

20MIA1150

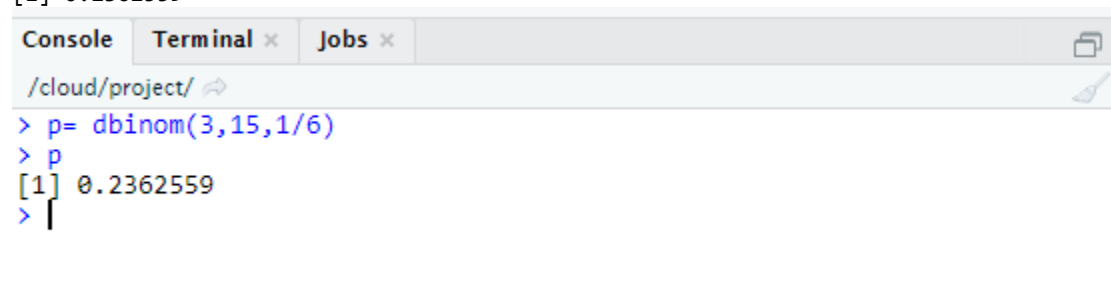
Saptharishree M

Assignment MAT2001(LAB)

Discrete Probability Distributions:

1. Find the Probability of getting three '3' among 15 dice.

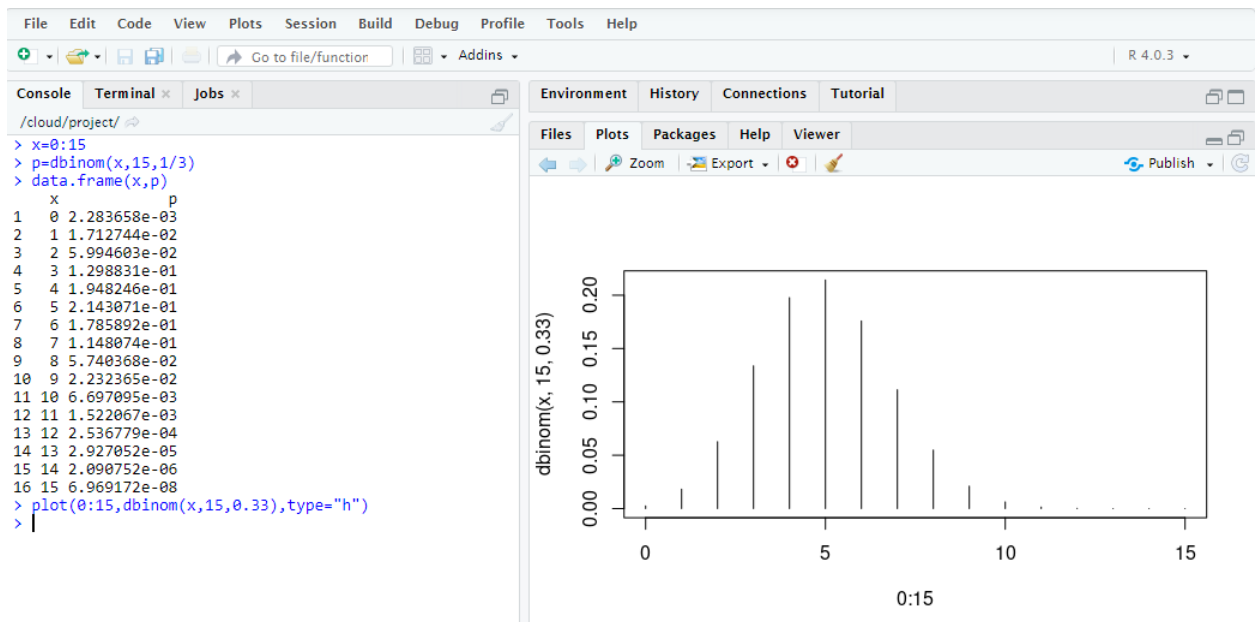
```
> p= dbinom(3,15,1/6)
> p
[1] 0.2362559
```

A screenshot of a terminal window with tabs for 'Console', 'Terminal', and 'Jobs'. The 'Console' tab is active, showing the R code and its output. The code is: > p= dbinom(3,15,1/6), > p, [1] 0.2362559. The output is: [1] 0.2362559. The terminal window has a light blue header bar with the path /cloud/project/ and a search icon on the right.

```
/cloud/project/
> p= dbinom(3,15,1/6)
> p
[1] 0.2362559
> |
```

2. Draw a Plot for the Binomial distribution Bin(n=15, p=1/3). Display those probabilities in a table.

```
> x=0:15
> p=dbinom(x,15,1/3)
> data.frame(x,p)
  x p
1 0 2.283658e-03
2 1 1.712744e-02
3 2 5.994603e-02
4 3 1.298831e-01
5 4 1.948246e-01
6 5 2.143071e-01
7 6 1.785892e-01
8 7 1.148074e-01
9 8 5.740368e-02
10 9 2.232365e-02
11 10 6.697095e-03
12 11 1.522067e-03
13 12 2.536779e-04
14 13 2.927052e-05
15 14 2.090752e-06
16 15 6.969172e-08
> plot(0:15,dbinom(x,15,0.33),type="h")
>
```



3. For a random variable X with binomial $(20, 1/2)$ distribution, find the following probabilities.

- Find $P(X < 8)$
- Find $P(X > 12)$
- Find $P(8 \leq x \leq 12)$

```

> pbinom(7,20,1/2)
[1] 0.131588
> 1-pbinom(12,20,1/2)
[1] 0.131588
> sum(dbinom(8:12,20,1/2))
[1] 0.736824
>

```

The RStudio interface shows the following R code in the console:

```

> pbinom(7,20,1/2)
[1] 0.131588
> 1-pbinom(12,20,1/2)
[1] 0.131588
> sum(dbinom(8:12,20,1/2))
[1] 0.736824
>

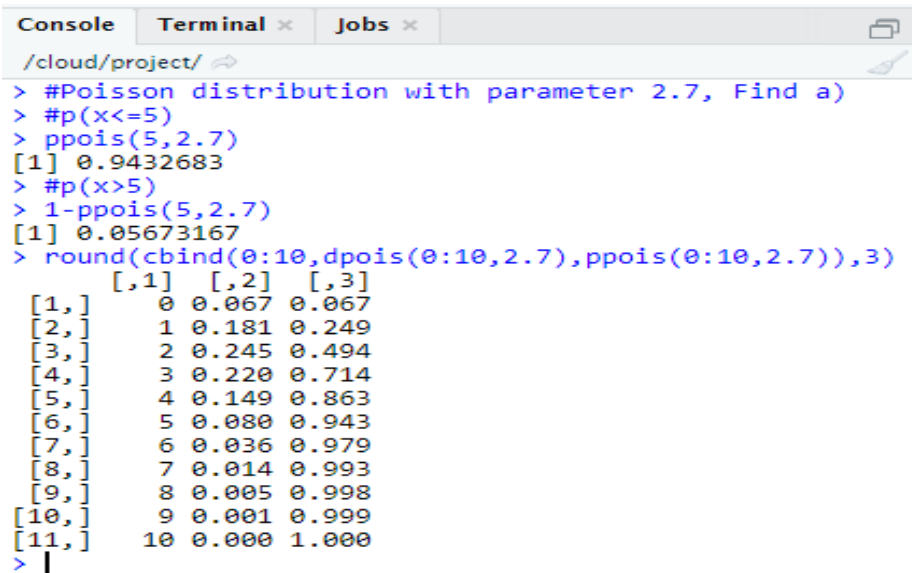
```

4. Poisson distribution with parameter 2.7, Find

(a) $P(X \leq 5)$ and $P(X > 5)$

(b) Make a table of the first 11 Poisson probabilities and cumulative probabilities when $\lambda=2.7$ and obtain the output prettier.

```
> #Poisson distribution with parameter 2.7, Find a)
> #p(x<=5)
> ppois(5,2.7)
[1] 0.9432683
> #p(x>5)
> 1-ppois(5,2.7)
[1] 0.05673167
> round(cbind(0:10,dpois(0:10,2.7),ppois(0:10,2.7)),3)
[,1] [,2] [,3]
[1,] 0 0.067 0.067
[2,] 1 0.181 0.249
[3,] 2 0.245 0.494
[4,] 3 0.220 0.714
[5,] 4 0.149 0.863
[6,] 5 0.080 0.943
[7,] 6 0.036 0.979
[8,] 7 0.014 0.993
[9,] 8 0.005 0.998
[10,] 9 0.001 0.999
[11,] 10 0.000 1.000
>
```



```
Console Terminal x Jobs x
/cloud/project/
> #Poisson distribution with parameter 2.7, Find a)
> #p(x<=5)
> ppois(5,2.7)
[1] 0.9432683
> #p(x>5)
> 1-ppois(5,2.7)
[1] 0.05673167
> round(cbind(0:10,dpois(0:10,2.7),ppois(0:10,2.7)),3)
  [,1] [,2] [,3]
[1,] 0 0.067 0.067
[2,] 1 0.181 0.249
[3,] 2 0.245 0.494
[4,] 3 0.220 0.714
[5,] 4 0.149 0.863
[6,] 5 0.080 0.943
[7,] 6 0.036 0.979
[8,] 7 0.014 0.993
[9,] 8 0.005 0.998
[10,] 9 0.001 0.999
[11,] 10 0.000 1.000
> |
```