Q1. In a component manufacturing industry, there is a small probability of 1/500 for any component to be defective. The components are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing:

(i) no defective
(ii) one defective
(iii) two defective components

in a consignment of 10,000 packets.

```
> p = 1/500

> n = 10

> N = 10000

> lambda = n * p

> N * dpois(0, lambda)

[1] 9801.987

> N * dpois(1, lambda)

[1] 196.0397

> N * dpois(2, lambda)

[1] 1.960397
```

Q2. The number of monthly breakdown of a computer is a random variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month:

(i) Without a breakdown
(ii) With only one breakdown and
(iii) With at least one break down

```
> lambda = 1.8

> dpois(0, 1.8)

[1] 0.1652989

> dpois(1, 1.8)

[1] 0.297538

> 1 - dpois(0, 1.8)

[1] 0.8347011
```

Q3. In a large consignment of electric bulbs 10% are defective. A random sample of 20 is taken for inspection. Find the probability that
(i) All are good bulbs.
(ii) At most there are 3 defective bulbs.
(iii) Exactly there are 3 defective bulbs.

```
> p = 0.1

> n = 20

> lambda = n * p

>

> 1 - ppois(0, lambda)

[1] 0.8646647

> ppois(3, lambda)

[1] 0.8571235

> dpois(3, lambda)

[1] 0.180447
```

Q4. A coin is tossed 10 times, find the probability of getting 6 heads.

```
> n = 10

> p = 0.5

> reqd = 6

> dbinom(reqd, n, p)

[1] 0.2050781
```

Q5. The mean and variance of a Binomial distribution are respectively 24 and 8, find:

(i) P(x>=2)
(ii) P(x<2)
(iii) P(x<10)

```
> m = 24
> v = 8
>
> q = v/m
> p = 1-q
> n = m/p
>
> 1 - pbinom(1, n, p)
[1] 1
> pbinom(1, n, p)
[1] 4.863598e-16
> pbinom(9, n, p)
[1] 3.80788e-07
```