```
rm(list = ls())


theta<- seq(.01,.3,by=.001)




# Plot 1  x=5

like<- dbinom(5,100,theta)
like2<- like/max(like)


text(.055,.4,'x=5',cex=.8)


plot(c(0,.3),range(c(like2)),type='n',xlab=expression(theta),ylab='Likelihood')
lines(theta,like2)
text(.055,.4,'x=5',cex=.8)
lines(theta,like2,lty='dotted',lwd=1.5)


##Loop to find argmax
Mxinit=dbinom(5,100,theta[1])
Mx=0
argmx=0
for(i in 1:length(theta))
{
  Mx=dbinom(5,100,theta[i])
  if (Mx > Mxinit)
  {
    Mxinit=Mx
    argmx=theta[i]

  }

}
#END ARGMX loop
J=paste("The likelihood ratio is ",round(Mxinit/max(like),2)," at ",round(argmx,2), sep="")
title(J)




# Plot 2 Biomial x<11



like <- pbinom(10,100,theta)
  like1<- like/max(like)


  plot(c(0,.3),range(c(like1)),type='n',
                     xlab=expression(theta),
                     ylab='Likelihood')


       lines(theta,like1)

       text(.15,.4,'x<11',cex=.8)



  ##Loop to find argmax
  Mxinit=pbinom(10,100,theta[1])
  Mx=0
  argmx=0
  for(i in 1:length(theta))
  {
    Mx=pbinom(10,100,theta[i])
    if (Mx > Mxinit)
    {
      Mxinit=Mx
      argmx=theta[i]

    }

  }
  #END ARGMX loop
  J=paste("The likelihood ratio is ",round(Mxinit/max(like),2)," at ",argmx, sep="")
 title(J)

#Plot 3 Normal x bar= 2.5
```

```
 theta <- seq(-1,6,by=.01)
 n<- 5
 xbar<- 2.5

# sums=c()
#for(i in length(theta))
#    {
#   sum=0
#        for(j in 1:n)
#         {
#            sum= sum+(xbar-theta)^2

#        }

#    sums=rbind(sums,sum)

# }






 #llike <- log(n) + log (1/sqrt(2*pi))+-.5*sums
 like <- dnorm(xbar,mean=theta,sd=sqrt(1/n))




 plot(theta,like,type='n',
      xlab=expression(theta),
      ylab='Likelihood')

 lines(theta,like,lty='dotted',lwd=1.5)




##Loop to find argmax
Mxinit= dnorm(xbar,mean=theta[1],sd=sqrt(1/n))
Mx=0
argmx=-50
for(i in 1:length(theta))
{
  Mx=dnorm(xbar,mean=theta[i],sd=sqrt(1/n))
  if (Mx > Mxinit)
  {
    Mxinit=Mx
    argmx=theta[i]

  }

}
#END ARGMX loop
max(like)
J=paste("The likelihood ratio is ",1," at ",round(argmx,2), sep="")
title(J)






#Plot 4 Normal x max=3.5


theta <- seq(-1,6,by=.01)
theta
n<- 5
xn<- 3.5
llike <- log(dnorm(xn,mean=theta,sd=sqrt(1/n))) + (n-1)*log(1-pnorm(xn,mean=theta,sd=sqrt(1/n)))+log(n)
like <- exp(llike-max(llike))

plot(theta,like,type='n',
     xlab=expression(theta),
     ylab='Likelihood')


lines(theta,like,lty='dotted',lwd=1.5)

##Loop to find argmax
Mxinit=exp(log(dnorm(xn,mean=theta,sd=sqrt(1/n))) + (n-1)*log(1-pnorm(xn,mean=theta,sd=sqrt(1/n)))+log(n))
Mxinit
Mx=0
```

```
argmx=-50

for(i in 1:length(theta))
{
  Mx=exp(log(dnorm(xn,mean=theta[i],sd=sqrt(1/n))) + (n-1)*log(1-pnorm(xn,mean=theta[i],sd=sqrt(1/n)))+log(n))

  if (Mx > Mxinit)
  {
    Mxinit=Mx
    argmx=theta[i]

  }

}

#END ARGMX loop
J=paste("The likelihood ratio is 1 at ",round(argmx,2), sep="")
title(J)
```