

## Question7

```
library(purrr)
library(tidyr)
library(ggplot2)
```

### Question 7

*#building the posterior function with parameters*

*#theta given in the question*

*#y given in the question*

```
postE<- function(theta, y){
  n= seq(1:10) + y
  like =dbinom(y,n,theta)
  prior= dpois(n,5)
  fy = sum(like*prior)
  post= like*prior/fy
  return(cbind(theta= theta, y = y, n = n, post = post))
}
```

*#Loop throught theta and y to create list of various combinations*

df<-

```
map2(c(.2,.5)%>%rep(3)%>%map(~..1),c(0,5.,10.)%>%rep(2)%>%sort()%>%map(~..1),
~postE(..1, ..2))
```

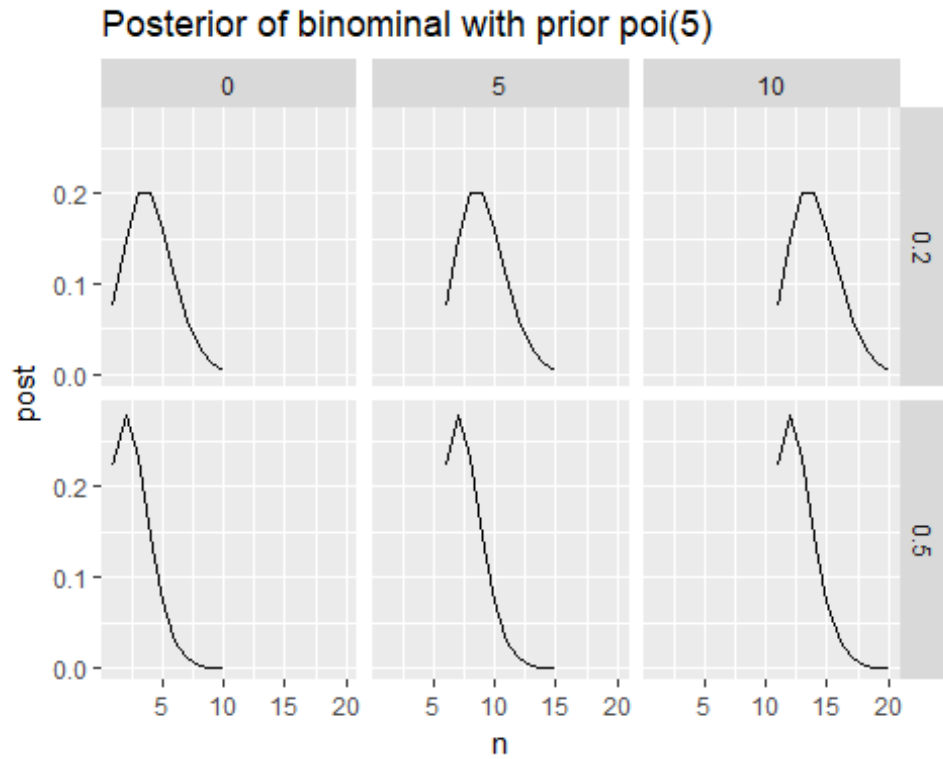
*#flaten out dataframes in list as one dataframe*

```
data<- df[[1]]%>%rbind(df[[2]])
```

```
for(i in 3:6){
  data= rbind(data, df[[i]])
}
```

*#plot the dataframes*

```
ggplot(as.data.frame(data), aes(y = post,x = n))+ geom_line()+
facet_grid(theta~y)+labs(title = "Posterior of binominal with prior poi(5)")
```



We see with the different  $\theta$  the post exterior curve peaks with  $\theta$  .2 at .2, but with .5 the curve peaks at about 2.75. Also, the posterior curve stays the same for each combination of  $y$  with the same  $\theta$ . The only difference between the 3 values of  $y$  is that the curve shifts further away from zero as  $y$  increases.