Chapters 20 - 25 : Optional Inference Practice Problems

These are optional problems for you to use to practice. <u>If</u> you choose to complete these BEFORE class on Tuesday December 5, 2017, you may come to class on Tuesday to share results and talk about these problems with your classmates.

<u>Instructions:</u> For each of the following problems, state a research question, state a plan for answering that research question, check the appropriate conditions for inference (including graphical and numerical data analysis), perform the appropriate inference procedure and state a well written conclusion for your question. Note: some of these are small samples for ease of calculation.

<u>Question 1:</u>   A car company advertises that their 2015 model cars get an average of 35 mpg. A consumer testing company randomly selects 15 cars and finds the following average gas mileages for the cars: 23, 29, 36, 30, 19, 31, 41, 20, 33, 39, 28, 29, 30, 46, 34. Does this data support the company's advertised claim for fuel consumption?

<u>Question 2:</u> In January 2014, The Pew Research Center surveyed 354 US adults who classified themselves as Republicans and 477 US adults who classified themselves as Democrats to determine if "Dealing with the nation's energy problem" is a top priority. 152 of the Republicans answered "yes" it is a top priority and 229 Democrats answered "yes" it is a top priority. Do these results support the statement that among all US adults, a greater proportion of Democrats place a high priority on dealing with the nation's energy problem?

<u>Question 3:</u> For a class project, a Wake Forest student posted a poll on his LinkedIn page asking college students to respond with information about their use of credit cards. A total of 1014 college students from across the US responded to the poll and 213 of them reported that they do not have any credit cards. Estimate the proportion of US college students who do not have any credit cards.

<u>Question 4:</u> A quality control specialist at the m&m's factory needs to estimate the average weight of the m&m's in small individual packages of milk chocolate m&m's. The specialist chooses a SRS of of 16 bags of m&m's packaged by the factory and weights them. She records the following weights (in ounces): 3.27, 3.25, 3.19, 3.30, 3.35, 3.21, 3.32, 3.29, 3.22, 3.10, 3.31, 3.26, 3.24, 3.16, 3.25, 33.2. Based on this data, estimate the average weight of the m&m's in the small individual packages.

<u>Question 5:</u> A spinner is made by dividing a circle into 4 equal sections and attaching a pointer. The results of 117 spins are listed below. Is this a fair spinner?

4	3	2	2	1	4	2	3	2	1	2	3	3
3	1	3	4	3	2	1	1	4	3	4	1	4
4	4	1	3	2	4	3	3	3	4	4	1	1
3	3	4	4	3	3	4	3	2	3	1	2	4
3	2	4	1	3	2	4	1	3	4	3	4	2
4	2	3	2	4	1	3	2	4	2	3	4	3
1	3	2	4	1	3	1	4	1	3	2	3	1
2	3	4	4	3	2	1	2	3	4	4	3	2
3	4	3	4	2	1	3	4	2	3	4	1	3

Question 6: The Pew Research Center for The People and The Press surveyed US adults in November 2012 and November 2013 to ask about their approval of the way President Obama was handling his job. In November 2012, 827 out of 1503 surveyed indicated that they approved of the way the President was handling his job. In November 2013, 822 out of 2003 surveyed indicated that they approved of the way the President was handling his job. Estimate the decline in the proportion of those who approved of the way the President was handling his job from November 2012 to November 2013.

Question 7: Black and Gold, Inc. is considering the purchase of a new computer system. In order to make a decision, a random sample of 15 jobs was selected and the processing time in minutes was recorded for computer system A and computer system B. The results are in the table below. Is the difference in processing time significant?

Job #	Computer A	Computer B
1	19	16
2	22	24
3	10	7
4	9	8
5	16	20
6	22	17
7	12	9
8	10	13
9	25	20
10	14	18
11	32	30
12	11	14
13	23	19
14	24	18
15	8	5

Question 8: A local entrepreneur is interested in the relationship between pizza delivery orders and type of housing for college students. He hires a marketing firm to poll students who live in Greek housing, independent housing, theme housing and freshman dorms to determine how many ordered pizza for delivery at least once in the last week. The results are below. Does it appear that there is a relationship between the type of housing for college students and pizza delivery orders?

	Greek	Independent	Theme	Freshman
Ordered pizza	76	83	27	39
Did not order pizza	44	67	38	36

Question 9: A national research organization surveys 703 NC adults, selected at random from all NC adults. Of those surveyed, 186 indicate that they would strongly support a national insurance plan paid for by the federal government that would pay most medical and hospital costs for citizens. Estimate the percentage of all NC adults who support such a national insurance plan.