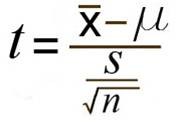
1. For this question, I will be using the One Sample T-test because it tests the mean of a single group against a known mean. In this question, 2160 is the mean of 20 selected light bulb and 2000 is the known population mean. I am not using Z-score because it requires the known information on the population mean, population standard deviation, the sample mean and the sample size. I don’t have any information on the population standard deviation; therefore I chose T-test.
2. Ho: μ > 2000

Which means the average life of the light bulbs produced by the factory is less than 2000 hours

Ha: μ ≥ 2000

Which means the average life of the light bulbs produced in the factory is at least 2000 hours (manufacturer’s claim)

With the information given, we know that the sample mean(x̄) is 2160, the population mean(μ) is 2000, the sample standard deviation(s) is 142 and the sample size(n) is 20. So we use the t statistic (also called t-stat, t-score or t-value) formula which is to get our t-stat, which is 5.04

T-stat approach:

With the significance level(α) of 0.05, we go to the t-table to look at its critical value at d.f. = 19. We get 1.70. Since 5.04 > 1.70, meaning that the sample mean (2160) falls into the rejection area. Therefore, we will reject the null in favor of the manufacturer’s claim.

P-value approach:

Since our t-stat is 5.04. With 19 degrees of freedom, we know that the p-value for a significance level of 0.0001 is 4.XXX. Therefore, we know that the p-value for 5.04 is even smaller than 0.0001, which confirms the rejection of the null in favor of the manufacturer’s claim.

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