IT2120- Probability and Statistics

Lab Sheet 09

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IT24103279

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.

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

IT24103279.R

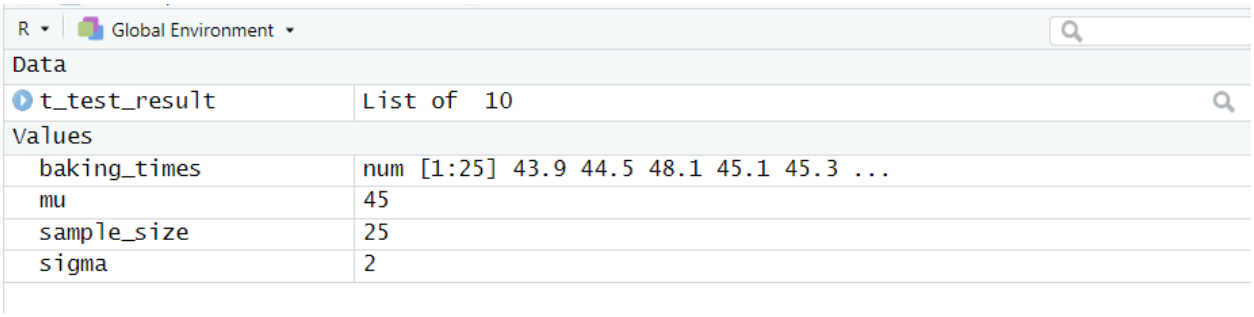
Source on Save | Run

```r
setwd("C:\\Users\\Hiruni\\Desktop\\IT24103279")
getwd()


# Set seed for reproducibility
set.seed(123)
# Part (i) Generate random sample
sample_size <- 25
mu <- 45
sigma <- 2
baking_times <- rnorm(sample_size, mean = mu, sd = sigma)
print(baking_times)
```

```
> setwd("C:\\Users\\Hiruni\\Desktop\\IT24103279")
> getwd()
[1] "C:/Users/Hiruni/Desktop/IT24103279"
>
>
> # Set seed for reproducibility
> set.seed(123)
> # Part (i) Generate random sample
> sample_size <- 25
> mu <- 45
> sigma <- 2
> baking_times <- rnorm(sample_size, mean = mu, sd = sigma)
> print(baking_times)
 [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
```

```r
# Part (ii) Hypothesis test
# H0: mean = 46
# H1: mean < 46

t_test_result <- t.test(baking_times, mu = 46, alternative = "less")
print(t_test_result)

```

```
> # Part (ii) Hypothesis test
> # H0: mean = 46
> # H1: mean < 46
>
> t_test_result <- t.test(baking_times, mu = 46, alternative = "less")
> print(t_test_result)

        One Sample t-test

data:  baking_times
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
```



R ▾ Global Environment ▾

Data	
t_test_result	List of 10
Values	
baking_times	num [1:25] 43.9 44.5 48.1 45.1 45.3 ...
mu	45
sample_size	25
sigma	2