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Math 171-09 Written Paper 2

10/28/18

For our written paper we decided to choose column A, which questioned “Do you consider yourself to be more of a dog person, cat person, both, or neither?” Our specified characteristic of interest we chose was if people in the sample considered themselves to be a dog person. The sample proportion from our sample size of 67 was .63 of the sample considered themselves to be a dog person, rather than a cat person, both, or neither. The type of data that this is in our sample size of 67 is qualitative. This is because the data we were observing was based off of that person’s personal opinion, rather than a numerical data set.

A Binomial Population accounts for the people that have a specified characteristic of interest within a proportion of a population and those who do not. Since this survey was conducted on only students who are taking Math 171 this semester we could view this population as a binomial proportion. By viewing the Math 171 students as the proportion of students who considered themselves to be dog people versus those who do not. We cannot calculate the population proportion for this because we do not have the data needed to conduct these calculations. However in order to do so in this example we would need to take all of the people who considered themselves dog people from the total population of students taking the survey in Math 171 divided by the total population of Math 171 students.

To compute the 95 percent Confidence Interval by hand you would have to first use the corresponding z value, which for 95 percent is equal to 1.96. Next you would take the p hat or estimator, which in this example is our .63 or the people who consider themselves to be dog people. Then you can use that p hat value and subtract it from one to find the q hat value, which is the people who are not dog people. To then set up your equation you would take .63 plus and minus your z-value, which for 95 percent is 1.96, multiplied by the square root of p hat times q hat divided by the sample size, being 67. To then compute the 99 percent Confidence Interval you repeat the same formula except the z-value would change to match the 99 percent Confidence Interval. For the 99 percent Confidence Interval the corresponding z-value will be 2.58. To calculate the 95 percent Confidence Interval using the graphing calculator you would first go to STAT then scroll over to TEST, then scroll down until you get to A: 1-PropZInt. You would then plug in your number (x) of specified characteristic of interest. Then plugging in your n, which is the sample size of 67 and finally your C-Level, or confidence interval which for this case is .95. For the 99 percent Confidence Interval in the graphing calculator you would repeat the same procedure except changing the C-Level to .99. Then once you press Calculate your confidence intervals will appear.

The 95 percent Confidence Interval for our population proportion would be (.51, .74). The interpretation of this Confidence Interval can be concluded that we are 95 percent sure that the p is in between that confidence interval. For the 99 percent Confidence Interval for the population proportion would be calculated as (.47, .78). We could also conclude here that we are 99 percent sure that p in is the confidence interval. After examining both of our confidence intervals we were surprised by the results. For instance the 95 percent Confidence Interval had a smaller range, while the 99 percent Confidence Interval had a broader range. We originally thought that these results would be the opposite, but after further examinations we have concluded that it would make more sense for the 99 percent Confidence Interval to have a broader range when compared to the 95 percent Confidence Interval. This is because with the broader range it is more likely that the p value will be in that interval. While with the 95 percent Confidence Interval there was a smaller range, meaning there is less of a chance that the p value would be within that interval. We also observed that the changes in intervals from 95 percent to 99 percent increased on the upper interval by .04 while decreasing on the lower interval by .04.