Fitting & Plotting of Normal Distribution

PRANAVCHENDUR T K

15BCE1097

Faculty: ARUN PRASATH G M

Aim:

Computing/Plotting and visualising the Normal Distribution

Program:

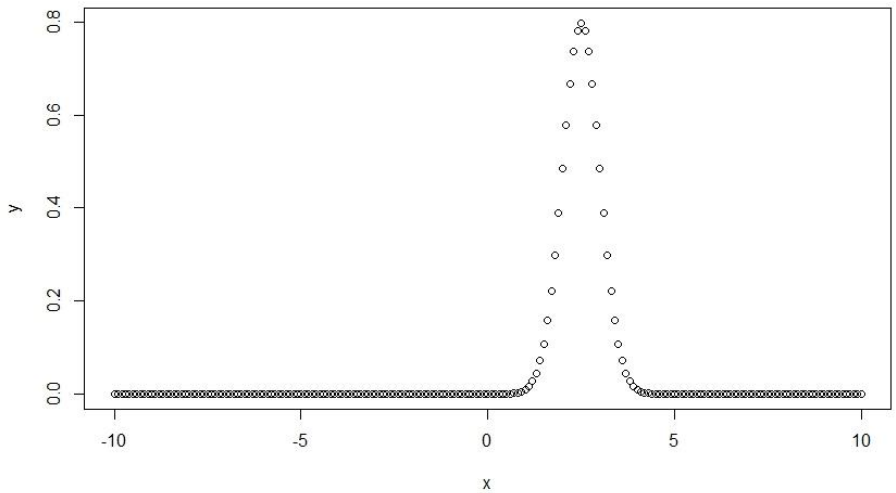
#dnorm() This function gives the height of the probability distribution at each point for a given mean and a standard devaition

#Prob 1) Create a sequence of numbers between -10 and 10 incrementing by 1

```
x = seq(-10,10,by=0.1)
x
```

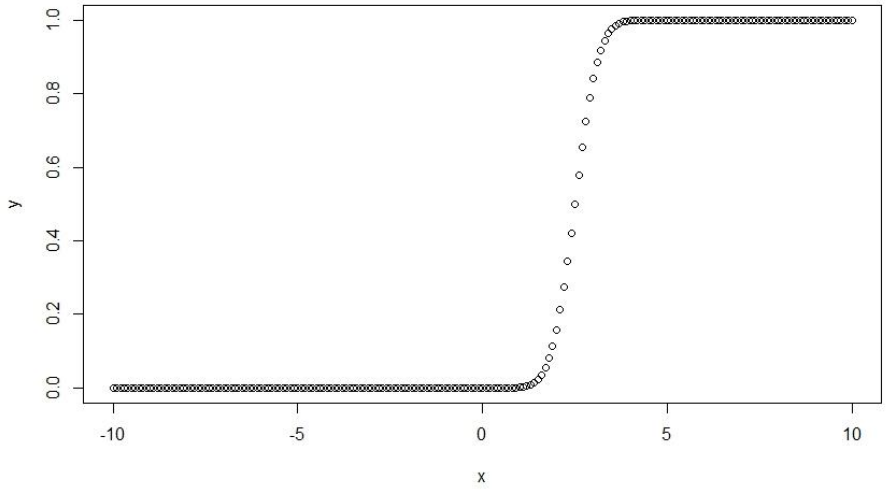
#Prob 2) Let the mean be 2.5 and standard deviation is 0.5 visualize the normal curve for the above sequence

```
y=dnorm(x,mean = 2.5,sd=0.5)
y
plot(x,y)
```



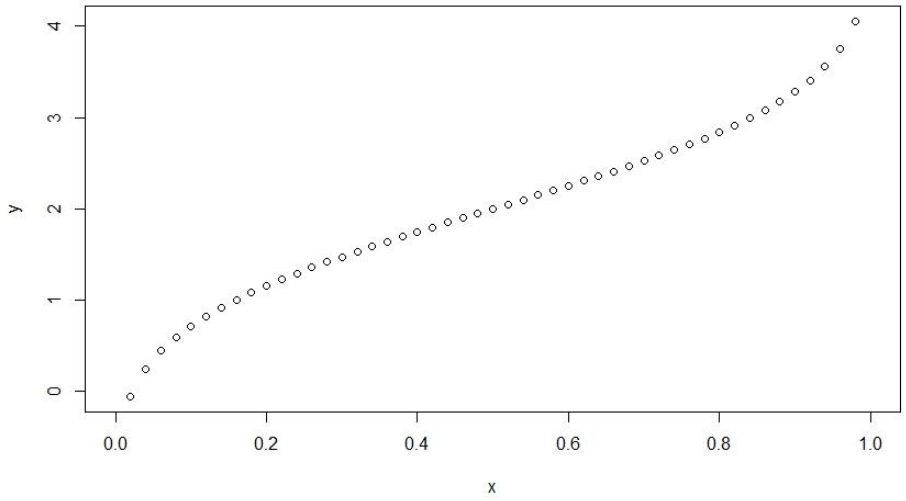
#pnorm() This function gives the probability of a normally distributed random number to be less that the value of a given number. It is also called as the Cumulative Distributive Function.

```
y=pnorm(x,mean = 2.5,sd=0.5)
plot(x,y)
```



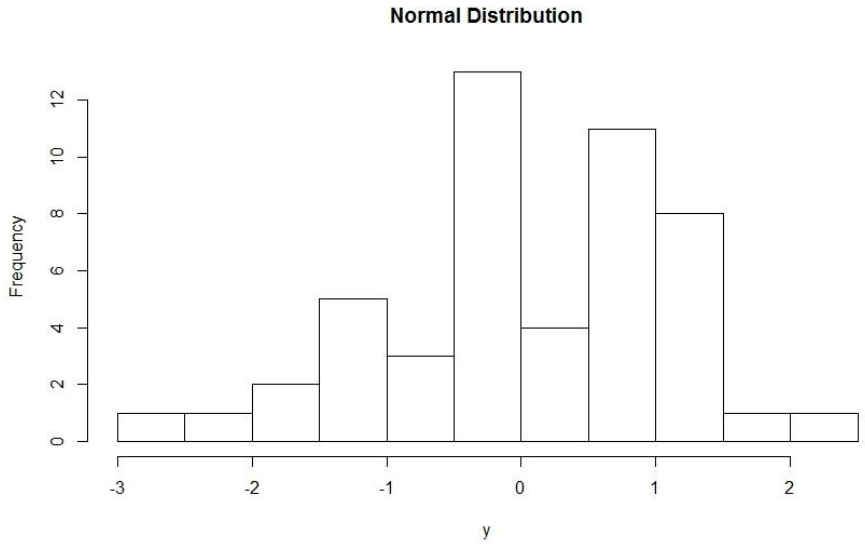
#qnorm() This function takes the probability value and gives a number whose cumulative value matches the probability value

```
x=seq(0,1,by=0.02)
y=qnorm(x,mean = 2,sd=1)
plot(x,y)
```

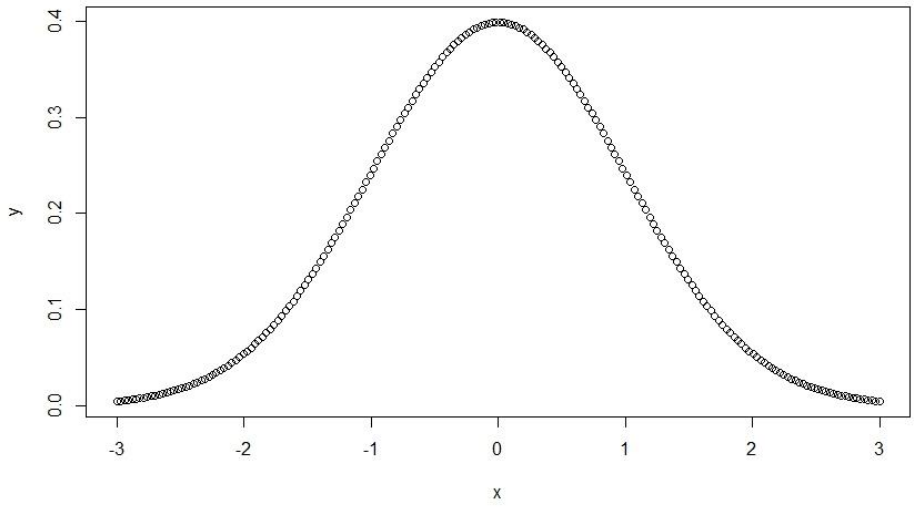


#rnorm() This function is used to generate random numbers whose distribution is normal. It takes the sample size as input and generates that many random numbers. We draw a histogram to show the distribution of the random numbers

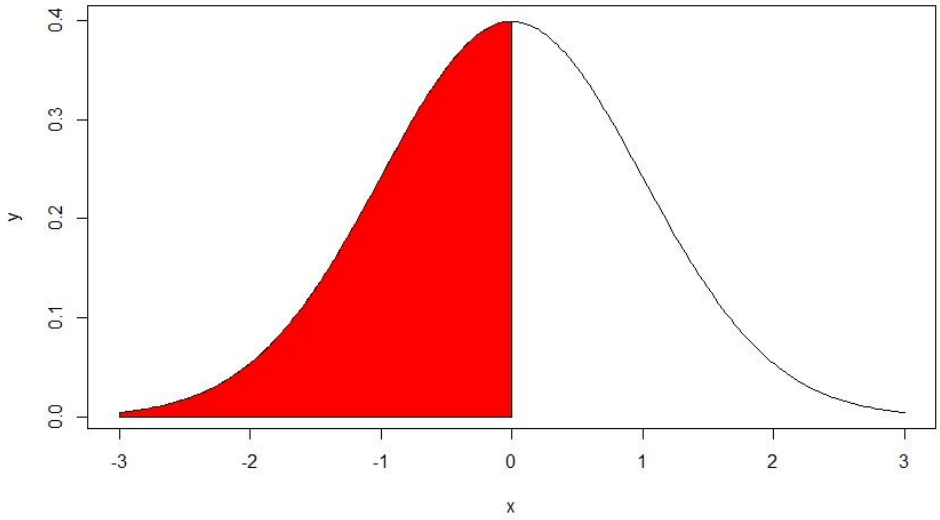
```
y=rnorm(50) #n is the size or number of observations
hist(y,main = "Normal Distribution")
```



#Standard Normal Probability Distribution Plotting and Finding the area
#Eg. To create a sequence of 200 numbers with x=-3 to 3 for standard normal pdf with mean 0 and sd 1
x=seq(-3,3,length = 200)
y=dnorm(x,mean = 0,sd=1)
plot(x,y)
plot(x,y,type = "l")



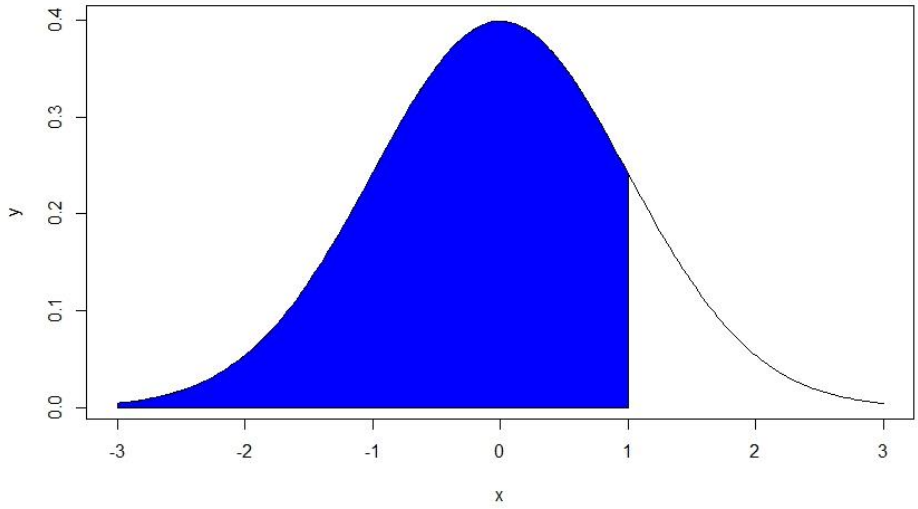
#Problem - To draw normal curve with mean 50 and sd = 50
#To find the area under the curve to the left of the mean
x=seq(-3,0,length=100)
y=dnorm(x,mean=0,sd=1)
polygon(c(-3,x,0),c(0,y,0),col = "red")
pnorm(0,mean = 0,sd =1)



#Prob2 -

```
x=seq(-3,3,length = 200)
y=dnorm(x,mean=0,sd=1)
plot(x,y,type="l")

x=seq(-3,1,length=100)
y=dnorm(x,mean=0,sd=1)
polygon(c(-3,x,1),c(0,y,0),col = "blue")
pnorm(0,mean = 0, sd=1)
```

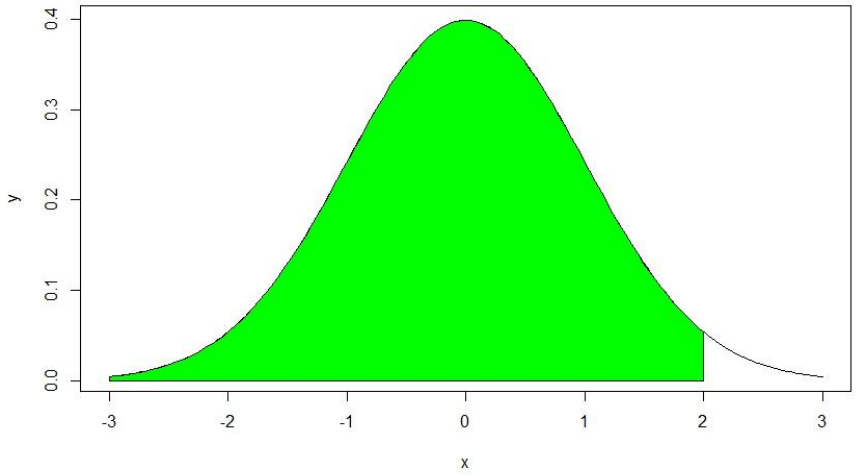


#Prob3 - Find the area to the right of 2. (first draw the image then compute)
#Area to the left of 2

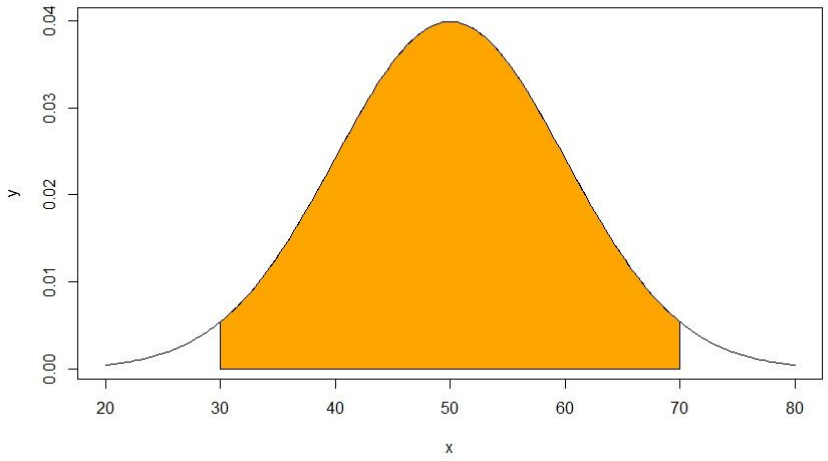
```
x=seq(-3,3,length = 200)
```

```
y=dnorm(x,mean=0,sd=1)
plot(x,y,type="l")

x=seq(-3,2,length=100)
y=dnorm(x,mean=0,sd=1)
polygon(c(-3,x,2),c(0,y,0),col = "green")
pnorm(2,mean = 0, sd=1)
```




```
#PART - II
#Example
x=seq(20,80,length = 200)
y=dnorm(x,mean=50,sd=10)
plot(x,y,type="l")
x=seq(30,70,length = 100)
y=dnorm(x,mean = 50,sd=10)
polygon(c(30,x,70),c(0,y,0),col = "orange")
pnorm(70,mean = 50,sd=10)-pnorm(30,mean = 50,sd=10)
```



```
#Normal Probability Shape
plot.new() #Gives the curve in new figure window
curve(dnorm,xlim = c(-3,3),ylim=c(0,0.5),xlab = "z",ylab = "f(z)")
zleft=0
zright=1.24
x=c(zleft,seq(zleft,zright,by=.001),zright)
y=c(0,dnorm(seq(zleft,zright,by=.001)),0)
polygon(x,y,col = "grey")
```