STAT 310 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Homework 11 (30 pts)  
Spring 2011  
**Due: Monday, April 18**

1. Suppose that five candidates have just entered the race for mayor of a large city. To determine whether any of the candidates has an early lead in popularity, a poll is conducted. Two-thousand voters are asked to indicate the candidate they prefer. A summary of their responses is shown in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CANDIDATE | I | II | III | IV | V |
| Frequency | 385 | 493 | 628 | 235 | 259 |

1. Do the data provide sufficient evidence to indicate a preference for at least one of the five candidates? State your final conclusion in words, and include a p-value to support your conclusion. (4 pts)
2. Candidate III, who clearly has the early advantage based on our sample, would like a range of values that is very likely to reflect the actual proportion of voters who prefer her. Construct and interpret such an interval. (4 pts)
3. A story describing an alleged date rape was read by 352 high school students. To investigate the effect of the victim’s clothing on subject’s judgment of the situation described, the story was accompanied by either a photograph of the victim dressed provocatively, a photo of the victim dressed conservatively, or no picture. Each student was asked whether the situation described in the story was one of rape. Data from the article “The Influence of Victim’s Attire on Adolescent Judgments of Date Rape” (*Adolescence* [1995]: 319-323) are given in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Picture | | |
| Response | Provocative | Conservative | No Picture |
| Rape | 80 | 104 | 92 |
| Not rape | 47 | 12 | 17 |

1. Create a mosaic plot for these data. Your solutions must include this plot. (2 pts)
2. Find the proportion who believe that the story described a rape for each of the three different photo groups. (2 pts)
3. Is there evidence that the proportion who believe that the story described a rape differs for the three different photo groups? (4 pts)
4. A study was carried out to investigate whether 4-year-olds would cheat more frequently in turn-taking than would 6-year-olds. The researcher watches and records whether each child cheats on turn-taking during 10-minute samples of playtime for fifteen 4-year-old and fifteen 6-year-old children. The researcher summarized the data as follows:

|  |  |  |
| --- | --- | --- |
|  | AGE OF CHILD | |
| CHEATED? | 4-years-old | 6-years-old |
| Yes | 9 | 6 |
| No | 6 | 9 |

1. Create a mosaic plot for these data. Your solutions must include this plot. (2 pts)
2. Find the proportion who cheated in each age group. (2 pts)
3. Is there evidence that the proportion who cheated differs for the age groups? Use a chi-square test to investigate, and report your p-value and your conclusion. (4 pts)
4. Is there evidence that the proportion who cheated differs for the age groups? Use Fisher’s exact test to investigate, and report both your p-value and conclusion. (4 pts)
5. Suppose that instead of recording the *number of kids* who cheat (and don’t cheat) in each age group, the researcher watches and records *the number of violations* of turn-taking observed. Suppose there were 19 occurrences of cheating for 4-year-olds and six for 6-year-olds; furthermore, there were six 4-year-olds that didn’t cheat, and nine 6-year-olds that didn’t cheat (as shown below). Explain why it is not appropriate to analyze the data in this way. (2 pts)

|  |  |  |
| --- | --- | --- |
|  | AGE OF CHILD | |
| CHEATING | 4-years-old | 6-years-old |
| Occurrences | 19 | 6 |
| Nonoccurrences | 6 | 9 |