

Sri Lanka Institute of Information Technology



Lab Submission
<Lab sheet 09>

<IT24102228>

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Probability and Statistics | IT2120

B.Sc. (Hons) in Information Technology

Exercise

1)

i.

```
> # Question 01
>
> # Part 1
> # The baking time is N(mean = 45, sd = 2). We take a sample of size 25.
> time <- rnorm(25, mean = 45, sd = 2)
> print(time)
[1] 45.43901 43.63300 39.33264 45.71637 44.66597 46.44207 46.59667 49.36764 43.13502 43.45693
[11] 45.44054 44.41682 45.32573 40.90672 45.06966 46.08797 42.76030 42.48797 48.30230 47.73562
[21] 46.31765 46.58623 48.30690 44.95002 44.55702
```

ii.

```
> # Part 2
>
> # Hypothesis: H0:  $\mu \geq 46$  vs H1:  $\mu < 46$ 
> # Consider a 5% level of significance
>
> # Run the one-sample (left-tailed) test with the null hypothesis  $\mu = 46$ 
> res <- t.test(time, mu = 46, alternative = "less")
>
> # Print the full test result
> print(res)
```

One Sample t-test

```
data: time
t = -1.9895, df = 24, p-value = 0.02908
alternative hypothesis: true mean is less than 46
95 percent confidence interval:
 -Inf 45.87135
sample estimates:
mean of x
45.08147
```

```
> # Test statistic:
> res$statistic
      t
-1.989534
>
>
> # p-value:
> res$p.value
[1] 0.02907723
>
>
> # Confidence interval
```

```
> res$conf.int
[1] -Inf 45.87135
attr(,"conf.level")
[1] 0.95
>
>
> # P-value approach will used to conclude the hypothesis test.
> # Conclusion:
> # Since the p-value (1) > 0.05, we do not reject  $H_0$  at the 5% level of significance.
> # Therefore, we conclude that there is no evidence to suggest the true mean is greater than 10.
In other words, the true mean sugar level of a cookie is likely less than or equal to 10.
> |
```