Experiment 6

Practice Problems:-(Binomial distribution)

1. For a random variable X with a binomial(20,1/2) distribution, find the following probabilities.
   (i). Find Pr(X < 8)
   (ii). Find Pr(X > 12)
   (iii) Find Pr(8 <= X <= 12)

2. For a binomial(200,1/2) distribution:
   (i) Find Pr(X < 80)
   (ii) Find Pr(X > 120)
   (iii) Find Pr(80 <= X <= 120)

3. For a binomial(2000,1/2) distribution:
   Find Pr(X < 800)
   Find Pr(X > 1200)
   Find Pr(800 <= X <= 1200)

4. Let X be the number of heads in 10 tosses of a fair coin.
   1. Find the probability of getting at least 5 heads (that is, 5 or more).
   2. Find the probability of getting exactly 5 heads.
   3. Find the probability of getting between 4 and 6 heads, inclusive

Plot any one of the above using the commands **plot and points**.

1.

(i)

```
> pbinom(7,20,1/2)
[1] 0.131588
```

(ii)

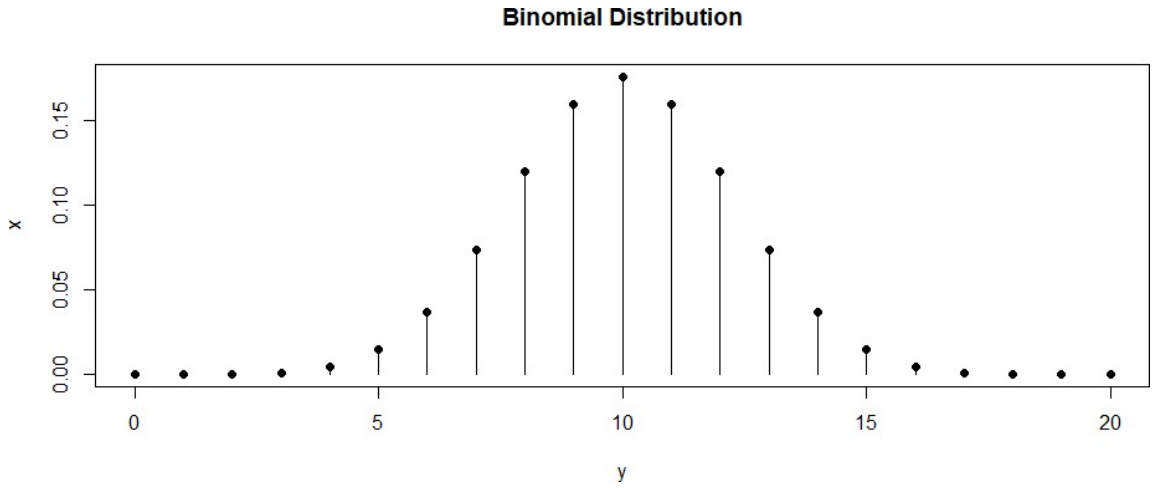
```
> 1-pbinom(12,20,1/2)
[1] 0.131588
```

(iii)

```
> pbinom(12,20,1/2) - pbinom(7,20,1/2)
[1] 0.736824
```

Plotting: -

```
> x=dbinom(c(0:20),20,1/2)
> y=c(0:20)
> plot(y,x,main="Binomial Distribution",type="h")
> points(y,x,pch=16,cex=1)
```



2.

(i)

```
> pbinom(79,200,1/2)
[1] 0.001817474
```

(ii)

```
> 1-pbinom(120,200,1/2)
[1] 0.001817474
```

(iii)

```
> pbinom(120,200,1/2)-pbinom(79,200,1/2)
[1] 0.9963651
```

3.

(i)

```
> pbinom(799,2000,1/2)
[1] 1.162645e-19
```

(ii)

```
> 1-pbinom(1200,2000,1/2)
[1] 0
```

(iii)

```
> pbinom(1200,2000,1/2)-pbinom(799,2000,1/2)
[1] 1
```

4.

(i)

```
> 1-pbinom(4,10,1/2)
[1] 0.6230469
```

(ii)

```
> dbinom(5,10,1/2)
[1] 0.2460938
```

(iii)

```
> pbinom(6,10,1/2)-pbinom(3,10,1/2)
[1] 0.65625
```