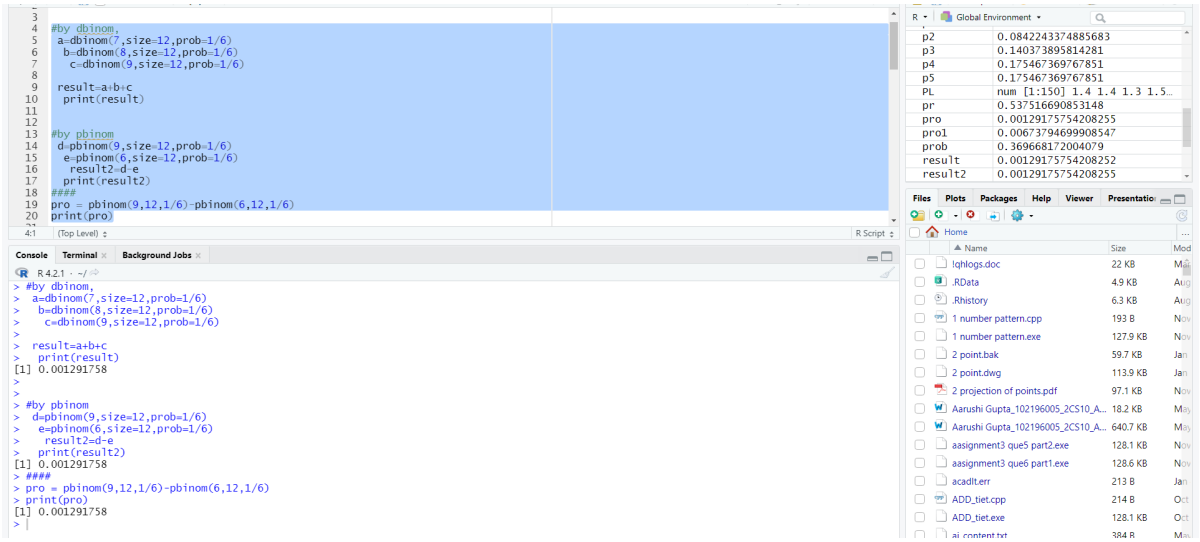
Assignment-3

Parth Vohra **102016044** **3CS10**

Que

(1) Roll 12 dice simultaneously, and let X denotes the number of 6's that appear. Calculate the probability of getting 7, 8 or 9, 6's using R. (Try using the function pbinom; If we set S = {get a 6 on one roll}, P(S) = 1/6 and the rolls constitute Bernoulli trials; thus X ∼ binom(size=12, prob=1/6) and we are looking for P(7 ≤ X ≤ 9).

```
#by dbinom,
 a=dbinom(7,size=12,prob=1/6)
  b=dbinom(8,size=12,prob=1/6)
   c=dbinom(9,size=12,prob=1/6)
 result=a+b+c
  print(result)
#by pbinom
 d=pbinom(9,size=12,prob=1/6)
  e=pbinom(6,size=12,prob=1/6)
   result2=d-e
  print(result2)
####
pro = pbinom(9,12,1/6)-pbinom(6,12,1/6)
print(pro)
```



Que 2

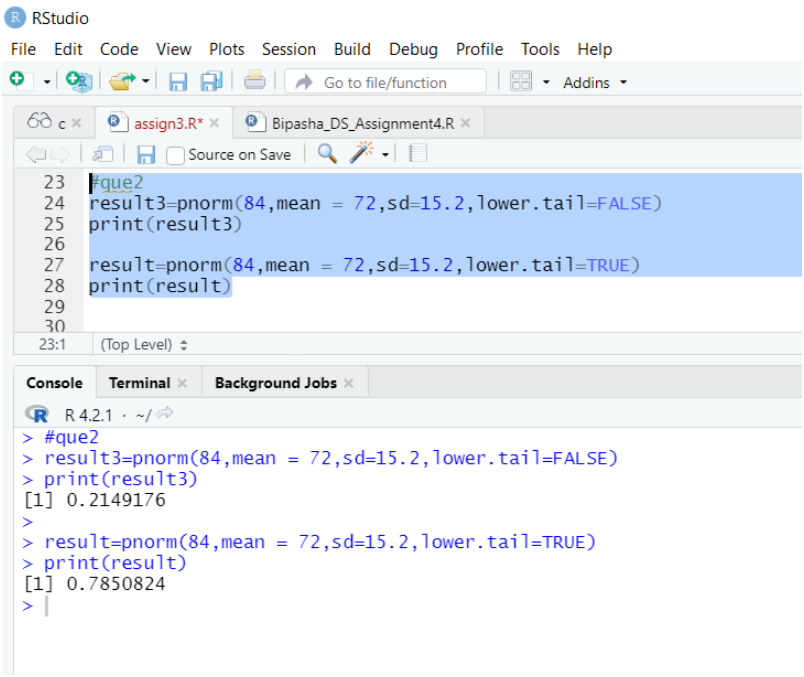
Assume that the test scores of a college entrance exam fits a normal distribution. Furthermore, the mean test score is 72, and the standard deviation is 15.2. What is the percentage of students scoring 84 or more in the exam?

result3=pnorm(84,mean = 72,sd=15.2,lower.tail=FALSE)

print(result3)

result=pnorm(84,mean = 72,sd=15.2,lower.tail=TRUE)

print(result)



Que3

On the average, five cars arrive at a particular car wash every hour. Let X count the number of cars that arrive from 10AM to 11AM, then X ~Poisson(λ = 5). What is probability that no car arrives during this time. Next, suppose the car wash above is in operation from 8AM to 6PM, and we let Y be the number of customers that appear in this period. Since this period covers a total of 10 hours, we get that Y ~ Poisson(λ = 5×10 = 50). What is the probability that there are between 48 and 50 customers, inclusive?

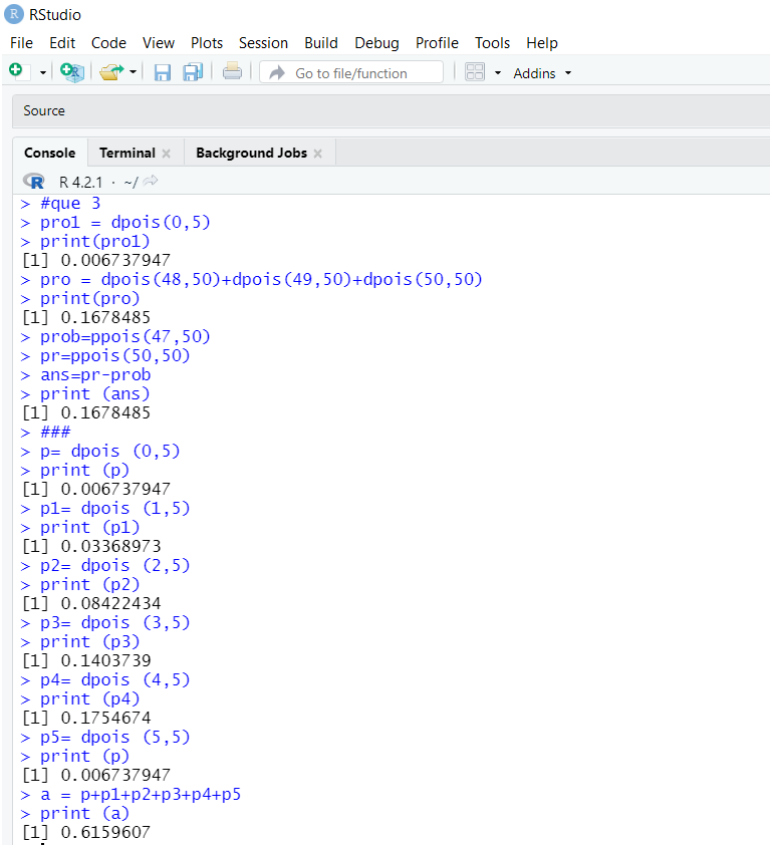
#que 3

pro1 = dpois(0,5)

print(pro1)

pro = dpois(48,50)+dpois(49,50)+dpois(50,50)

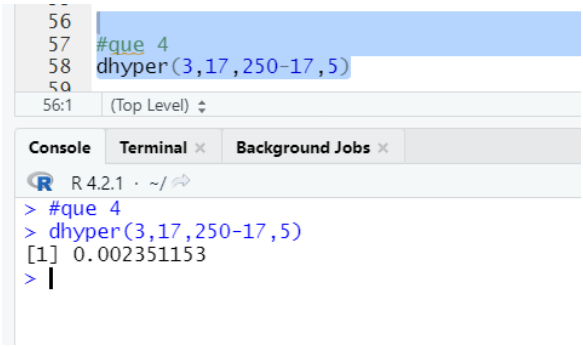
```
print(pro)
prob=ppois(47,50)
pr=ppois(50,50)
ans=pr-prob
print (ans)
###
p= dpois (0,5)
print (p)
p1= dpois (1,5)
print (p1)
p2= dpois (2,5)
print (p2)
p3= dpois (3,5)
print (p3)
p4= dpois (4,5)
print (p4)
p5= dpois (5,5)
print (p)
a = p+p1+p2+p3+p4+p5
print (a)
```



Que4

Suppose in a certain shipment of 250 Pentium processors there are 17 defective processors. A quality control consultant randomly collects 5 processors for inspection to determine whether or not they are defective. Let X denote the number of defectives in the sample. Find the probability of exactly 3 defectives in the sample, that is, find P(X = 3).

dhyper(3,17,250-17,5)



Que5

A recent national study showed that approximately 44.7% of college students have used Wikipedia as a source in at least one of their term papers. Let X equal the number of students in a random sample of size n = 31 who have used Wikipedia as a source. (a) How is X distributed? (b) Sketch the probability mass function. (c) Sketch the cumulative distribution function. (d) Find mean, variance and standard deviation of X

```
pro=dbinom(1:31,31,447/1000)

e <- data.frame(x=1:31,pro)

print(e)

plot(e,type="l")

plot(e,type="h")

print(mean(pro))

print(sd(pro))

print(var(pro))
```