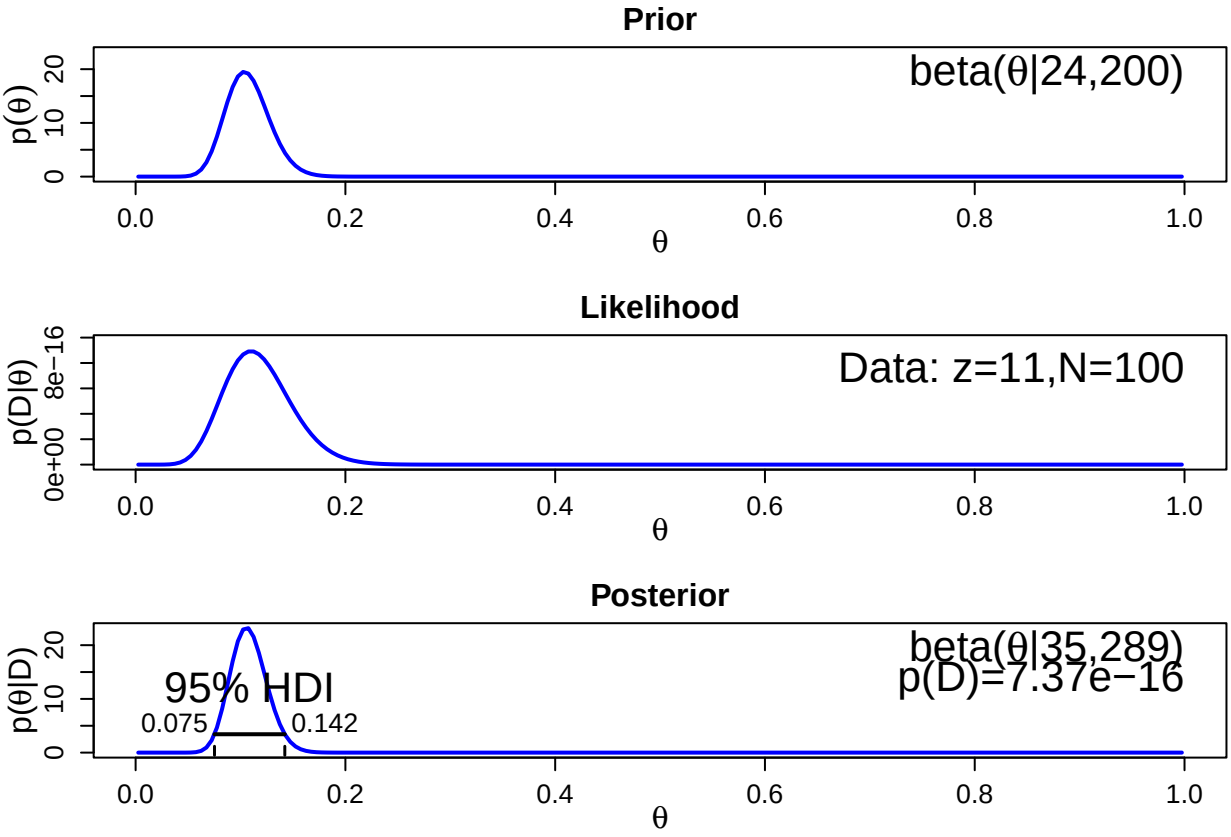
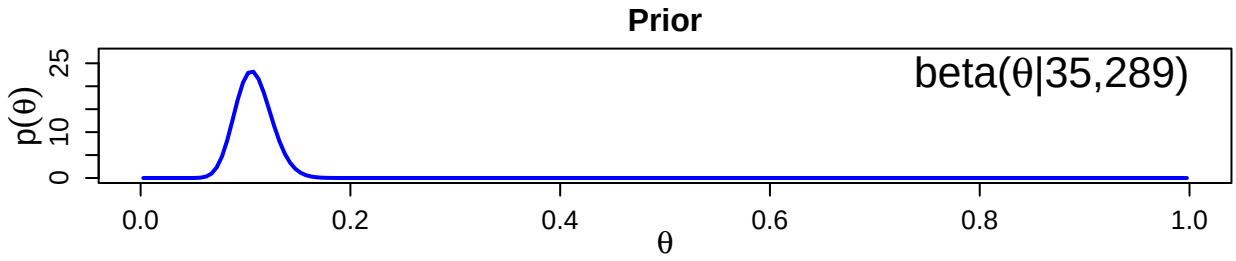
Task 3

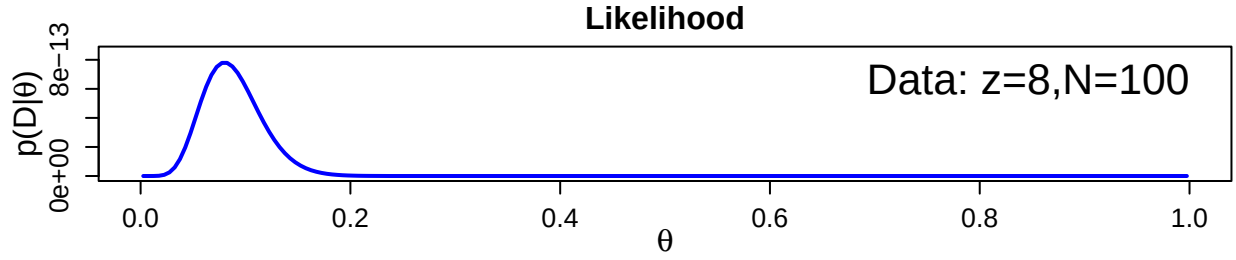
Start with a subset of 100 data points and perform inference. Find the posterior probability that the new page has a higher conversion rate. Hint: use random samples from the independent posteriors to estimate the probability. Update the posteriors with another 100 data points. At what data size do the priors become irrelevant?

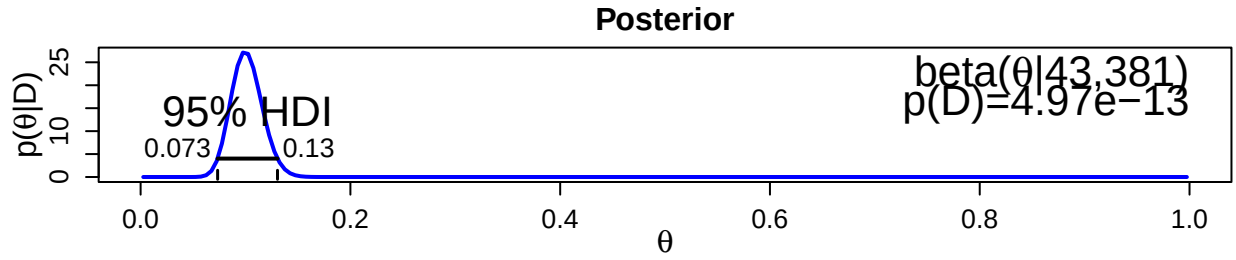
```
## [1] "Test 1"
```



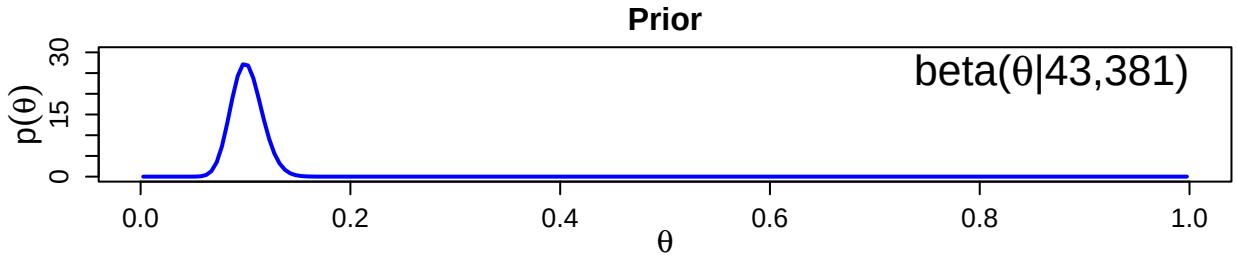

```
## [1] "Test 2"
```

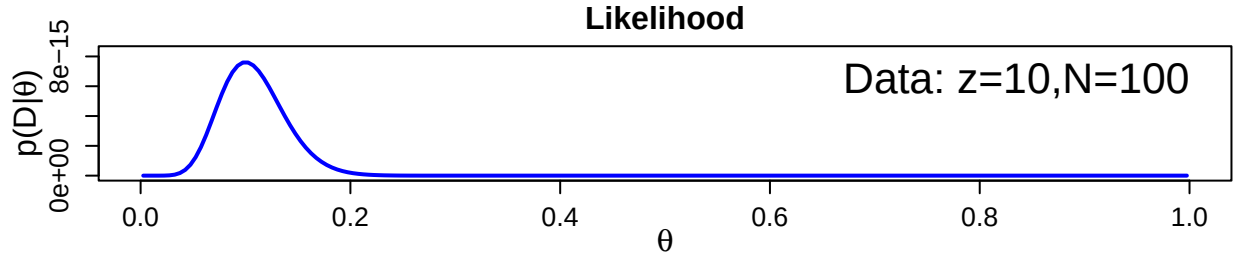

Prior
p(θ)
0
10
25
beta(θ|35,289)
0.0
0.2
0.4
0.6
0.8
1.0
θ

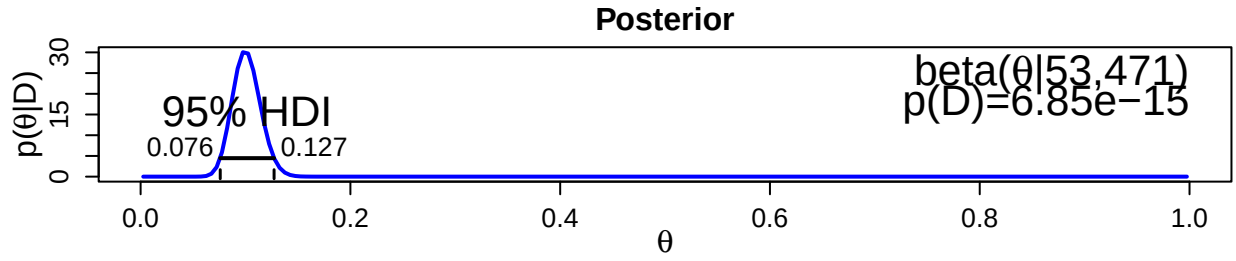

Likelihood
p(D|θ)
0e+00
8e−13
Data: z=8,N=100
0.0
0.2
0.4
0.6
0.8
1.0
θ


Posterior
p(θ|D)
0
10
25
95% HDI
0.073
0.13
beta(θ|43,381)
p(D)=4.97e−13
0.0
0.2
0.4
0.6
0.8
1.0
θ

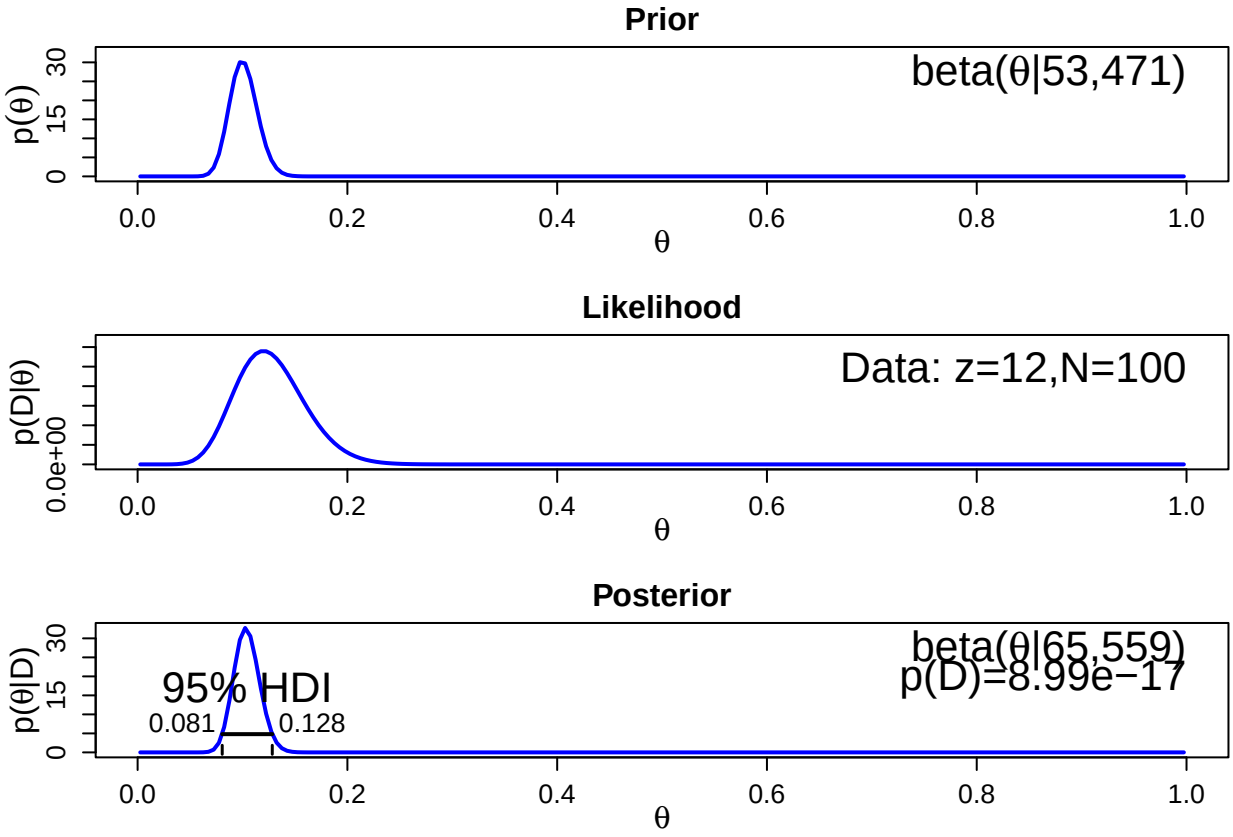
```
## [1] "Test 3"
```


Prior
p(θ)
0
15
30
beta(θ|43,381)
0.0
0.2
0.4
0.6
0.8
1.0
θ

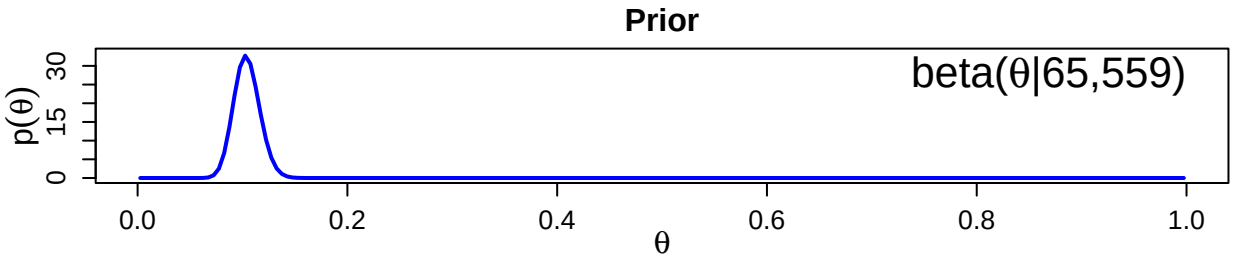

Likelihood
p(D|θ)
0e+00
8e−15
Data: z=10,N=100
0.0
0.2
0.4
0.6
0.8
1.0
θ

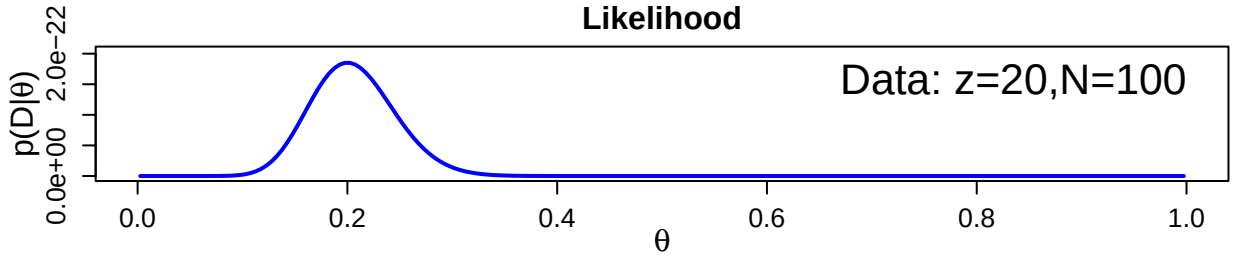

Posterior
p(θ|D)
0
15
30
95% HDI
0.076
0.127
beta(θ|53,471)
p(D)=6.85e−15
0.0
0.2
0.4
0.6
0.8
1.0
θ

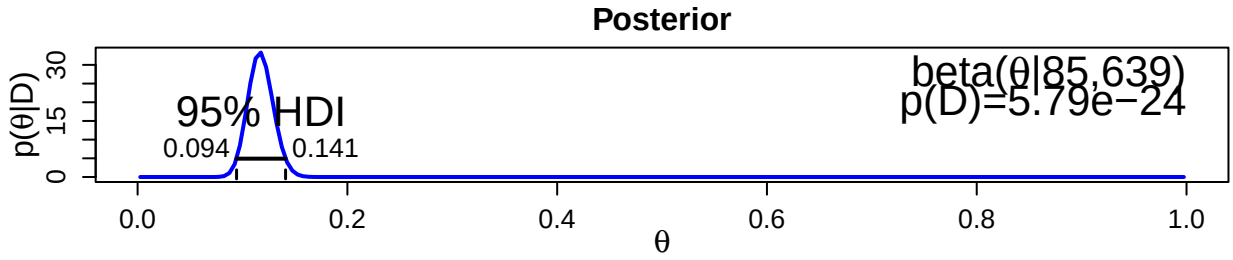
```
## [1] "Test 4"
```



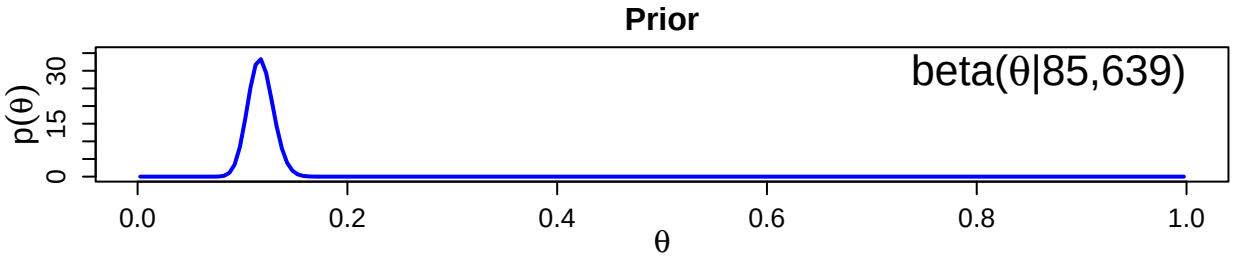

```
## [1] "Test 5"
```

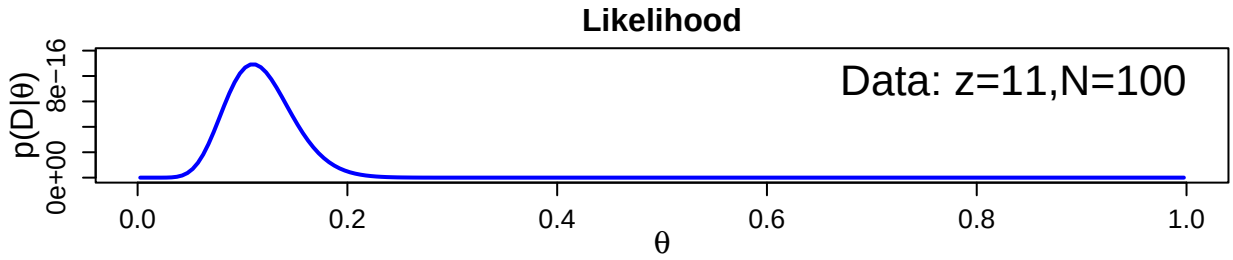

Prior
p(θ)
0
15
30
beta(θ|65,559)
0.0
0.2
0.4
0.6
0.8
1.0
θ

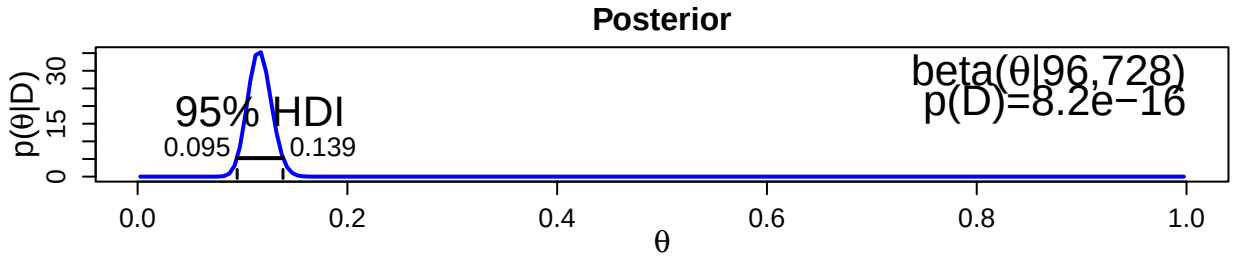

Likelihood
p(D|θ)
0.0e+00
2.0e−22
Data: z=20,N=100
0.0
0.2
0.4
0.6
0.8
1.0
θ


Posterior
p(θ|D)
0
15
30
beta(θ|85,639)
p(D)=5.79e−24
95% HDI
0.094
0.141
0.0
0.2
0.4
0.6
0.8
1.0
θ

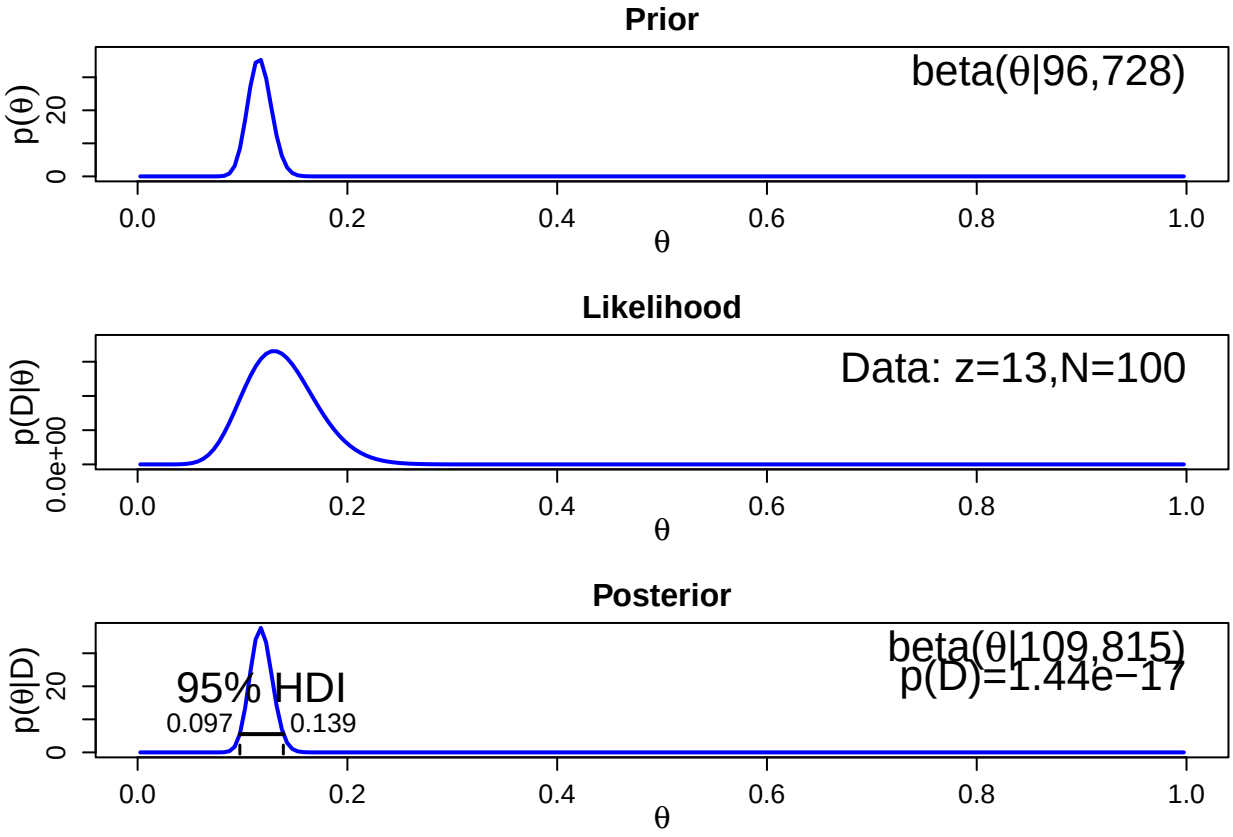
```
## [1] "Test 6"
```


Prior
p(θ)
0
15
30
beta(θ|85,639)
0.0
0.2
0.4
0.6
0.8
1.0
θ

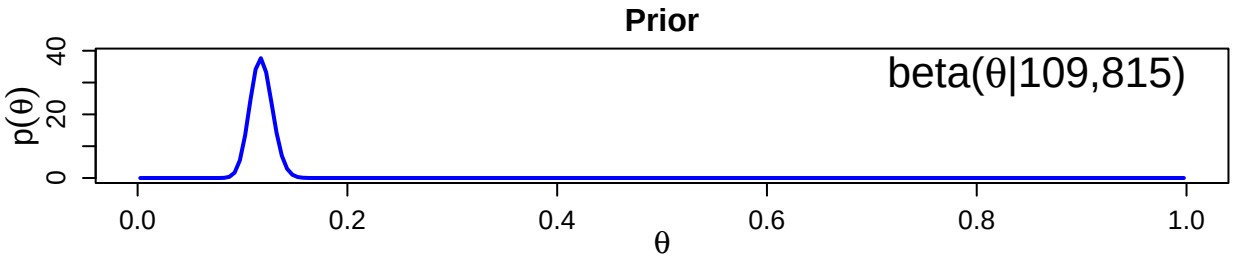

Likelihood
p(D|θ)
0e+00
8e−16
Data: z=11,N=100
0.0
0.2
0.4
0.6
0.8
1.0
θ

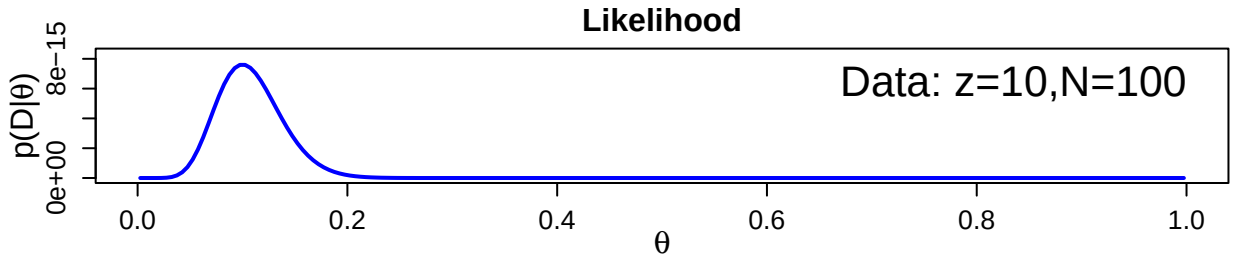

Posterior
p(θ|D)
0
15
30
beta(θ|96,728)
p(D)=8.2e−16
95% HDI
0.095
0.139
0.0
0.2
0.4
0.6
0.8
1.0
θ

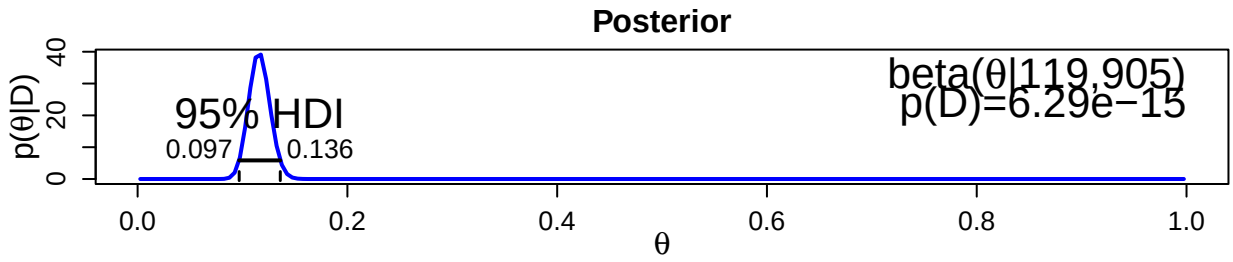
```
## [1] "Test 7"
```



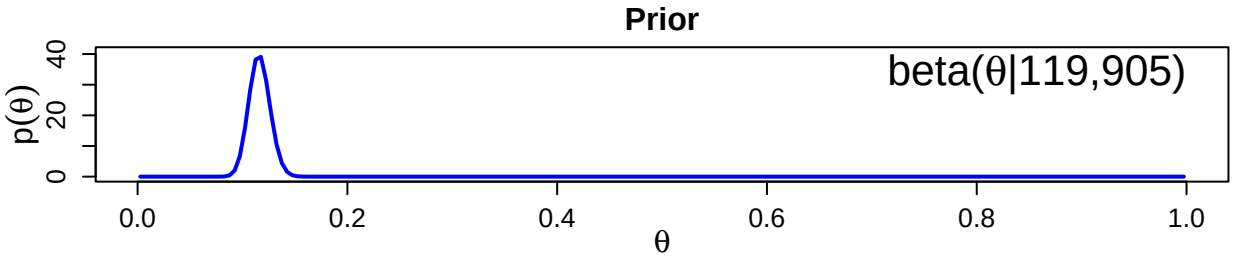

```
## [1] "Test 8"
```

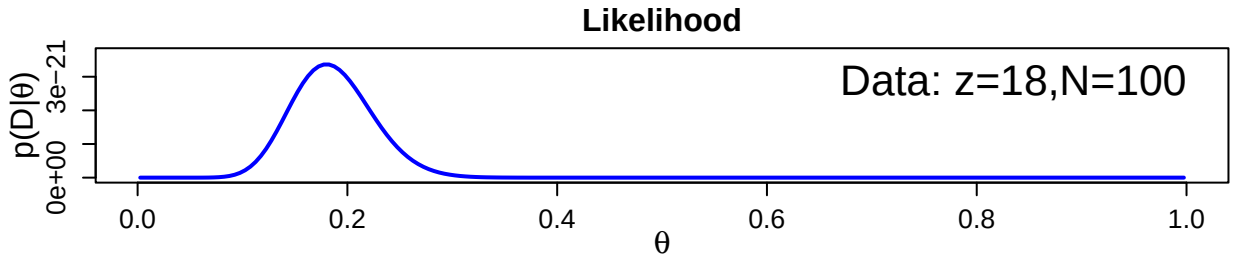

Prior
p(θ)
0
20
40
beta(θ|109,815)
0.0
0.2
0.4
0.6
0.8
1.0
θ

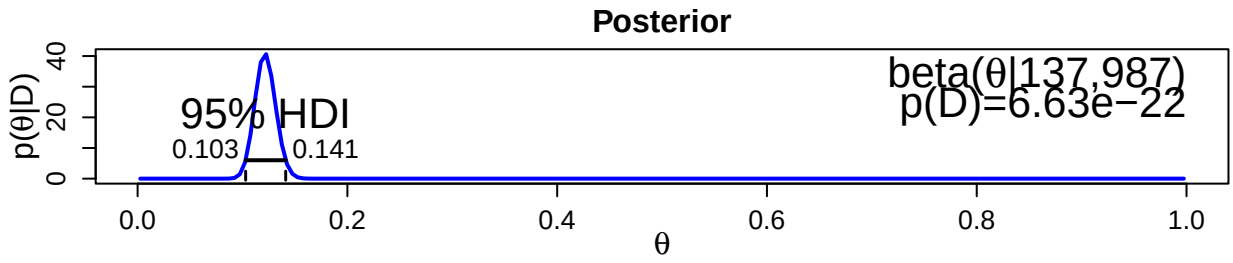

Likelihood
p(D|θ)
0e+00
8e−15
Data: z=10,N=100
0.0
0.2
0.4
0.6
0.8
1.0
θ


Posterior
p(θ|D)
0
20
40
95% HDI
0.097
0.136
beta(θ|119,905)
p(D)=6.29e−15
0.0
0.2
0.4
0.6
0.8
1.0
θ

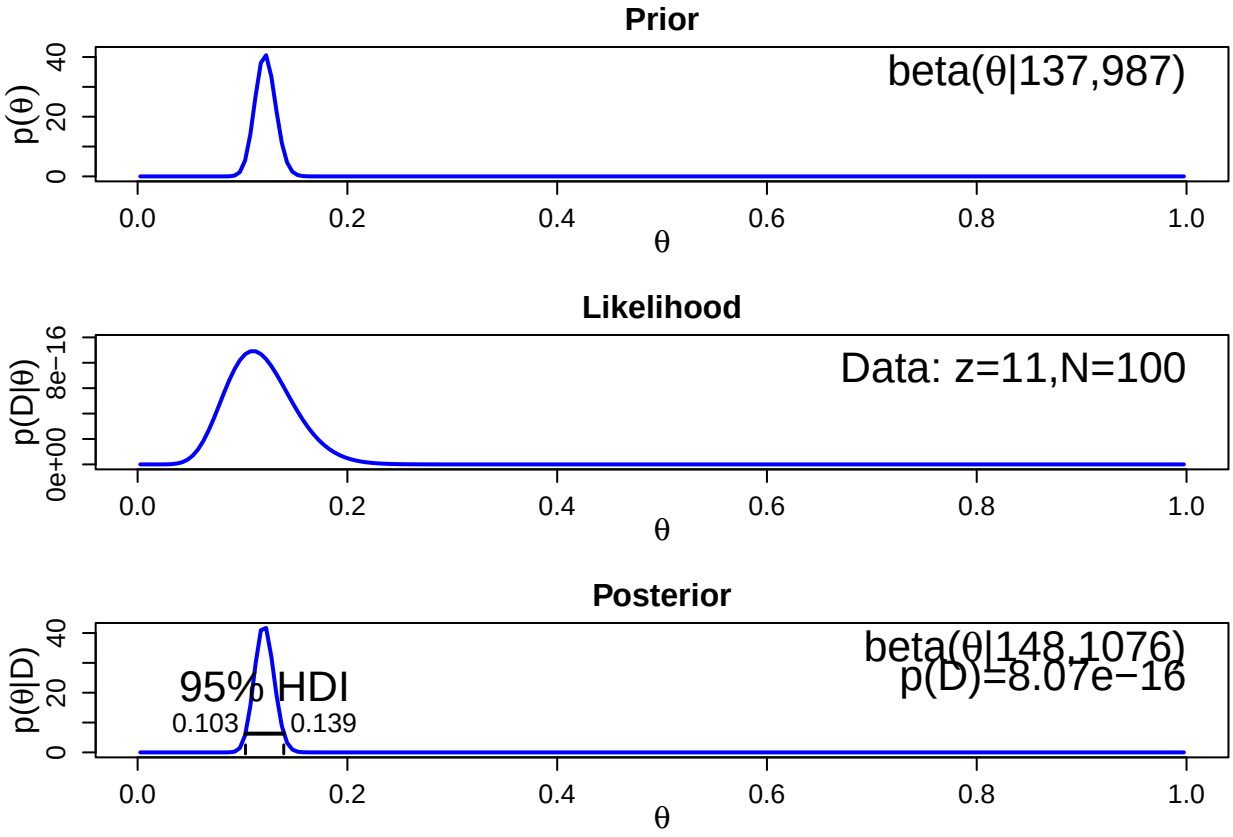
```
## [1] "Test 9"
```


Prior
p(θ)
0
20
40
beta(θ|119,905)
0.0
0.2
0.4
0.6
0.8
1.0
θ


Likelihood
p(D|θ)
0e+00
3e−21
Data: z=18,N=100
0.0
0.2
0.4
0.6
0.8
1.0
θ


Posterior
p(θ|D)
0
20
40
95% HDI
0.103
0.141
beta(θ|137,987)
p(D)=6.63e−22
0.0
0.2
0.4
0.6
0.8
1.0
θ

```
## [1] "Test 10"
```


Prior
beta(θ|137,987)
p(θ)
0
20
40
0.0
0.2
0.4
0.6
0.8
1.0
θ
Likelihood
Data: z=11,N=100
p(D|θ)
0e+00
8e−16
θ
Posterior
beta(θ|148,1076)
p(D)=8.07e−16
95% HDI
0.103
0.139
p(θ|D)
θ