Problem 1

The following contingency table contains enrollment data for a **random sample** of students from the college of Liberal Arts and Engineering at a University during the 2016-2017 academic year. The table lists the number of male and female students enrolled in each college.

(Observed)	Female	Male	Total
Liberal Arts	155	75	
Engineering	80	320	
Total			

- Let $p = \mathbb{P}(\text{Female}|\text{Liberal Arts})$ in that university. Construct a 95% confidence interval for p .
- Let $p_1 = \mathbb{P}(\text{Female}|\text{Liberal Arts})$ and $p_2 = \mathbb{P}(\text{Female}|\text{Engineering})$. Perform a hypothesis test with $H_0 : p_1 = p_2$ vs. $H_a : p_1 \neq p_2$.

- c. Use the contingency table to conduct a χ^2 test for independence from beginning to end. Use $\alpha = .01$.

Problem 2

The following information represents data gathered during an observational study of Clemson residents. The table depicts the number of people in categories based on marital status and level of happiness.

	Happy	So-So	Unhappy	Totals
Married	60	80	140	
Single	100	80	160	
Totals				

a. Calculate and fill in the row and column totals as well as the overall total.

b. Use the information above to create a table of expected counts.

	Happy	So-So	Unhappy
Married			
Single			

c. Construct a table of partial χ^2 values (a χ^2 value for each individual cell).

	Happy	So-So	Unhappy
Married			
Single			

d. What is the χ^2 value?

e. What are the degrees of freedom (df)?

f. At the $\alpha = .01$ level, what is the χ^2 critical value?

g. What is your conclusion?