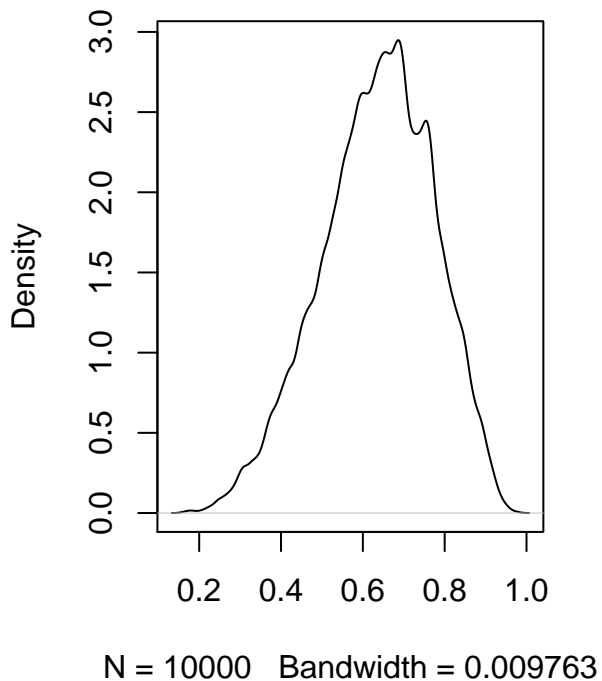
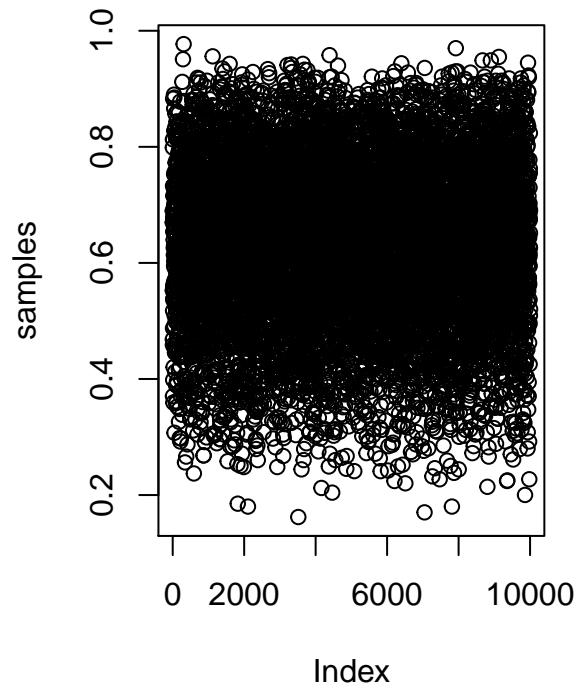


Chapter 3 – Practice

```
p_grid = seq(from=0, to=1, length.out=1000)
prior <- rep(1, 1000)
likelihood <- dbinom(6, size=9, prob=p_grid)
posterior <- likelihood * prior
posterior <- posterior / sum(posterior)
set.seed(100)
samples <- sample(p_grid, prob=posterior, size=1e4, replace=T)
```

```
par(mfrow=c(1, 2))
plot(samples)
plot(density(samples, adjust = 0.5), main="")
```



3E1. How much posterior probability lies below $p = 0.2$?

```
sum(posterior[p_grid < 0.2])

## [1] 0.0008560951
sum(samples < 0.2) / length(samples)

## [1] 5e-04
```

3E2. How much posterior probability lies above $p = 0.8$?

```
sum(posterior[p_grid > 0.8])
```

```
## [1] 0.1203449
```

```
sum(samples > 0.8) / length(samples)
```

```
## [1] 0.1117
```

3E3. How much posterior probability lies between $p = 0.2$ and $p = 0.8$?

```
sum(posterior[p_grid > 0.2 & p_grid < 0.8])
```

```
## [1] 0.878799
```

```
sum(samples > 0.2 & samples < 0.8) / length(samples)
```

```
## [1] 0.8878
```

3E4. 20% of the posterior probability lies below which value of p ?

```
quantile(samples, 0.2)
```

```
##      20%
```

```
## 0.5195195
```

3E5. 20% of the posterior probability lies above which value of p ?

```
quantile(samples, 0.8)
```

```
##      80%
```

```
## 0.7567568
```

3E6. Which values of p contain the narrowest interval equal to 66% of the posterior probability?