R Lab 4

Vinayak Mathur

5th April 2022

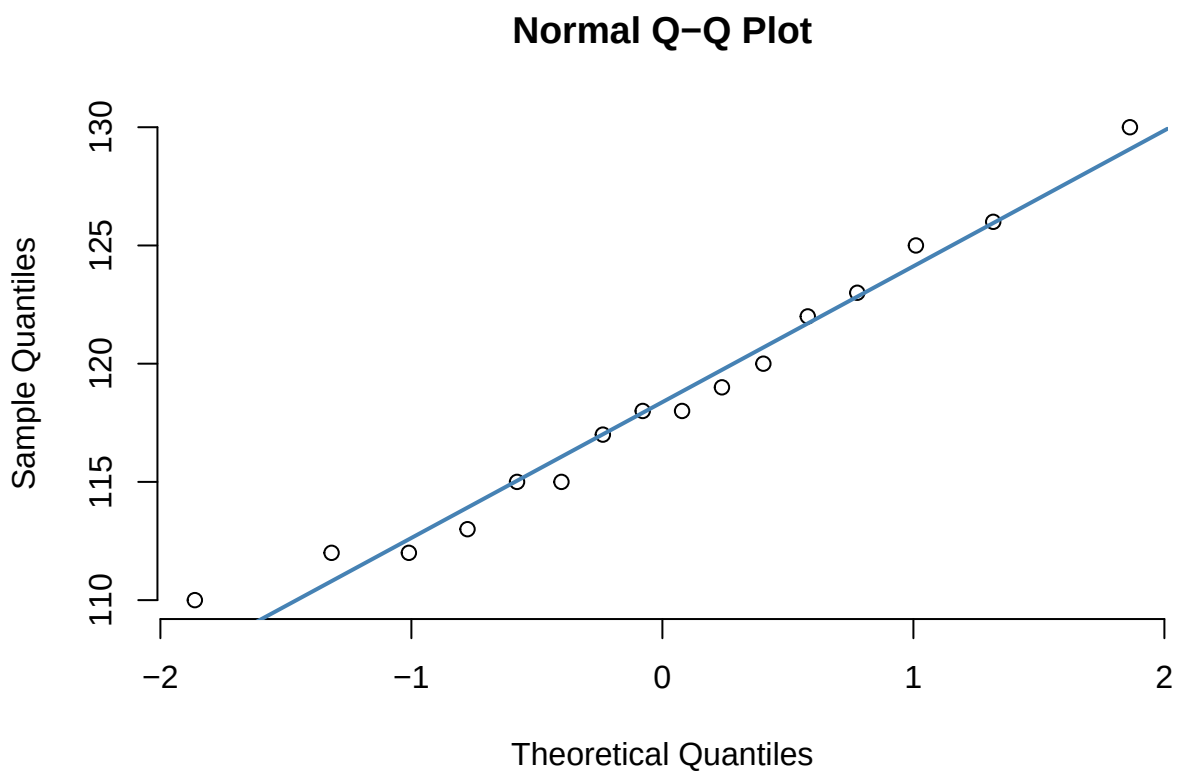
Problem 1:

A random sample of 16 Americans in a city yielded the following data on the number of pounds of beef consumed per year: 118 ,115.125,110, 112, 130,117 ,112 ,115 ,120, 113, 118, 119, 122, 123, 126.

a) (4 points)

Construct a quantile-quantile plot for the data to check if the annual beef consumption in the given city can be modelled by a normal distribution.

```
sampleData <- c(118, 115, 125, 110, 112, 130, 117, 112, 115, 120, 113, 118, 119, 122, 123, 126)
qqnorm(sampleData, pch = 1, frame = FALSE)
qqline(sampleData, col = "steelblue", lwd = 2)
```




```
shapiro.test(sampleData)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  sampleData
## W = 0.96922, p-value = 0.8259
```

Ans:

b) (4+2=6 points)

Construct a two-sided 95% confidence interval for the mean beef consumption of the people in the given city and interpret it.

95% two-sided CI where neither μ nor σ are known is given by $(\bar{X} - t_{\alpha/2,n-1}\frac{s}{\sqrt(n)}, \bar{X} + t_{\alpha/2,n-1}\frac{s}{\sqrt(n)})$

```
t.test(sampleData)
```

```
##
##  One Sample t-test
##
## data:  sampleData
## t = 83.753, df = 15, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  115.4234 121.4516
## sample estimates:
## mean of x
##  118.4375
```

```
x_bar <- mean(sampleData)
s <- sd(sampleData)
n <- length(sampleData)
alpha <- 0.95
t <- qt((1-alpha)/2, n-1)
LCL <- x_bar - abs(t*s/sqrt(n))
UCL <- x_bar + abs(t*s/sqrt(n))
c(LCL, UCL)
```

```
## [1] 115.4234 121.4516
```