**Practical No: 01**

* 1. A coin is tossed 10 times. What is the probability of getting exactly 6 heads? x=pbinom(6,10,1/2)

x

Ans-[1] 0.2050781

* 1. 60% of people who purchase sports cars are men. Of 10 sports car owners are randomly selected, find the probability that exactly 7 are men

x=dbinom(7,10,0.6) x

Ans-[1] 0.2149908

* 1. In a box of floppy dises it is known that 95% will work. A sample of three of the discs is selected at random. Find the probability that

(a) none (b) 1, (e) 2, (d) all 3 of the sample will work x=dbinom(3,3,0.95)

x

y=dbinom(2,3,0.95) y

z=dbinom(1,3,0.95) z

p=dbinom(0,3,0.95) p

Ans- a) [1] 0.000125

b) [1] 0.007125

c) [1] 0.135375

d) [1] 0.857375

* 1. In a box of switches it is known 10% of the switches are faulty. A technician is wiring 30 circuits, each of which needs one switch. What is the probability that

a) all 30 work, b)at most 2 of the circuits do not work? x=dbinom(30,30,0.9)

x

y=dbinom(28,30,0.9) y z=dbinom(29,30,0.9) z

p=x+y+z p

Ans a) [1] 0.04239116

b) [1] 0.4113512

c) [1] 0.1875

d) [1] 0.4

* 1. Find the probability of rolling exactly four even numbers in five rolls of a fair die. Find the probability of rolling exactly five even numbers in five rolls of a fair die. Hence find the probability of rolling four or more even numbers in five rolls of a fair die.

x=dbinom(4,5,0.5) x

y=dbinom(5,5,0.5) y

z=sum(dbinom(4,5,0.5)+dbinom(5,5,0.5)) z

Ans-a) [1] 0.15625

b) [1] 0.03125

c)[1] 0.1875

* 1. Find eight random values from a sample of 150 With probability of 0.4. x=rbinom(8,150,.4)

x

Ans [1] 53 66 60 55 64 61 59 57

* 1. For n=20 and , evaluate binomial probabilities and plot the graph of pmf and cdf. Before plotting round of the 3 decimal.

Ans x=0:20

* + - x

[1] 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

> x=seq(1:20)

* + - x

[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

* + - y=dbinom(x,20,0.6)
* y

[1] 3.298535e-07 4.700412e-06 4.230371e-05 2.696862e-04 1.294494e-03 [6] 4.854351e-03 1.456305e-02 3.549744e-02 7.099488e-02 1.171416e-01 [11] 1.597385e-01 1.797058e-01 1.658823e-01 1.244117e-01 7.464702e-02 [16] 3.499079e-02 1.234969e-02 3.087423e-03 4.874878e-04 3.656158e-05

* z=round(y,3)
* z

[1] 0.000 0.000 0.000 0.000 0.001 0.005 0.015 0.035 0.071 0.117 0.160 0.180

[13] 0.166 0.124 0.075 0.035 0.012 0.003 0.000 0.000

* y

[1] 3.298535e-07 4.700412e-06 4.230371e-05 2.696862e-04 1.294494e-03 [6] 4.854351e-03 1.456305e-02 3.549744e-02 7.099488e-02 1.171416e-01 [11] 1.597385e-01 1.797058e-01 1.658823e-01 1.244117e-01 7.464702e-02 [16] 3.499079e-02 1.234969e-02 3.087423e-03 4.874878e-04 3.656158e-05

plot(x,z)

* plot(x,z,'l')
* plot(x,z,'h')
* plot(x,z,'h',col="green")
* plot(x,z,'h',col="green",main="plot of PMF")
* y1=pbinom(x,20,0.6)
* y1

[1] 3.408486e-07 5.041261e-06 4.734497e-05 3.170311e-04 1.611525e-03 [6] 6.465875e-03 2.102893e-02 5.652637e-02 1.275212e-01 2.446628e-01 [11] 4.044013e-01 5.841071e-01 7.499893e-01 8.744010e-01 9.490480e-01 [16] 9.840388e-01 9.963885e-01 9.994760e-01 9.999634e-01 1.000000e+00

* z1=round(y1,3)
* z1

[1] 0.000 0.000 0.000 0.000 0.002 0.006 0.021 0.057 0.128 0.245 0.404 0.584

[13] 0.750 0.874 0.949 0.984 0.996 0.999 1.000 1.000

* data=data.frame(x,z1)
* data

x z1

1 1 0.000

2 2 0.000

3 3 0.000

4 4 0.000

5 5 0.002

6 6 0.006

7 7 0.021

8 8 0.057

9 9 0.128

10 10 0.245

11 11 0.404

12 12 0.584

13 13 0.750

14 14 0.874

15 15 0.949

16 16 0.984

17 17 0.996

18 18 0.999

19 19 1.000

20 20 1.000

* plot(x,z1,"s")
* plot(x,z1,"s",main="cdf of data")
* plot(x,z1,"s",main="cdf of data",col="yellow")
* plot(x,z1,main="cdf of data",col="purple")
  1. Draw the random sample of size 10 from B(8,0.4) find mean and variance of the sample values.

n=8;p=0.4

x=rbinom(10,8,0.4) x

m=mean(x) m

v=var(x) v

Ans a)[1] 3.4

b)[1] 0.7734375

c)[1] 2.488889

* 1. An biased coin is tossed 7 times . Calculate the probability of obtaining more head then tails.

x = pbinom(4,7,1/2) x

Ans-1/2

* 1. At certain time one out of five telephone line is engaged in a conversation , what is probability that out of 10 telephones chosen at random only 2 are engaged.

n=10

probability=1/5 x=dbinom(2,10,0.2) x

Ans- [1] 0.3019899

* 1. It is known that during manufacturing , the probability of panel to be defective is 10%. Assume 18 solar panels are chosen find the probability of getting four of more sample to be defective with using

1. dbinom function
2. pbinom function x=dbinom(4,18,0.1) x

y=pbinom(4,18,0.1) y

>1-sum(dbinom(0,18,0.1)+dbinom(1,18,0.1)+dbinom(2,18,0.1)

+dbinom(3,18,0.1)) Ans- [1] 0.09819684

2) > 1-pbinom(3,18,0.1)

Ans- [1] 0.09819684

* 1. What are the 10th, 20th, and so forth quantiles of the bin(10, 1/3) distribution x=qbinom(0.1, 10, 1/3)

x

Ans [1] 0.7734375

y=qbinom(0.2, 10, 1/3) y

Ans [1] 0.9718061

# and so forth, or all at once with z=qbinom(seq(0.1, 0.9, 0.1), 10 z

Ans [1] 0.1875

**Output:**









