1.4

a.) The main question of this research study is: will the implementation of the Buteyko method improve the quality of life for asthma patients?

b.) The subjects of the study are 600 asthma patients.

c.) The variables of this study are quality of life, activity, asthma symptoms, and medication reduction. All variables are numerical and discrete because they are all scored on a scale from 1 to 10.

1.12

a.) The variables used in creating the visualization are percentage of “yes” roll calls on each issue, country, issue, and year.

b.) Percentage of “yes” role calls for each issue is a continuous numerical variable. Country is a nominal categorical variable. Issue is a nominal categorical variable. Year is a discrete numerical variable.

1.34

a.) This study is an experiment.

b.) The treatment group is the group that will exercise twice a week and the control group is the group that will not exercise.

c.) This study does make use of blocking. The blocking variable is age.

d.) No, the study does not make use of blinding; no placebo or other method is used to ensure participants do not know which group they are in. Also, researchers are not blinded and will know which group each participant belongs to.

e.) The experiment follows three of the four principles of experimental design: controlling, randomization, and blocking. The practice of evaluating the mental health of each subject before and after the study, while including the three principles mentioned above in the design supports the case that the study could be used to establish a causal relationship. However, the fourth principle, replication, is not accounted for in the description of the study. Without knowing if the study included a sufficiently large sample size, it is difficult to say that the results definitely prove or disprove a causal relationship and can be applied to the population at large. Additionally, there are several other lifestyle factors that may contribute to mental health that are not accounted for.

f.) The study proposal does not include any consideration for participants’ chronic mental illness that may affect the results of the study.

2.16

a.) The distribution would be right skewed. The lower 25% of houses cost less than $350,000 and 50% of house cost less than $450,000, while the upper 25% of houses cost between $1,000,000 and above $6,000,000. This information suggests there will be a long tail on the right side of a histogram representing the data. Due to the skew in the distribution, the median and IQR would best represent a typical observation and the variability of observations, respectively.

b.) The distribution would be symmetric. The equal difference between the third quartile and the 50th percentile and the 50th percentile and the first quartile suggest the distribution would be symmetric. Also, because there is only a few observations that over $1.2 million, the data is not likely to be skewed like in part a. The mean and standard deviation would best represent a typical observation and the variability of observations, respectively, because the data is symmetrically distributed.

c.) The distribution would be right skewed. Most students are under 21 and have no drinks while only few drink alcohol excessively, so the distribution will have a long right tail. Median and IQR will best characterize the data because of the skew.

d.) The distribution will likely be symmetric if only a few employees earn significantly higher salaries than the rest of the employees sampled. With a symmetric distribution, mean and standard deviation will best represent the data.

2.22

a.) (372 / 910) \* 100% = 40.88% conservative

b.) (278 / 910) \* 100% = 30.55% in favor of citizenship

c.) (57 / 910) \* 100% = 6.26% of conservatives favor citizenship

d.) Conservative voters in favor of citizenship = (57 / 372) \* 100% = 15.32%

Moderate voters in favor of citizenship = (120 / 363) \* 100% = 33.06%

Liberal voters in favor of citizenship = (101 / 175) \* 100% = 57.71%

e.) Political ideology and views on immigration do not appear to be independent. Based on the percentage of voters who support citizenship in each ideology group, it is apparent that views on immigration will be heavily impacted by the voter’s ideology.