

1. Suppose Somadev finds that his weight in kgs during each month of year to be

75 76 73 75 74 73 73 76 73 79 77 75

- (a) Write a function called `zconf` that takes in the weights above as a vector `x`, assumes a known standard deviation of 1.5 and produces default 95% confidence interval.
 - (b) Write a function called `tconf` that takes in the weights above as a vector `x`, assumes that variance is unknown and produces default 95% confidence interval.
 - (c) Use the inbuilt `t.test` command on the vector `x` (as above), describe each output of the command `t.test(x)` Please explain all the inferences you can make from the output.
2. Distinguishing between Students-*t*-distribution and Normal distribution:
- (a) Using `rnorm` and `rt` generate 100 samples of Normal(0, 1) and t_{25} distribution. Compare them using the inbuilt `boxplot`, `qqnorm` and `qqline` functions.
 - (b) Using range of $[-4.4]$ (in same frame) plot the densities of Normal(0,1) and t_k distributions for $k = 3, 33, 66$ and 99 using the `dnorm`, `dt` and `plot` function.
3. Suppose we wish to test if the coin given to us is fair. We toss it a 100 times and find that there are 45 heads. Using the inbuilt `prop.test` in R, describe each output of the command `prop.test(45, 100)`. Please explain all the inferences you can make from the output.
4. In the previous example if we toss the coin a 10000 times and find that there are 4500 heads. Then will you conclude that the coin is fair ?
5. Suppose Doddapple manufactures claims that their batteries last 25 years. Students from CMI's Data Science programs sample 10 users and find the sample mean time for battery life was 21 with a sample standard deviation of 1.7. Is Doddapple claim believable ?