

Assignment 1

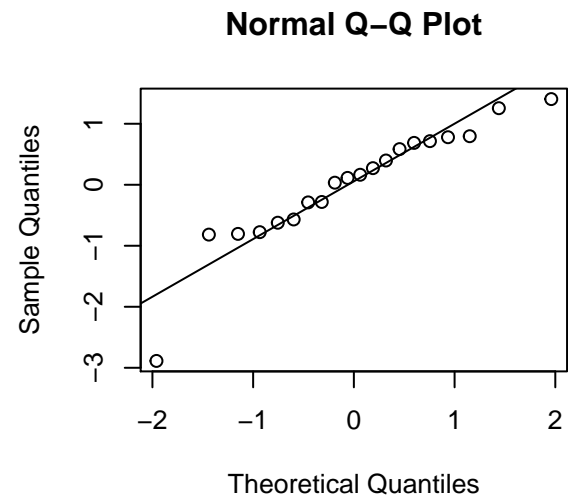
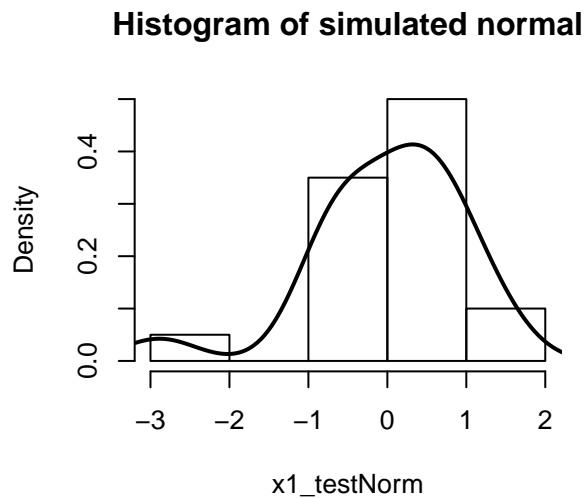
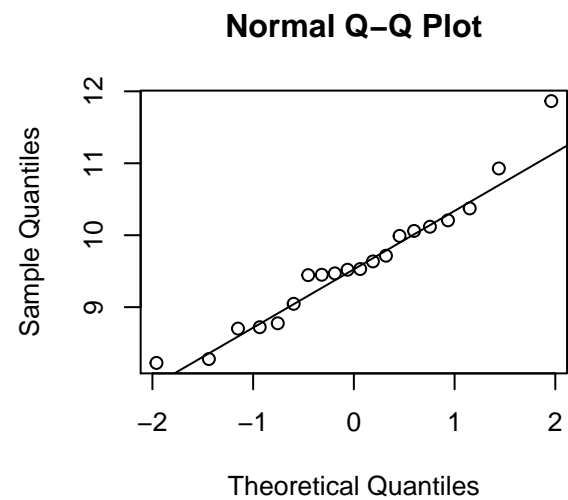
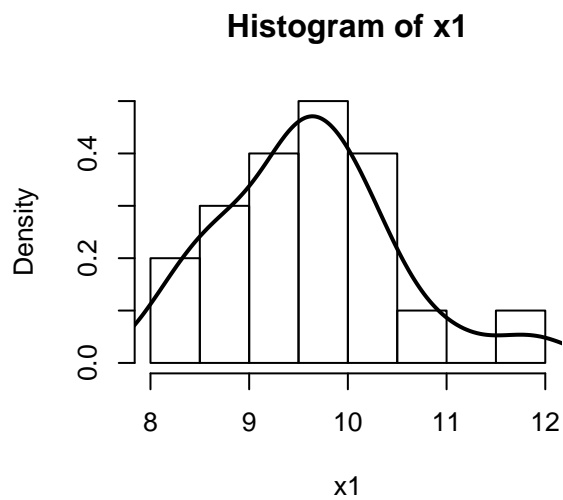
Daniel Galea, Konrad Karas and Long Tran, group 6

14 February 2018

Exercises

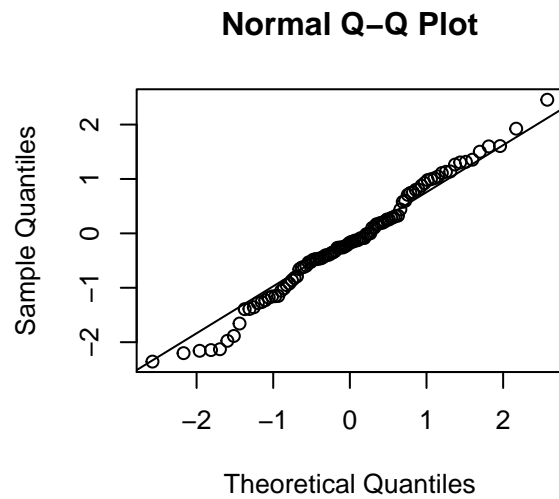
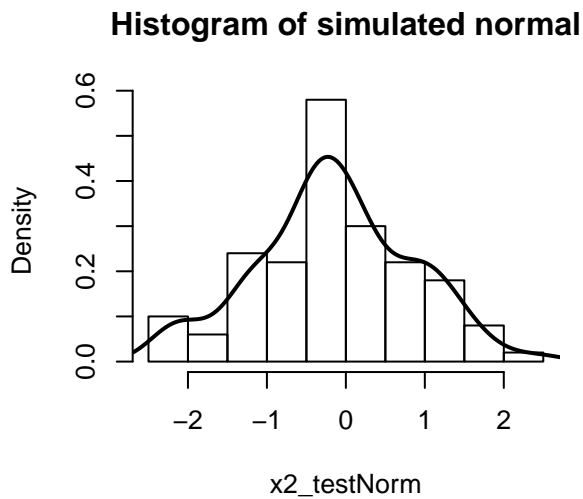
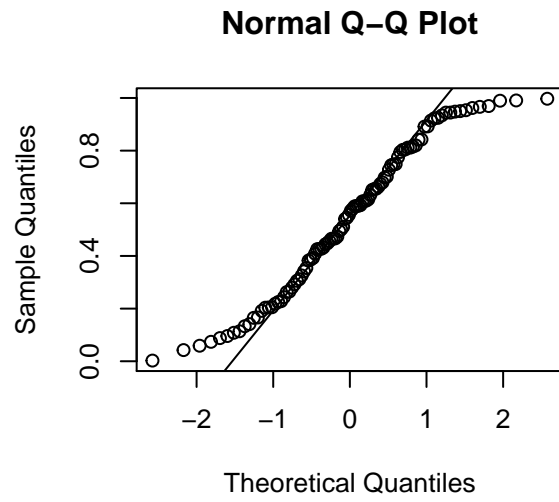
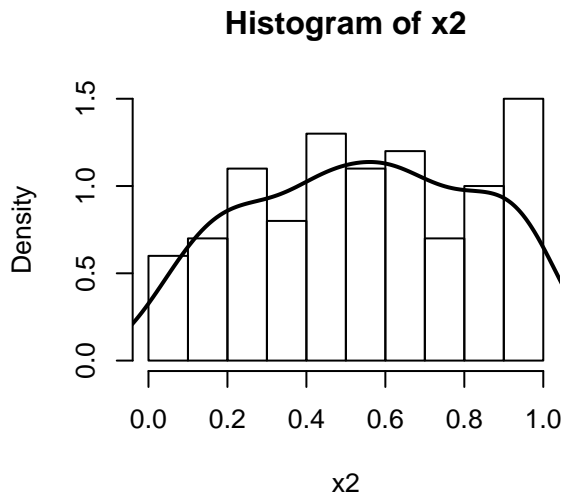
Exercise 1

x1 plots



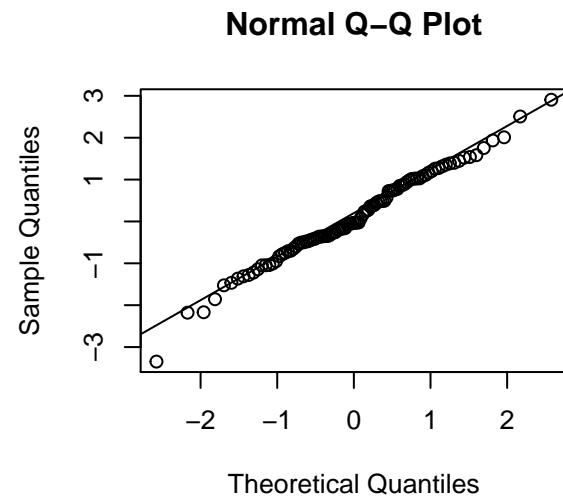
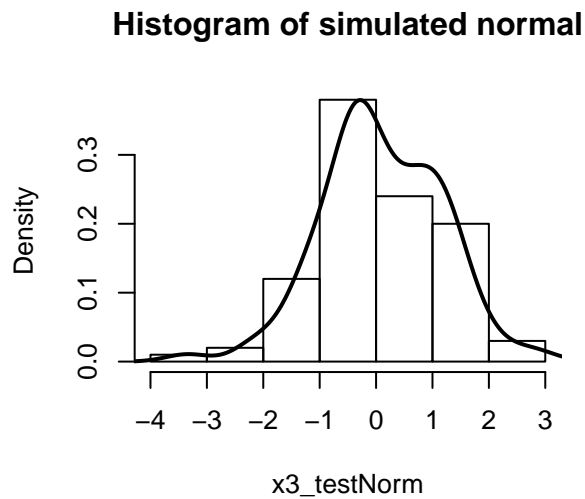
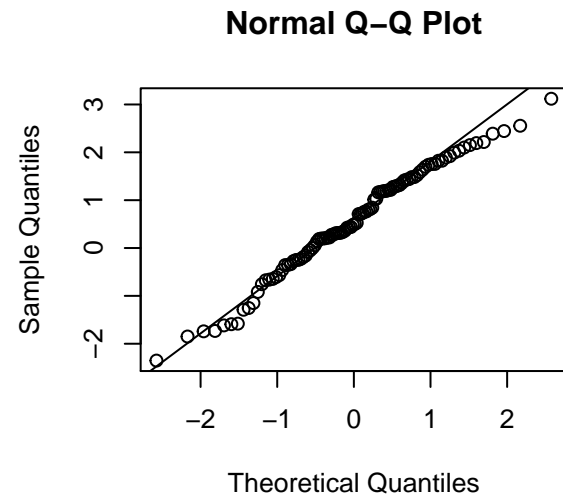
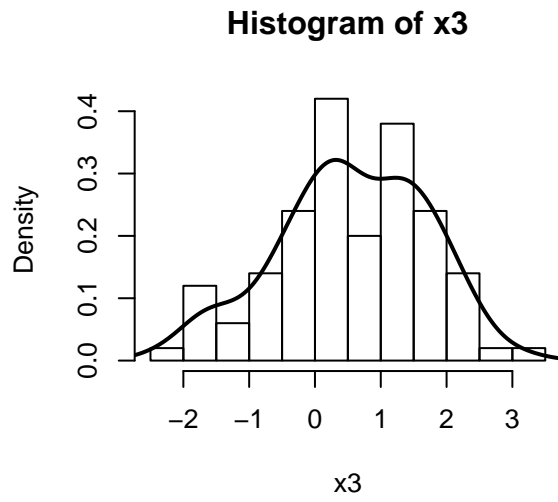
x1 is sampled from normal distribution. The quantiles form roughly a straight line. Since x1 has a low amount of samples inaccuracies are acceptable. The histogram and QQ-plot of the simulated normal distribution resembles the plots of x1.

x2 plots



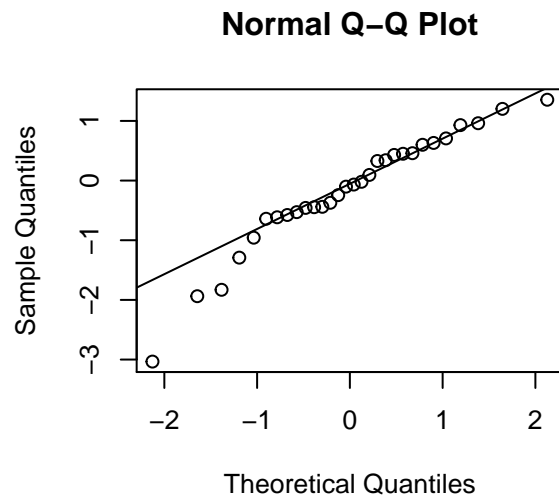
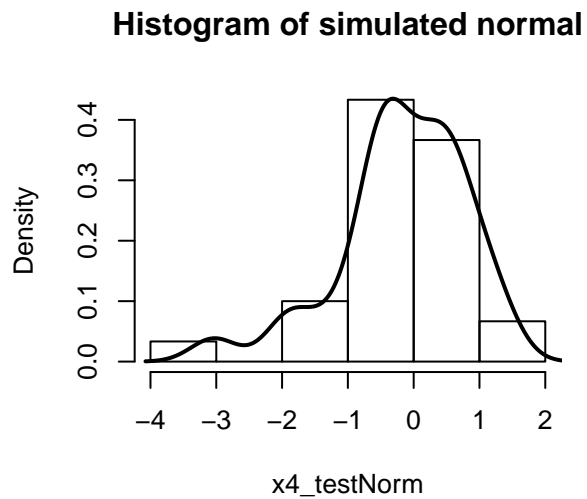
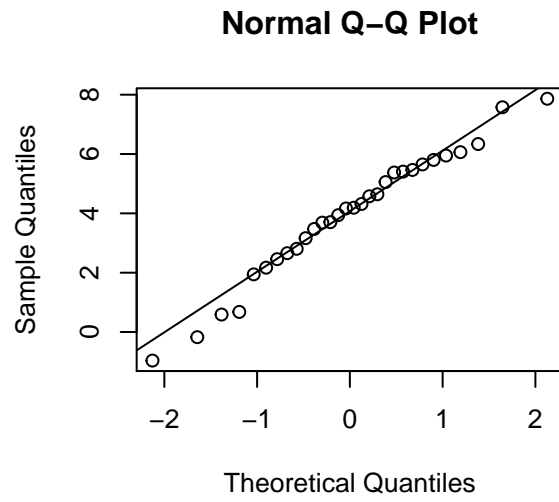
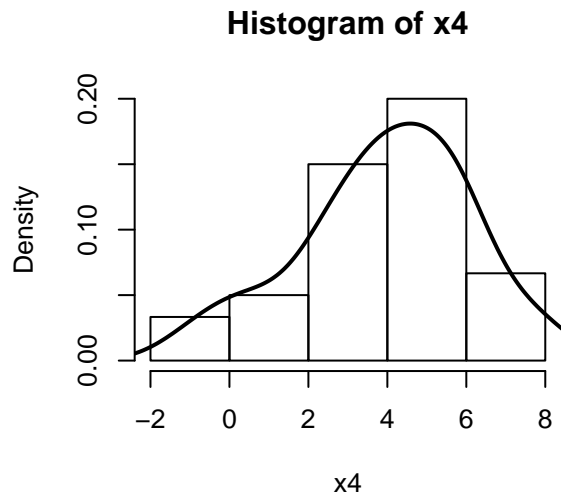
This is not a normal distribution as the histogram shows more of a uniform distribution. The quantiles do not form a straight line. The plots do not resemble that of the simulated normal distribution's.

x3 plots



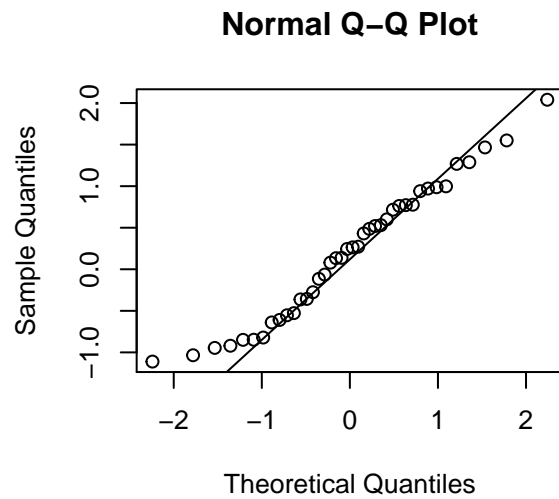
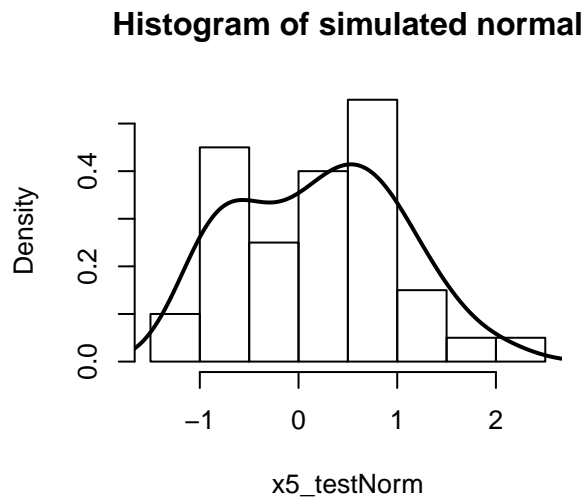
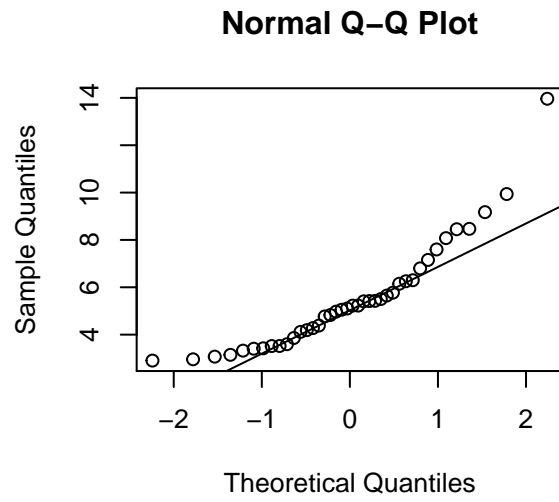
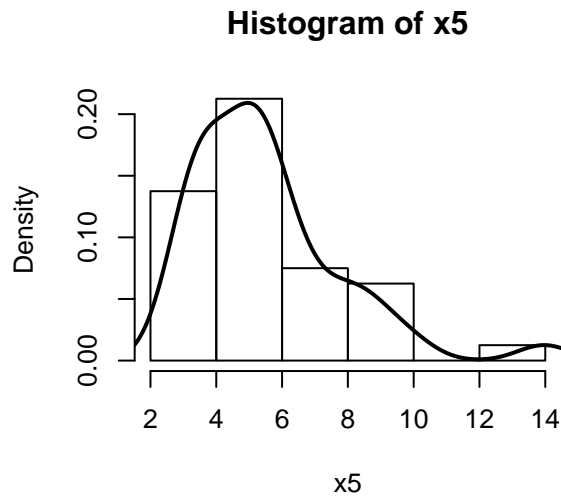
This is from a normal distribution as the quantiles form a very straight line and looks similar to the simulated distribution.

x4 plots



The histogram has the bell-shape but it is slightly offset. The QQ-plot closely resembles a line and looks similar to the simulated one. x4 is from a normal distribution.

x5 plots



This is not from a normal distribution. The quantiles do not form a straight line and the histogram does not have the bell-shape of a normal distribution.

Exercise 2

1.

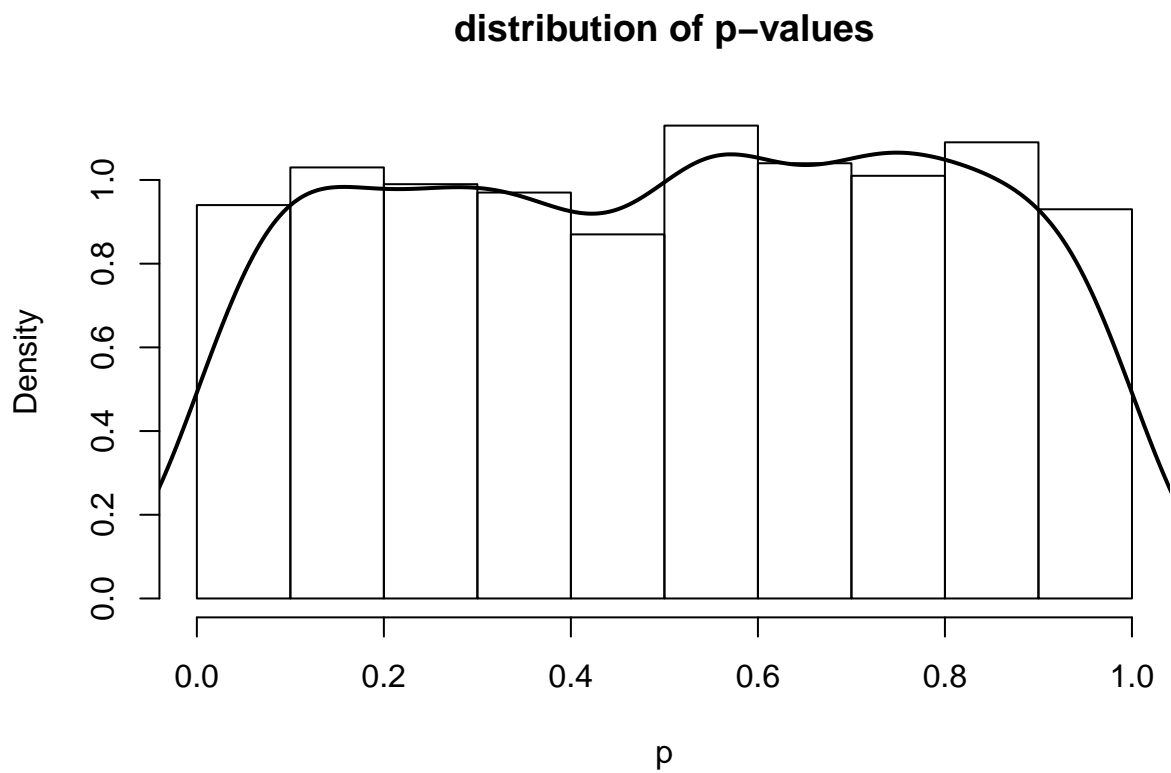
```
m = 30  
n = 30  
mu = 180  
nu = 180  
sd = 10
```

p -values smaller than 5%

```
## [1] 0.047
```

p -values smaller than 10%

```
## [1] 0.094
```



This is a uniform distribution.

2.

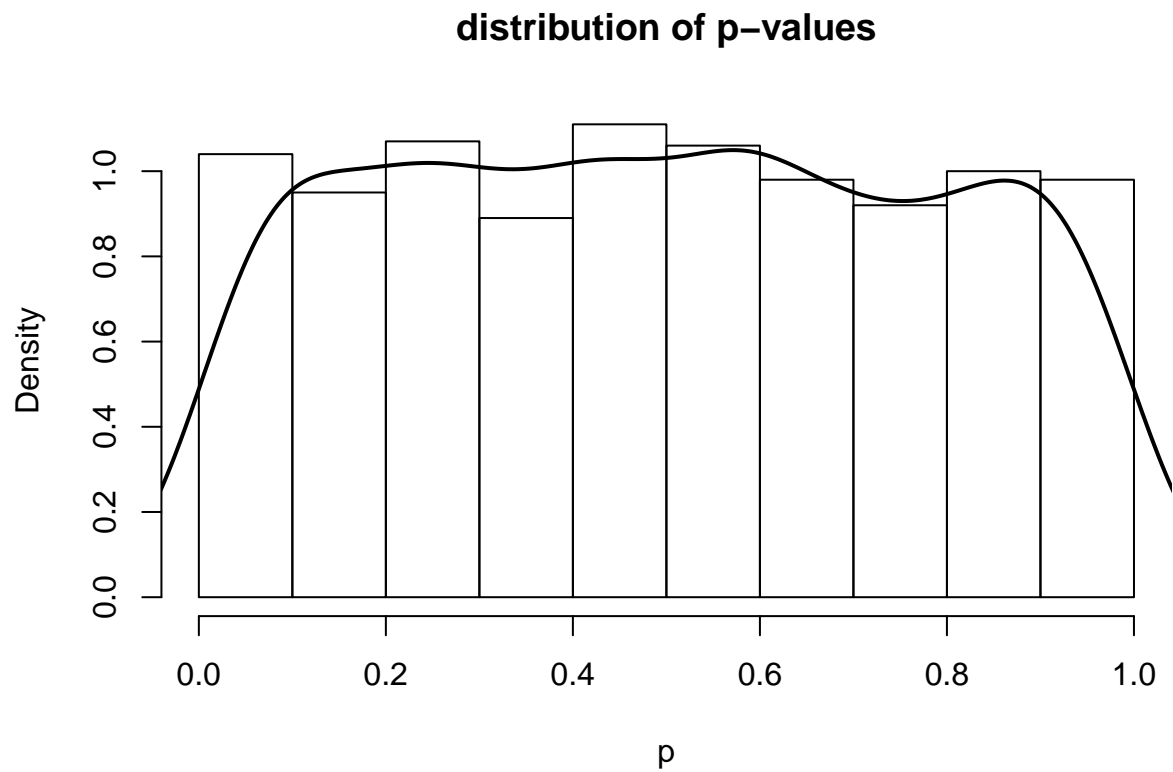
```
m = 30  
n = 30  
mu = 180  
nu = 180  
sd = 1
```

p -values smaller than 5%

```
## [1] 0.044
```

p -values smaller than 10%

```
## [1] 0.104
```



This is a uniform distribution.

3.

```
m = 30  
n = 30  
mu = 180  
nu = 175  
sd = 6
```

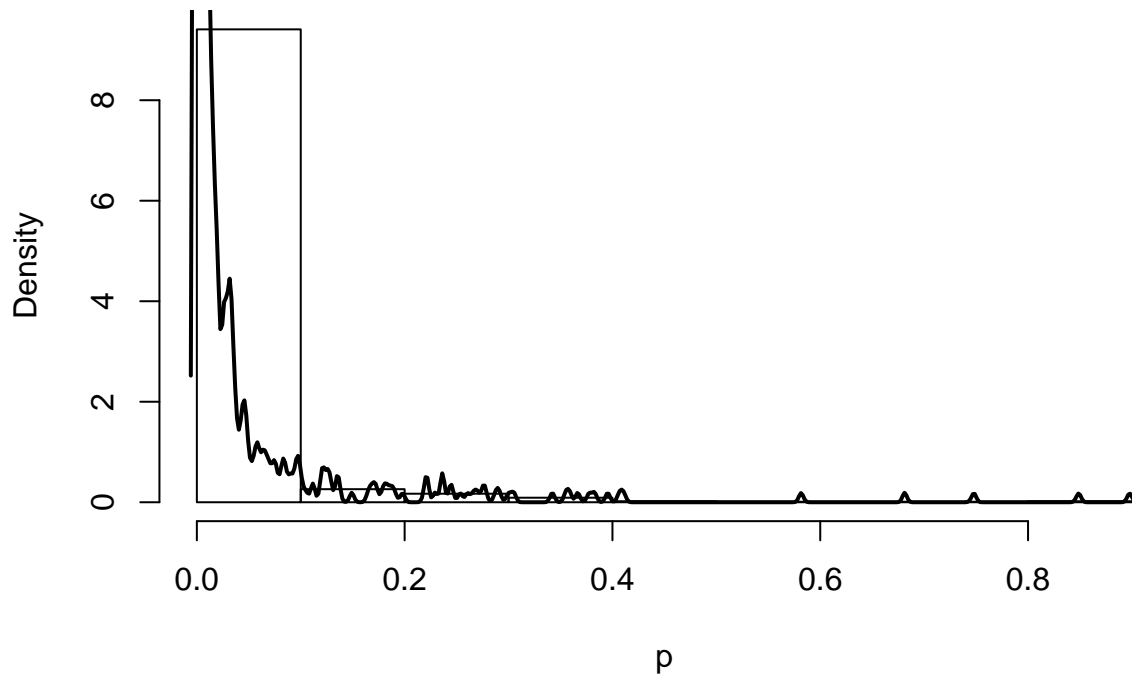
p -values smaller than 5%

```
## [1] 0.899
```

p -values smaller than 10%

```
## [1] 0.941
```

distribution of p-values



This is an exponential distribution.

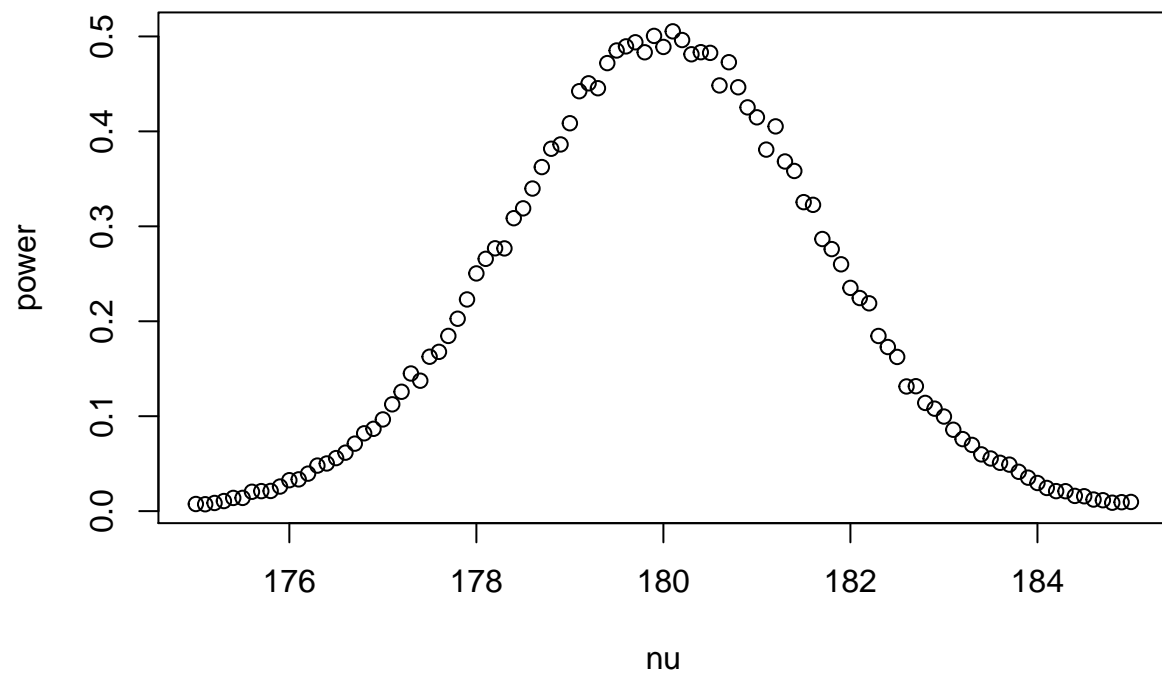
4.

In the first and second case the number of high p -values is very high, so we cannot reject the null hypothesis. For the last case, a high percentage of the p -values were very low, which means that we reject the null hypothesis.

Exercise 3

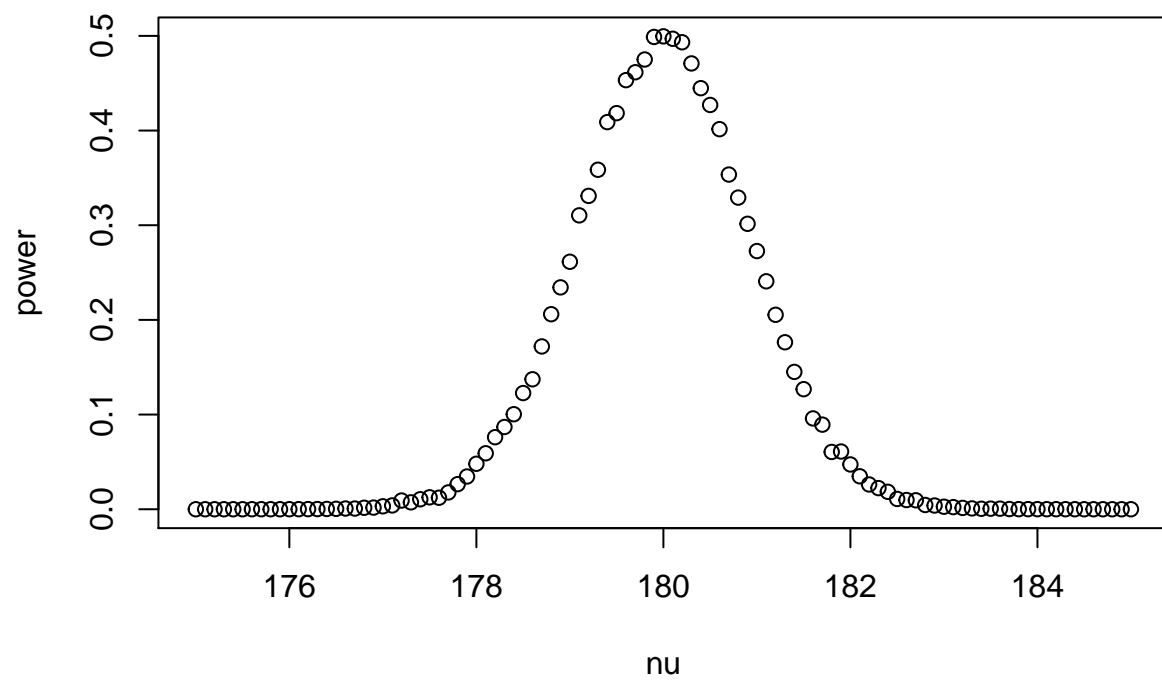
1.

```
m = 30
n = 30
mu = 180
nu = seq(175,185,by=0.1)
sd = 5
```

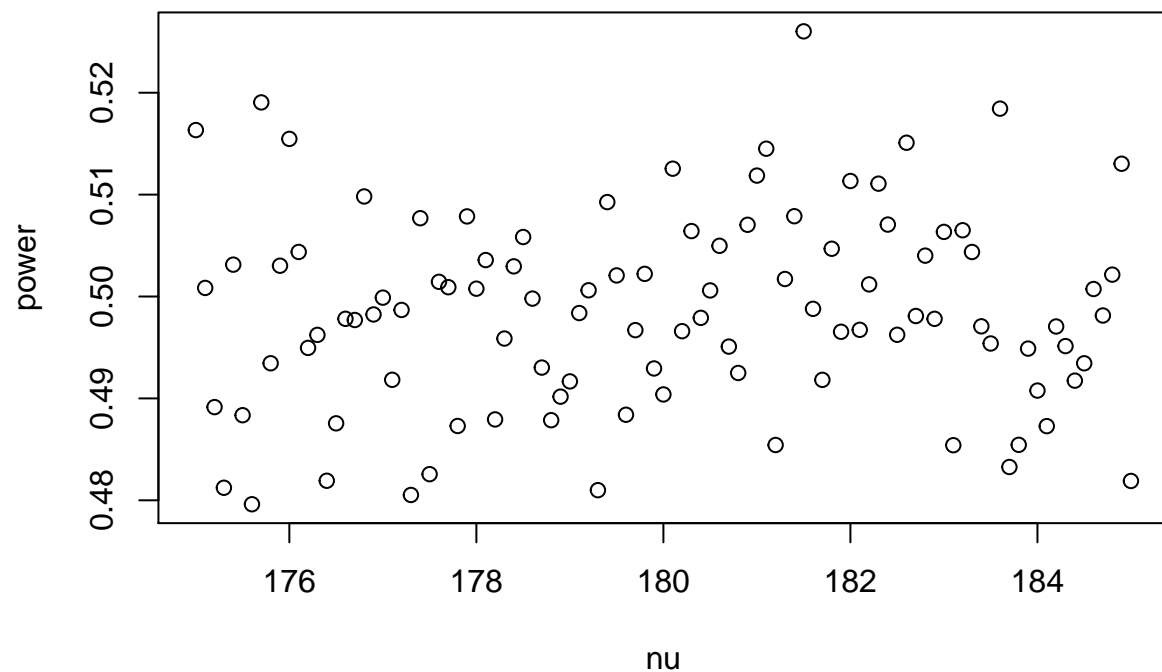
2.

```
m = 100  
n = 100  
mu = 180  
nu = seq(175,185,by=0.1)  
sd = 5
```



3.

```
m = 30
n = 30
mu = 180
nu = seq(175,185,by=0.1)
sd = 100
```



4.

The first two plots look like normal distribution as the standard deviation is a low, so the t-test has high confidence. In the second case we have a lot more samples which resulted in a narrower bell-shape and higher confidence. In the third case the standard deviation is so high, that the created graph does not contain any useful information and we cannot recognize any distribution.