

# IT2120- Probability and Statistics

## Lab Sheet 06

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IT24103279

1. An IT company claims that their newly developed learning platform improves student performance in online tests. According to previous data, 85% of students who used the platform passed their online tests. A batch of 50 students is selected at random who have completed the course using this platform. Let  $X$  denote the number of students who passed the test out of 50 students.


- What is the distribution of  $X$ ?
- What is the probability that at least 47 students passed the test?

2. A call center receives an average of 12 customer calls per hour.

- What is the random variable ( $X$ ) for the problem?
- What is the distribution of  $X$ ?
- What is the probability that exactly 15 calls are received in an hour?

Environment	History	Connections	Tutorial
   Import Dataset ▾	 147 MiB ▾		
R ▾	Global Environment ▾		
Values			
lambda		12	
n		50	
p		0.85	

```
IT24103279.R x  Untitled2 x
Source on Save
1 setwd("C:\\Users\\Hiruni\\Desktop\\IT24103279")
2
3 #Question 1
4
5 #Part 1
6 #Binomial Distribution
7 n <- 50
8 p <- 0.85
9
10 #Part 2 |
11 #P(X >= 47) = 1-P(x <= 46)
12 1 - pbinom(46, n, p, lower.tail = TRUE)
13 #pbinom(46, n, p, lower.tail = FALSE)
14
15
16 #Question 2
17
18 #Part 1
19 #Number of calls a call center recieves per hour
20
21 #Part 2
22 #Poisson Distribution
23 #Lambda = 12
24
25 #Part 3
26 lambda <- 12
27 dpois(15, lambda)
```

Console	Terminal x	Background Jobs x
 R 4.5.1 · C:/Users/Hiruni/Desktop/IT24103279/ ↗		
<pre>&gt; setwd("C:\\Users\\Hiruni\\Desktop\\IT24103279") &gt; &gt; #Question 1 &gt; &gt; #Part 1 &gt; #Binomial Distribution &gt; n &lt;- 50 &gt; p &lt;- 0.85 &gt; &gt; #Part 2 &gt; #P(X &gt;= 47) = 1-P(x &lt;= 46) &gt; 1 - pbinom(46, n, p, lower.tail = TRUE) [1] 0.04604658 &gt; #pbinom(46, n, p, lower.tail = FALSE) &gt; &gt; &gt; #Question 2 &gt; &gt; #Part 1 &gt; #Number of calls a call center receives per hour &gt; &gt; #Part 2 &gt; #Poisson Distribution &gt; #Lambda = 12 &gt; &gt; #Part 3 &gt; lambda &lt;- 12 &gt; dpois(15, lambda) [1] 0.07239112 &gt;  </pre>		