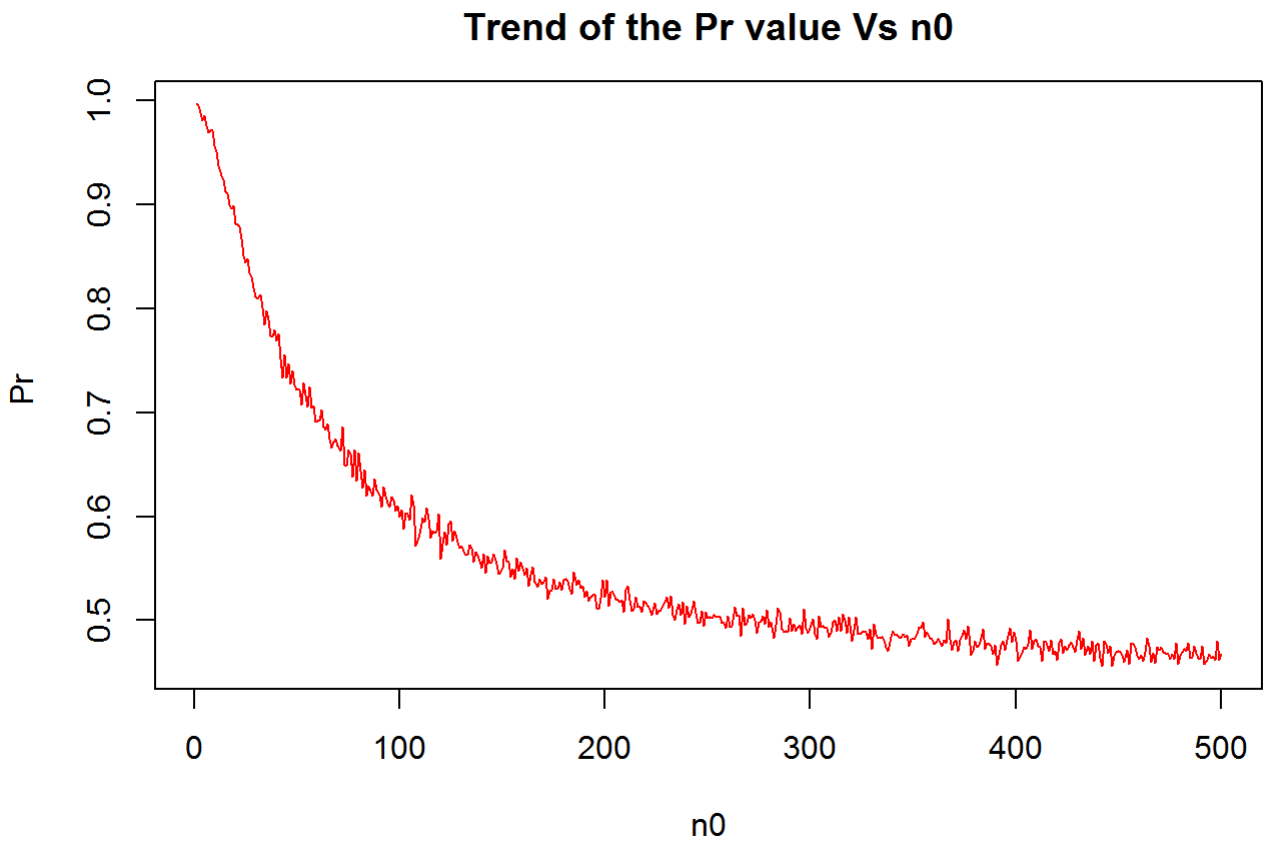
```
#Question 1 (4.2)

ya=c(12,9,12,14,13,13,15,8,15,6)
yb=c(11,11,10,9,9,8,7,10,6,8,8,9,7)
#given data observations

#Prior distributions are as follows
#thetaa=gamma(120,10)
#thetab=gamma(12,1)

#??????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????

#Part ????a

postdistmcthetaa=rgamma(1000,120+sum(ya),10+length(ya))
postdistmcthetab=rgamma(1000,12+sum(yb),1+length(yb))
#generate random posterior samples

p=mean(postdistmcthetaa>postdistmcthetab)
ans=paste("There fore Pr is",p)
print(ans)
```

```
## [1] "There fore Pr is 0.997"
```

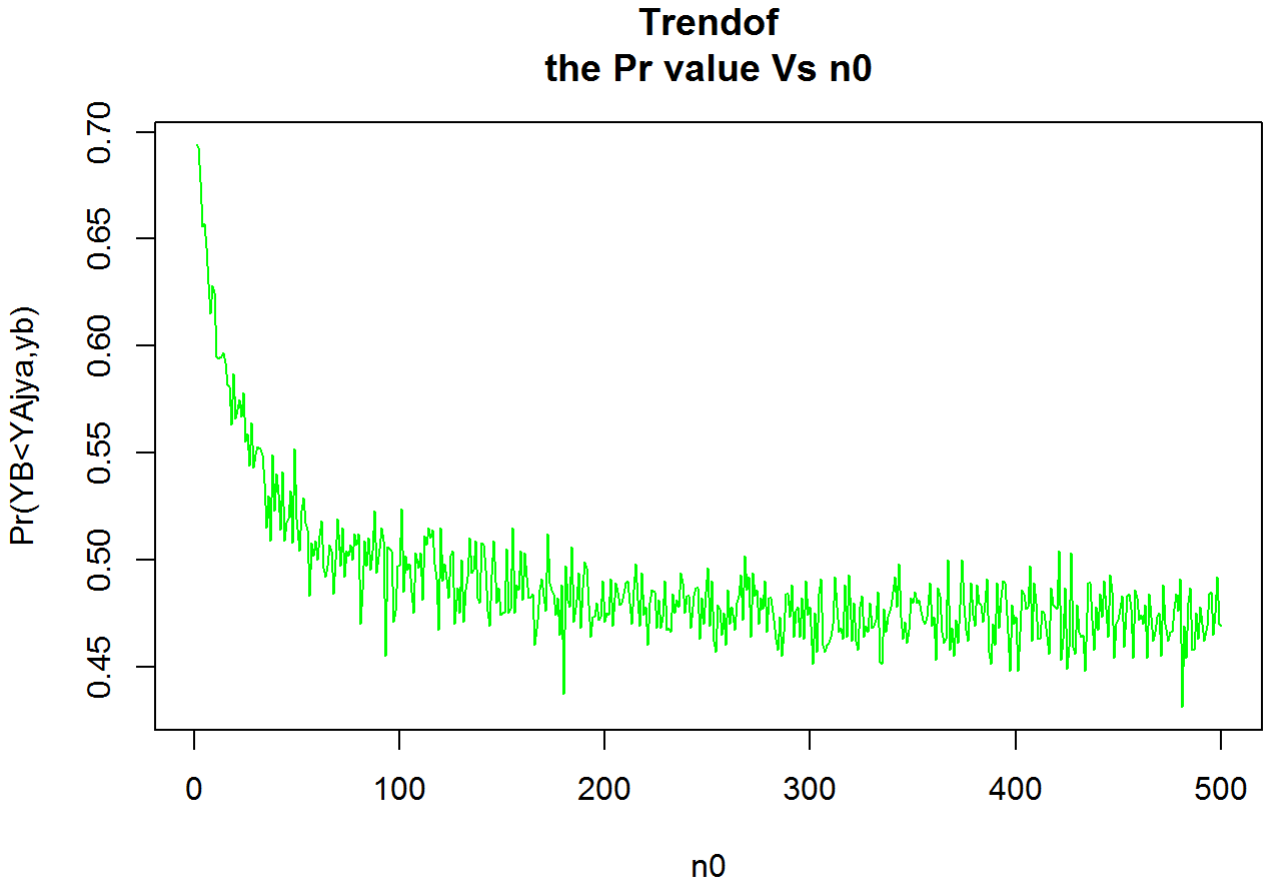
```
############################################################

#Part ????b

postdistmcthetaa=rgamma(1000,120+sum(ya),10+length(ya))
#generate random samples for data ya
pr=numeric(50)
#empty vector of length 500
for(i in 1:500)
#iterate through numbers from 1to500
{
postdistmcthetab=rgamma(1000,12*i+sum(yb),i+length(yb))
pr[i]=mean(postdistmcthetaa>postdistmcthetab)
}

plot(pr,ylab="Pr ",xlab="n0",main="
Trend of the Pr value Vs n0",col="red",type="l")
```


Trend of the Pr value Vs n0
Pr
1.0
0.9
0.8
0.7
0.6
0.5
0
100
200
300
400
500
n0

```
############################################################
#Part ????c

#subpart ????a

postdistmcthetaa=rgamma(1000,120+sum(ya),10+length(ya))
postdistmcthetab=rgamma(1000,12+sum(yb),1+length(yb))
#generate random posterior samples
yapred=rpois(1000,postdistmcthetaa)
ybpred=rpois(1000,postdistmcthetab)
#random samples for prediction data

p=mean(yapred>ybpred)
ans=paste("There fore Pr()is",p)
print(ans)
```

```
## [1] "There fore Pr()is 0.711"
```

```
#subpart ????b
pr=numeric(500)
for(i in 1:500)
{
postdistmcthetab=rgamma(1000,12*i+sum(yb),i+length(yb
))
#generate random posterior samples
ybpred=rpois(1000,postdistmcthetab)
pr[i]=mean(yapred>ybpred)
}

plot(pr,ylab="Pr(YB<YAjya,yb)",xlab="n0",main="Trendof
the Pr value Vs n0",col="green",type="l")
```


Trendof
the Pr value Vs n0
Pr(YB<YAjya,yb)
0.45
0.50
0.55
0.60
0.65
0.70
0
100
200
300
400
500
n0