STAT 321 Homework 4

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STAT 321-001

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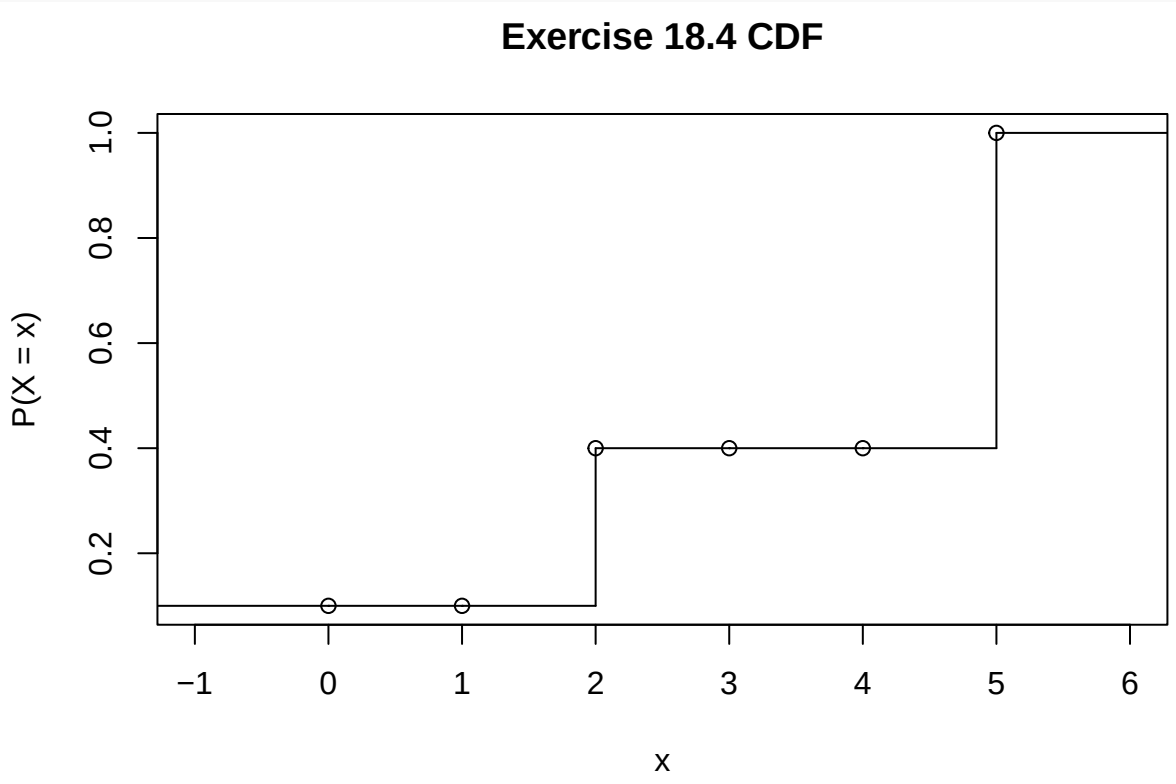
Exercise 18.4

```
rm(list=ls())
set.seed(98)
o <- 0.1
t <- o + 0.3
s <- t + 0.6
plot(stepfun(0:5,c(o,o,o,t,t,t,s)),main="Exercise 18.4 CDF",ylab="P(X = x)")
```




```
f <- function(x = runif(1)){
  x <- c(0,0)
  x[1] <- runif(1)
  if (x[1] <= o){
    x[2] <- 1
  } else if (x[1] > o & x[1] <= t){
```

```
    x[2] <- 2
  } else if (x[1] > t){
    x[2] <- 5
  }
  cat("x =",x[1],"| X =",x[2])
  }
f(x)
```

```
## x = 0.4671304 | X = 5
```

Exercise 18.12

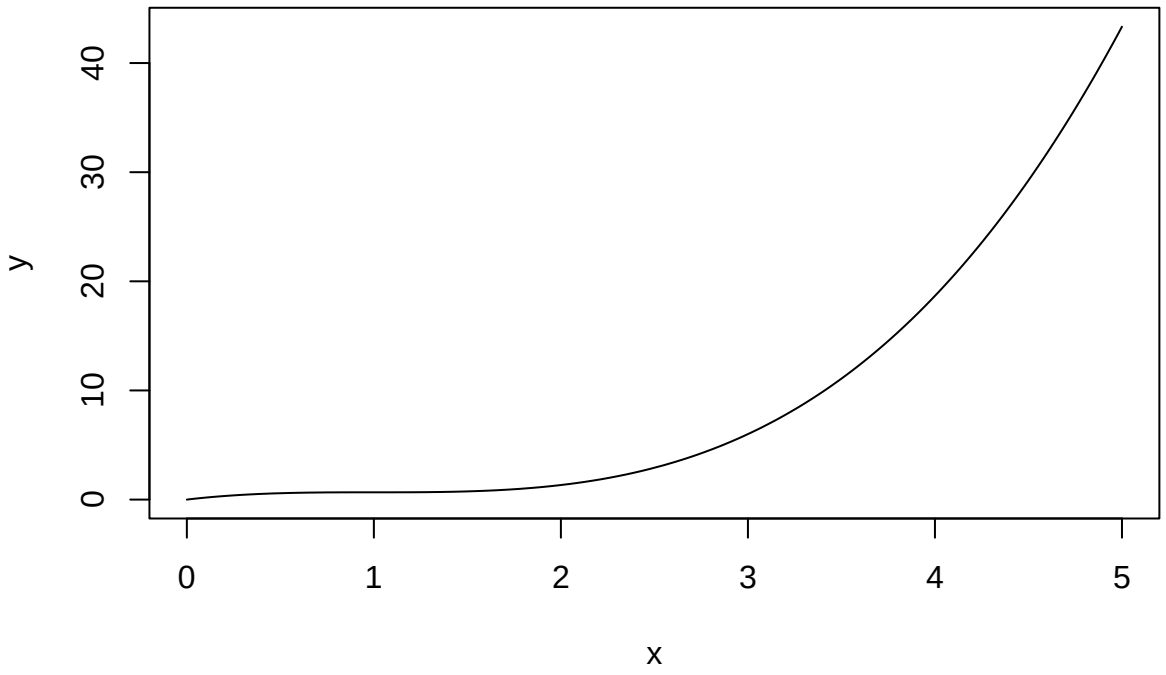
```
rm(list=ls())
set.seed(321)
# Because N is a discrete variable and the variance is unknown, a poisson distribution would be a good
# Geometric distribution with p = 0.8                                    # Exercise 18.12b
# Y = sum(Xi)                                                            # Exercise 18.12c
N <- function(x = 10){rpois(1,x)}
n <- N()
X <- function(i = n){rgeom(i,0.8)}
Xi <- X()
Y <- function(x = Xi){sum(x)}
cat("N =",n,"\nXi =",Xi,"\nY =",Y())
```

```
## N = 15
## Xi = 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0
## Y = 2
```

```
#           inf                          inf
# P(Y = 0) = S dpois(i,10)*dgeom(i,0.8) = S (10^i*e^(-10)/i!)*(0.8^i) =     # Exercise 18.12d
#           i=0                          i=0
#                   inf
# P(Y = 0) = e^-10 * S 8^i/i! = 0.13533
#                   i=0
```

Exercise 18.13

```
rm(list=ls())
# int(2(x-1)^2 dx) =
# 2 * int((x^2-2x+1) dx) =
# 2(x^3/3-x^2+x)
x <- seq(0,5,len=250)
y <- 2/3*x^3-2*x^2+2*x
plot(x,y,type="l")
```



Exercise 18.14

```
rm(list=ls())
# int(e^(-x)/(1+e^(-x))^2 dx) =      # u = 1+e^(-x)
# int(-1/(u)^2 du) =                 # du = -e^(-x) dx
# 1/u =
# 1/(1+e^(-x))
```