Hannah Ramey and Heather Waldo

Math 171-09 Written Paper 3

11/26/18

For this written project we choose column C, which asked, “What is the perfect temperature?”. We are given a sample size of thirty that has been randomly selected from the three hundred Math 171 students that took the survey at the beginning of the year. We were able to calculate the sample mean value and sample standard deviation value by putting our data into the calculator under L1. Our sample mean was 72.7 and our sample standard deviation was 6.199. To find the Null Hypothesis we had to use the assumed population mean given, which for column C is 75. So our Null Hypothesis is H0: μ = 75 and the Alternative Hypothesis was Ha: μ > 75. Based on our Alternative Hypothesis, our Hypothesis Test is one tailed and is going to the right.

To find the test statistic z that corresponds to the sample mean value we used the calculator. To do so we first went to Stat, then TEST, and then 1) Z-Test. We then plugged in x-bar, μ, standard deviation, and n. Once we plugged in our values and pressed, calculate, our test statistic was z = -2.03. To find the p-value we simply repeated the same process above and came to the conclusion that p = .9789. Our p-value is greater than the alpha, which is 0.05. Next, we found the Critical Value/ Rejection Region to be 1.645. We found this in the calculator by going to 2nd Vars, 3) invNorm, and then entered into the area section 1-.05. We left μ = 0 and standard deviation = 1 since we are finding a z-value. Since our Alternate Hypothesis is to the right, we had to then find the area to the right, which is why we plugged in 1-.05, instead of just .05 which would have given you the area to the left. Our test statistic z was not in the rejection region. We can tell that our test statistic z was not in the rejection region because with the rejection region being 1.645 and our test statistic z being -2.03, which is less than that. In order to be in the rejection region the test statistic z had to be greater than the rejection value since our Alternative Hypothesis was to the right.

Using the P-value approach to find a conclusion we can not reject the Null Hypothesis, in other words we accept the Null Hypothesis. We come to this conclusion because our p-value was 0.9789 and the alpha = 0.05, so the p-value is much greater than the alpha. Since the p-value is greater than the alpha we cannot reject the Null Hypothesis. In the Critical Value/ Rejection Region approach, using alpha = 0.05, we again cannot reject the Null Hypothesis. This is because the test statistic value is not in the rejection region.

From our results above we observed that the same results were found for both the P-value approach and the Critical Value/ Rejection Region approach. We did expect to find these results to be exactly the same, since we have discussed both of these approaches in class many times. From this, you can pick whichever approach you like better and find the same answer either way. Of these two approaches we preferred to use the P-value approach to get to this conclusion. This is because you most likely always have to start off by finding the test statistic z in the calculator, which is how we prefer to find that. Once we find the test statistic z in the calculator, the p-value also shows up on the same window with the answer right there. So once you have the p-value then you can just look at the alpha value and determine your results based on if it is greater than or less than the alpha. If the p-value is less than the alpha we can reject the Null Hypothesis. So we think it is a lot faster and more convenient to use this approach rather than the Critical Value/ Rejection Region approach.

However, sometimes if the question also asks for the critical values then it would then be just as easy to use this approach. This is because once you have the critical values then all you have to do is determine if the test statistic z is in the rejection region. With the rejection regions being when the test statistic z is greater than or less than those regions. If the test statistic is in the rejection region then we can reject the Null Hypothesis.