**Problem Set 4**

This problem set covers material from class on Friday July 17, Tuesday July 21, Wednesday July 22, and Thursday July 23, including material from OIS Sections 6.2, 6.3, and 7.1-7.4. It makes use similar data to that we discussed in class. Partial credit may be given for answers that are correct in part, but not in full. As a reminder, you are allowed to work with others, but your answer should be your own. What that means is that on problems that require you to write interpretations or responses, you should make sure that you and those you work with do not provide answers that are constructed similarly. This problem set is due at 11:59 pm on July 23.

**Part I: Rasmussen vs. Rasmussen 2 (25 pts.)**

In addition to the approval rating numbers we used in class, both Rasmussens also recently came out with numbers for the presidential race.

These poll results are summarized below:

* Rasmussen Reports: Joe Biden 47% Donald Trump 44%, 2500 likely voters.
* RMG Research (Scott Rasmussen’s firm): Joe Biden 46% Donald Trump 39%, 1200 LVs.

1. For this question, we are going to focus on Donald Trump’s support in these two polls.
   1. Please calculate and interpret the 95% confidence interval for the difference in Trump’s support in the two polls. Please show your work. Does there appear to be a significant difference between the two polls? How do you know? (For this problem, you can assume that the necessary conditions have been met and you can set aside that polls have a slightly different sample.) (10 points.)
   2. Now please calculate the z-score for the difference in Trump’s support in these polls and then find and interpret the associated p-value. Please show your work for the z-score and explain how you got the p-value. (15 points.)

**Part II: A “Tea” Test (30 pts.)**

Following the 2008 Election, a conservative movement known as the Tea Party rose up in opposition to President Obama. While their influence has since [waned](https://apnews.com/64b634a91a2d4933b8bca4c95baa1309), the caucus had significant influence following the 2010 Election. In this section, you will be working with data from the 2016 [American National Election Study](https://electionstudies.org/).

1. In the 2016 ANES, respondents were asked after the election to rate the Tea Party on a scale from 0 to 100, where 0 indicates that they have very cold feelings towards the Tea Party and 100 indicates they have very warm feelings towards the group. The mean rating for the Tea Party after the election was 44.52, the sample standard deviation was 26.09, and 3,514 respondents answered that question.
   1. Please find and interpret a 95% confidence interval for the mean feeling towards the Tea Party in the 2016 ANES. Please explain how you found your t-critical value. Does this t-distribution closely approximate a normal distribution? Why? (10 pts.)
   2. Let’s say that your null hypothesis was that the mean rating of the Tea Party was 50. Find a t-score and p-value at the 95% confidence level to test the alternative hypothesis that the mean rating for the Tea Party is different from 50%. Please show your work, interpret your p-value, and explain how you found the p-value. (10 pts.)
   3. Let’s imagine that the same 3,514 respondents had also been asked their views on the Tea Party before the election and their mean response had been 47.47. Also, imagine that the standard deviation for the difference in support before and after the election is 15. Conducting a paired t-test, provide evidence to suggest whether there is a significant difference (using the 95% confidence level) in views on the Tea Party before the election and after the election? Please show work and interpret your p-value. (10 pts.)

**Part III: The (Blue) Dog Days of Summer (45 pts.)**

In class this week, we are reading sections of Andrew Clarke’s honors thesis on the Blue Dog Caucus. In this section, you will be conducting several analyses that replicate tests he ran a decade ago on earlier Congresses.

1. The Blue Dog Caucus has a reputation for fiscal conservatism. The National Taxpayers Union (NTU) puts out scores each year that measure ["the way that members of Congress vote for taxpayers."](https://www.ntu.org/ratecongress) (25 pts.)
   1. In class, we looked/will look at NTU ratings for 2019 among members of the current Congress. Here we are interested in looking at NTU ratings for members who received an NTU rating in 2018 (i.e., members who are not currently in their first term.) In 2018, the mean NTU rating for the 17 Blue Dogs who are in the current Congress was 20.29 and the standard deviation was 10.79. In contrast, the mean NTU rating for the 151 non-Blue Dogs are in the current Congress was 6.32 and the standard deviation was 3.71. Please calculate and interpret the 95% confidence interval for the difference in mean NTU score for Blue Dogs and non-Blue Dogs. Please show your work. (10 pts.)
   2. Please find the t-score and p-value and discuss whether there is evidence to suggest a difference in mean NTU score for Blue Dogs and non-Blue Dogs. Please show your work, explain how you found the p-value and interpret the p-value. If you did a one-sided test, would you have enough evidence to suggest that the average score for Blue Dogs is higher than that of non-Blue Dogs? (10 pts.)
   3. Please compare your results to what Andrew Clarke found when he conducted a difference of means test for NTU scores in the 104th to 110th Congresses. What similarities and differences exist here in terms of the level of NTU scores and hypothesis test results? (5 pts.)
2. Clarke used Chi-Square Tests to look at the makeup of “prestige” committees in Congress to see whether Blue Dogs were overrepresented on these committees. (20 pts.)
   1. Below is a table of membership on the Ways and Means Committee in the current Congress. Please conduct a Chi-Square Test to determine if Blue Dogs are overrepresented. Please show your work and interpret your p-value. (15 pts.)

|  |  |  |
| --- | --- | --- |
|  | Non-Member | Member |
| Non-Blue Dog | 189 | 21 |
| Blue Dog | 23 | 3 |

* 1. Should you be cautious in interpreting your results of this test? Why? (5 pts.)