STAT 112: Homework Goodness-of-Fit and Contingency Tables

1. A family planning counselor believes on the basis of her many interviews that the numbers of children women want differ according to the sizes of the families from which they come. She randomly surveys newly married people and obtains the following results.

	Number of Children Desired				
Size of Family	0	1	2	3	4 or more
1	8	14	13	20	15
2	8	10	9	5	8
3	5	8	8	11	5
4 or more	7	9	10	12	5

   Is there a relationship between the number of children desired and the size of the family from which the married women come at a .05 level of significance?

2. The U.S. Association of Pediatrics (U.S.A.P.) recommends that the breast feeding of infants for a variety of reasons. The association wants to educate mothers as to the benefits of breast feeding. To determine where the major effort of its educational campaign should be directed, the association needs to determine whether the decision of a mother to breast feed is related to her economic level. The following set of data was obtained from interviewing 234 mothers.

	Economic Class			
	Poverty	Low	Middle	Upper
Bottle	30	54	11	12
Breast	7	18	19	29
Bottle and breast	5	23	7	19

   Is there a relationship between the kind of feeding and the mother's economic class at a .05 level of significance?

3. In an experiment to study the dependance of hypertension on smoking habits, the following set of data was obtained from 180 people.

	Non-smokers	Moderate Smokers	Heavy Smokers
Hypertension	21	36	30
No Hypertension	48	26	19

Test the hypothesis that the presence or absence of hypertension is independent of smoking habits. Use a .05 level of significance.

4. Two groups of people were chosen at random, one from the east coast and one from the west coast of the United States, and each person is classified as Protestant, Catholic, or Jewish. The observed frequencies are presented in the following table. Test the hypothesis at $\alpha = .05$ that the distribution of people according to religion is independent of geographic area.

In the following tabulation of the data, the original frequencies are at the bottom of each cell; the expected frequency is in the upper right hand corner within parentheses; and the contribution to the chi-squared test statistic is in the upper left corner.

	Protestant	Catholic	Jewish
East Coast	1.905 (182)	(210.6) 215	1.2302 203
West Coast	2.92 (134.2) 154	.1378 136	(125.2) 110

Find the following:

(a) Complete the table by filling in the blanks.

(b) X^2=

(c) Degrees of freedom=

(d) The appropriate X^2 quantile=

(e) Give your decision with justification.

5. The distribution of colors of 400 M & M's is as follows:

Color	Blue	Brown	Green	Orange	Red	Yellow
Mars Distribution	.30	.20	.20	.10	.10	.10
Observed	84	79	105	49	36	47

Test the hypothesis, at the .05 level of significance, that the distribution of colors follows the Mars distribution.