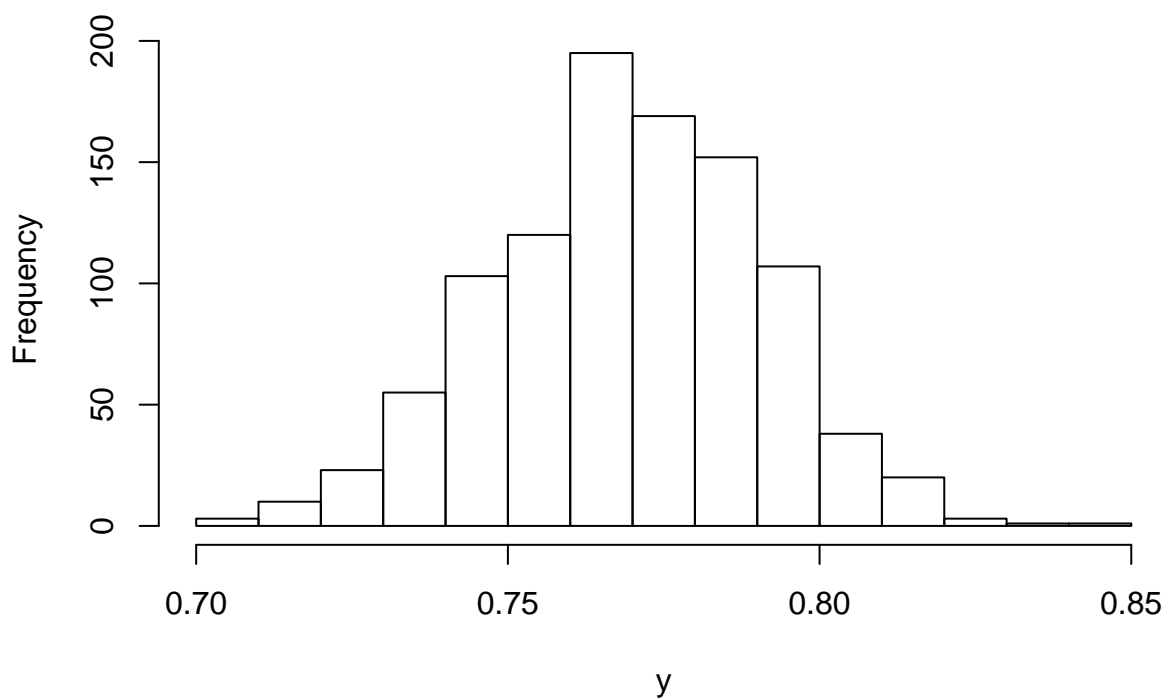# HW5Part6

Eric Rothman

March 15, 2018

```r
thetaMLE = 73/95
p1 = (1 - thetaMLE)*(1 - thetaMLE)
p2 = 2*thetaMLE*(1-thetaMLE)
p3 = thetaMLE * thetaMLE
multinom<-rmultinom(1000,190,c(p1,p2,p3))
y<-rep(0,1000)
for(i in 1:1000) {y[i]<-((2*multinom[3,i]+multinom[2,i])/(2*190))}
hist(y)
```

Histogram of y


```r
sy<-sort(y)
varTheta<-var(y)
varDif<-abs(varTheta-0.000468)
standardError <- sqrt(varTheta)
stdDif<-abs(standardError-0.02164)
print(paste("Bootstrapped variance is", varTheta))
```

```
## [1] "Bootstrapped variance is 0.00046224837025391"
```

```r
print(paste("This is a difference of ", varDif, "from my asymptotic variance 0.000468"))
```

```
## [1] "This is a difference of  5.75162974608955e-06 from my asymptotic variance 0.000468"
```

```r
print(paste("Bootstrappd standard error is:", standardError))
```

```
## [1] "Bootstrappd standard error is: 0.0214999620988947"
```

```
z<-rep(0,1000)
for(i in 1:1000) {z[i]<-(sy[i]-thetaMLE)}
upperBound<-thetaMLE-z[5]
lowerBound<-thetaMLE-z[995]
print(paste("Confidence interval is (", upperBound, ", ", lowerBound, ")"))
```

```
## [1] "Confidence interval is ( 0.823684210526316 ,  0.718421052631579 )"
```

```
print(paste("Compared by my estimated interval of (0.8241, 0.7127) we get:"))
```

```
## [1] "Compared by my estimated interval of (0.8241, 0.7127) we get:"
```

```
lowerBoundDiff<-abs(lowerBound - 0.7127)
upperBoundDiff<-abs(upperBound - 0.8241)
print(paste("Lower bounds have a difference of ", lowerBoundDiff))
```

```
## [1] "Lower bounds have a difference of  0.00572105263157885"
```

```
print(paste("Upper bounds have a difference of ", upperBoundDiff))
```

```
## [1] "Upper bounds have a difference of  0.000415789473684369"
```