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THE KNOWLEDGE UNIVERSITY

Faculty of Computing

Year 2 Semester 1 (2025)

IT2120 - Probability and Statistics Lab Sheet 09

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.

```
setwd("C:\\Users\\ip\\OneDrive\\Desktop\\IT24100015"

#Exercise
#Q1
# i. Generate random sample of size 25
set.seed(123)   # for reproducibility
sample_data <- rnorm(25, mean = 45, sd = 2)
sample_data
```

```
> setwd("C:\\Users\\ip\\OneDrive\\Desktop\\IT24100015")
> #Exercise
> #Q1
> # i. Generate random sample of size 25
> set.seed(123)   # for reproducibility
> sample_data <- rnorm(25, mean = 45, sd = 2)
> sample_data
 [1] 43.87905 44.53965 48.11742 45.14102
 [5] 45.25858 48.43013 45.92183 42.46988
 [9] 43.62629 44.10868 47.44816 45.71963
[13] 45.80154 45.22137 43.88832 48.57383
[17] 45.99570 41.06677 46.40271 44.05442
[21] 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.

```
10  # ii. One-sample t-test
11  t.test(sample_data, mu = 46, alternative = "less", conf.level = 0.95)
12
13
```

```
> # ii. One-sample t-test
> t.test(sample_data, mu = 46, alternative = "less", conf.level = 0.95)

        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
```