

# Aatmaj K Mhatre Batch B2 Rollno 16010121110

## Q)33 Binomial

Find the Binomial distribution if the mean is 5 & variance is 10/3. Find  $P(x = 2)$  ,  $P(x = 4)$

Mean is 5

Variance is 10/3

hence

$np=5$

$npq=10/3$

$q=2/3$

$p=1/3$

$n=15$

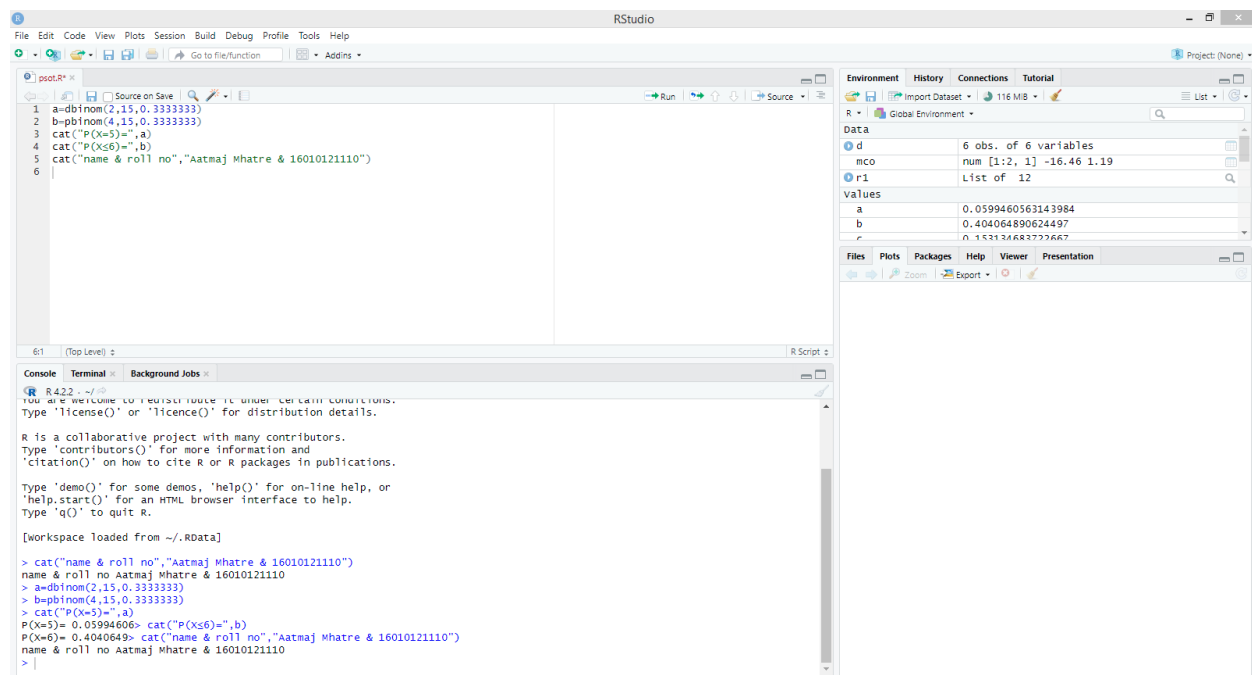
```
a=dbinom(2,15,0.3333333)
```

```
b=pbinom(4,15,0.3333333)
```

```
cat("P(X=5)=",a)
```

```
cat("P(X≤6)=",b)
```

```
cat("name & roll no","Aatmaj Mhatre & 16010121110")
```



The screenshot shows the RStudio environment with the following components:

- Source Editor:** Contains the R script code:

```
1 a=dbinom(2,15,0.3333333)
2 b=pbinom(4,15,0.3333333)
3 cat("P(X=5)=",a)
4 cat("P(X≤6)=",b)
5 cat("name & roll no","Aatmaj Mhatre & 16010121110")
6
```
- Environment:** Shows the global environment with variables 'a' and 'b' created from the script.
- Console:** Displays the output of the script execution:

```
R 4.2.2 ~ /
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[workspace loaded from ~/.RData]

> cat("name & roll no","Aatmaj Mhatre & 16010121110")
name & roll no Aatmaj Mhatre & 16010121110
> a=dbinom(2,15,0.3333333)
> b=pbinom(4,15,0.3333333)
> cat("P(X=5)=",a)
P(X=5)= 0.05994606> cat("P(X≤6)=",b)
P(X≤6)= 0.4040649> cat("name & roll no","Aatmaj Mhatre & 16010121110")
name & roll no Aatmaj Mhatre & 16010121110
> |
```

```
> cat("name & roll no","Aatmaj Mhatre & 16010121110")
```

```

name & roll no Aatmaj Mhatre & 16010121110
> a=dbinom(2,15,0.3333333)
> b=pbinom(4,15,0.3333333)
> cat("P(X=5)=",a)
P(X=5)= 0.05994606> cat("P(X≤6)=",b)
P(X=6)= 0.4040649> cat("name & roll no","Aatmaj Mhatre & 16010121110")
name & roll no Aatmaj Mhatre & 16010121110

```

## Q) 63 poisson

**Between the hours of 2 & 4 P.M. the average number of phone calls per minute coming in to the switchboard of a company is 2.5, find the probability that during a particular minute there will be i) no phone calls at all ii) more than 6 calls.**

$m=2.5$

$a=dpois(0,m)$

$b=1-ppois(6,m)$

$cat("P(X=0)=",a)$

$cat("More Than 6 phone calls=",b)$

$cat("name \& roll no","Aatmaj Mhatre \& 16010121110")$

```

edit LOPE view plots session build Debug Profile Tools Help
psot.R
1 m=2.5
2 a=dpois(0,m)
3 b=1-ppois(6,m)
4 cat("P(X=0)=",a)
5 cat("More Than 6 phone calls=",b)
6
7 cat("name & roll no","Aatmaj Mhatre & 16010121110")
8

```

Environment

Variable	Value
est	Named num [1:10] 73.5 53.7 83 48.6 58 ...
ex	90.5323741007194
ey	60.3423680456491
f	num [1:6] 7 10 15 25 30 40
m	2.5
n	5L
p	0.68503937007874
pa	2.5e-05

```

R 4.2.2 ~ /
C:\Program Files\R\R4.2.2\bin\R.exe
cat("P(X=2.3)=",a)
(x<2.3)= 0.2> cat("P(3<X)=",b)
(3<X)= 0.75> cat("P(2<X<3.5)=",c)
(2<X<3.5)= -0.3> cat("name & roll no","Aatmaj Mhatre & 16010121110")
ame & roll no Aatmaj Mhatre & 16010121110
pa=1/40000
a=pexp(20000, pa)
b=1-pexp(20000, pa)
cat("At least 20000=",a)
t least 20000= 0.3934693> cat("At most 20000",b)
t most 20000 0.6065307> cat("name & roll no","Aatmaj Mhatre & 16010121110")
ame & roll no Aatmaj Mhatre & 16010121110
m=2.5
a=dpois(0,m)
b=1-ppois(6,m)
cat("P(X=0)=",a)
(x=0)= 0.082085> cat("More Than 6 phone calls=",b)
ore Than 6 phone calls= 0.01418731>
cat("name & roll no","Aatmaj Mhatre & 16010121110")
ame & roll no Aatmaj Mhatre & 16010121110

```

3:46 PM  
2/6/2023

```

> m=2.5
> a=dpois(0,m)
> b=1-ppois(6,m)
> cat("P(X=0)=",a)
P(X=0)= 0.082085> cat("More Than 6 phone calls=",b)
More Than 6 phone calls= 0.01418731>
> cat("name & roll no","Aatmaj Mhatre & 16010121110")
name & roll no Aatmaj Mhatre & 16010121110

```

## Q) 109 Uniform distribution

**Suppose that for a certain company , the conference time, X has a uniform distribution over interval (0,5)hrs (1) what is pdf of X (2) . Find the probability that any conference lasts atleast 3hrs (3) Find the probability that any conference lasts for atleast 2hrs ,but does not exceed more than 3.5 hrs**

```

a=dunif(2,0,5)
b=1-punif(3,1,9)
c=punif(3.5,0,5)-punif(2,0,5)
cat("P(X<2.3)=",a)
cat("P(3<X)=",b)
cat("P(2<X<3.5)=",c)
cat("name & roll no","Aatmaj Mhatre & 16010121110")

```

The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains R code for generating random variables and categorical data.
 

```

1 a=dunif(2,0,5)
2 b=1-punif(3,1,9)
3 c=punif(2,0,5)-punif(3.5,0,5)
4 cat("P(X<2.3)=",a)
5 cat("P(3<X)=",b)
6 cat("P(2<X<3.5)=",c)
7 cat("name & roll no", "Aatmaj Mhatre & 16010121110")
8

```
- Environment Pane:** Shows the current environment with variables:
 

Variable	Value
d	6 obs. of 6 variables
mco	num [1:2, 1] -16.46 1.19
r1	List of 12
- Console:** Shows the execution output:
 

```

R 4.2.2 ~ /
help.start() for an HTML browser interface to help.
type 'q()' to quit R.

workspace loaded from ~/.RData

      cat("name & roll no", "Aatmaj Mhatre & 16010121110")
ame & roll no Aatmaj Mhatre & 16010121110
a=dbinom(2,15,0.3333333)
b=pbinom(4,15,0.3333333)
cat("P(X<5)=",a)
(X<5)= 0.05904606> cat("P(X<6)=",b)
(X<6)= 0.4040649> cat("name & roll no", "Aatmaj Mhatre & 16010121110")
ame & roll no Aatmaj Mhatre & 16010121110
a=dunif(2,0,5)
b=1-punif(3,1,9)
c=punif(2,0,5)-punif(3.5,0,5)
cat("P(X<2.3)=",a)
(X<2.3)= 0.2> cat("P(3<X)=",b)
(3<X)= 0.75> cat("P(3.5<X<2)=",c)
(2<X<3.5)= 0.3> cat("name & roll no", "Aatmaj Mhatre & 16010121110")
ame & roll no Aatmaj Mhatre & 16010121110

```

```

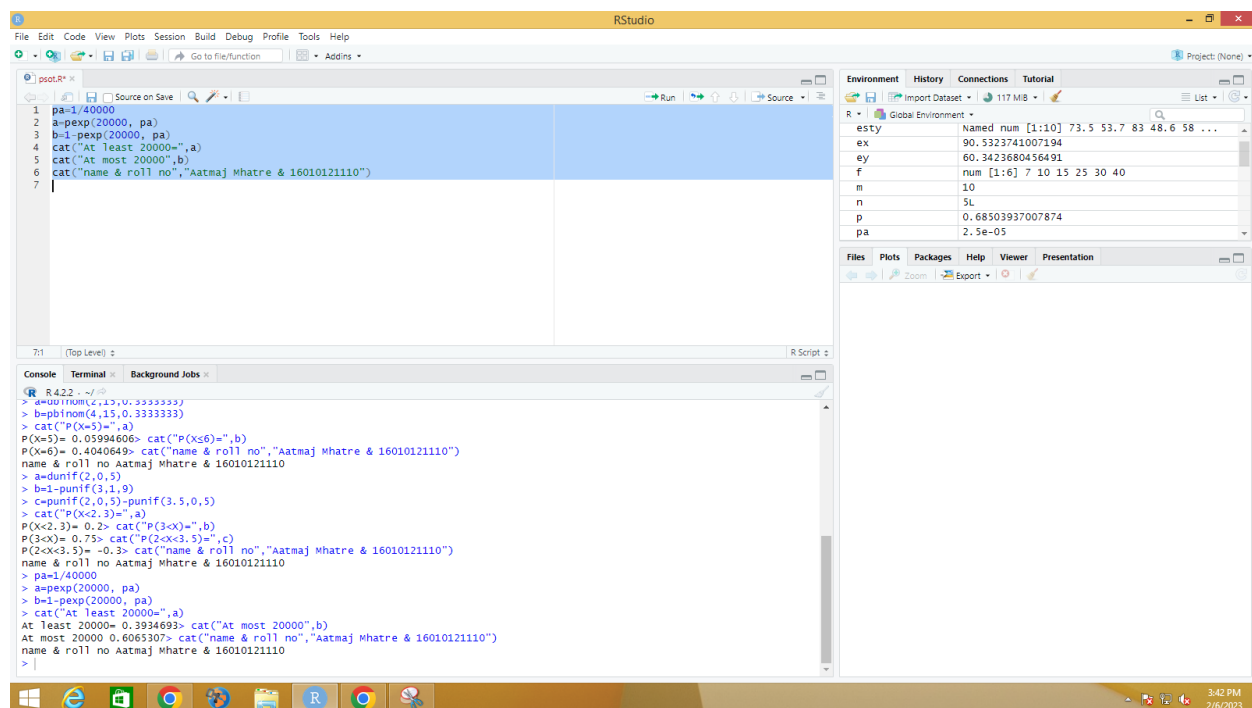
> a=dunif(2,0,5)
> b=1-punif(3,1,9)
> c=punif(2,0,5)-punif(3.5,0,5)
> cat("P(X<2.3)=",a)
P(X<2.3)= 0.2> cat("P(3<X)=",b)
P(3<X)= 0.75> cat("P(3.5<X<2)=",c)
P(2<X<3.5)= 0.3> cat("name & roll no", "Aatmaj Mhatre & 16010121110")
name & roll no Aatmaj Mhatre & 16010121110

```

## Q) 116 Exponential distribution

The mileage which car owners get with a certain kind of radial tire is a random variable having an exponential distribution with mean 40,000km. Find the probability that one of these tires will last (i) atleast 20,000km (ii) atmost 20,000km

```
pa=1/40000
a=pexp(20000, pa)
b=1-pexp(20000, pa)
cat("At least 20000=",a)
cat("At most 20000",b)
cat("name & roll no","Aatmaj Mhatre & 16010121110")
```



The screenshot shows the RStudio interface with the following components:

- Source Editor:** Contains the R code from the previous block, with line numbers 1 through 7.
- Environment:** Lists the objects created in the global environment: `esty` (Named num [1:10]), `ex` (90.5323741007194), `ey` (60.3423680456491), `f` (num [1:6]), `m` (10), `n` (5L), `p` (0.68503937007874), and `pa` (2.5e-05).
- Console:** Shows the output of the code execution, including the results of the probability calculations and the final cat statement output.

```
> pa=1/40000
> a=pexp(20000, pa)
> b=1-pexp(20000, pa)
> cat("At least 20000=",a)
At least 20000= 0.3934693> cat("At most 20000",b)
At most 20000 0.6065307> cat("name & roll no","Aatmaj Mhatre &
16010121110")
name & roll no Aatmaj Mhatre & 16010121110
```

