

Problem 1

In the paper "Color Association of Male and Female Fourth-Grade School Children", children were asked to indicate what emotion they associated with the color red. The response and the sex of the child are noted and summarized below.

	Anger	Happy	Love	Pain	Row totals
Females	27	19	39	17	102
Males	34	12	38	28	112
Column totals	61	31	77	45	

1. State the null hypothesis.
2. Under a suitable null hypothesis, what is the expected frequency for the cell corresponding to Anger and Males?
3. Under a suitable null hypothesis, the rounded expected frequency for the cell corresponding to Pain and Males is 24. What is their contribution to the chi-square test statistic?
4. Suppose the chi-square value for this test was 4.629. What is our conclusion?

Problem 2

The percentage of adults across the country who drink occasionally is expected to be between 0.3 and 0.7. A survey was conducted to determine the true proportion p of adults across the country who drink beer, wine, or hard liquor at least occasionally. How many adults should be sampled in order to estimate p within ± 0.025 with 95% confidence?

Problem 3

In 2001, 29% of Fictional County motorists said that fuel efficiency was the most important factor in their choice of a car. For her statistics project, Amber set out to prove that the percentage has decreased. She interviewed 870 motorists in a systematic sample of those registering vehicles at the DMV, and 284 of them said that fuel efficiency was the most important factor in their choice of a car. Test her hypothesis, at the 1% significance level.