

HW 5: One Proportion CI and Hypothesis Testing

Instructions: Work must be shown to receive full credit. You may work with others on the homework, but you must write and turn in your own copy. **This does not mean that you can simply copy someone else's work!!** Also, make sure your homework is neat, stapled, and all answers are written in complete sentences!! Come and see me if you have any questions.

On problems that require the use of R, PLEASE give me the RELEVANT R code and output to for each problem so I can assess partial credit. I may take off for including unnecessary R output. If one problem refers back to output from another problem, make sure to cite that output in your answer. Incorrect one-sentence answers will get little or no credit.

NOTE: If a problem asks you to perform a hypothesis test, make sure to give the hypotheses, test statistic, p-value, and a conclusion in the terms of the problem. Also, if the problem asks you to perform a confidence interval, make sure to interpret the confidence interval.

“By Hand” Problems: For hypothesis tests, you may use R to find the p-value. For confidence intervals, you may use R to find the multiplier.

1. A random sample of 1000 men was selected. Out of those surveyed, 123 of them said they used exercise to relieve stress.
 - (a) Determine what confidence interval is most appropriate. Justify your answer.
 - (b) Construct the most appropriate 99% confidence interval for the population proportion of men who use exercise to relieve stress.
 - (c) Interpret the interval from (b).
2. A sports trainer randomly selected 36 injuries and found that 17 of them occurred during football practice.
 - (a) Determine what confidence interval is most appropriate. Justify your answer.
 - (b) Construct the most appropriate 90% confidence interval for the true percentage of football injuries that occur during practice.
 - (c) Interpret the interval from (b).
3. Some friends were designing their own Minute-to-Win-it type game for game night. They were curious if the challenge would be completed less than 25% of the time. To answer this, the challenge was performed twenty five times and with five successful completions.
 - (a) State the most appropriate hypothesis test for the setting.
 - (b) State the hypotheses of the test.
 - (c) Calculate the test statistic.

- (d) Calculate the p-value.
 - (e) Interpret the p-value.
 - (f) State your conclusion.
4. Social scientists are interested in studying the diversity represented in day to day living. In 1995, 35% of households said they had a person of a different race over for dinner. One researcher is curious if that has increased in the last ten years. In 2005 the GSS asked “Has anyone of a different race recently come to your home for a family dinner?” Out of 1,006 respondents 40% said ”Yes”.
- (a) State the most appropriate hypothesis test for the setting.
 - (b) State the hypotheses of the test.
 - (c) Calculate the test statistic.
 - (d) Calculate the p-value.
 - (e) Interpret the p-value.
 - (f) State your conclusion.

“R” Problems:

5. In a random sample of 1500 heads of households, 921 responded that they owned their homes. Using **R**, calculate the most appropriate 95% confidence interval for the proportion of households that own their home. Be sure to interpret the interval.
6. In a random sample of 30 children, 17 said they often have a snack after school. Using **R**, calculate the most appropriate 90% confidence interval for the proportion of children who often have a snack after school. Be sure to interpret the interval.
7. In 2012, 31% of Americans were “not at all interested” in international and foreign policy issues. Given the current climate, has the proportion who are uninterested in foreign policy changed? A random sample of 1,000 American adults resulted in 210 that are uninterested.
- (a) State the most appropriate test.
 - (b) Perform the test in **R**.
 - (c) Provide a complete write-up of the results.
8. Most people love chocolate. I think this is a fact. However, can we say that more than 90% of people like chocolate? A random sample of 18 adults found that 17 like chocolate. Does this give us evidence for our hypothesis?
- (a) State the most appropriate test.
 - (b) Perform the test in **R**.
 - (c) Provide a complete write-up of the results.