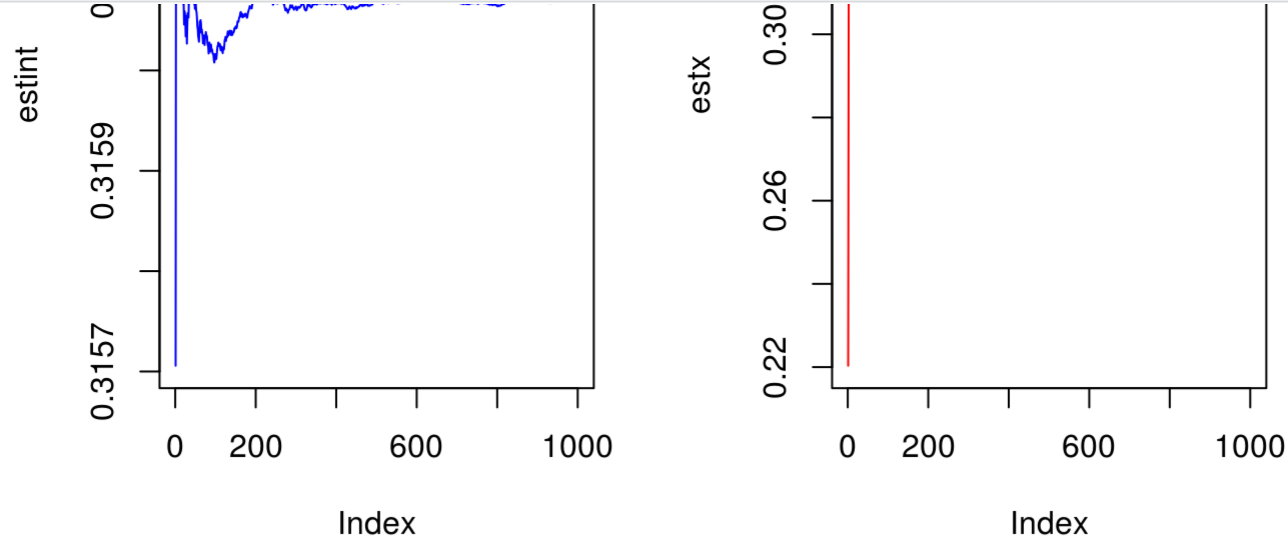

(iv) $f_4(x) = \frac{2}{\pi\sqrt{3}}(1 + x^2/3)^{-2}$

```
# Set parameters
  Nsim <- 1000
  q <- 8
# Set Function
  fx <- function(x){
    (2/(pi*sqrt(3)))*(1+x^2/3)^(-2)
  }

## Generate Uniform
  U <- runif(Nsim,0,1)
  x <- fx(U)
  estx <- cumsum(x)/1:Nsim

## dyadic symetries
  resid <- U%%2^(-q)
  simx <- matrix(resid,ncol=2^q,nrow=Nsim)
  simx[,2^(q-1)+1:2^1] <- 2^(-q)-simx[,2^(q-1)+1:2^1]
  for (i in 1:2^q){
    simx[,i] <- simx[,i] + (i-1)*2^(-q)
  }
  xsym <- fx(simx)
  estint <- cumsum(apply(xsym,1,mean))/(1:Nsim)

## Sum up
  print(paste0("The raw variance is ",var(estx)," The variance with antithetic variable is ", va
r(estint)
              ,"The raw mean is ", mean(estx)," The mean with antithetic variables is ",mean(est
int)))
```

```
## [1] "The raw variance is 6.68384962391457e-06 The variance with antithetic variable is 1.9060
7093035838e-10The raw mean is 0.303640666200224 The mean with antithetic variables is 0.30448800
0391239"
```