hw8.R

mwilde

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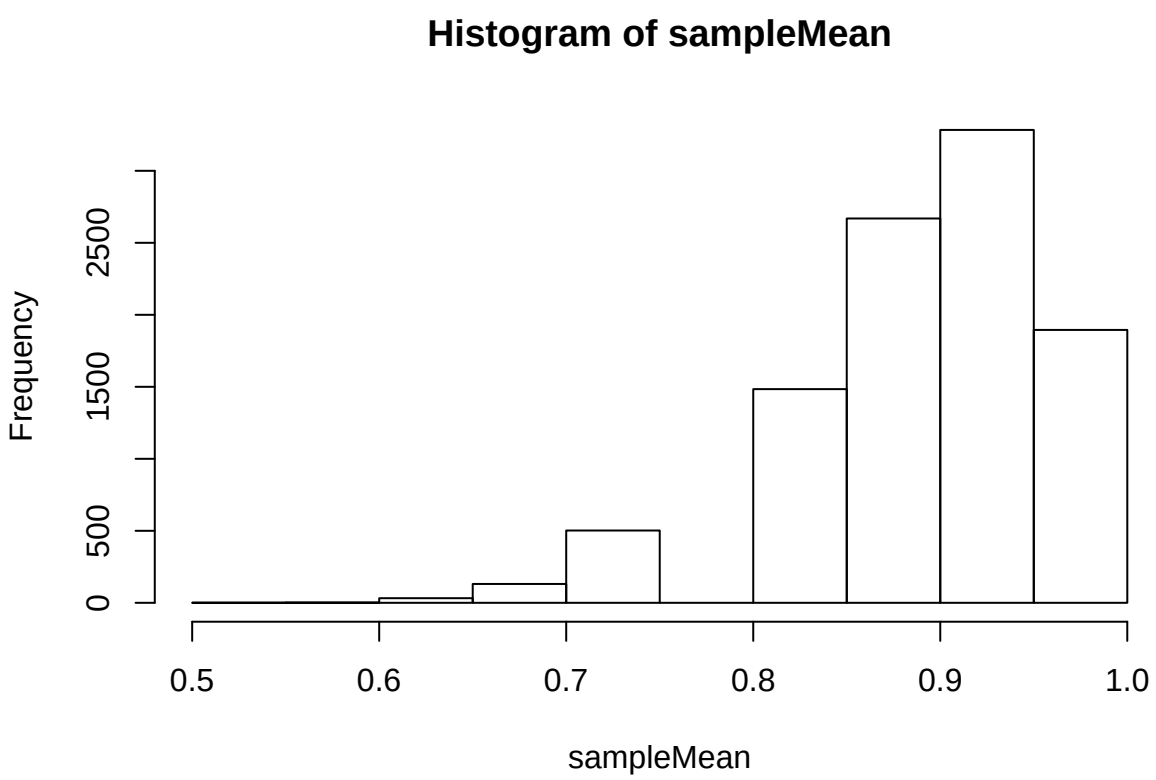
```
# HW 8
# Matthew Wilde

### Problem 1)

### b)
p = 0.9
n = 16

sampleMean = 0
for(i in 1:10000){
  sampleMean[i] = mean(rbinom(n,1,p))
}

hist(sampleMean)
```




```
# hist(rbinom(n,1,p))


### c)
print(c("mean of sampleMean:", mean(sampleMean)))
```

```
## [1] "mean of sampleMean:" "0.90030625"
```

```r
print(c("theoretical mean of sampleMean:", p))
```

```
## [1] "theoretical mean of sampleMean:" "0.9"
```

```r
print(c("var of sampleMean:", var(sampleMean)))
```

```
## [1] "var of sampleMean:"  "0.00566211304724222"
```

```r
print(c("theoretical var of sampleMean:", p*(1-p)/n))
```

```
## [1] "theoretical var of sampleMean:" "0.005625"
```

```r
### d)
MSE = 0
for(i in 1:10000){
  Xhat = mean(rbinom(n,1,p))
  MSE[i] = (Xhat - p)^2
}
print(paste("avererage MSE:", mean(MSE)))
```

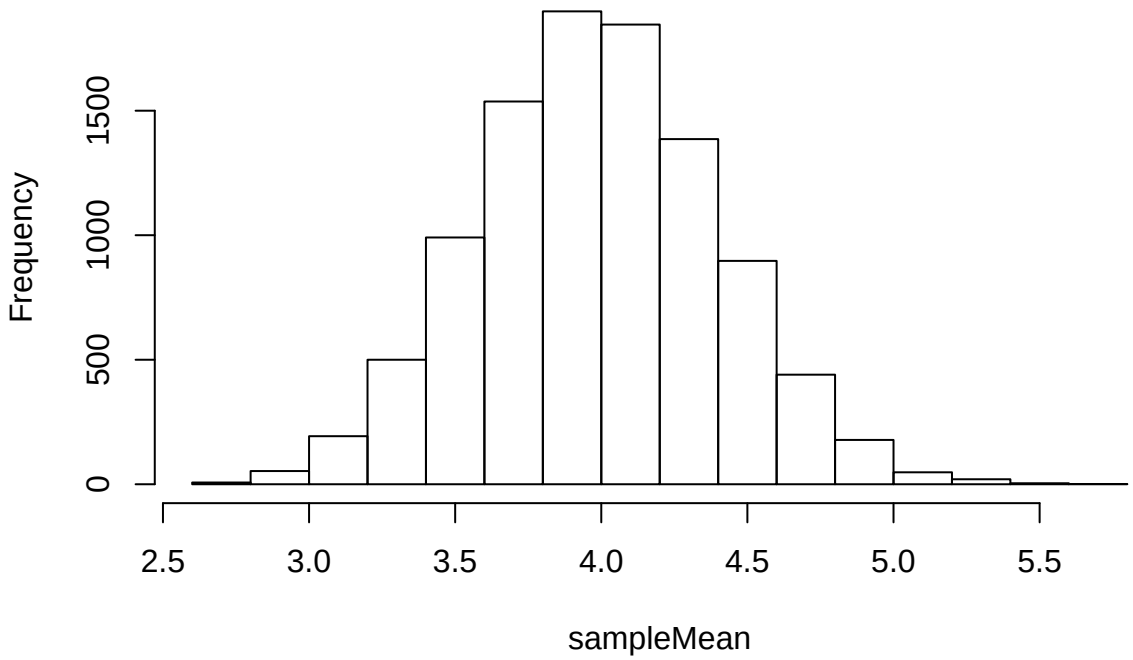
```
## [1] "avererage MSE: 0.005614140625"
```

```r
### Problem 2)
### b)

lam = 4
n = 25

sampleMean = 0
for(i in 1:10000){
  sampleMean[i] = mean(rpois(n,lam))
}

hist(sampleMean, main = "Problem 2b) Poisson")
```




```
### c)
print("problem 2c:")
```

```
## [1] "problem 2c:"
```

```
print(c("mean of sampleMean:", mean(sampleMean)))
```

```
## [1] "mean of sampleMean:" "4.005956"
```

```
print(c("theoretical mean of sampleMean:", lam))
```

```
## [1] "theoretical mean of sampleMean:" "4"
```

```
print(c("var of sampleMean:", var(sampleMean)))
```

```
## [1] "var of sampleMean:" "0.168546980762076"
```

```
print(c("theoretical var of sampleMean:", lam/n))
```

```
## [1] "theoretical var of sampleMean:" "0.16"
```

```
### d)
MSE = 0
for(i in 1:10000){
  Xhat = mean(rpois(n,lam))
  MSE[i] = (Xhat - lam)^2
}
print(paste("avererage MSE:", mean(MSE)))
```

```
## [1] "avererage MSE: 0.16256112"
```

```
### 5)
### a)
3*1.64
```

```
## [1] 4.92
```

```
m_0 = 0
m_a = 0.3
sig = 3
n = 36
z = qnorm(0.95)
power = 1 - pnorm(sqrt(n)*(m_0 - m_a)/sig + z)
print(paste("power =", power))
```

```
## [1] "power = 0.148045312594663"
```

```
### c)
for (n in 100:1000){
  power = 1 - pnorm(sqrt(n)*(m_0 - m_a)/sig + z)
  if (power > 0.8){
    break
  }
}
print(paste("power =", power))
```

```
## [1] "power = 0.800418615358553"
```

```
print(paste("n =", n))
```

```
## [1] "n = 619"
```