Sri Lanka Institute of Information Technology

Lab Submission
<Worksheet 07>

<IT24102257>

<Senadheera P.V.S.T.>

Probability and Statistics - IT2120

Exercise

Instructions: Create a folder in your desktop with your registration number (Eg: "IT......"). You need to save the R script file and take screenshots of the command prompt with answers and save it in a word document inside the folder. Save both R script file and word document with your registration number (Eg: "IT....."). After you finish the exercise, zip the folder and upload the zip file to the submission link.

1. A train arrives at a station uniformly between 8:00 a.m. and 8:40 a.m. Let the random variable X represent the number of minutes the train arrives after 8:00 a.m. What is the probability that the train arrives between 8:10 a.m. and 8:25 a.m.?

```
> setwd("C:\\Users\\Sahan Senadheera\\Desktop\\IT24102257 PS Lab7")
> #Excersise
> #(1)
> # X ~ Uniform(0, 40)
> # P(10 <= X <= 25) = P(X <= 25) - P(X <= 10)
> punif(25, min = 0, max = 40, lower.tail = TRUE) - punif(10, min = 0, max = 40, lower.tail = TRUE)
[1] 0.375
```

2. The time (in hours) to complete a software update is exponentially distributed with rate $\lambda = \frac{1}{3}$. Find the probability that an update will take at most 2 hours.

```
> #(2)
> # X ~ Exponential(λ = 1/3)
> # P(X <= 2)
> pexp(2, rate = 1/3, lower.tail = TRUE)
[1] 0.4865829
```

3. Suppose IQ scores are normally distributed with a mean of 100 and a standard deviation of 15.
    i. What is the probability that a randomly selected person has an IQ above 130?

```
> #(3)
> # Part i: P(X > 130)
> 1 - pnorm(130, mean = 100, sd = 15, lower.tail = TRUE)
[1] 0.02275013
> # OR:
> pnorm(130, mean = 100, sd = 15, lower.tail = FALSE)
[1] 0.02275013
```

ii. What IQ score represents the 95th percentile?

```
> # Part ii: IQ score for 95th percentile (P(X <= b) = 0.95)
> qnorm(0.95, mean = 100, sd = 15, lower.tail = TRUE)
[1] 124.6728
```