EX 4 Programs on Probability Distribution

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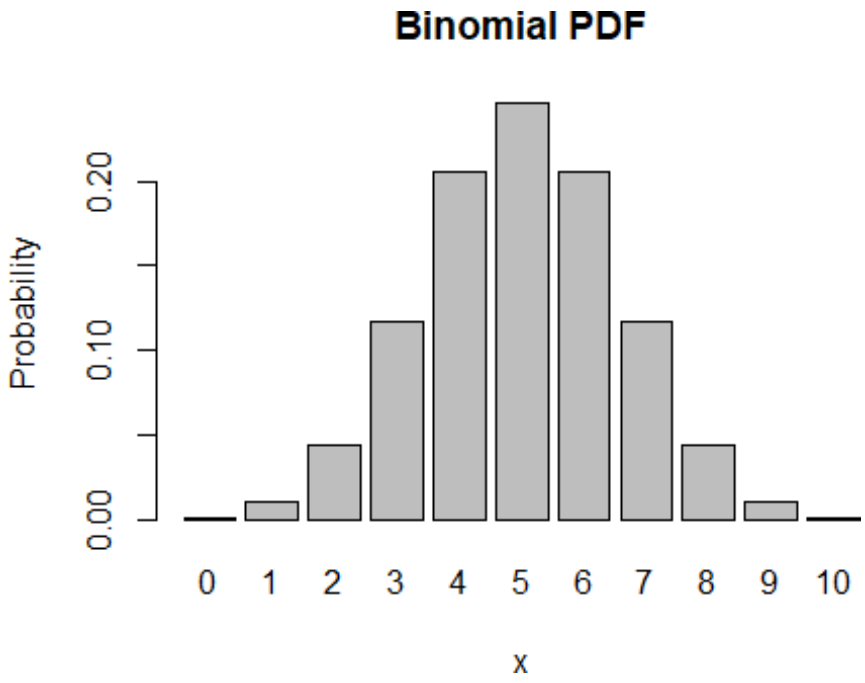
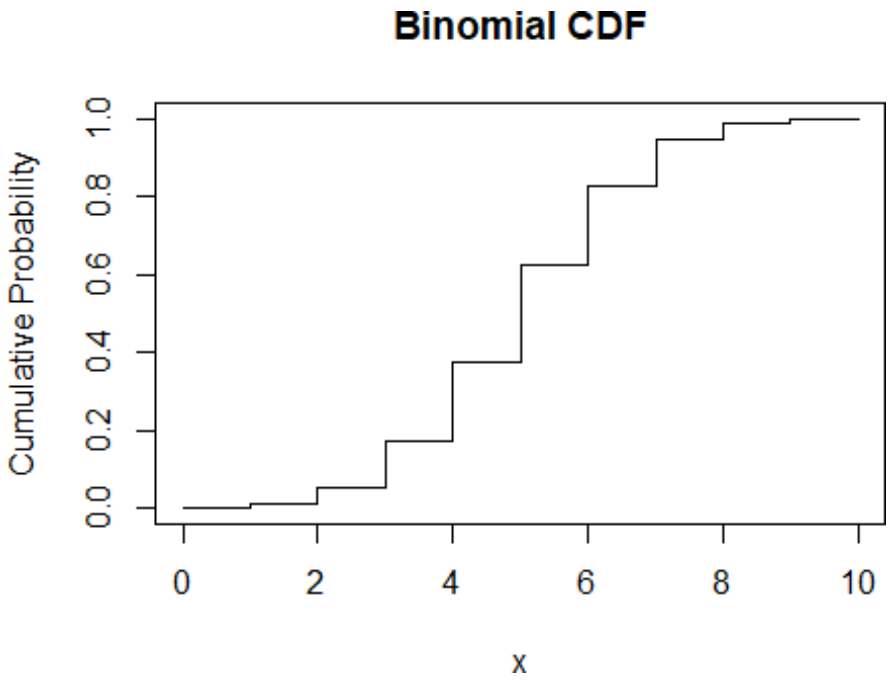
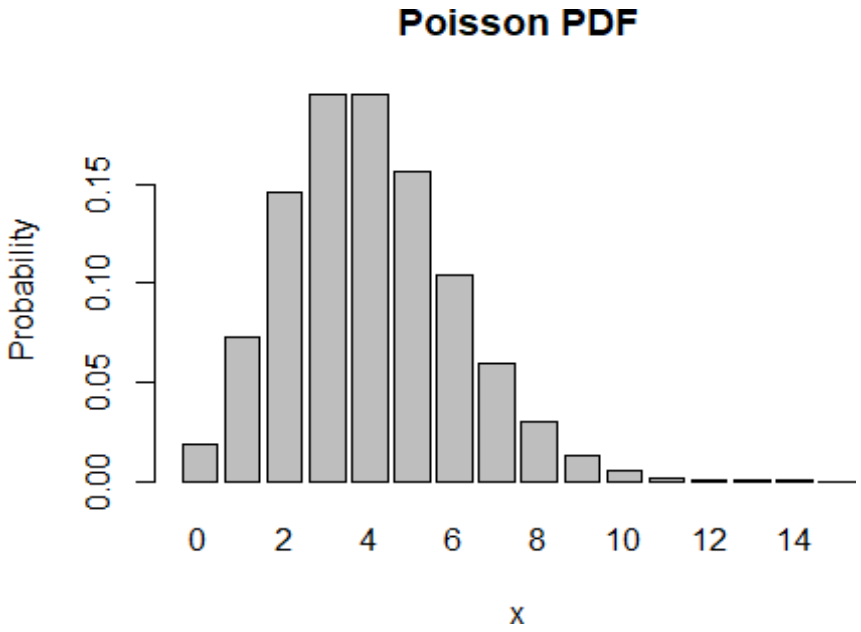
```
n <- 10
p <- 0.5
x <- 0:n
pdf <- dbinom(x, size = n, prob = p)
barplot(pdf, names.arg = x, main = "Binomial PDF", xlab = "x", ylab =
"Probability")
```



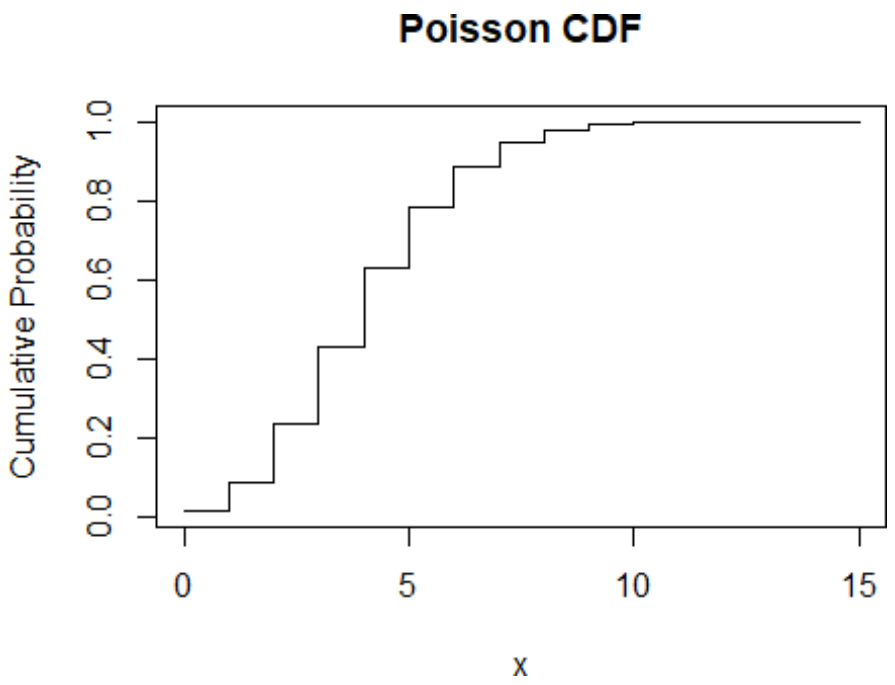

```
cdf <- pbinom(x, size = n, prob = p)
plot(x, cdf, type = "s", main = "Binomial CDF", xlab = "x", ylab =
"Cumulative Probability")
```



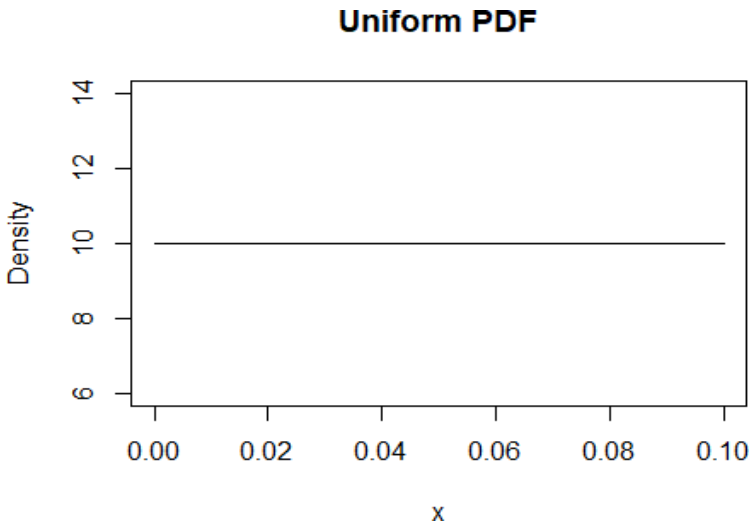

```r
lambda <- 4
x <- 0:15
pdf <- dpois(x, lambda)
barplot(pdf, names.arg = x, main = "Poisson PDF", xlab = "x", ylab =
"Probability")
```



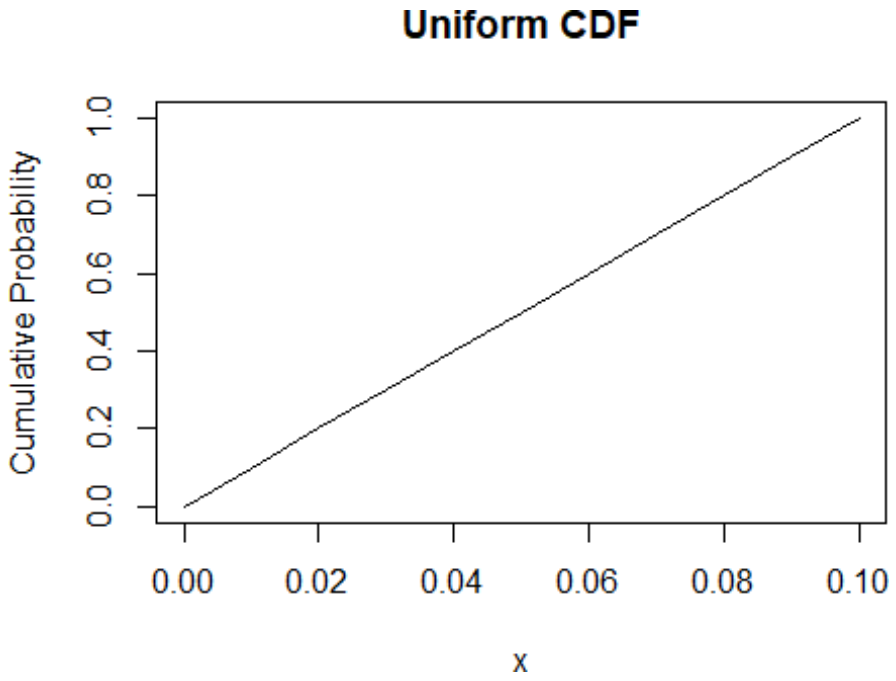
```r
cdf <- ppois(x, lambda)
plot(x, cdf, type = "s", main = "Poisson CDF", xlab = "x", ylab = "Cumulative
Probability")
```



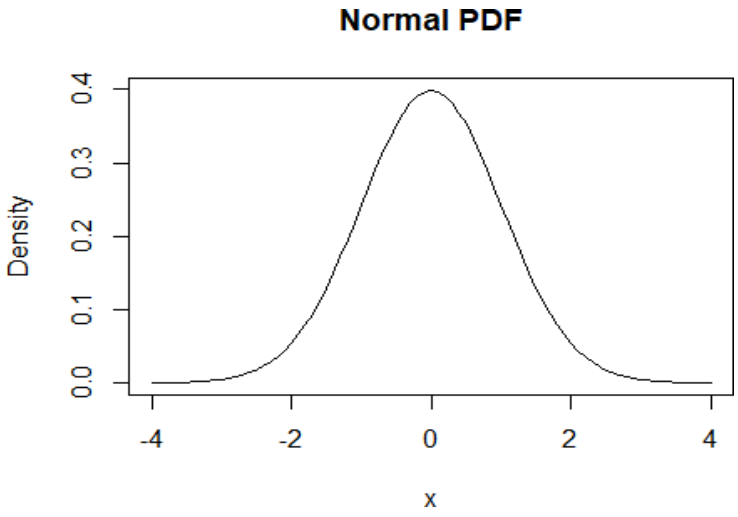

```r
b <- 1
x <- seq(0, 0.1, by = 0.01)
pdf <- dunif(x, min = 0, max = 0.1)
plot(x, pdf, type = "l", main = "Uniform PDF", xlab = "x", ylab = "Density")
```



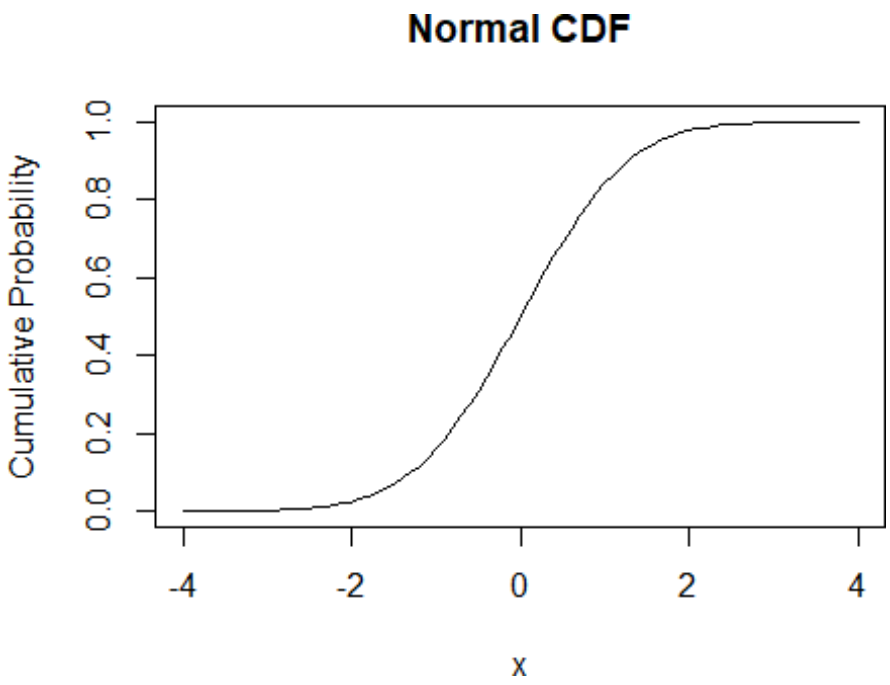
```r
cdf <- punif(x, min = 0, max = 0.1)
plot(x, cdf, type = "l", main = "Uniform CDF", xlab = "x", ylab = "Cumulative
Probability")
```




```r
mean <- 0
sd <- 1
x <- seq(-4, 4, by = 0.1)
pdf <- dnorm(x, mean = mean, sd = sd)
plot(x, pdf, type = "l", main = "Normal PDF", xlab = "x", ylab = "Density")
```

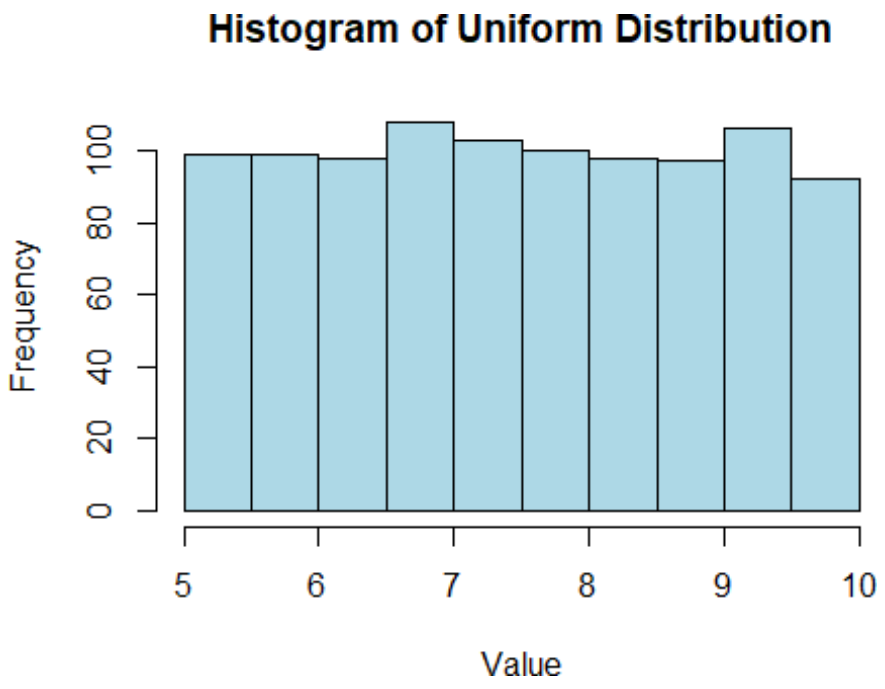


```r
cdf <- pnorm(x, mean = mean, sd = sd)
plot(x, cdf, type = "l", main = "Normal CDF", xlab = "x", ylab = "Cumulative
Probability")
```

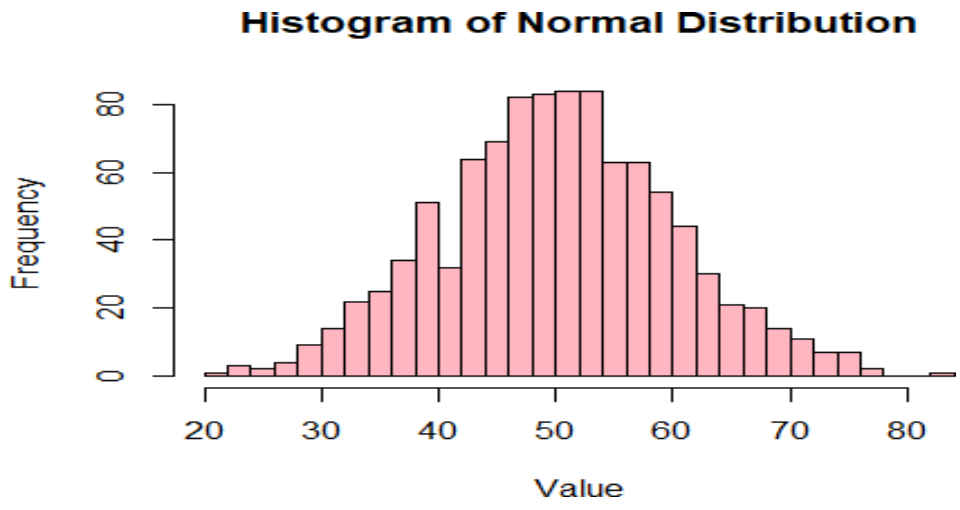



```r
prob <- pnorm(1, mean = 0, sd = 1) - pnorm(-1, mean = 0, sd = 1)
prob

## [1] 0.6826895

rate <- 1.5
mean_value <- integrate(function(x) x * dexp(x, rate), lower = 0, upper =
Inf)$value
mean_value

## [1] 0.6666667

n <- 8
p <- 0.6
prob <- dbinom(3, size = n, prob = p)
prob

## [1] 0.123863

lambda <- 2
prob <- ppois(5, lambda)
prob

## [1] 0.9834364
```

```r
set.seed(123)
data <- runif(1000, min = 5, max = 10)
hist(data, main = "Histogram of Uniform Distribution", xlab = "Value", ylab =
"Frequency", col = "lightblue")
```




```r
set.seed(123)
data <- rnorm(1000, mean = 50, sd = 10)
hist(data, main = "Histogram of Normal Distribution", xlab = "Value", ylab =
"Frequency", col = "lightpink", breaks = 30)
```



```r
set.seed(123)
data <- rpois(1000, lambda = 3)
mean(data)
```

```
## [1] 2.967
```

```r
var(data)
```

```
## [1] 2.916828
```

```r
set.seed(123)
n <- 10
p <- 0.5
data <- rbinom(1000, size = n, prob = p)
mean(data)
```

```
## [1] 4.975
```

```r
var(data)
```

```
## [1] 2.556932
```