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:

1. no defective
2. one defective
3. 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:

1. Without a breakdown
2. With only one breakdown and
3. 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:

1. P(x>=2)
2. P(x<2)
3. 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