Problem 1

The director of Gainesville Sun newspaper is studying the relationship between the type of community in which a subscriber resides and the section of the newspaper he or she reads first. For a sample of readers, she collected the sample information in the following table:

	National News	Sports	Comics
City	170	124	90
Suburb	120	130	100
Rural	130	90	88

a. At the 95% confidence level, can we conclude that there is a relationship between the type of community where the person resides and the section of the paper read first, i.e. are they dependent?

b. What is the largest chi-square value? How would you interpret this?

c. Is the number of people that read national news in rural areas greater or less than expected?

d. Is the number of people that read comics in cities greater or less than expected?

	National News	Sports	Comics	**Total**
City	170 ev 154.779	124 ev 126.772	90 ev 102.449	**384**
Suburb	120 ev 141.075	130 ev 115.547	100 ev 93.378	**350**
Rural	130 ev 124.146	90 ev 101.684	88 ev 82.173	**308**
Total	**420**	**344**	**278**	**1042**

Expected Value = (Row total * Column Total)/grand total

A

Chi Square Test of Independence:

Alpha = 0.05

Null Hypothesis: There **IS NOT** a relationship between type of community and section of newspaper first read

Alternative Hypothesis: There **IS** a relationship between type of community and section of newspaper first read

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

x^2 = 10.527576

degrees of freedom = (3-1)*(3-1) = 4

Using a x^2 calculator and 4 degrees of freedom the P Value is 0.0324

Since the P Value < Alpha (0.0324<0.05) **reject the null hypothesis** and we can conclude that there is a 95% confident relationship between community and what section of the paper is read first

B

Largest Chi Squared is Suburban National News with a x^2 of 3.1483. This means that this has the largest difference between the observed value adjusted for things like relative size and positive and negative

C

The number of rural readers is higher than expected because the expected value is 124.1 versus the actual number being 130

D

The number of people who read comics in the city is less than expected because there were 102.4 people expected and only 90 readers

Problem 2

The Federal Correction Agency is investigating whether a male released from a prison make a different adjustment to civilian life if he returns to his hometown or if he goes elsewhere to live? To put it another way, is there a relationship between adjustment to civilian life and place of residence after release from prison? The counts are given in the following contingency table:

		Adjustment to Civilian Life			
		Outstanding	Good	Fair	UnSat.
Residence after release	Hometown	27	35	33	25
	Not Hometown	13	15	27	25

At 99% confidence can we conclude that adjustment to civilian life and residence after release are dependent?

	Outstanding	Good	Fair	Unsatisfying	**Total**
Hometown	27 ev 24	35 e 5.72916667 v 30	33 ev 36	25 ev 30	**120**
Not Hometown	13 ev 16	15 ev 20	27 ev 24	25 ev 20	**80**
Total	**40**	**50**	**60**	**50**	**200**

Null Hypothesis: There is **not** a relationship between adjustment to civilian life after release and residence

Alternative Hypothesis. There **is** a relationship between adjustment to civilian life after release and residence

Alpha: 0.01

X^2 : 5.7291667

Degrees of Freedom = 3

p-val: 0.028503

Since the P value is greater than alpha, fail to reject null hypothesis and cannot conclude that adjustment to civilian life and residence after release are dependent