

STAT511 HW #9

Reading: Read Chapter 10 of Ott & Longnecker.
See Canvas Calendar for due date.

NOTE: This assignment will be discussed in class before Exam2. You should complete it before Exam2, but it may be turned in anytime up to the due date. Grading will be just a check-off (i.e. full credit for anything that looks reasonable).

25 points Total

1. An investigator is interested in estimating the proportion of cats (over age 7) suffering from diabetes. The investigator would like to have a 95% ME of **10% or less**. Answers should be based on the large sample normal approximation.
 - A. Using a conjectured proportion of 0.20, what sample size is required?
 - B. Without using the conjectured proportion from above, what (maximum) sample size is required?
2. The Cartoon Network conducted a nation-wide survey to assess viewer attitudes toward Superman. Using a simple random sample, they selected 400 boys and 300 girls. Forty percent of the boys stated that Superman is their favorite cartoon character, compared to thirty percent of the girls.
 - A. Calculate the **90%** confidence interval for the true percent difference in viewer attitude between the boys and the girls using the normal approximation.
 - B. Based on the CI from A, is there a difference in attitude between the boys and girls? Provide justification for your response.
 - C. Using $\alpha=0.10$, run a **two-sided** test comparing the proportion of boys vs girls that select Superman as their favorite character. Give your test statistic, p-value and conclusion.
3. This is problem 10.31 in the 6th edition of O&L. Does weather affect the occurrence of violent crimes? Sociologists have long debated whether certain atmospheric conditions are associated with increases in the homicide rate. A researcher classified 1500 homicides in the southwest US according to the season in which the homicide occurred.

	Winter	Spring	Summer	Fall
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- A. Test the hypothesis that the homicide rates are equal among the four seasons using $\alpha = 0.05$ level. State your hypotheses, test statistic, p-value and conclusion.
- B. Calculate the Pearson residuals and state any conjectures that arise from these residuals.

4. An experiment involving subjects with schizophrenia compared “personal therapy” to “family therapy”. Only 2 out of 23 subjects assigned to the personal therapy group suffered psychotic relapses in the first year of the study, compared to 8 of the 24 subjects assigned to the family therapy group. The investigators were interested in testing the null hypothesis that the relapse rate is the same for personal and family therapies.
- A. Report the test statistic and p-value from the chi-squared test.
 - B. Report the p-value from Fisher’s Exact test.
 - C. Which test is appropriate for this data? Justify your response.