

# Sri Lanka Institute of Information Technology



Lab Submission  
Lab sheet No 9

**IT24101551**

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**IT2120 - Probability and Statistics**

B.Sc. (Hons) in 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.

```
IT24101551.R* x
Source on Save Run
1 getwd()
2
3 ## Set directory
4 setwd("C:\\Users\\thiya\\OneDrive\\Desktop\\IT24101551")
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)
20
21

R 4.5.1 · C:/Users/thiya/OneDrive/Desktop/IT24101551/
> getwd()
[1] "C:/Users/thiya/OneDrive/Desktop/IT24101551"
>
> ## Set directory
> setwd("C:\\Users\\thiya\\OneDrive\\Desktop\\IT24101551")
> getwd()
[1] "C:/Users/thiya/OneDrive/Desktop/IT24101551"
>
> ## =====
> ## 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 43.62629
[10] 44.10868 47.44816 45.71963 45.80154 45.22137 43.88832 48.57383 45.99570 41.06677
[19] 46.40271 44.05442 42.86435 44.56405 42.94799 43.54222 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
```