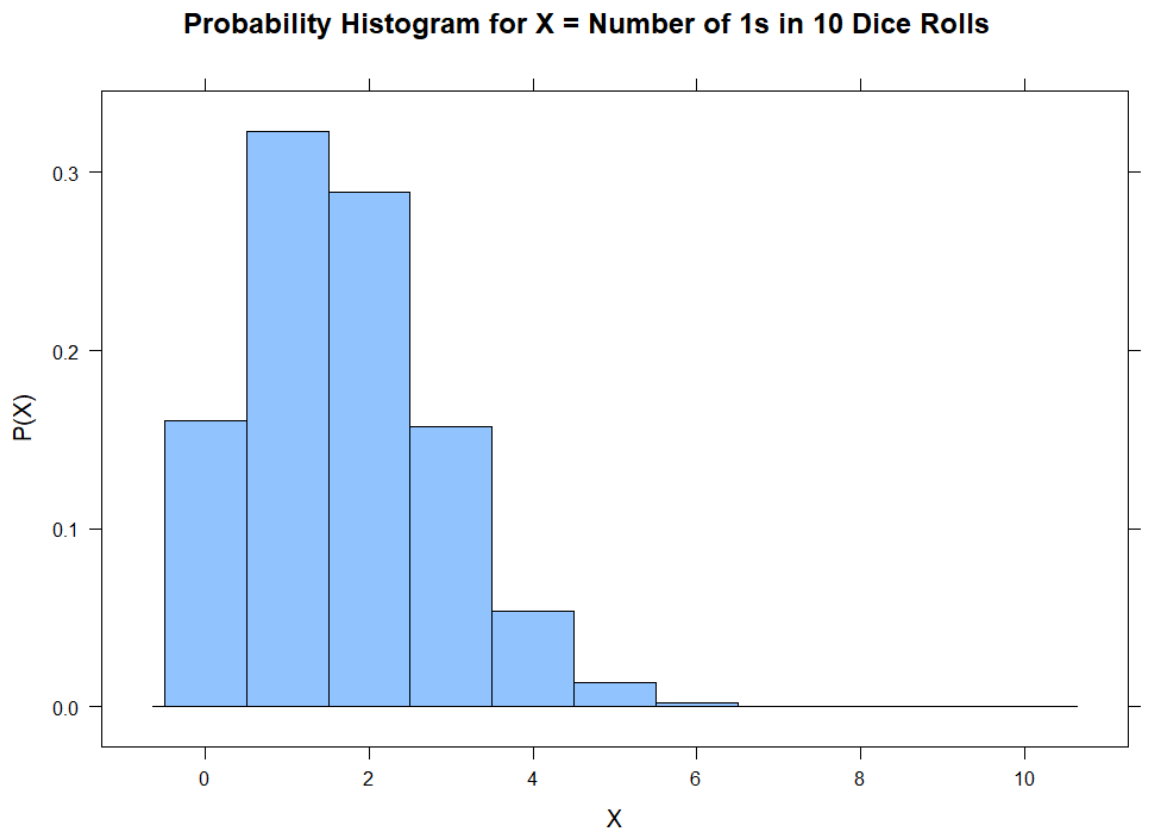
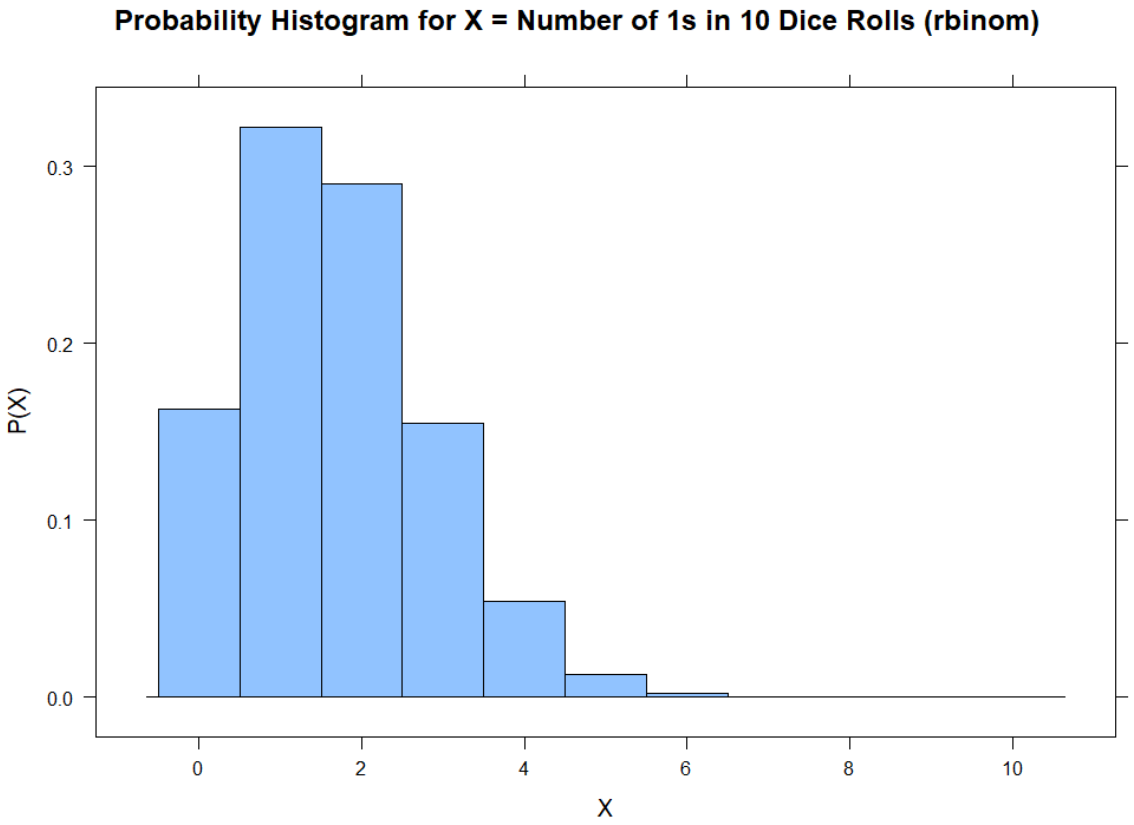
Q1

```
#Q1
#n=300, p=1/3
#a
Exactly.100 <- dbinom(100, 300, 1/3)
#b
At.Most.100 <- pbinom(100,300,1/3)
#c
Fewer.Than.100 <- pbinom(99,300,1/3)
#d
At.Least.110 <- 1 - pbinom(109,300,1/3)
#e
Less.Than.90 <- pbinom(89,300,1/3)
More.Than.110 <- 1 - pbinom(110,300,1/3)
Between.90.110 <- 1 - Less.Than.90 - More.Than.110
round(c(
  Exactly.100   = Exactly.100,
  At.Most.100   = At.Most.100,
  Fewer.Than.100 = Fewer.Than.100,
  At.Least.110  = At.Least.110,
  Between.90.110 = Between.90.110
), 4)
```

Q2




```
> RollDice(10, 100000)
   x relative_frequency
   0             0.16065
   1             0.32671
   2             0.28947
   3             0.15379
   4             0.05455
   5             0.01236
   6             0.00222
   7             0.00019
   8             0.00006
   9             0.00000
  10             0.00000
```




```
> RollDiceBinom(10, 100000)
   x relative_frequency
   0              0.15914
   1              0.32427
   2              0.29137
   3              0.15606
   4              0.05378
   5              0.01293
   6              0.00210
   7              0.00034
   8              0.00001
   9              0.00000
  10              0.00000
```

Q3

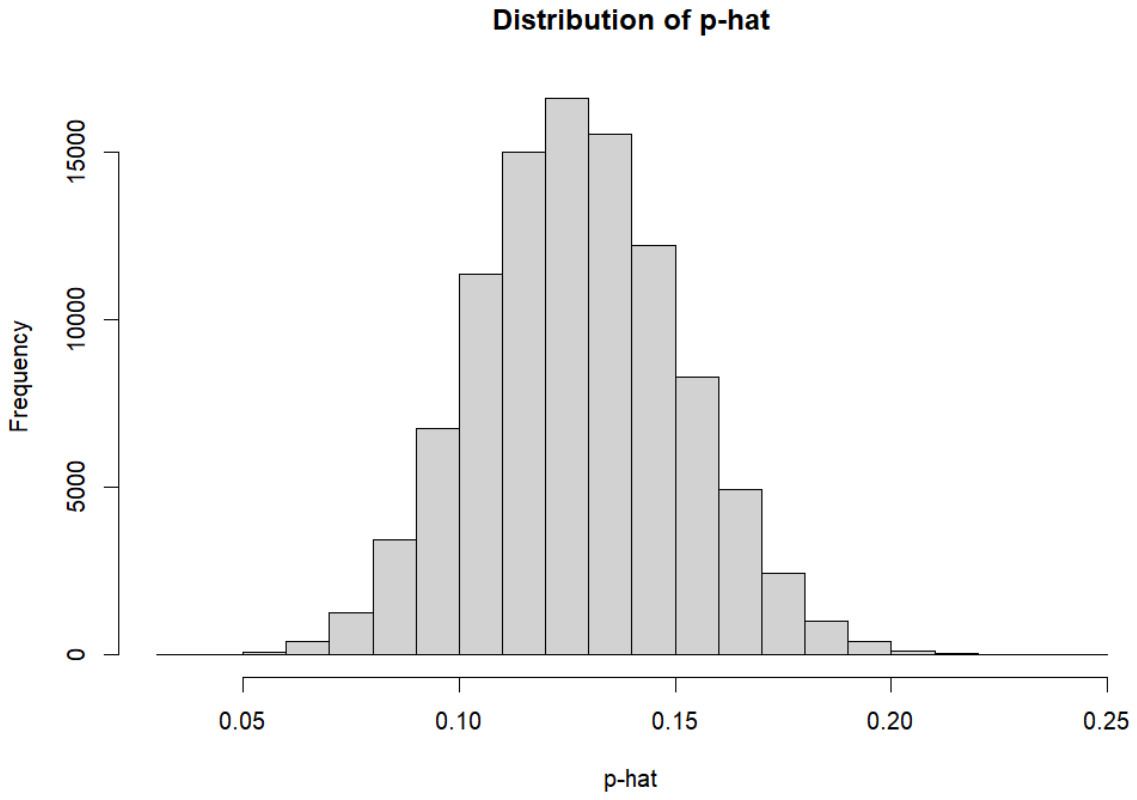
a

```
> c(mu = mu, sigma = sigma)
       mu     sigma
26.000000  4.756049
```

b

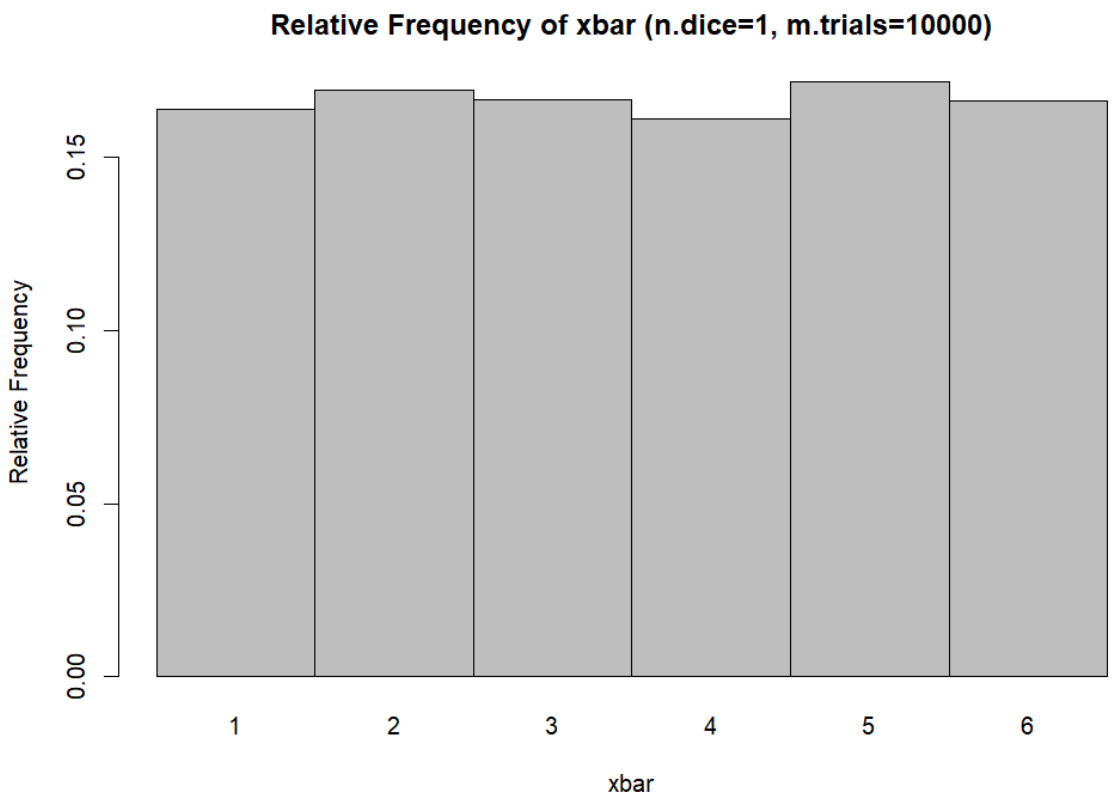
```
> Left.Sample.Prop(200, 0.130)
[1] 0.14
```

c

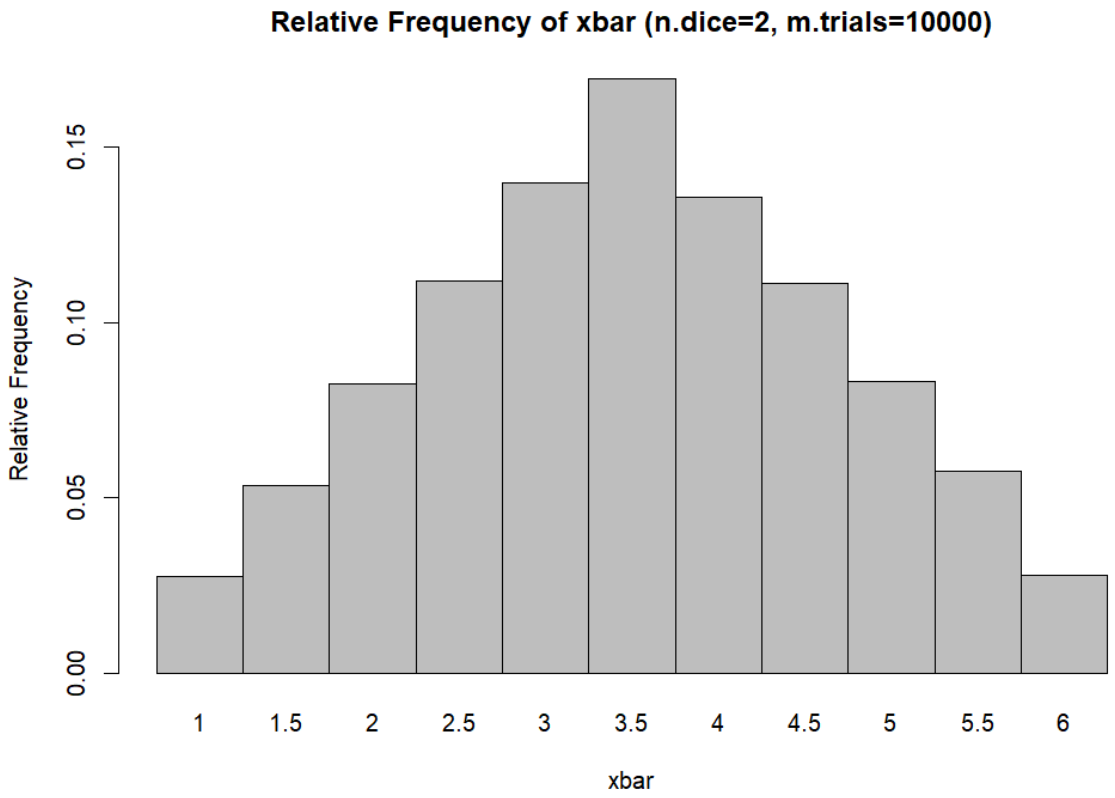



```
> Dist.Left.Sample.Prop(200, 0.130, 10^5)
[1] 0.1301362
[1] 0.02378384
```

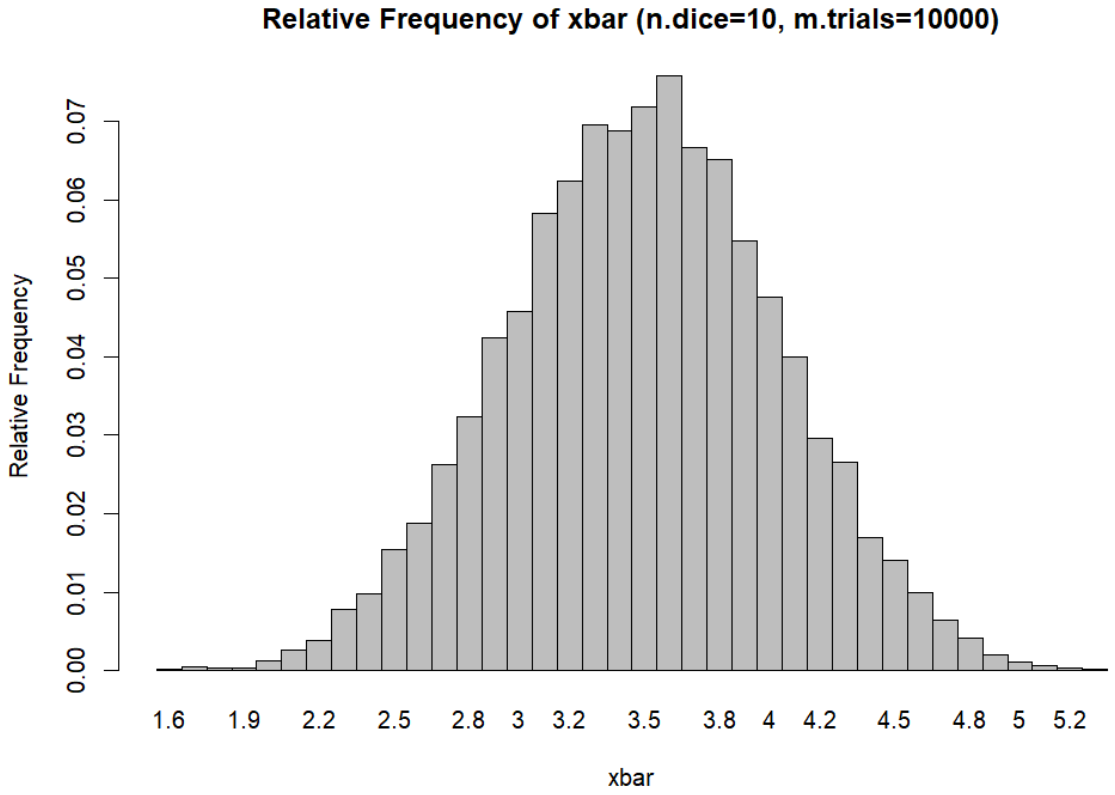
Q4



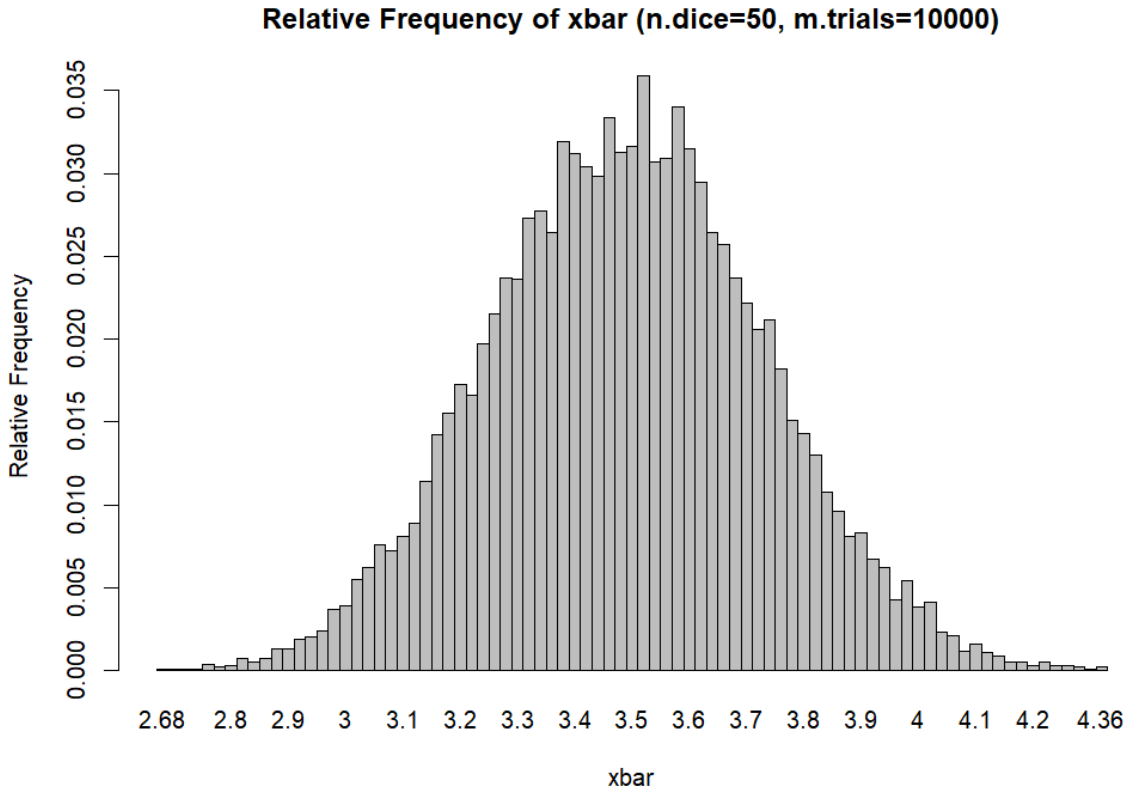

```
> DiceMeans(1, 10000)
   mu_xbar sigma_xbar
  3.506400   1.707528
```



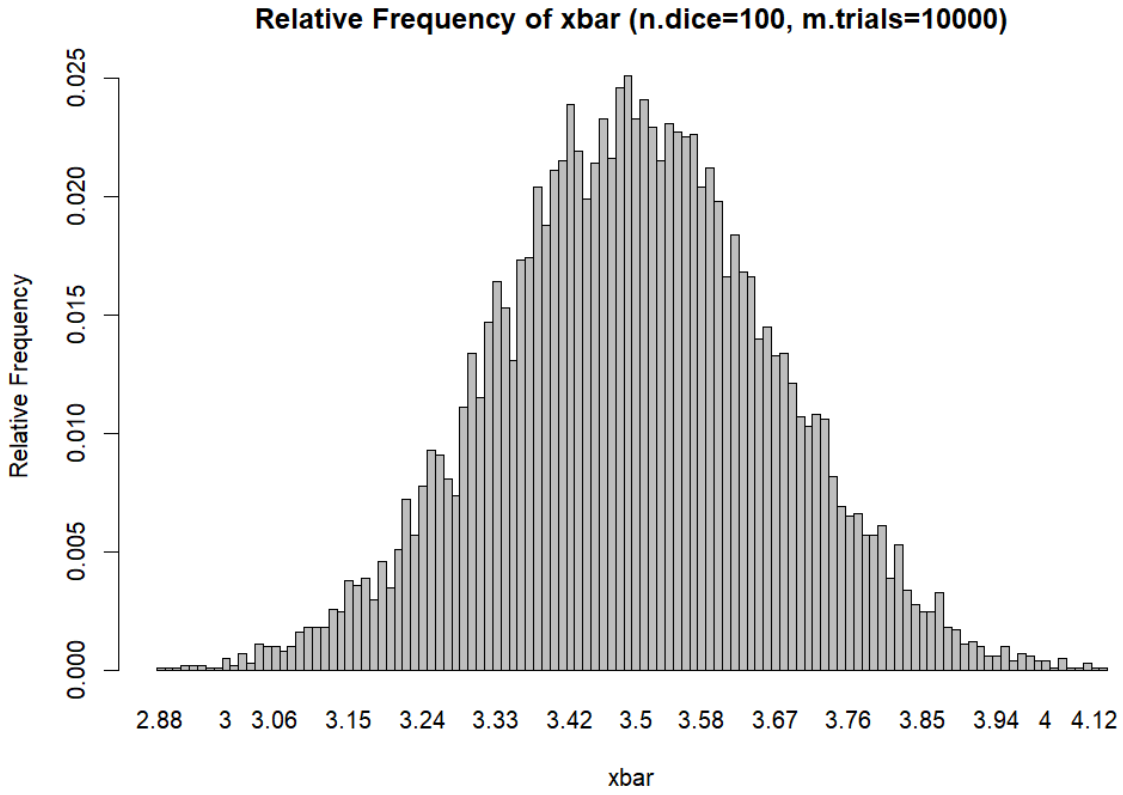

```
> DiceMeans(2, 10000)
   mu_xbar sigma_xbar
  3.507400   1.206562
```




```
> DiceMeans(10, 10000)
   mu_xbar sigma_xbar
 3.4919500  0.5400568
```




```
> DiceMeans(50, 10000)
   mu_xbar sigma_xbar
 3.4920680  0.2392131
```




```
> DiceMeans(100, 10000)
   mu_xbar sigma_xbar
 3.4978390  0.1702555
```

The mean remains approximately stable around 3.5, and the standard deviation decreases as n increases.

As n increases, the bars become more concentrated around 3.5, the distribution becomes more symmetric, and it approaches a normal distribution.