R Notebook

Code

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Exercise 8

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#a)
#Binomial distribution is a discrete probability distribution that models the number of succe
sses in a fixed number of independent trials.
#Binomial distribution has two parameters: n, the number of trials, and p, the probability of
success on each trial. The probability mass function (PMF) of binomial distribution is given
by:
#f(x)= (nCx) x (p^x) x ((1-p)^n-x)
#where x is the number of successes and (n  x) is the binomial coefficient.

#Gamma distribution is a continuous probability distribution that models the time until a cer
tain number of events occur in a Poisson process.
#Gamma distribution has two parameters: k (or α), the shape parameter, and θ (or β), the scal
e (or rate) parameter. The probability density function (PDF) of gamma distribution is given
by:
#f(x)=1/(Γ(k)θ^k)(x^(k−1)e^(−x/θ))
#where x is the time variable and Γ(k) is the gamma function.
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#b)
#To generate 10 random values from a binomial distribution with n = 20 and p = 0.5, you can u
se the rbinom function:

set.seed(123)
rbinom(10, size = 20, prob = 0.5)
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```
 [1]  9 12  9 13 13  6 10 13 10 10
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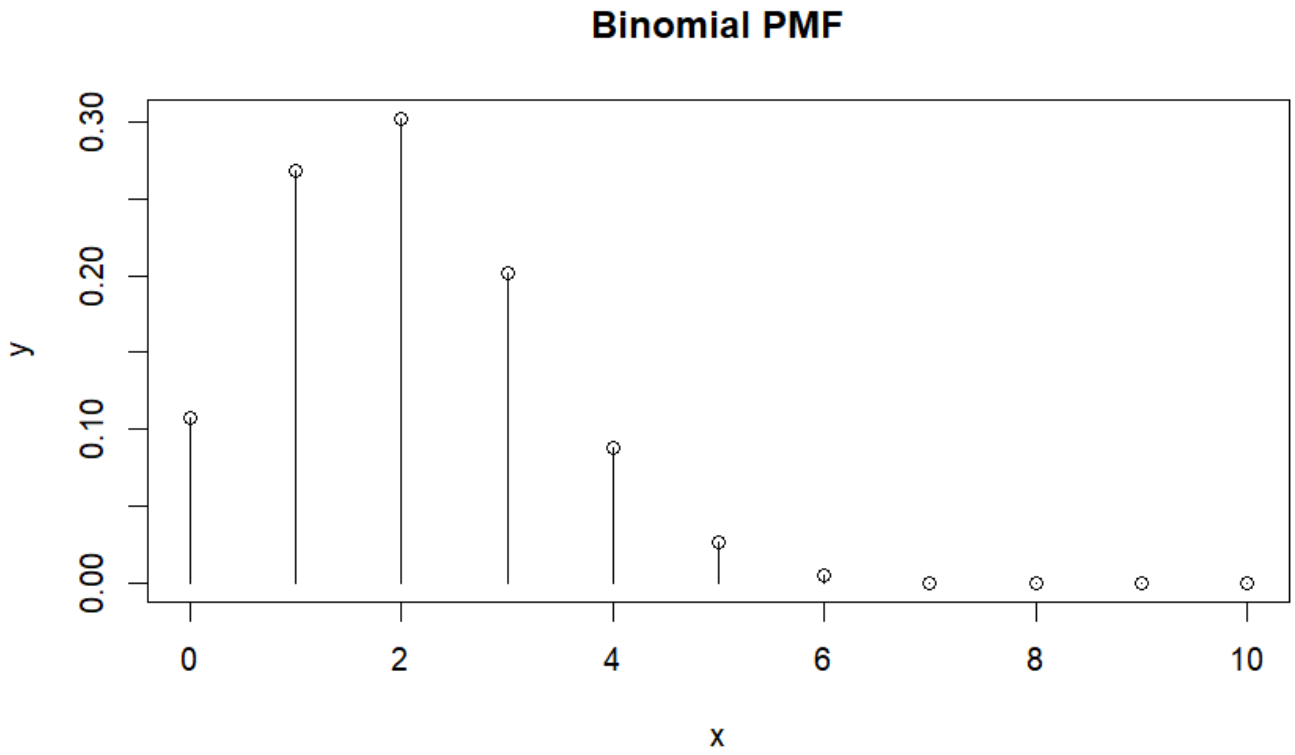
#To plot the probability mass function of a binomial distribution with n = 10 and p = 0.2, yo
u can use the dbinom function:

x <- 0:10
y <- dbinom(x, size = 10, prob = 0.2)
plot(x, y, type = "h", main = "Binomial PMF")
points(x, y)
```



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```
#To generate 10 random values from a gamma distribution with shape = 2 and rate = 1, you can use the rgamma function:

set.seed(123)
rgamma(10, shape = 2, rate = 1)
```

```
 [1] 0.8920936 3.3118474 0.1443750 1.6625233 4.3358790 2.1176157 0.3507177 0.1304001
 [9] 3.3737820 1.9730466
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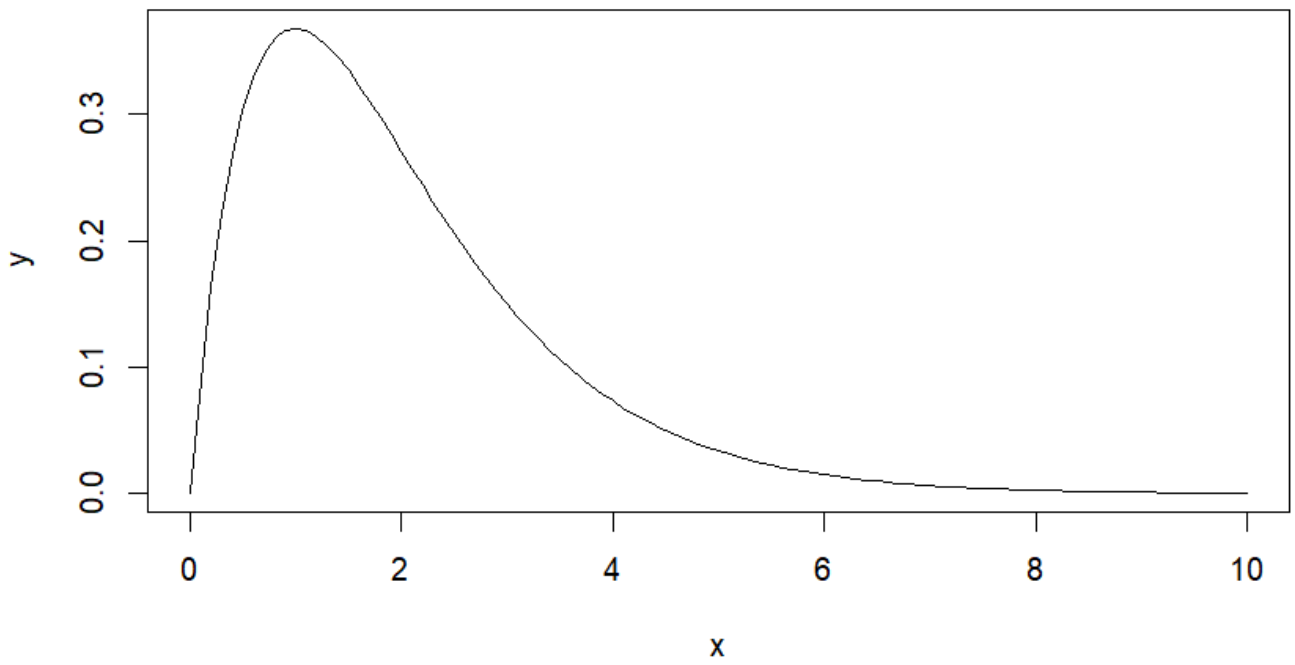
```
#To plot the probability density function of a gamma distribution with shape = 2 and rate = 1, you can use the dgamma function:

x <- seq(0, 10, by = 0.1)
y <- dgamma(x, shape = 2, rate = 1)
plot(x, y, type = "l", main = "Gamma PDF")
```


Gamma PDF
y
0.0
0.1
0.2
0.3
0
2
4
6
8
10
x