

# Sri Lanka Institute of Information Technology



## Lab Submission Lab Sheet 06

**IT24101387**

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**Probability and Statistics| IT2120**

B.Sc. (Hons) in Information Technology

## Question – 01

i.

```
1 setwd("C:\\Users\\Deshani\\OneDrive\\Desktop\\IT24101387")
2
3 #Question 01
4 #Part 01
5 #Binomial Distribution
6 # X ~ Binomial(n = 44, p = 0.92)
7
8
9 |
10
11
12
13
14
15
16
17
18
19
20
21
22
23 ~
24
25 9:1 (Top Level) R Script
```

```
R 4.5.1 - C:/Users/Deshani/OneDrive/Desktop/IT24101387/
> setwd("C:\\Users\\Deshani\\OneDrive\\Desktop\\IT24101387")
> |
```

ii.

```
8 #Part 02
9 # P(X = 40)
10 dbinom(40,44,0.92)
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25 12:1 (Top Level) R Script
```

```
R 4.5.1 - C:/Users/Deshani/OneDrive/Desktop/IT24101387/
> dbinom(40,44,0.92)
[1] 0.1979776
> |
```

iii.

```
13 #Part 03
14 # P(X <= 35)
15 pbinom(35, 44, 0.92, lower.tail = TRUE)
16
17
```

17:1 (Top Level) R Script

Console Terminal Background Jobs

R 4.5.1 · C:/Users/Deshani/OneDrive/Desktop/IT24101387/

```
> pbinom(35, 44, 0.92, lower.tail = TRUE)
[1] 0.007252274
> |
```

iv.

```
17 #Part 04
18 # P(X >= 38) = 1 - P(X <= 37)
19 1 - pbinom(37, 44, 0.92, lower.tail = TRUE)
20 pbinom(37, 44, 0.92, lower.tail = FALSE)
21
22 |
```

22:1 (Top Level) R Script

Console Terminal Background Jobs

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```
> 1 - pbinom(37, 44, 0.92, lower.tail = TRUE)
[1] 0.9412233
> pbinom(37, 44, 0.92, lower.tail = FALSE)
[1] 0.9412233
> |
```

**V.**

```
23 #Part 05
24 # P(40 <= X <= 42) = P(X <= 42) - P(X <= 39)
25 pbinom(42, 44, 0.92, lower.tail = TRUE) - pbinom(39, 44, 0.92, lower.tail = TRUE)
26
27 |
```

27:1 (Top Level) ↕

R Script ↕

Console

Terminal ×

Background Jobs ×



R 4.5.1 · C:/Users/Deshani/OneDrive/Desktop/IT24101387/ ↗

```
> pbinom(42, 44, 0.92, lower.tail = TRUE) - pbinom(39, 44, 0.92, lower.tail = TRUE)
```

```
[1] 0.6025556
```

```
> |
```

## **Question – 02**

**i.**

```
28 #Question 02
29 #Part 01
30 #Number of babies born in a hospital on a given day
31
32 |
```

**ii.**

```
33 #Part 02
34 #Poisson Distribution
35 # X ~ Poisson(lambda = 5)
36
37
```

iii.

```
38 #Part 03
39 # P(X = 6)
40 dpois(6, 5)
41
42 |
```

42:1 (Top Level) ↕ R Script ↕

Console Terminal × Background Jobs ×

R 4.5.1 · C:/Users/Deshani/OneDrive/Desktop/IT24101387/ ↗

```
> dpois(6, 5)
[1] 0.1462228
> |
```

iv.

```
43 #Part 04
44 # P(X > 6) = 1 - P(X <= 6)
45 ppois(6, 5, lower.tail = FALSE)
46
47 |
```

47:1 (Top Level) ↕ R Script ↕

Console Terminal × Background Jobs ×

R 4.5.1 · C:/Users/Deshani/OneDrive/Desktop/IT24101387/ ↗

```
> ppois(6, 5, lower.tail = FALSE)
[1] 0.2378165
> |
```

## Exercise

### Question – 01

i.

```
48  
49 #Exercise  
50 #Question 01  
51 #Part 01  
52 #Binomial Distribution  
53 # X ~ Binomial(n = 50, p = 0.85)  
54  
55 |
```

ii.

```
55 #Part 02  
56 # P(X >= 47) = 1 - P(X <= 46)  
57 pbinom(46, 50, 0.85, lower.tail = TRUE)  
58  
59
```

59:1 (Top Level) ↕

R Script ↕

Console Terminal Background Jobs

R 4.5.1 · C:/Users/Deshani/OneDrive/Desktop/IT24101387/ ↗

```
> pbinom(46, 50, 0.85, lower.tail = TRUE)
```

```
[1] 0.9539534
```

```
> |
```

## Question – 02

i.

```
60 #Question 02
61 #Part 01
62 # X = number of calls in one hour
63
64
```

ii.

```
65 #Part 02
66 #Poisson Distribution
67 #  $X \sim \text{Poisson}(\lambda = 12)$ 
68
69 |
```

iii.

```
70 #Part 03
71 #  $P(X = 15)$ 
72 dpois(15, 12)
73
74 |
```

74:1 (Top Level) ↕

R Script ↕

Console Terminal × Background Jobs ×  
R 4.5.1 · C:/Users/Deshani/OneDrive/Desktop/IT24101387/ ↕

```
> dpois(15, 12)
[1] 0.07239112
> |
```