

Sri Lanka Institute of Information Technology



Lab Submission <Lab sheet No-08>

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Probability and Statistics| IT2120

B.Sc. (Hons) in Information Technology

1. Calculate the population mean and population standard deviation of the laptop bag weights

```
> print(paste("Population Mean:", pop_mean))
[1] "Population Mean: 2.468"
> print(paste("Population Standard Deviation:", pop_sd))
[1] "Population Standard Deviation: 0.256106948813907"
```

2. Draw 25 random samples of size 6 (with replacement) and calculate the sample mean and sample standard deviation for each sample.

```
> print(sample_means)
sample_1 sample_2 sample_3 sample_4 sample_5 sample_6 sample_7
2.511667 2.316667 2.533333 2.491667 2.390000 2.426667 2.468333
sample_8 sample_9 sample_10 sample_11 sample_12 sample_13 sample_14
2.471667 2.448333 2.285000 2.593333 2.566667 2.320000 2.530000
sample_15 sample_16 sample_17 sample_18 sample_19 sample_20 sample_21
2.470000 2.576667 2.380000 2.418333 2.458333 2.391667 2.545000
sample_22 sample_23 sample_24 sample_25
2.560000 2.358333 2.635000 2.430000

> print(sample_standard_deviations)
[1] "Sample Standard Deviations:"
> print(sample_sds)
sample_1 sample_2 sample_3 sample_4 sample_5 sample_6
0.20536959 0.20392809 0.29574764 0.07808115 0.13251415 0.14962175
sample_7 sample_8 sample_9 sample_10 sample_11 sample_12
0.17803558 0.23077406 0.16702295 0.25343638 0.18206226 0.14250146
sample_13 sample_14 sample_15 sample_16 sample_17 sample_18
0.40398020 0.24355697 0.17308957 0.16753109 0.20899761 0.32529474
sample_19 sample_20 sample_21 sample_22 sample_23 sample_24
0.22728103 0.20546695 0.22572107 0.14587666 0.23301645 0.15319922
sample_25
0.22208107
```

3. Calculate the mean and standard deviation of the 25

sample means and state the relationship of them with true mean and true standard deviation.

```

> print(paste("Mean of Sample Means:", mean_of_sample_means))
[1] "Mean of Sample Means: 2.47853333333333"
> print(paste("Standard Deviation of Sample Means (Standard Error):", sd_of_sample_means))
[1] "Standard Deviation of Sample Means (Standard Error): 0.12000995329092"
>
>
[1] "Relationship between Population Mean and Mean of Sample Means:"
> print(paste("Population Mean (", pop_mean, ") is approximately equal to the Mean of Sample Means (", mean_of_sample_means, ")"))
[1] "Population Mean ( 2.468 ) is approximately equal to the Mean of Sample Means ( 2.45733333333333 )"
>
>
print("Relationship between Population Standard Deviation and Standard Deviation of Sample Means:")
[1] "Relationship between Population Standard Deviation and Standard Deviation of Sample Means:"
> print(paste("The Standard Deviation of Sample Means (", sd_of_sample_means, ") is approximately equal to the Population Standard Deviation divided by the square root of the number of samples ( 10 )."))
[1] "The Standard Deviation of Sample Means ( 0.101017966865452 ) is approximately equal to the Population Standard Deviation divided by the square root of the number of samples ( 10 )."
>

```