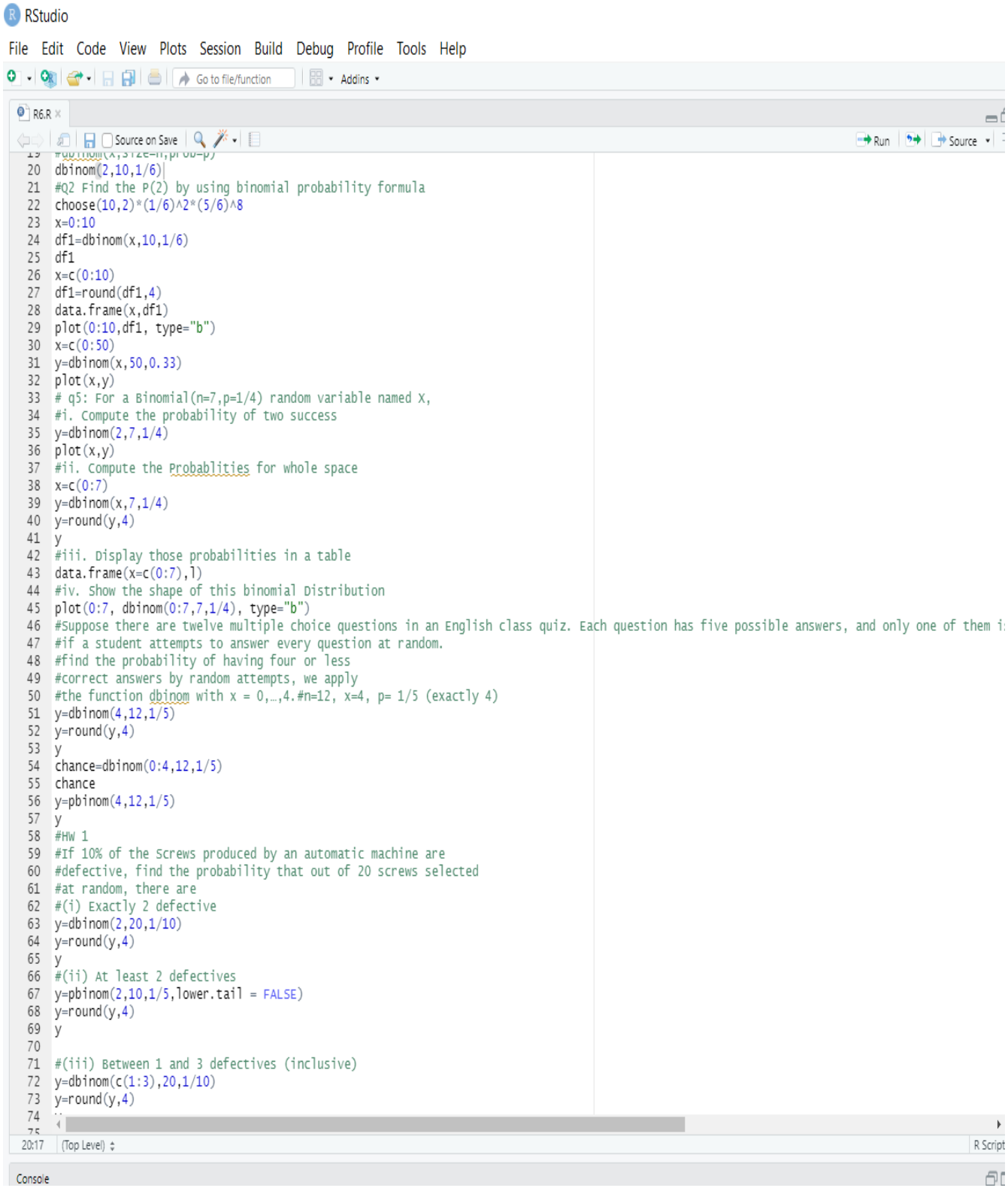
BINOMIAL DISTRIBUTION

Code:



1)Find the Probability of getting two 2's among ten dice and

2) Find the P(2) by using binomial probability formula

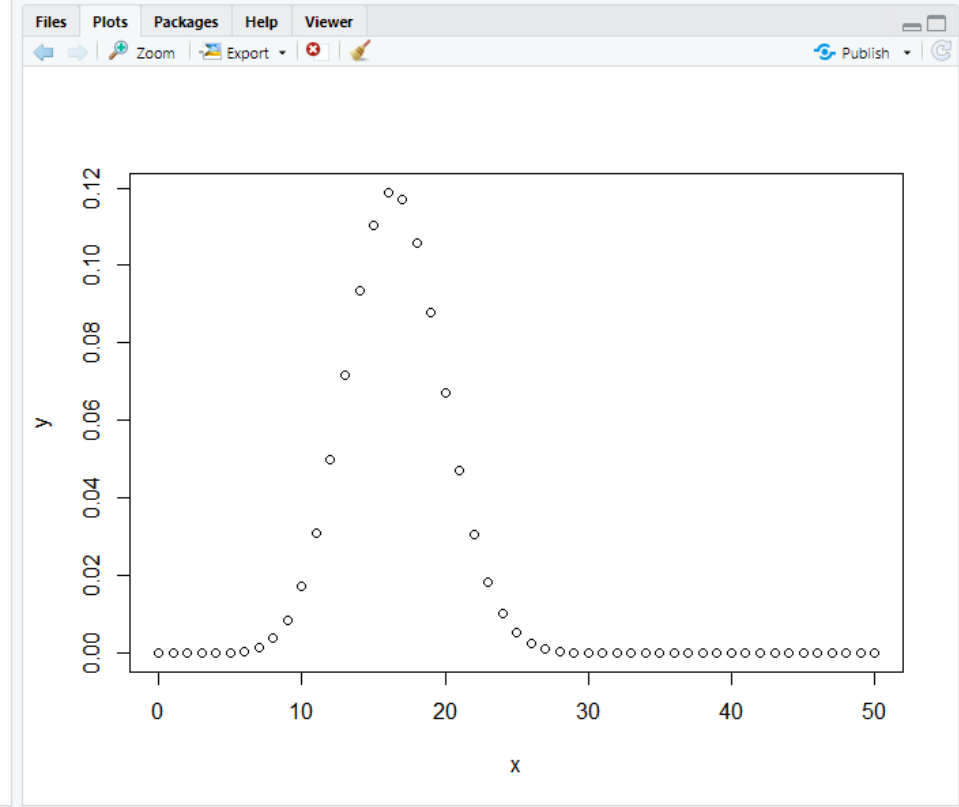
```
> y=dbinom(2,10,1/6)
> y=round(y,4)
> y
[1] 0.2907
> choose(10,2)*(1/6)^2*(5/6)^8
[1] 0.29071
>
```

3) other functions

```
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

> y=dbinom(2,10,1/6)
> y=round(y,4)
> y
[1] 0.2907
> choose(10,2)*(1/6)^2*(5/6)^8
[1] 0.29071
> x=0:10
> df1=dbinom(x,10,1/6)
> df1
 [1] 1.615056e-01 3.230112e-01 2.907100e-01 1.550454e-01 5.426588e-02 1.302381e-02 2.170635e-03 2.480726e-04 1.860544e-05 8.269086e-07
[11] 1.653817e-08
> x=c(0:10)
> df1=round(df1,4)
> data.frame(x,df1)
    x    df1
1   0 0.1615
2   1 0.3230
3   2 0.2907
4   3 0.1550
5   4 0.0543
6   5 0.0130
7   6 0.0022
8   7 0.0002
9   8 0.0000
10  9 0.0000
11 10 0.0000
> plot(0:10,df1, type="b")
> x=c(0:50)
> y=dbinom(x,50,0.33)
> plot(x,y)
>
```



4)For a Binomial(n=7,p=1/4) random variable named X,

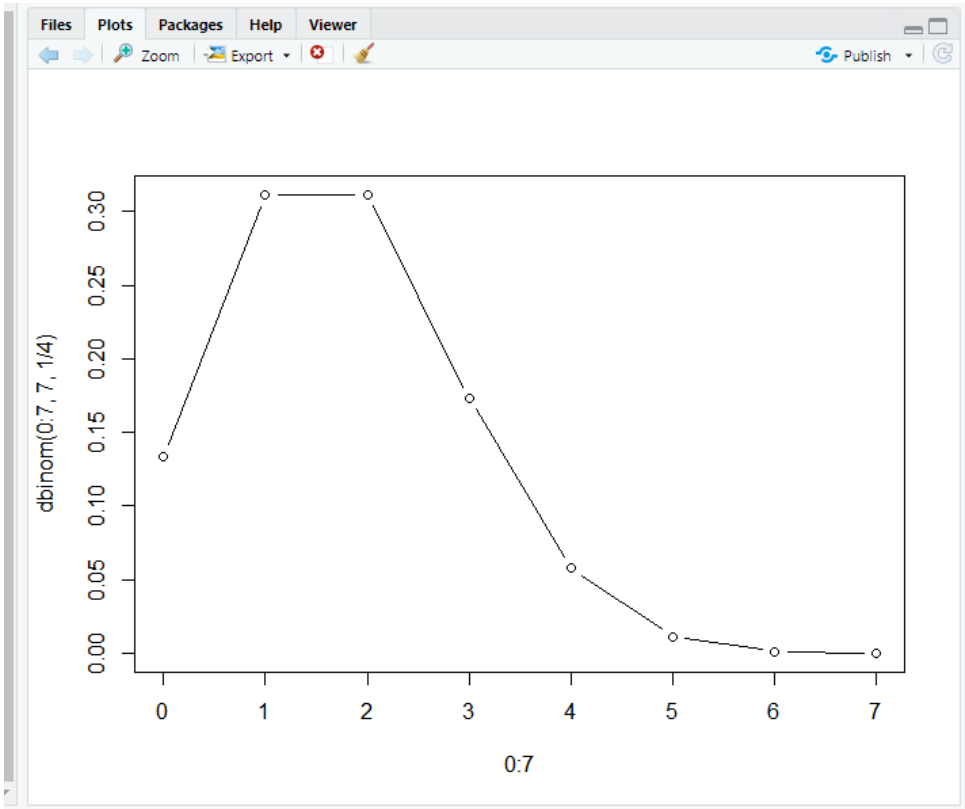
#i. Compute the probability of two success

#ii. Compute the Probablities for whole space

#iii. Display those probabilities in a table

#iv. Show the shape of this binomial Distribution

```
> y=dbinom(2,7,1/4)
> y=round(y,4)
> y
[1] 0.3115
> x=c(0:7)
> y=dbinom(x,7,1/4)
> y=round(y,4)
> y
[1] 0.1335 0.3115 0.3115 0.1730 0.0577 0.0115 0.0013 0.0001
> data.frame(x=c(0:7),l)
Error in data.frame(x = c(0:7), l) : object 'l' not found
> data.frame(x=c(0:7),y)
  x      y
1 0 0.1335
2 1 0.3115
3 2 0.3115
4 3 0.1730
5 4 0.0577
6 5 0.0115
7 6 0.0013
8 7 0.0001
> plot(0:7, dbinom(0:7,7,1/4), type="b")
```



5)Suppose there are twelve multiple choice questions in an English class quiz. Each question has five possible answers, and only one of them is correct. Find the probability of having four or less correct answers,if a student attempts to answer every question at random.

find the probability of having four or less correct answers by random attempts, we apply the function dbinom with x = 0,.,4.#n=12, x=4, p= 1/5 (exactly 4)

```
> y=dbinom(4,12,1/5)
> y=round(y,4)
> y
[1] 0.1329
> chance=dbinom(0:4,12,1/5)
> chance
[1] 0.06871948 0.20615843 0.28346784 0.23622320 0.13287555
> y=pbinom(4,12,1/5)
> y
[1] 0.9274445
>
```

6) If 10% of the Screws produced by an automatic machine are defective, find the probability that out of 20 screws selected at random, there are

(i) Exactly 2 defective, (ii) At least 2 defectives and (iii) Between 1 and 3 defectives (inclusive)

```
> y=dbinom(2,20,1/10)
> y=round(y,4)
> y
[1] 0.2852
> y=pbinom(2,10,1/5,lower.tail = FALSE)
> y=round(y,4)
> y
[1] 0.3222
> y=dbinom(c(1:3),20,1/10)
> y=round(y,4)
> y
[1] 0.2702 0.2852 0.1901
>
```

Date:8/4/2021

Poisson distribution

Code:

```
#Poisson distribution with parameter 2
#1. How to obtain a sequence from 0 to 10
s.val=0:10
#2. Calculate P(0),P(1),...,P(10) when lambda =2 and Make the output prettier
p=dpois(s.val,2)
round(p,4)
#3. Find P(X <= 6)
ppois(6,2)
#4. Sum all probabilities
sum(p)
#5. Find P(X>6)
ppois(6,2,lower.tail = FALSE)
#6. Make a table of the first 11 Poisson probabilities and cumulative probilities when lamda=2 and obtain the output prettier.
fx=cumsum(p)
p=dpois(s.val,2)
round(data.frame(fx,p),4)
#7. Plot the probabilities Put some labels on the axes and give the plot a title
plot(dpois(0:10,2),type='h',main='poisson probabilitiy',xlab = 'x-value',ylab='probability distribution')
```

Poisson distribution with parameter 2

1. How to obtain a sequence from 0 to 10

s.val=0:10

2. Calculate P(0),P(1),...,P(10) when lambda =2 and Make the output prettier.

```
> s.val=0:10
> p=dpois(s.val,2)
> round(p,4)
 [1] 0.1353 0.2707 0.2707 0.1804 0.0902 0.0361 0.0120 0.0034 0.0009 0.0002 0.0000
```

3. Find P(X <= 6)

4. Sum all probabilities

5. Find P(X>6)

```
> ppois(6,2)
[1] 0.9954662
> sum(p)
[1] 0.9999917
> ppois(6,2,lower.tail = FALSE)
[1] 0.004533806
```

6. Make a table of the first 11 Poisson probabilities and cumulative probilities when lamda=2 and obtain the output prettier.

```
> fx=cumsum(p)
> p=dpois(s.val,2)
> round(data.frame(fx,p),4)
       fx      p
1  0.1353 0.1353
2  0.4060 0.2707
3  0.6767 0.2707
4  0.8571 0.1804
5  0.9473 0.0902
6  0.9834 0.0361
7  0.9955 0.0120
8  0.9989 0.0034
9  0.9998 0.0009
10 1.0000 0.0002
11 1.0000 0.0000
>
```

7. Plot the probabilities Put some labels on the axes and give the plot a title