Untitled

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A

```r
table <- data.frame(c(3.03, 5.53, 5.60, 9.30, 9.92, 12.51, 12.95, 15.21, 16.04, 16.84),
                    c(3.19, 4.26, 4.47, 4.53, 4.67, 4.69, 12.78, 6.79, 9.37, 12.75))
colnames(table) <- c("Type1", "Type2")

#We get the mean and stdv for each type.

mean1 <- mean(table$Type1)
mean2 <- mean(table$Type2)

sd1 <- sd(table$Type1)
sd2 <- sd(table$Type2)

t.test(table$Type1, table$Type2)
```

```
##
##  Welch Two Sample t-test
##
## data:  table$Type1 and table$Type2
## t = 2.0723, df = 16.665, p-value = 0.05408
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.07752643  7.96352643
## sample estimates:
## mean of x mean of y
##    10.693     6.750
```

```r
# This might be little bit different with the method by hands, since they approximate (assumed the vari

# p = 0.05408
```

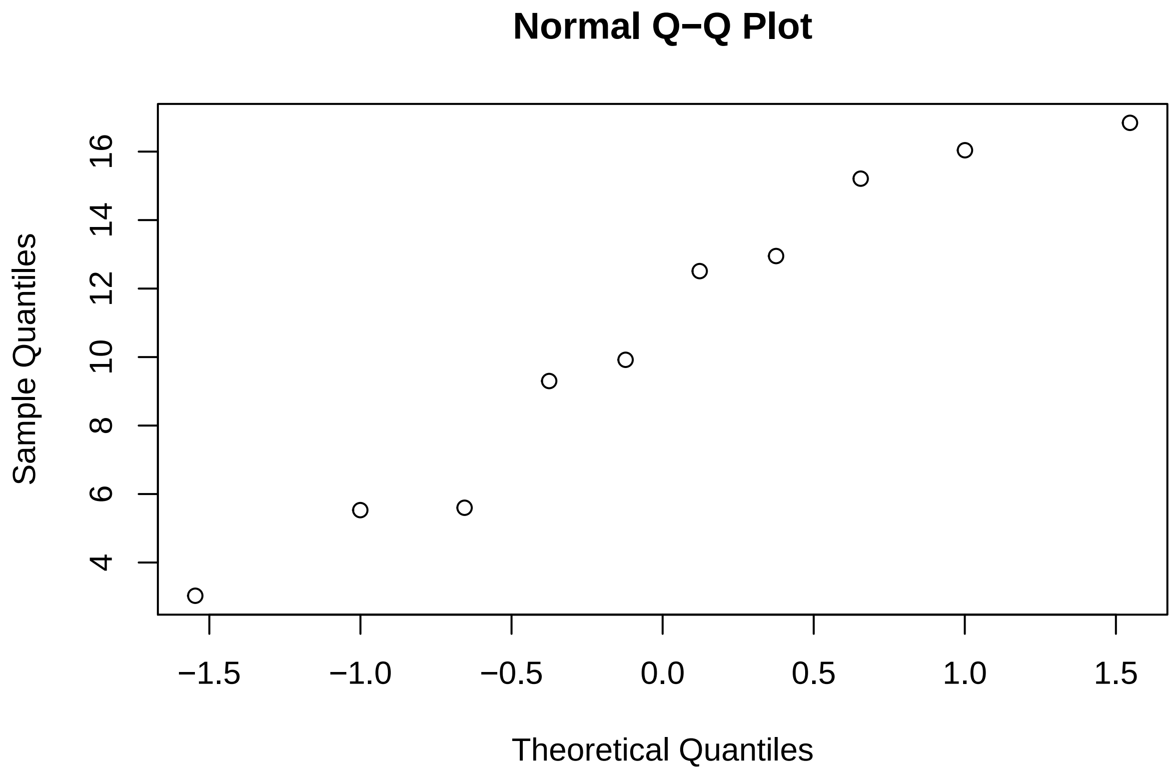
B

```r
# Rather than using the rank sum test by hands and use appendix B at the back of the textbook, I will u
wilcox.test(table$Type1, table$Type2)
```

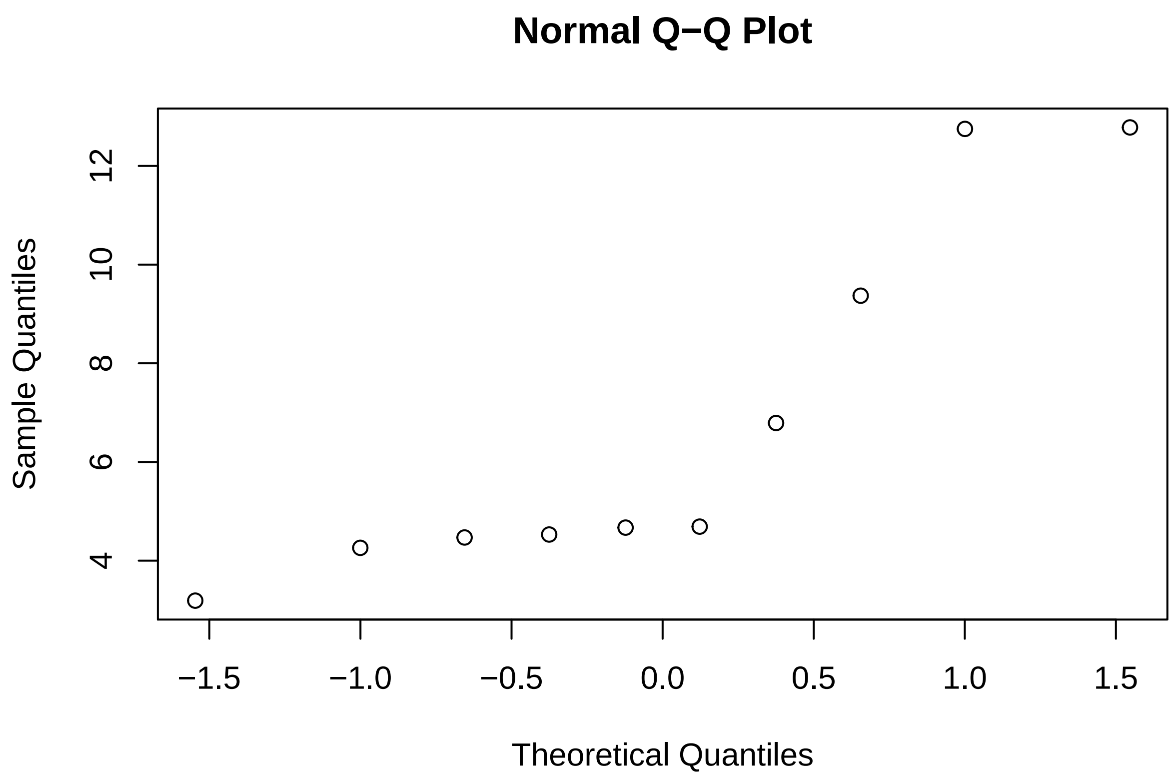
```
##
##  Wilcoxon rank sum test
##
## data:  table$Type1 and table$Type2
## W = 75, p-value = 0.06301
## alternative hypothesis: true location shift is not equal to 0
```

C

```r
#Since the sample sizes of the two groups are small so, it is better to go with non-parametric method.
qqnorm(table$Type1)
```




```r
qqnorm(table$Type2)
```




```
# They do not both look like quite normal
```

D

```
#Tries to find the estimated probability where Type 1 bears more than Type 2 for this question.
# http://www.endmemo.com/program/R/outer.php
ty <- outer(table$Type1, table$Type2, ">")
Ty <- sum(ty)/ 100 #100 is the number of rows for type 1 * number of the rows for type 2

Ty
```

```
## [1] 0.75
```

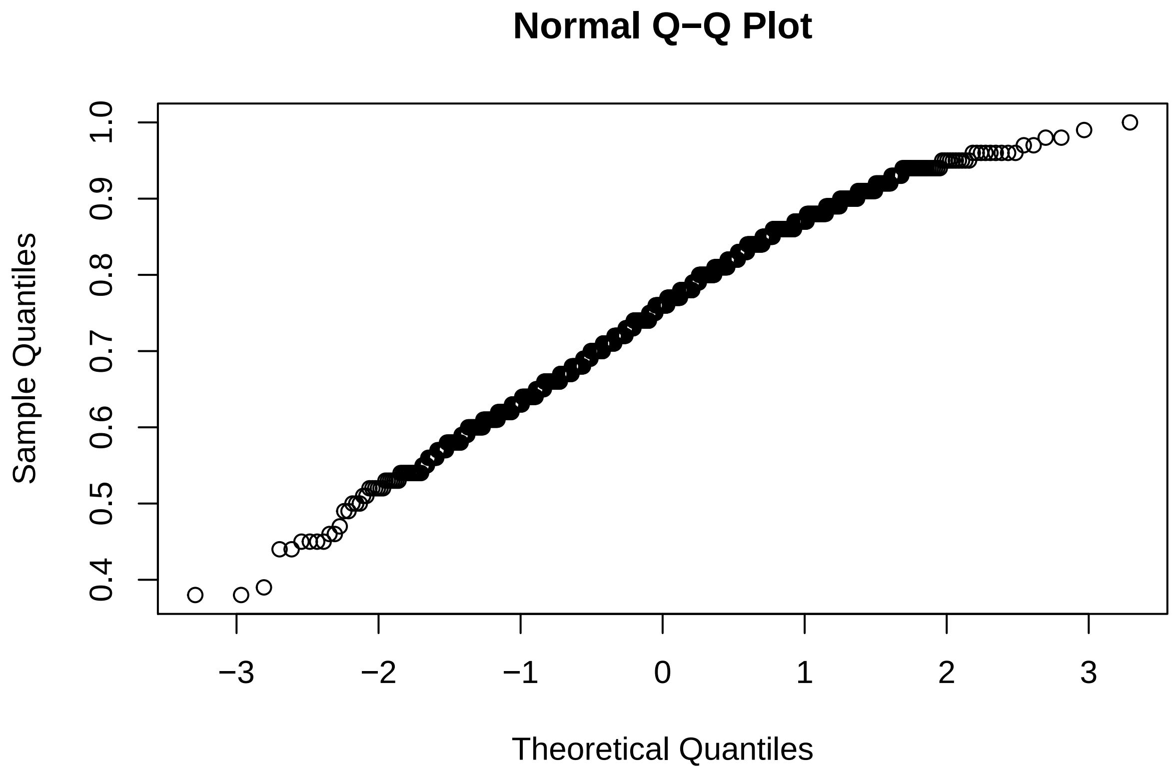
E

```
type1sample <- replicate(n = 1000, sample(table$Type1, size = 10, replace = T))
type2sample <- replicate(n = 1000, sample(table$Type2, size = 10, replace = T))
a <- c(0)

for (i in 1:1000){
  a[i] <- sum(outer(type1sample[,i], type2sample[,i], ">"))/100
}

sd(a)
```

```
## [1] 0.114052
```

F

```r
qqnorm(a) #It looks approximately normal!
```




```r
#Find 95% CI.

CI <- c(mean(a) - qnorm(0.975)*sd(a), mean(a) + qnorm(0.975)*sd(a))

CI
```

```
## [1] 0.5296322 0.9767078
```