Appendix

Jadon Fowler, STA 570 Section 1

Homework 8, 2023/04/06

```
library(ggplot2)
library(dplyr)
library(mosaic)
library(Lock5Data)
library(tidyr)
library(coin)
```

1)

a)

```
pf(0.5, df1=5, df2=5)
```

```
## [1] 0.2325113
```

```
1-pf(0.5, df1=5, df2=5)
```

```
## [1] 0.7674887
```

```
pf(6, df1=4, df2=10)
```

```
## [1] 0.9900311
```

```
1-pf(1/6, df1=10, df2=4)
```

```
## [1] 0.9900311
```

2)

```
pf(7^2/4^2, 14, 19)
```

```
## [1] 0.9875962
```

3)

```
ComponentFailure <- data.frame(TimeToFailure
=c(19.25,19.7,19.75,19.9,19.95,20.05,20.13,20.4,20.6,9.7,9.75,9.8,9.82,
9.85,9.9,9.92,10.01,10.02,10.1,10.11,10.13,10.19,10.28),Voltage = c(
rep('110Voltage',9), rep('220Voltage',14)))
ComponentFailure110 <- data.frame(TimeToFailure
=c(19.25,19.7,19.75,19.9,19.95,20.05,20.13,20.4,20.6))
ComponentFailure220 <- data.frame(TimeToFailure
=c(9.7,9.75,9.8,9.82,9.85,9.9,9.92,10.01,10.02,10.1,10.11,10.13,10.19,10.28))
```

a)

```
mean(ComponentFailure110$TimeToFailure)
```

```
## [1] 19.97
```

```
var(ComponentFailure110$TimeToFailure)
```

```
## [1] 0.15735
```

```
mean(ComponentFailure220$TimeToFailure)
```

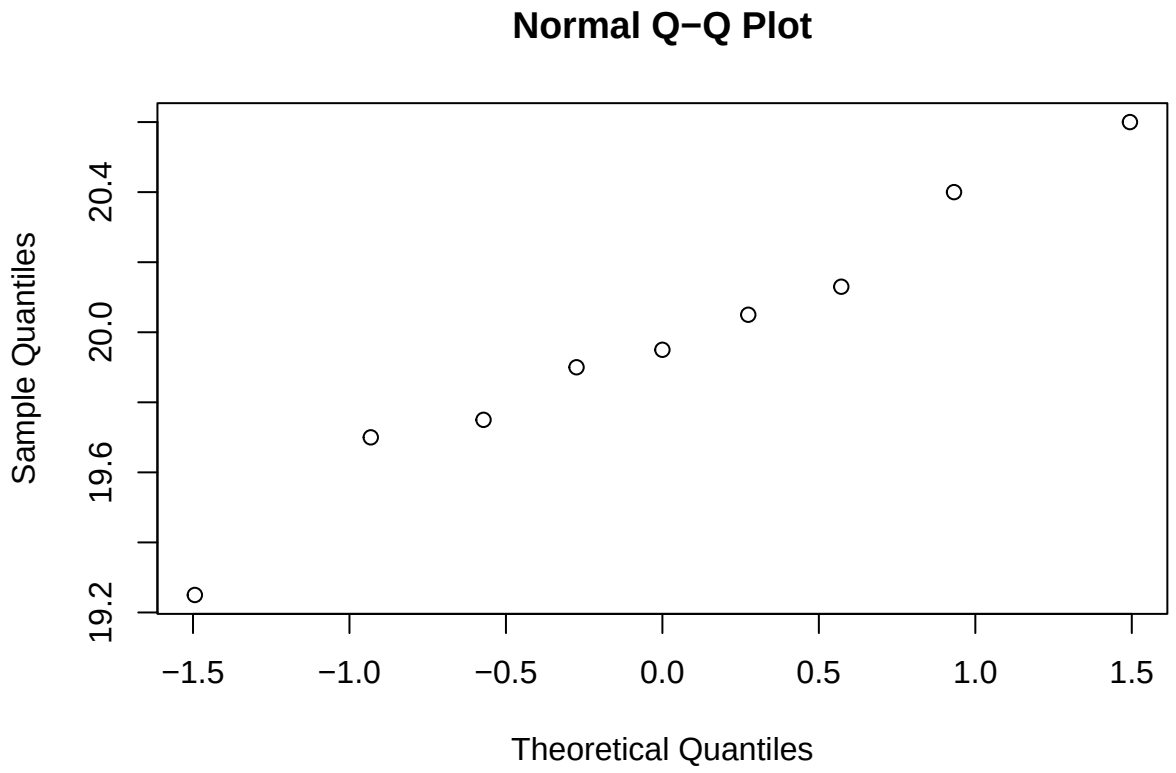
```
## [1] 9.97
```

```
var(ComponentFailure220$TimeToFailure)
```

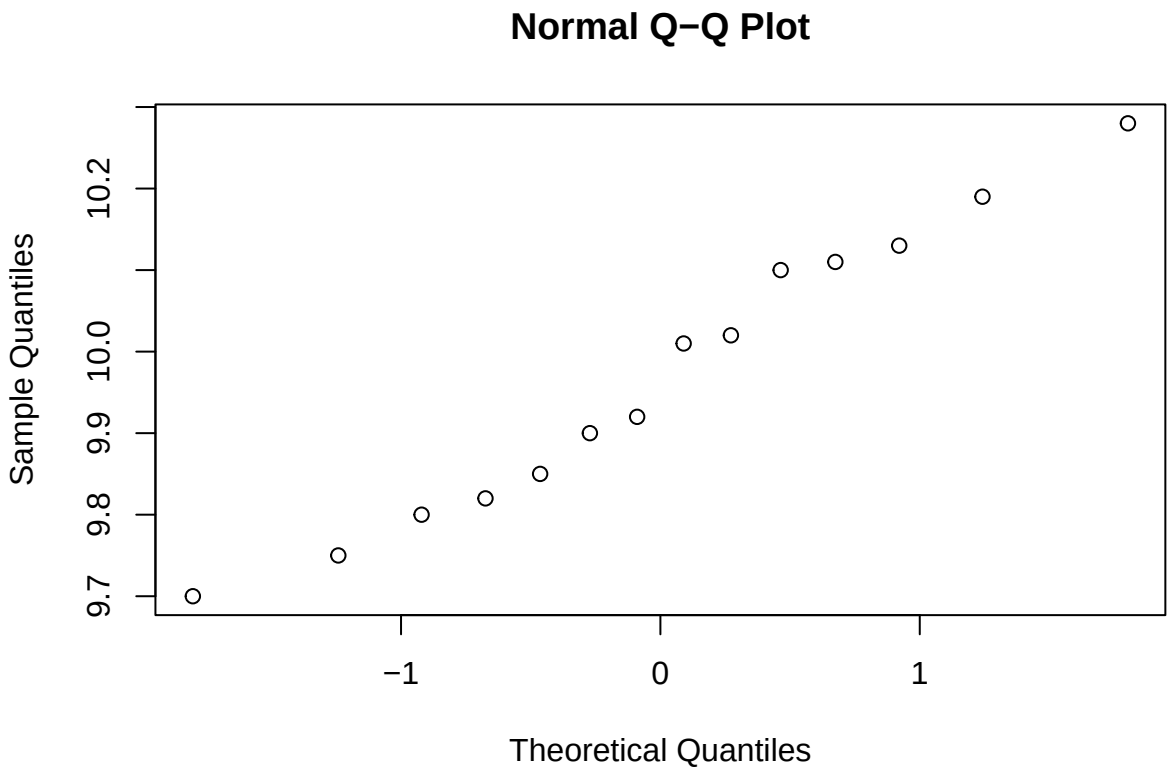
```
## [1] 0.03116923
```

b)
c)

```
#3.b.i
qqnorm(ComponentFailure110$TimeToFailure)
```



```
qqnorm(ComponentFailure220$TimeToFailure)
```



The plots look like they follow a diagonal line and look normally distributed.

ii)

```
#3.b.ii
shapiro.test(ComponentFailure110$TimeToFailure)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  ComponentFailure110$TimeToFailure
## W = 0.98102, p-value = 0.9693
```

```
shapiro.test(ComponentFailure220$TimeToFailure)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  ComponentFailure220$TimeToFailure
## W = 0.96675, p-value = 0.8304
```

c)

d) P(F(9-1,14-1) < 0.157/0.031)

```
pf(0.157/0.031, 9-1, 14-1)
```

```
## [1] 0.9949506
```

ii)

```
var.test(ComponentFailure110$TimeToFailure, ComponentFailure220$TimeToFailure)
```

```
##
##  F test to compare two variances
##
## data:  ComponentFailure110$TimeToFailure and ComponentFailure220$TimeToFailure
## F = 5.0482, num df = 8, denom df = 13, p-value = 0.01024
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##   1.490043 21.011668
## sample estimates:
## ratio of variances
##           5.048248
```

p-value = 0.01024, the variances are not equal.