IT24100047

Dissanayake D.M.C.Y.B

Lab 06

Probability and Statistics - IT2120

Question 1

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setwd("C:\\Users\\chanu\\OneDrive\\Desktop\\IT24100047_LAB_06")
##Question 01
#Part 1
#Binomial Distribution
#Here, random variable X has binomial distribution with n=44 and p=0.92

#Part 2
#It asks to find P(X=40). Following command gives the density.
#In other words, probability of getting an exact value can be calculated using "dbinom" command.
dbinom(40,44,0.92)

#Part 3
#It asks to find P(X <= 35). Following command gives the cumulative
#probability ( <= ), if ""lower. tail" argument equals to "TRUE".
pbinom(35, 44, 0.92, lower.tail = TRUE)

#Part 4
#It asks to find P(X>=38). This can find using "pbinom" command as follows.
#You need to rearrange the probability statement as follows.
#P(X>=38)=1-P(X<38)=1-P(X <= 37)
#Then command will be as follows.
1- pbinom(37, 44, 0.92,lower.tail = TRUE)
#Or else following command can also used by keeping argument "lower.tail" as "FALSE".
#Here, when that argument is "FALSE", it means that P(X>37) which is same as P(X>=38).
pbinom(37, 44, 0.92, lower.tail = FALSE)

#Part 5
#It asks to find P(40 <= X <= 42). This can find using "pbinom" command as follows.
#You need to rearrange the probability statement as follows.
#P(40 <= X <= 42)=P(X <= 42)-P(X <= 39)
#Then command will be as follows.
pbinom(42, 44, 0.92, lower.tail = TRUE)-pbinom(39, 44, 0.92, lower.tail = TRUE)
```

Question 2

```
##Question 02
#Part 1
#Number of babies born in a hospital on a given day

#Part 2
#Poisson distribution
#Here, random variable X has poisson distribution with lambda=5

#Part 3
#It asks to find P(X=6). Following command gives the density.
#In other words, probability of getting an exact value can be calculated using "dpois" command.
dpois (6,5)

#Part 4
#It asks to find P(x>6). This can find using "ppois" command as follows.
#If you keep "lower.tail" argument as "TRUE", that means P(X <= 6).
#Since we need P(X>6), keep the "lower.tail" argument as "FALSE".
ppois(6, 5,lower.tail = FALSE)
```

Exercise 01

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###############Excercise 01



##Question 01
#Part 1
#Binomial Distribution
#Here, random variable X has binomial distribution with n=50 and p=0.85
#X ~ Binomial(n = 50, p = 0.85)

#Part 2
#It asks to find P(X >= 47). This can be calculated using "pbinom" command as follows.
#You need to rearrange the probability statement as follows.
#P(X >= 47) = 1 - P(X <= 46)
#Then command will be as follows:
1 - pbinom(46, 50, 0.85, lower.tail = TRUE)


#Or else, following command can also be used by keeping argument "lower.tail" as "FALSE".
#Here, when that argument is "FALSE", it means that P(X > 46), which is same as P(X >= 47).
pbinom(46, 50, 0.85, lower.tail = FALSE)


##Question 02
#Part 1
#Random variable X is the number of customer calls received in one hour.


#Part 2
#Poisson distribution
#Here, random variable X has poisson distribution with lambda = 12
#X ~ Poisson(lambda = 12)


#Part 3
#It asks to find P(X = 15). Following command gives the density.
#In other words, probability of getting an exact value can be calculated using "dpois" command.
dpois(15, 12)
```

Answers

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> setwd("C:\\Users\\chanu\\OneDrive\\Desktop\\IT24100047_LAB_06")
> #Part 2
> #It asks to find P(X=40). Following command gives the density.
> #In other words, probability of getting an exact value can be calculated using "dbinom" command.
> dbinom(40,44,0.92)
[1] 0.1979776
> #Part 3
> #It asks to find P(X <= 35). Following command gives the cumulative
> #probability ( <= ), if ""lower. tail" argument equals to "TRUE".
> pbinom(35, 44, 0.92, lower.tail = TRUE)
[1] 0.007252274
> #Part 4
> #It asks to find P(X>=38). This can find using "pbinom" command as follows.
> #You need to rearrange the probability statement as follows.
> #P(X>=38)=1-P(X<38)=1-P(X <= 37)
> #Then command will be as follows.
> 1- pbinom(37, 44, 0.92,lower.tail = TRUE)
[1] 0.9412233
> #Or else following command can also used by keeping argument "lower.tail" as "FALSE".
> #Here, when that argument is "FALSE", it means that P(X>37) which is same as P(X>=38).
> pbinom(37, 44, 0.92, lower.tail = FALSE)
[1] 0.9412233
> #Part 5
> #It asks to find P(40 <= X <= 42). This can find using "pbinom" command as follows.
> #You need to rearrange the probability statement as follows.
> #P(40 <= X <= 42)=P(X <= 42)-P(X <= 39)
> #Then command will be as follows.
> pbinom(42, 44, 0.92, lower.tail = TRUE)-pbinom(39, 44, 0.92, lower.tail = TRUE)
[1] 0.6025556
```

```
> #Part 3
> #It asks to find P(X=6). Following command gives the density.
> #In other words, probability of getting an exact value can be calculated using "dpois" command.
> dpois (6,5)
[1] 0.1462228
> #Part 4
> #It asks to find P(x>6). This can find using "ppois" command as follows.
> #If you keep "lower.tail" argument as "TRUE", that means P(X <= 6).
> #Since we need P(X>6), keep the "lower.tail" argument as "FALSE".
> ppois(6, 5,lower.tail = FALSE)
[1] 0.2378165
>
```

```
> #Part 2
> #It asks to find P(X >= 47). This can be calculated using "pbinom" command as follows.
> #You need to rearrange the probability statement as follows.
> #P(X >= 47) = 1 - P(X <= 46)
> #Then command will be as follows:
> 1 - pbinom(46, 50, 0.85, lower.tail = TRUE)
[1] 0.04604658
> #Or else, following command can also be used by keeping argument "lower.tail" as "FALSE".
> #Here, when that argument is "FALSE", it means that P(X > 46), which is same as P(X >= 47).
> pbinom(46, 50, 0.85, lower.tail = FALSE)
[1] 0.04604658
> #Part 3
> #It asks to find P(X = 15). Following command gives the density.
> #In other words, probability of getting an exact value can be calculated using "dpois" command.
> dpois(15, 12)
[1] 0.07239112
>
```

```
>
> #Part 3
> #It asks to find P(X = 15). Following command gives the density.
> #In other words, probability of getting an exact value can be calculated using "dpois" command.
> dpois(15, 12)
[1] 0.07239112
>
```