Categorical Data Analysis: Final Exam – Take Home

1. The table below summarizes a study where each subject responded "favorably" or "unfavorably" to each of three drugs given to him or her. We assume that the sequence in which the three drugs are given is irrelevant and that the severity of the chronic condition that these drugs are treating remains stable during the entire study. (10 pts)

	Drug A favorable		Drug A unfavorable	
	Drug B favorable	Drug B unfavorable	B favorable	B unfavorable
Drug C favorable	6	2	2	6
Drug C unfavorable	16	4	4	6

    a. Let's first analyze the 2x2 table comparing drugs B and C when Drug A is deemed favorable (i.e., the table to the left). Conduct an appropriate test to see whether under this situation the probability of a favorable outcome with drug B differs significantly from the probability of a favorable outcome with drug C.

    b. Find a 95% confidence interval for the difference in the probability of a favorable outcome between drugs B and C .

    c. Now using the entire table and an appropriate statistical procedure, write down and then fit a model that estimates the probability of a favorable outcome with each of these three drugs. Is there a drug that you would rather not recommend? Why?

2. In the 2012 General Social Survey taken in the US, a random sample of participants was asked whether, taken all together, they felt very happy, pretty happy or not too happy and where they feel their income falls (above average, average, below average). The data obtained is given in the table below. (5 pts)
   a. What is the sampling design?
   b. Is there evidence that Happiness and Family Income are associated?
   c. Use residuals to follow up your test.

	Happiness		
Family Income	Very Happy	Pretty Happy	Not too Happy
Above Average	272	294	49
Average	454	835	131
Below Average	185	527	208

3. For a small specific subgroup of the respondents with certain characteristics that were also part of the survey, the table looked as shown below. Is there evidence of an association in this subgroup? Analyze. (5 pts)

	Happiness		
Family Income	Very Happy	Pretty Happy	Not too Happy
Above Average	2	2	0
Average	5	7	4
Below Average	1	3	8