SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
WINTER SEMESTER - 2024-25
PMDS503P – Statistical Inference
LAB – Programming with R
Assignment No. 4
LAB ASSIGNMENT Date: 24.03.2025
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```
#Q1.(a)  If 20 cards are defective, what is the probability that at least 1 defective card
p1 = 20/140
n = 20
p1

## [1] 0.1428571

dbinom(1,n,p1)

## [1] 0.1527365

#(b) If 5 cards are defective, what is the probability that at least 1 defective card appea
p2 = 5/140
p2

## [1] 0.03571429

dbinom(1,n,p2)

## [1] 0.3579158
```

```
#Q2. The number of failures of a testing instrument from contamination particles on the pro
#(a) What is the probability that the instrument does not fail in an     8-hour shift?
lambda = 0.02
p = dpois(0,lambda*8)
p

## [1] 0.8521438

#(b) What is the probability of at least one failure in a 24-hour day?
p1 = 1-dpois(0,lambda*24)
p1

## [1] 0.3812166
```

```r
#Q3.3. The thickness of a laminated covering for a wood surface is normally distributed with
#(a) What is the probability that a covering thickness is greater than 5.5 millimeters?
mu =5
sigma = 0.2
pg = 1-pnorm(5.5,mean = mu,sd=sigma)
pg
```

```
## [1] 0.006209665
```

```r
#(b) If the specifications require the thickness to be between 4.5 and 5.5 millimeters,what
pb = pnorm(4.5,mean = mu,sd = sigma )
pb
```

```
## [1] 0.006209665
```

```r
#(c) The covering thickness of 95% of samples is below what value?
p = pnorm(0.95,mean = mu ,sd= sigma)
p
```

```
## [1] 1.7762e-91
```

```r
#4. The time between calls is exponentially distributed with a mean time between calls of 1
#(a) What is the probability that the time until the first call is less than 5 minutes?
lambda = 1/10
p_less = pexp(5,rate = lambda)
p_less
```

```
## [1] 0.3934693
```

```r
#(b) What is the probability that the time until the first call is between 5 and 15 minutes
p_betw = pexp(15,rate = lambda)-pexp(5,rate = lambda)
p_betw
```

```
## [1] 0.3834005
```

```r
#(c) Determine the length of an interval of time such that the probability of at least one
p_time = qexp(0.90,rate = lambda)
p_time
```

```
## [1] 23.02585
```