Sri Lanka Institute of Information Technology

Exercise :

1. Assume that the time taken to bake a batch of cookies is normally distributed with mean 45 minutes and standard deviation 2 minutes.

i. Generate a random sample of size 25 for the baking time.

```
1  getwd()
2
3  ## Set directory
4  setwd("C:\\Users\\User\\Desktop\\IT24103115")
5  getwd()
6
7  ## ===============================
8  ## Exercise: Cookie baking time
9  ## ===============================
10  ## Parameters
11  mean_time <- 45
12  sd_time <- 2
13  sample_size <- 25
14
15
16  ## i. Generate random sample
17  set.seed(123)
18  sample_data <- rnorm(sample_size, mean = mean_time, sd = sd_time)
19  print(sample_data)
```

```
> getwd()
[1] "C:/Users/User/Desktop/IT24103115"
>
> ## Set directory
> setwd("C:\\Users\\User\\Desktop\\IT24103115")
> getwd()
[1] "C:/Users/User/Desktop/IT24103115"
>
> ## ===============================
> ## Exercise: Cookie baking time
> ## ===============================
> ## Parameters
> mean_time <- 45
> sd_time <- 2
> sample_size <- 25
>
>
> ## i. Generate random sample
> set.seed(123)
> sample_data <- rnorm(sample_size, mean = mean_time, sd = sd_time)
> print(sample_data)
 [1] 43.87905 44.53965 48.11742 45.14102 45.25858 48.43013 45.92183 42.46988
 [9] 43.62629 44.10868 47.44816 45.71963 45.80154 45.22137 43.88832 48.57383
[17] 45.99570 41.06677 46.40271 44.05442 42.86435 44.56405 42.94799 43.54222
[25] 43.74992
>
```

ii. Test whether the average baking time is less than 46 minutes at a 5% level of significance.

```
22  ## ii. One-tailed t-test: H0: mean = 46, H1: mean < 46
23  t_test <- t.test(sample_data, mu = 46, alternative = "less")
24  print(t_test)
25
```

```
R ▾  R 4.5.1 · C:/Users/thiya/OneDrive/Desktop/IT24101551/ ⇗
>
> ## ii. One-tailed t-test: H0: mean = 46, H1: mean < 46
> t_test <- t.test(sample_data, mu = 46, alternative = "less")
> print(t_test)

        One Sample t-test

data:  sample_data
t = -2.8167, df = 24, p-value = 0.004776
alternative hypothesis: true mean is less than 46
95 percent confidence interval:
    -Inf 45.58124
sample estimates:
mean of x
 44.93334
```