In-Class Assignment 14

For this problem, we will use the mtcars dataset.

1. Examine the qsec field in the dataset. Calculate its mean and standard deviation.

    1. mean(mtcars$qsec)
    2. sd(mtcars$qsec)
    3. [1] 17.84875
    4. [1] 1.786943

2. What is the standard error?

    sd(mtcars$qsec)/sqrt(length(mtcars$qsec)) =0.3158899

3. Construct a 95% confidence interval for the mean of the qsec field. Then, construct a 99% 1-sided confidence interval (lower limit). What would the result be for the 99% confidence interval if you used a normal distribution in place of the t-distribution?

- LCL <- mean(mtcars$qsec) + sd(mtcars$qsec)/sqrt(length(mtcars$qsec)) *qt(0.025, mean(mtcars$qsec) - 1)
- UCL <- mean(mtcars$qsec) + sd(mtcars$qsec)/sqrt(length(mtcars$qsec)) *qt(0.975, mean(mtcars$qsec) - 1)
- UCL
- LCL
- [1] 18.51568
- [1] 17.18182
- mean(mtcars$qsec) + sd(mtcars$qsec)/sqrt(length(mtcars$qsec)) * qt(0.01,mean(mtcars$qsec) -1)
- 17.03713
- qnorm(0.01, mean(mtcars$qsec), sd(mtcars$qsec)/sqrt(length(mtcars$qsec)))
- 17.11388

4. Construct 95% lower- and upper-confidence intervals (1-sided).

LCL <- mean(mtcars$qsec) + sd(mtcars$qsec)/sqrt(length(mtcars$qsec)) *qt(0.025, mean(mtcars$qsec) - 1)

UCL <- mean(mtcars$qsec) + sd(mtcars$qsec)/sqrt(length(mtcars$qsec)) *qt(0.975, mean(mtcars$qsec) - 1)

UCL

LCL

[1] 18.51568

[1] 17.18182

5. How large would the sample size have to be if a 99% confidence interval were to be 0.2 seconds wide?

it would be the size of the population which in this case is equal to 32.