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Rollnos: B033

[Question 1]

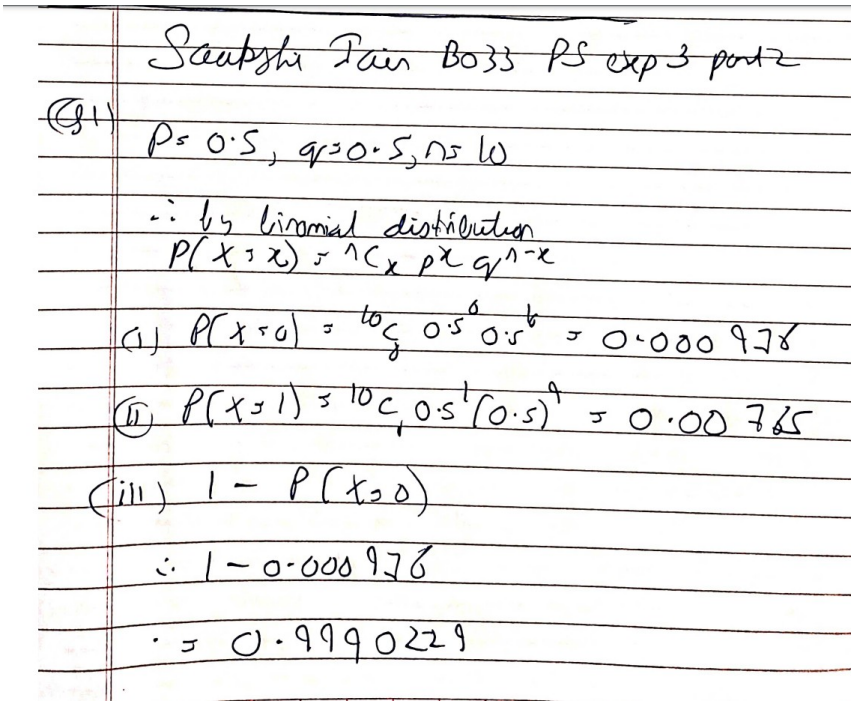
1. The probability of entering students in chartered accountant will graduate is 0.5. Determine the probability that out of 10 students

i. None

ii. One

iii. At least one will graduate Write a R program for above problem.

```
> #Question 1
> x = pbinom(0,10,0.5)
> print(x)
[1] 0.0009765625
>
> y = pbinom(1,10,0.5)
> print(y)
[1] 0.01074219
>
> z=1-x
> print(z)
[1] 0.9990234
>
```

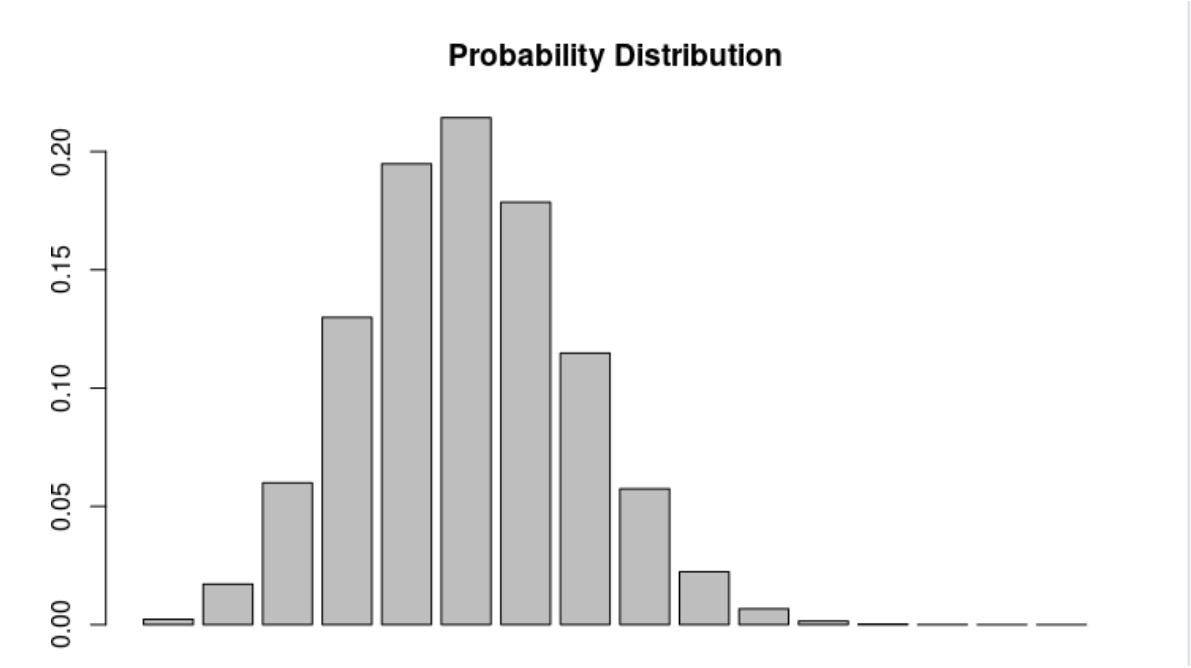


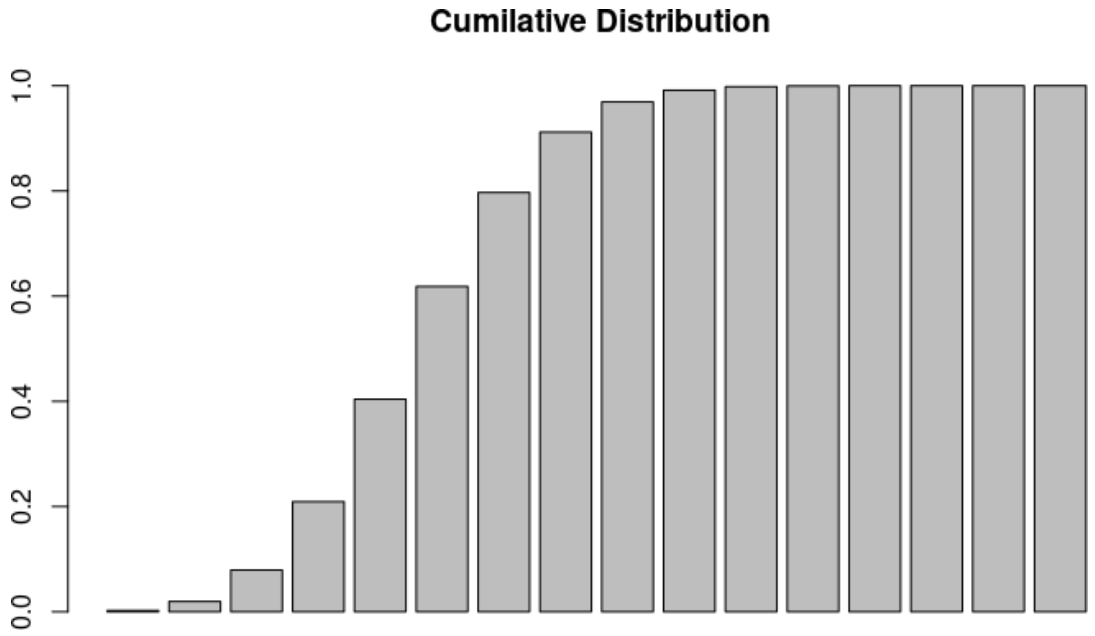
[Question 2]

2. Find binomial distribution if the mean is 5 and variance is 10/3. Write a R program for above problem. Also write a R program to plot probability distribution and cumulative probability distribution.

```
> #Question 2
> mean=5
> var=10/3
> q=var/mean
> print(q)
[1] 0.6666667
>
> p=1-q
> print(p)
[1] 0.3333333
>
> n=5/p
> print(n)
[1] 15
```

```
> x=(0:n)
> y=pbinom(x,n,p)
> z=dbinom(x,n,p)
> print(y)
 [1] 0.002283658 0.019411095 0.079357125 0.209240188 0.404064783 0.618371838 0.796961051 0.911768402 0.969172077
[10] 0.991495729 0.998192824 0.999714891 0.999968569 0.999997840 0.999999930 1.000000000
> print(z)
 [1] 2.283658e-03 1.712744e-02 5.994603e-02 1.298831e-01 1.948246e-01 2.143071e-01 1.785892e-01 1.148074e-01
 [9] 5.740368e-02 2.232365e-02 6.697095e-03 1.522067e-03 2.536779e-04 2.927052e-05 2.090752e-06 6.969172e-08
> barplot(y)
> barplot(z)
```





Q2) Mean > 5 ; np , Var = 10/3 = npq

∴ 10/3 = 5q q = 1/3

p = 1 − q = 1/3

5 = n = 1/3

∴ n = 15 , p = 1/3 , q = 2/3

By Linear distribution

$P(X = x) = {}^{15}C_x \left(\frac{1}{3}\right)^{n} \left(\frac{2}{3}\right)^{15-x}$

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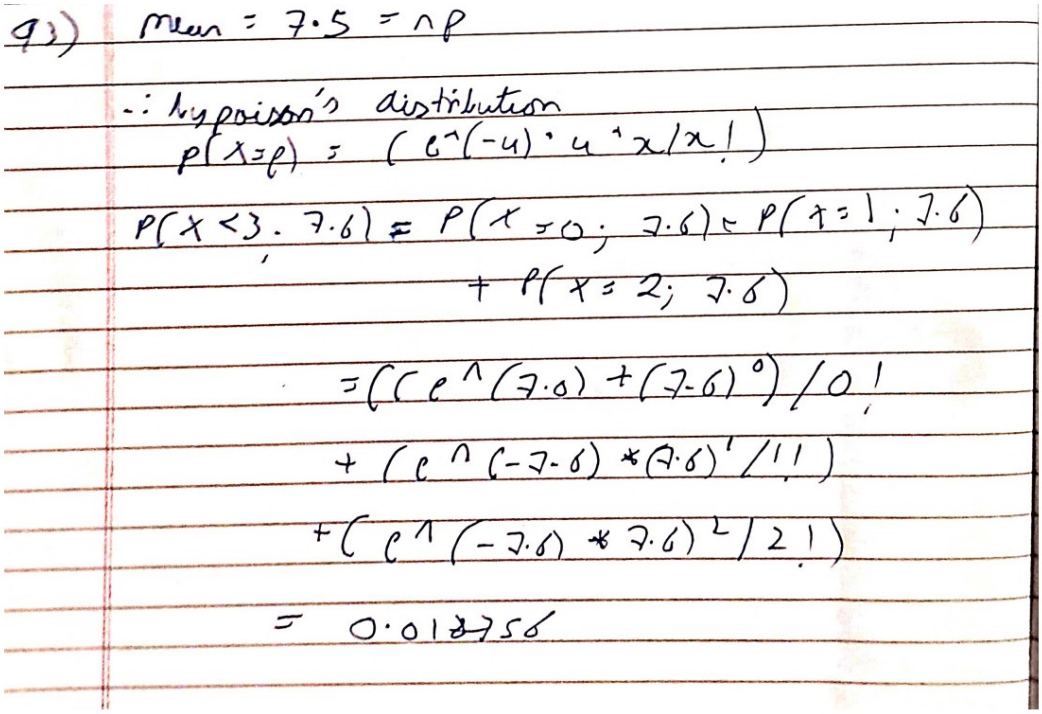
[Question 3]

3. The number of traffic accidents that occur on a particular stretch of road during a month follows a Poisson distribution with a mean of 7.6. Find the probability that

i. less than three accidents will occur next month on this stretch of road.

ii. Exactly three accidents will occur next month on this stretch of road. Write a R program for above problem.

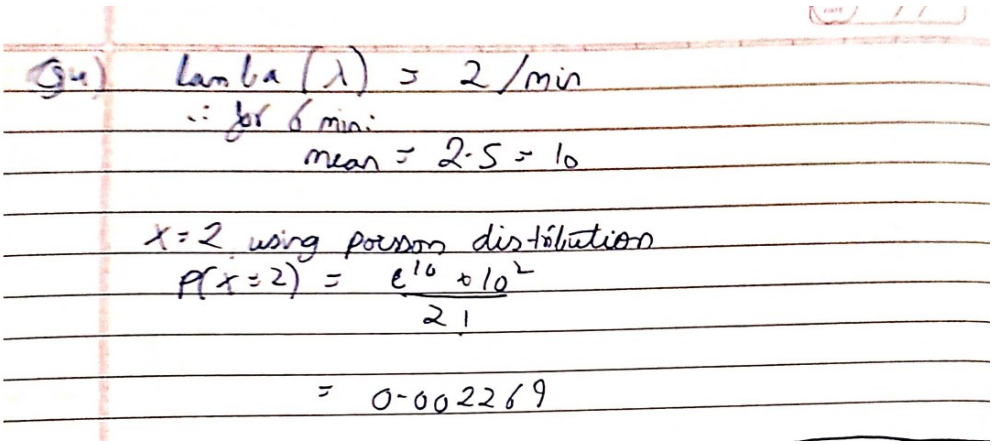
```
> #Question 3
>
> mean=7.6
> x=ppois(2,mean)
> y=dpois(3,mean)
> print(x)
[1] 0.01875692
> print(y)
[1] 0.03661436
>
```



[Question 4]

4. Telephone calls arrive at an exchange according to the Poisson process at a rate λ= 2/min. Calculate the probability that exactly two calls will be received during each of the first 5 minutes of the hour.

```
> #Question 4
>
> lambda=2
> totalmin=5
> mean=lambda*totalmin
> x=dpois(2,mean)
> print(x)
[1] 0.002269996
>
```



[Question 5]

5. Find 8 random values from a sample of 150 with probability of 0.4.

```
> #Question 5
>
> x=rbinom(8,150,0.4)
> print(x)
[1] 61 57 63 60 67 61 52 70
>
```

[Question 6]

6. How many heads will have a probability of 0.25 will come out when a coin is tossed 51 times. What is the Probability of getting 26 or less heads from a 51 tosses of a coin

```
> #Question 6
>
> x=qbinom(0.25,51,0.5)
> print(x)
[1] 23
>
> y=pbinom(26,51,0.5)
> print(y)
[1] 0.610116
>
```