Modelos lineares aula 1

Danilo de Paula Santos

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```
# install.packages("compareGroups")
# install.packages("ggplot2")
# install.packages("data.table")


library("compareGroups")
library("ggplot2")
library("haven")
```

Estuda da relação entre infecção por acilóstomo e perda de sangue. Tailândia 1970

```
suwit <- read_sav("C:/Users/00265021/Documents/Cadeiras/Modelos lineares/Suwit.sav")
```

```
compare_suwit <- compareGroups( ~ ., data = suwit)

summary(compare_suwit)
```

```
##
##  --- Descriptives of each row-variable ---
##
## --------------------
## row-variable: Identificação
##
##       N  mean sd       lower    upper
## [ALL] 15 8    4.472136 5.523414 10.47659
##
## --------------------
## row-variable: número de vermes
##
##       N  mean  sd       lower    upper
## [ALL] 15 552.4 513.9007 267.8113 836.9887
##
## --------------------
## row-variable: Perda de sangue por dia
##
##       N  mean     sd       lower    upper
## [ALL] 15 33.45267 24.85249 19.68982 47.21551
```

```
tabela_suwit <- createTable(compare_suwit)
```

Estudo Fat_dat "Fitting Percentage of Body Fat to Simple Body Measurements"

```
fat_dat <- read_sav("C:/Users/00265021/Documents/Cadeiras/Modelos lineares/fat_dat.sav")
```

Corrigindo os erros de digitação:

- The body densities for cases 48, 76, and 96, for instance, each seem to have one digit in error as can be seen from the two body fat percentage values.
- Case 42) over 200 pounds in weight who is less than 3 feet tall (the height should presumably be 69.5 inches, not 29.5 inches)!
- The percent body fat estimates are truncated to zero when negative (case 182)

```
# Altura

fat_dat$altura_pol <- ifelse( fat_dat$numero == 42, 69.5, fat_dat$altura_pol)

# Densidades

fat_dat$densidade <- ifelse( fat_dat$numero == 48, 1.0865, fat_dat$densidade)
fat_dat$densidade <- ifelse( fat_dat$numero == 76, 1.0566, fat_dat$densidade)
fat_dat$densidade <- ifelse( fat_dat$numero == 96, 1.0591, fat_dat$densidade)
```

```
compare_fat <- compareGroups( ~ ., data = fat_dat)

summary(compare_fat)
```

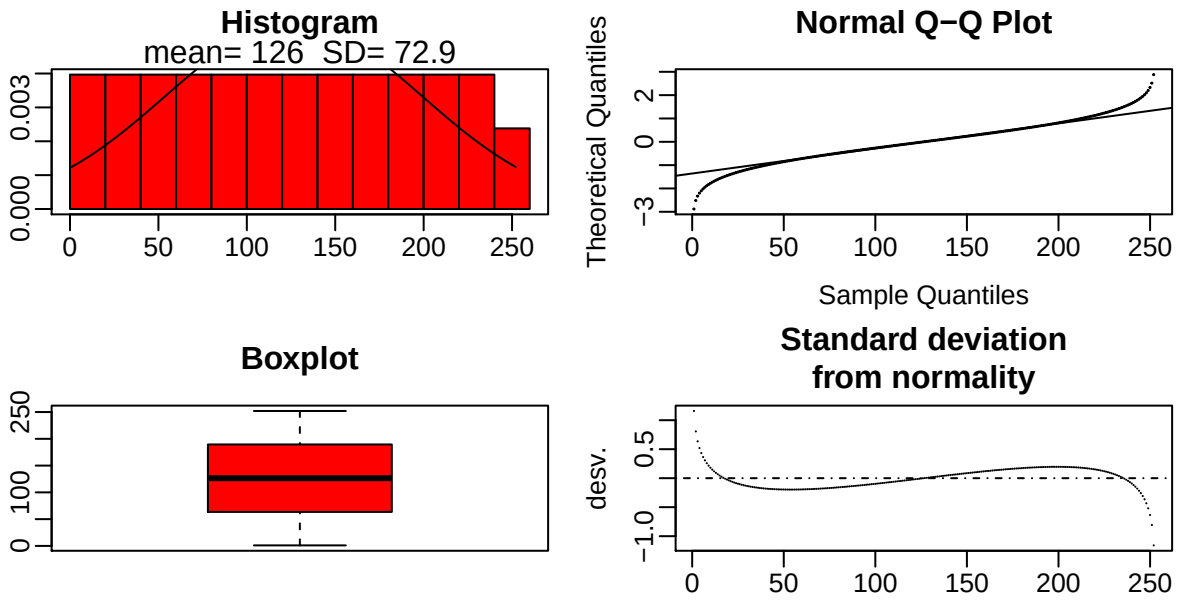
```
##
##  --- Descriptives of each row-variable ---
##
## --------------------
## row-variable: numero
##
##       N   mean  sd       lower    upper
## [ALL] 252 126.5 72.89033 117.4569 135.5431
##
## --------------------
## row-variable: fat_Brozek
##
##       N   mean     sd       lower    upper
## [ALL] 252 18.93849 7.750856 17.97689 19.9001
##
## --------------------
## row-variable: fat_Siri
##
##       N   mean     sd      lower    upper
## [ALL] 252 19.15079 8.36874 18.11253 20.18906
##
## --------------------
## row-variable: densidade
##
```

```
##       N   mean     sd       lower    upper
## [ALL] 252 1.055455 0.018909 1.053109 1.057801
##
## -------------------
## row-variable: idade
##
##       N   mean     sd       lower    upper
## [ALL] 252 44.88492 12.60204 43.32146 46.44838
##
## -------------------
## row-variable: Peso em libras
##
##       N   mean     sd       lower    upper
## [ALL] 252 178.9244 29.38916 175.2783 182.5706
##
## -------------------
## row-variable: altura_pol
##
##       N   mean     sd       lower    upper
## [ALL] 252 70.30754 2.609583 69.98378 70.6313
##
## -------------------
## row-variable: kg/m2
##
##       N   mean    sd       lower   upper
## [ALL] 252 25.4369 3.648111 24.9843 25.88951
##
## -------------------
## row-variable: peso da massa magra
##
##       N   mean     sd       lower   upper
## [ALL] 252 143.7139 18.23164 141.452 145.9758
##
## -------------------
## row-variable: Circunferencia do pescoço
##
##       N   mean     sd       lower    upper
## [ALL] 252 37.99206 2.430913 37.69047 38.29365
##
## -------------------
## row-variable: Circunferencia do peito
##
##       N   mean     sd       lower    upper
## [ALL] 252 100.8242 8.430476 99.77829 101.8701
##
## -------------------
## row-variable: Circ do abdomem
##
##       N   mean     sd       lower    upper
## [ALL] 252 92.55595 10.78308 91.21816 93.89375
##
## -------------------
## row-variable: circ do quadril
##
```

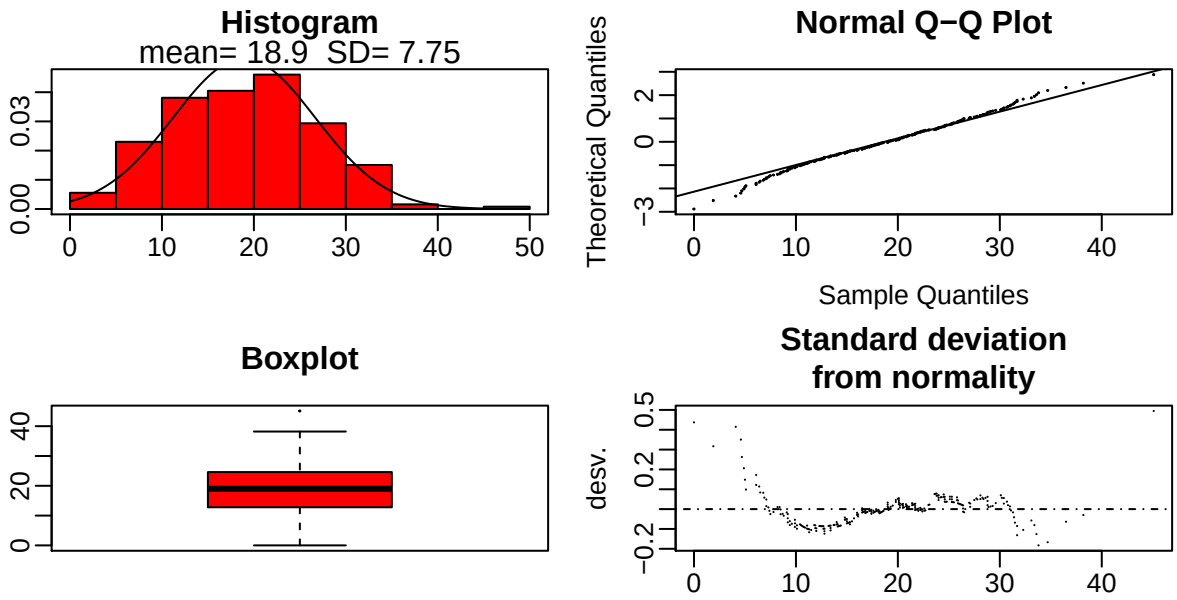
```
##       N   mean     sd       lower    upper
## [ALL] 252 99.90476 7.164058 99.01596 100.7936
##
## -------------------
## row-variable: circ do coxa
##
##       N   mean     sd       lower    upper
## [ALL] 252 59.40595 5.249952 58.75462 60.05728
##
## -------------------
## row-variable: circ do joelho
##
##       N   mean     sd       lower    upper
## [ALL] 252 38.59048 2.411805 38.29126 38.8897
##
## -------------------
## row-variable: circ do tornozelo
##
##       N   mean     sd       lower    upper
## [ALL] 252 23.10238 1.694893 22.89211 23.31266
##
## -------------------
## row-variable: circ do biceps
##
##       N   mean     sd       lower    upper
## [ALL] 252 32.27341 3.021274 31.89858 32.64825
##
## -------------------
## row-variable: circ do antebraco
##
##       N   mean     sd       lower    upper
## [ALL] 252 28.66389 2.020691 28.41319 28.91458
##
## -------------------
## row-variable: circ do pulso
##
##       N   mean     sd       lower    upper
## [ALL] 252 18.22976 0.933585 18.11394 18.34559
```

```
tabela_fat <- createTable(compare_fat)
```

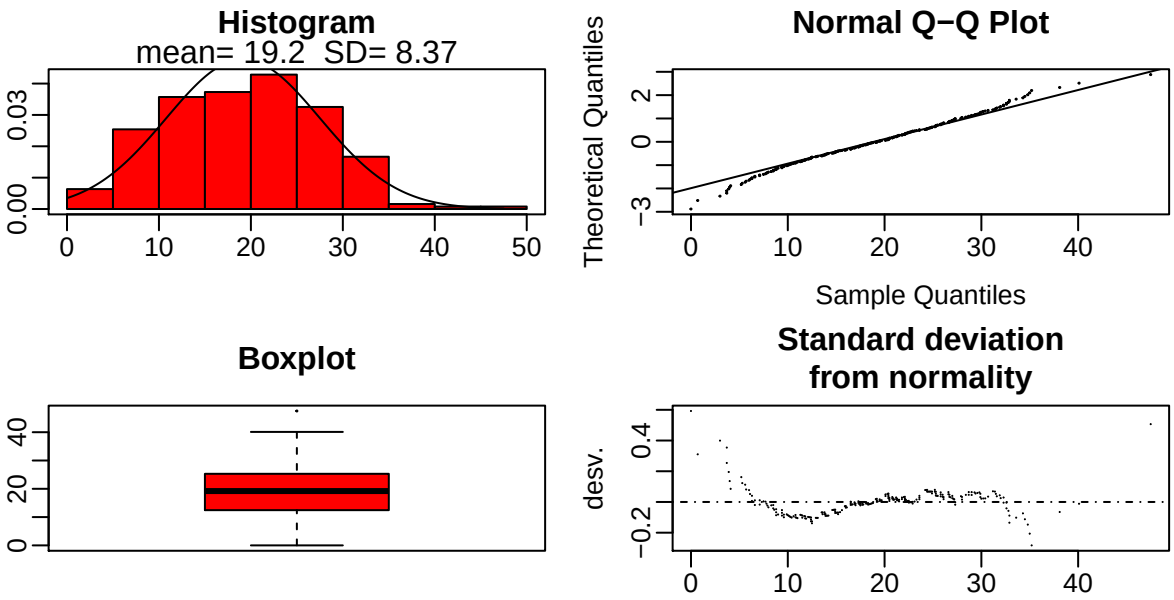
```
plot(compare_fat)
```



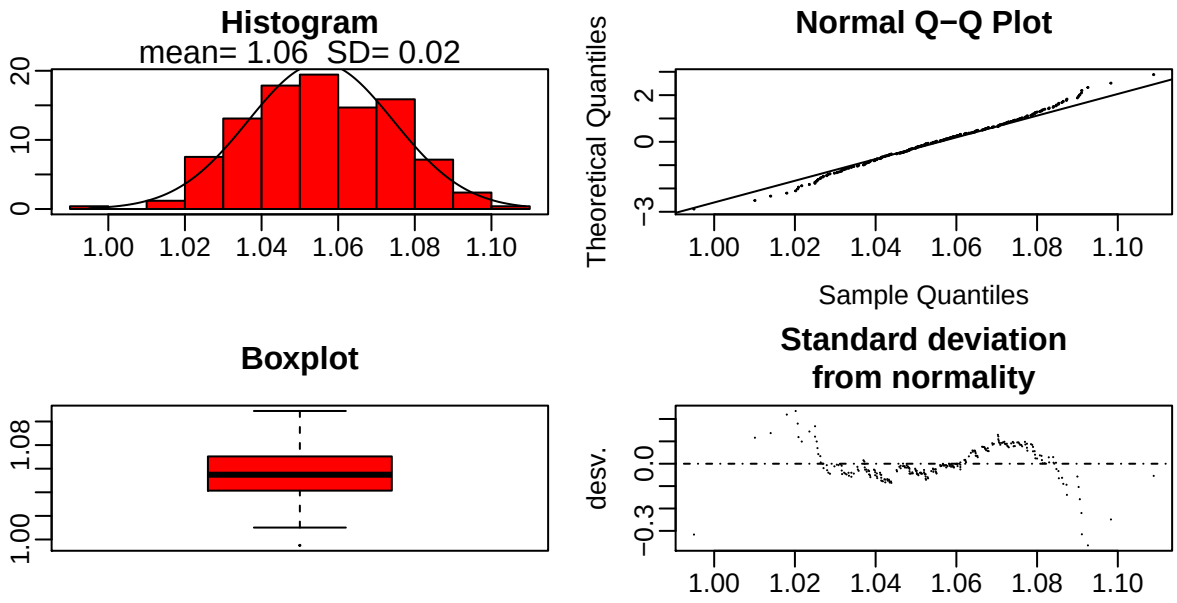
Shapiro−Wilks p−value: <0.001



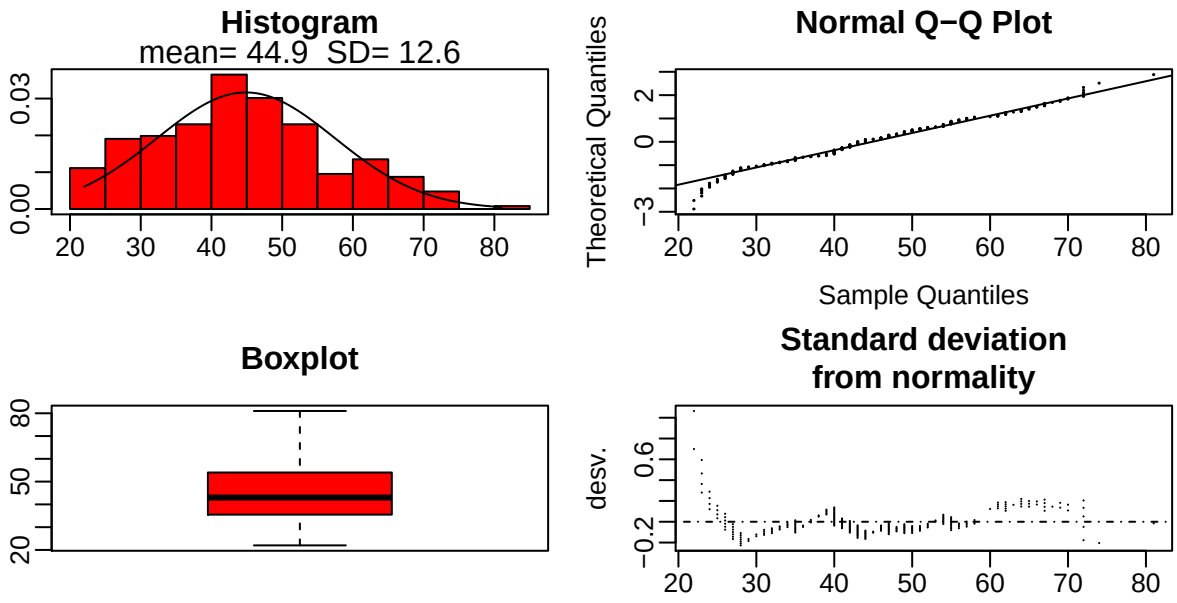
Shapiro−Wilks p−value: 0.275



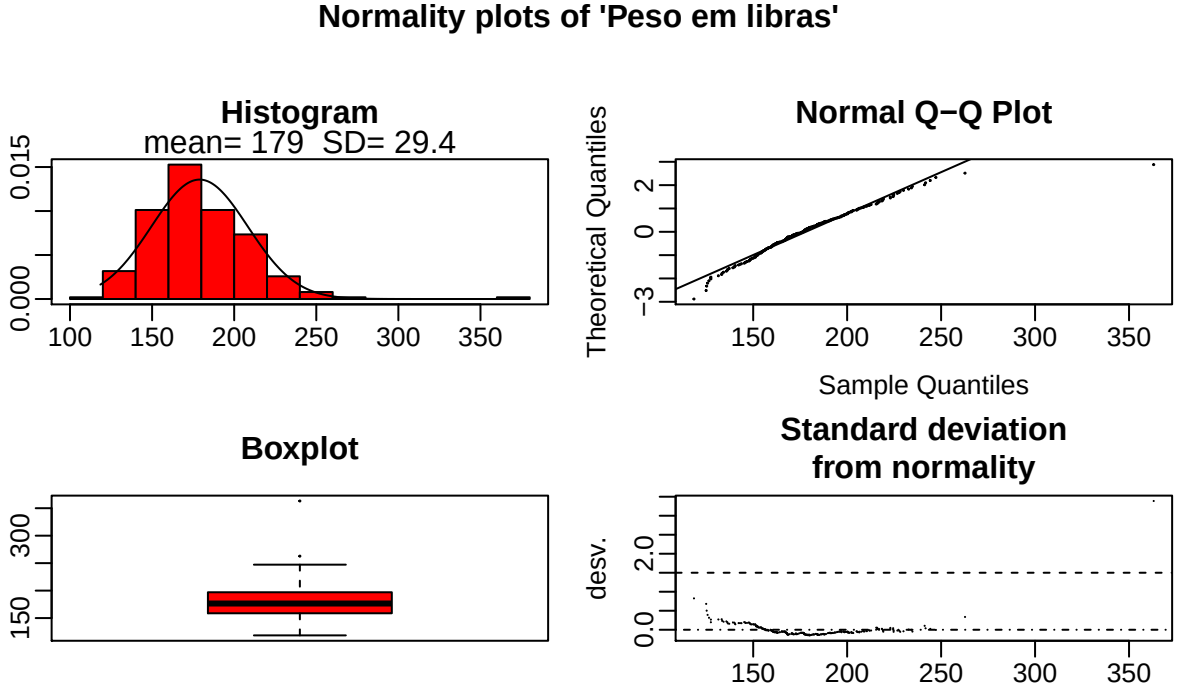
Shapiro−Wilks p−value: 0.165



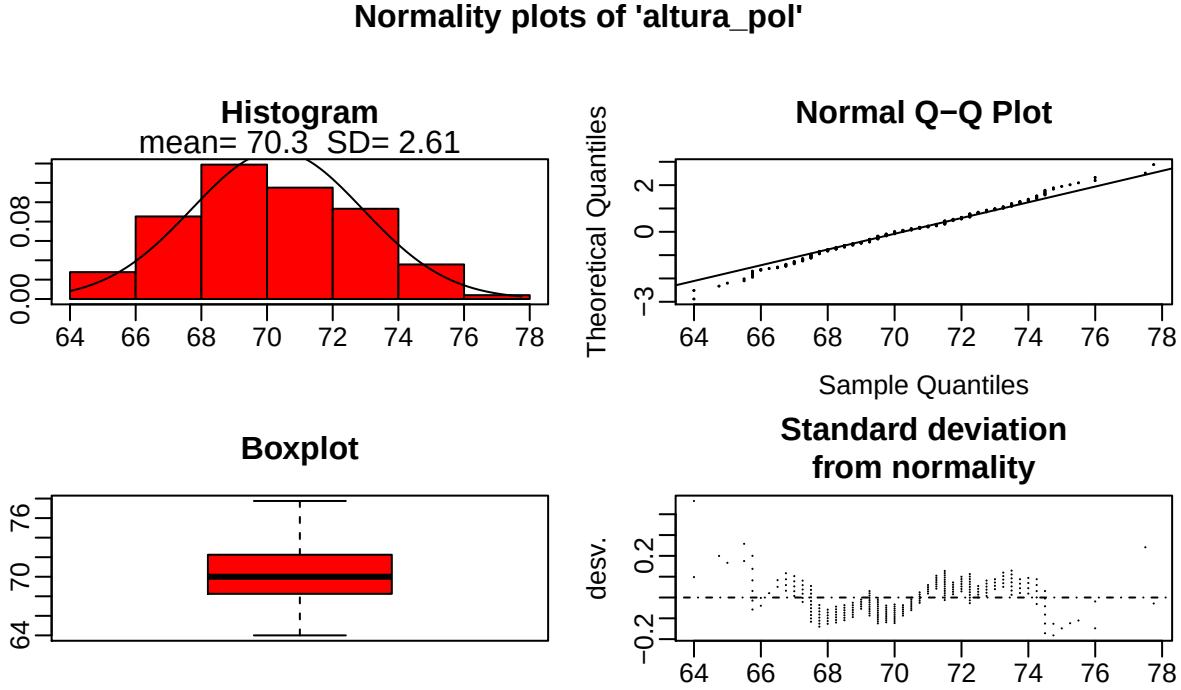
Shapiro−Wilks p−value: 0.522



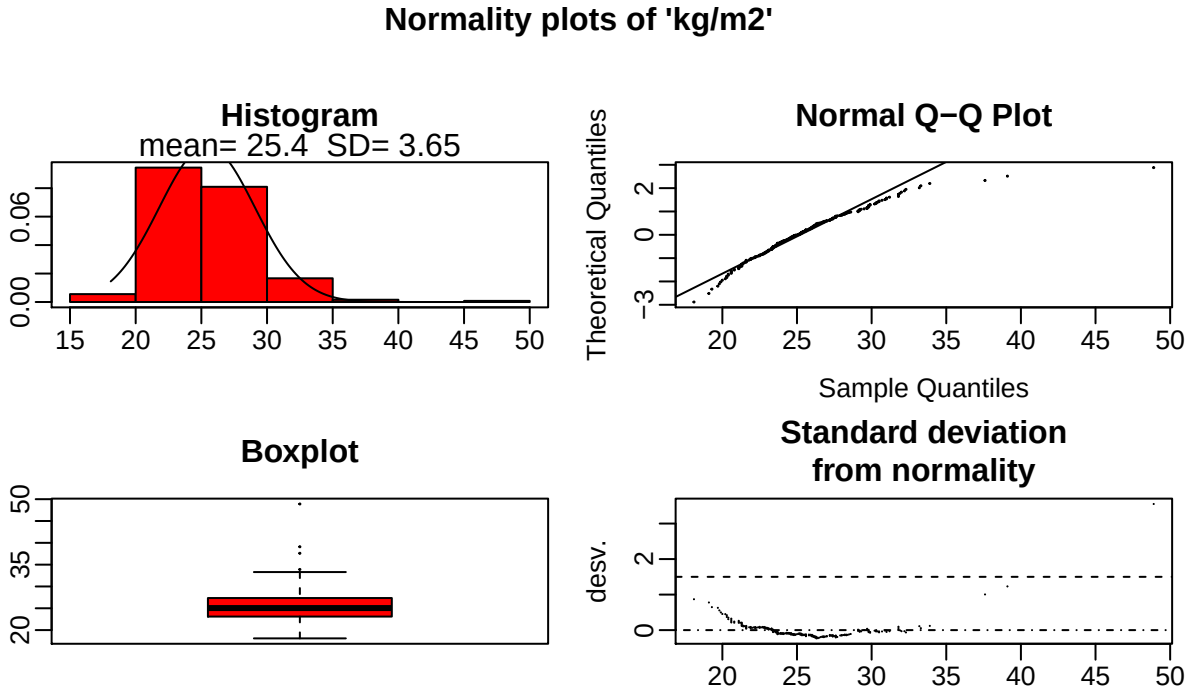
Shapiro−Wilks p−value: 0.001



Shapiro−Wilks p−value: <0.001

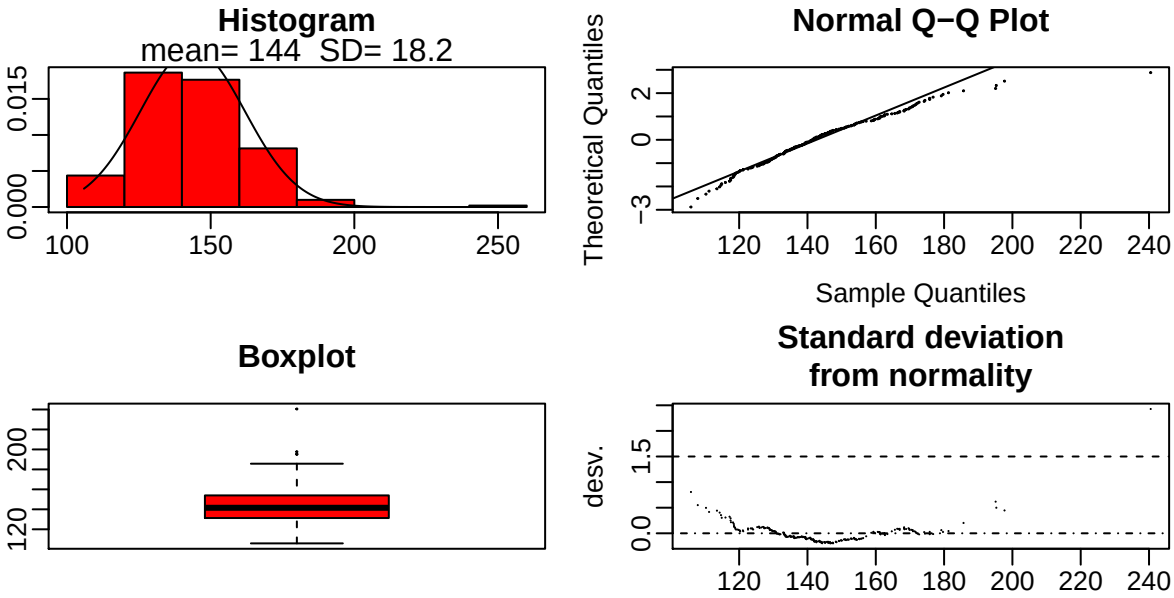


Shapiro−Wilks p−value: 0.237



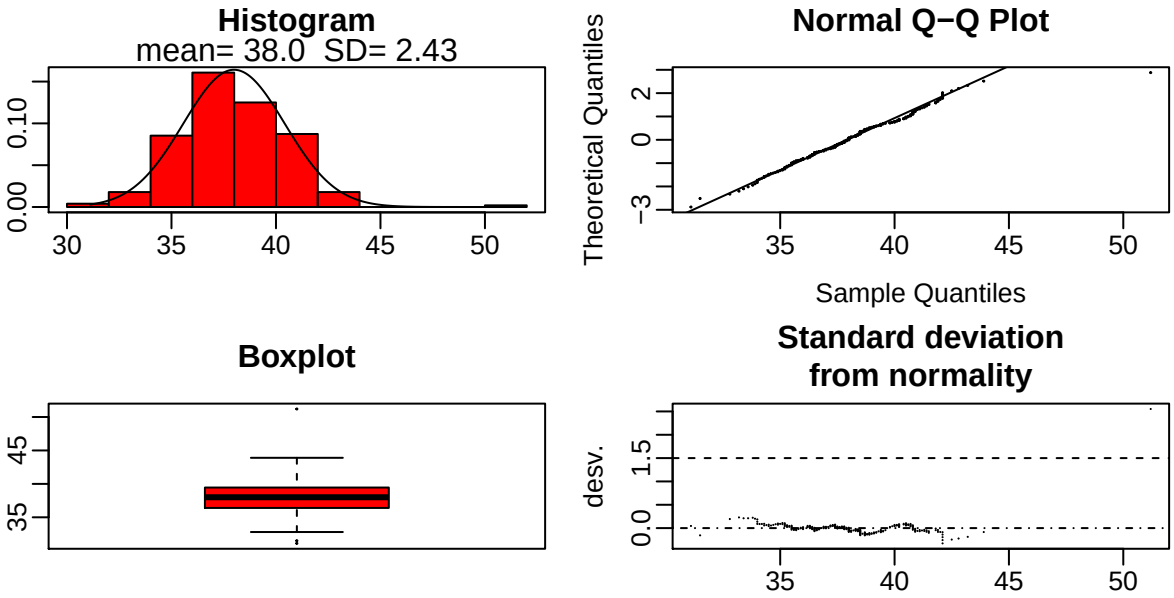
Shapiro−Wilks p−value: <0.001

Normality plots of 'peso da massa magra'



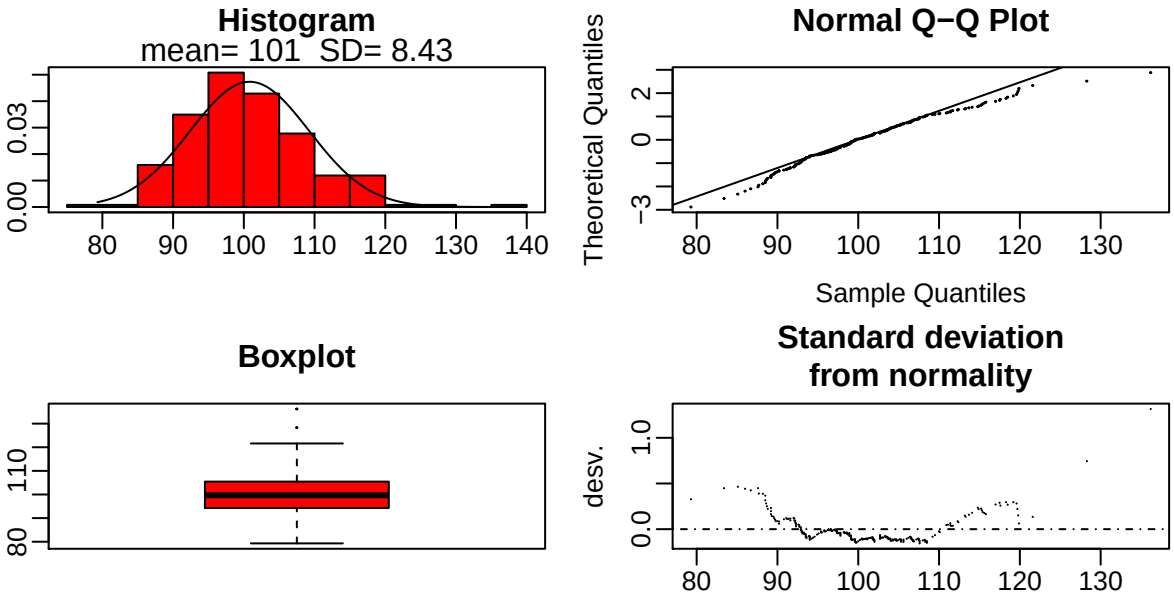
Shapiro−Wilks p−value: <0.001

Normality plots of 'Circunferencia do pescoço'



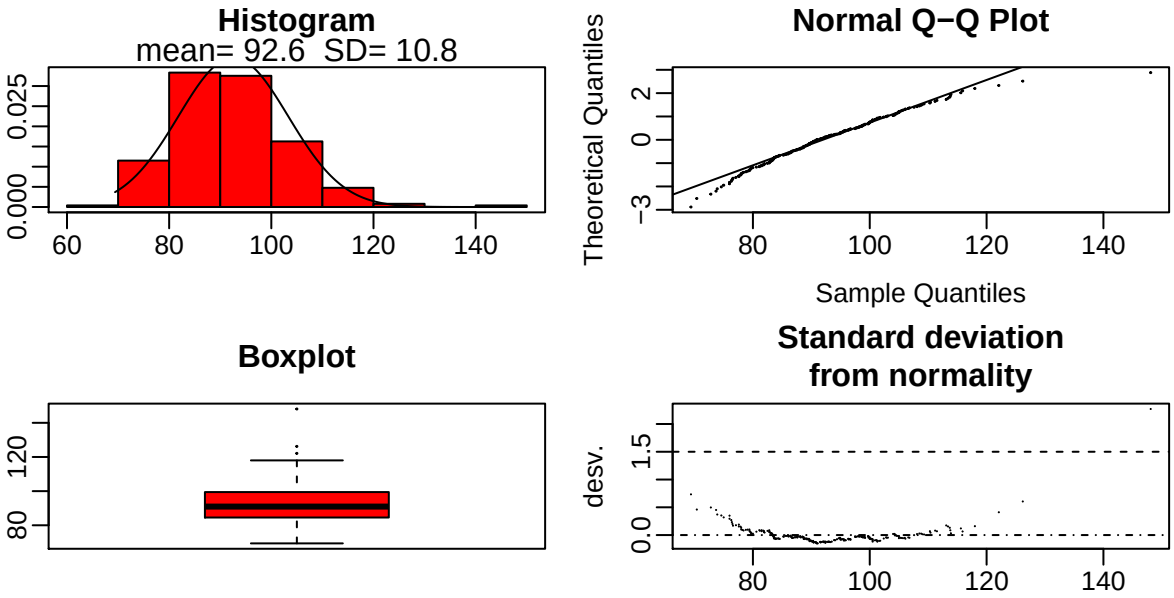
Shapiro−Wilks p−value: <0.001

Normality plots of 'Circunferencia do peito'



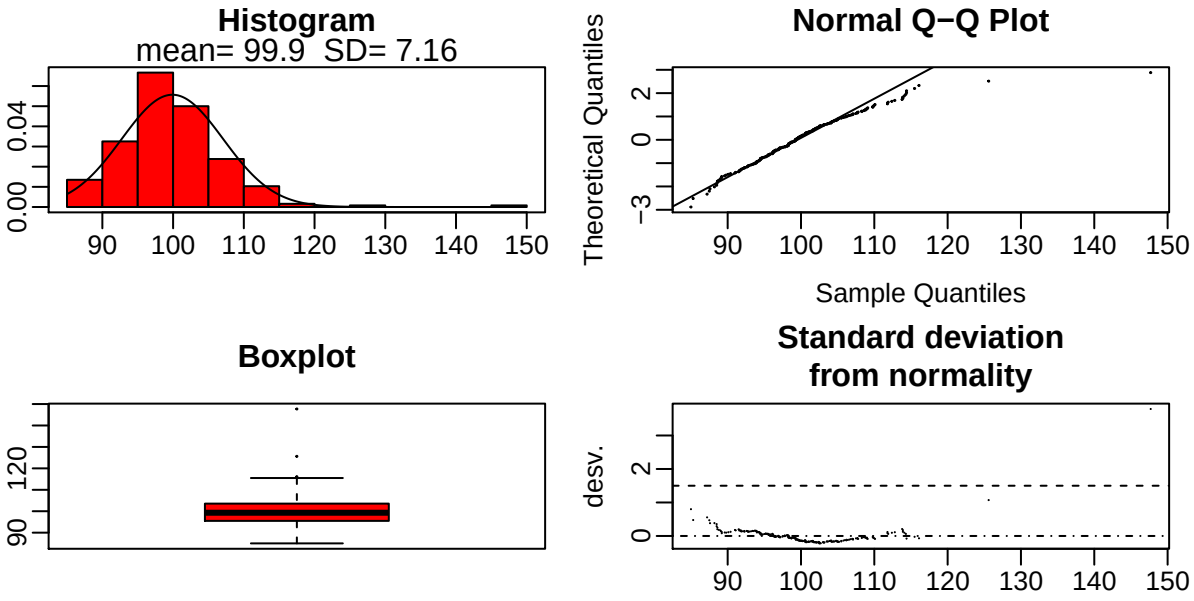
Shapiro−Wilks p−value: <0.001

Normality plots of 'Circ do abdomem'

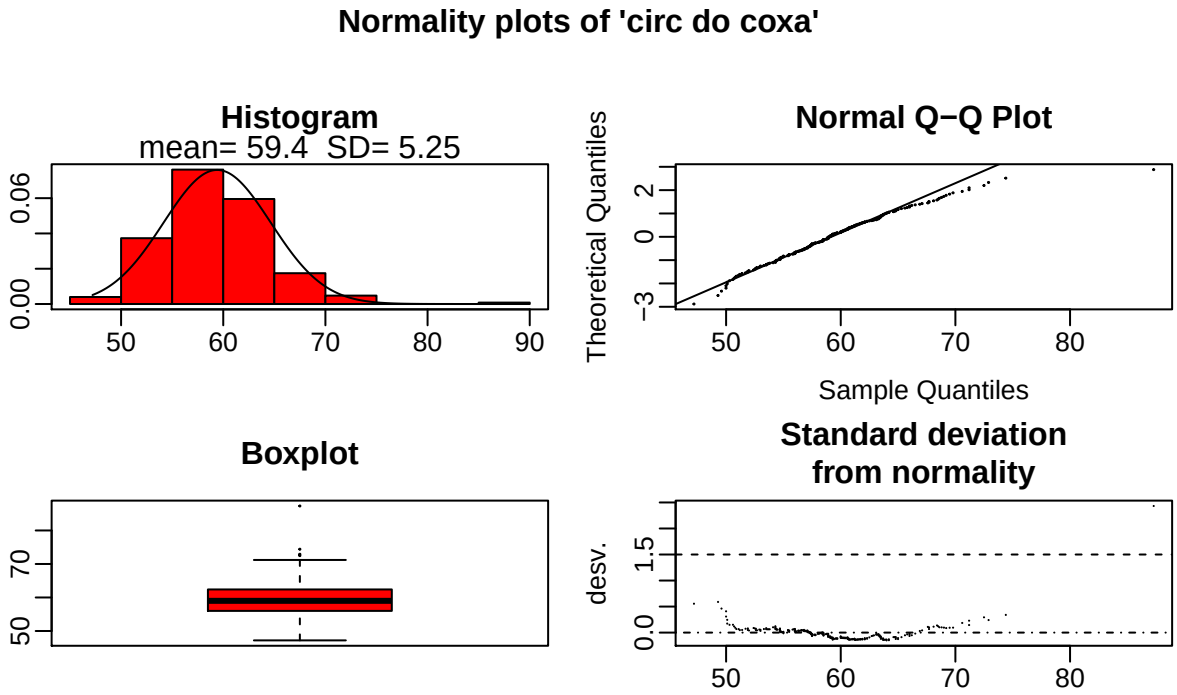


Shapiro−Wilks p−value: <0.001

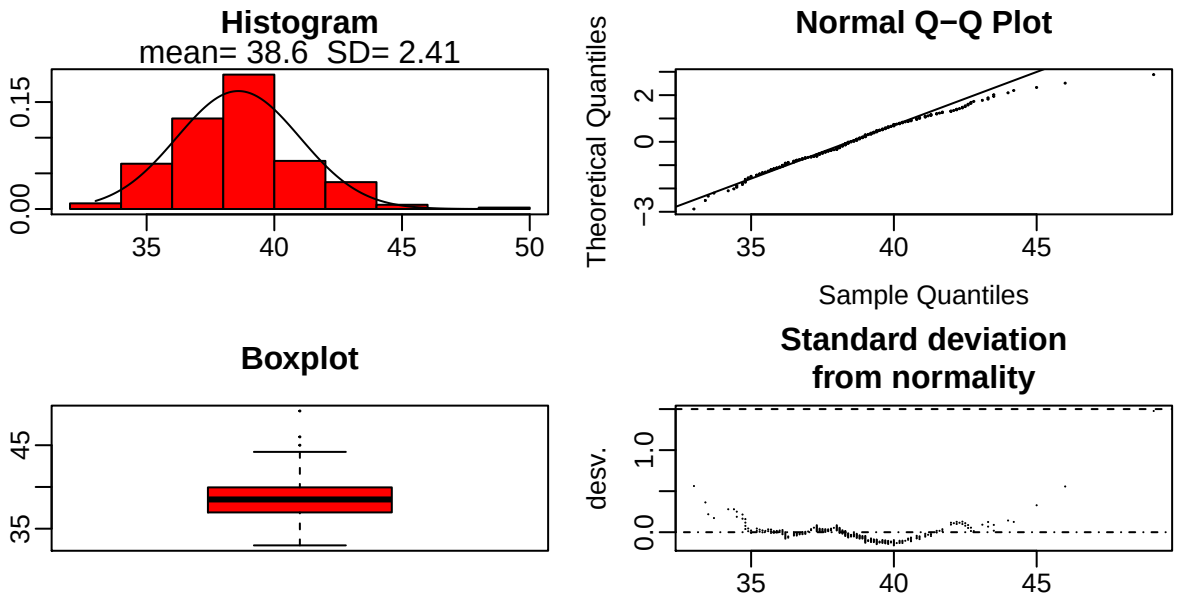
Normality plots of 'circ do quadril'



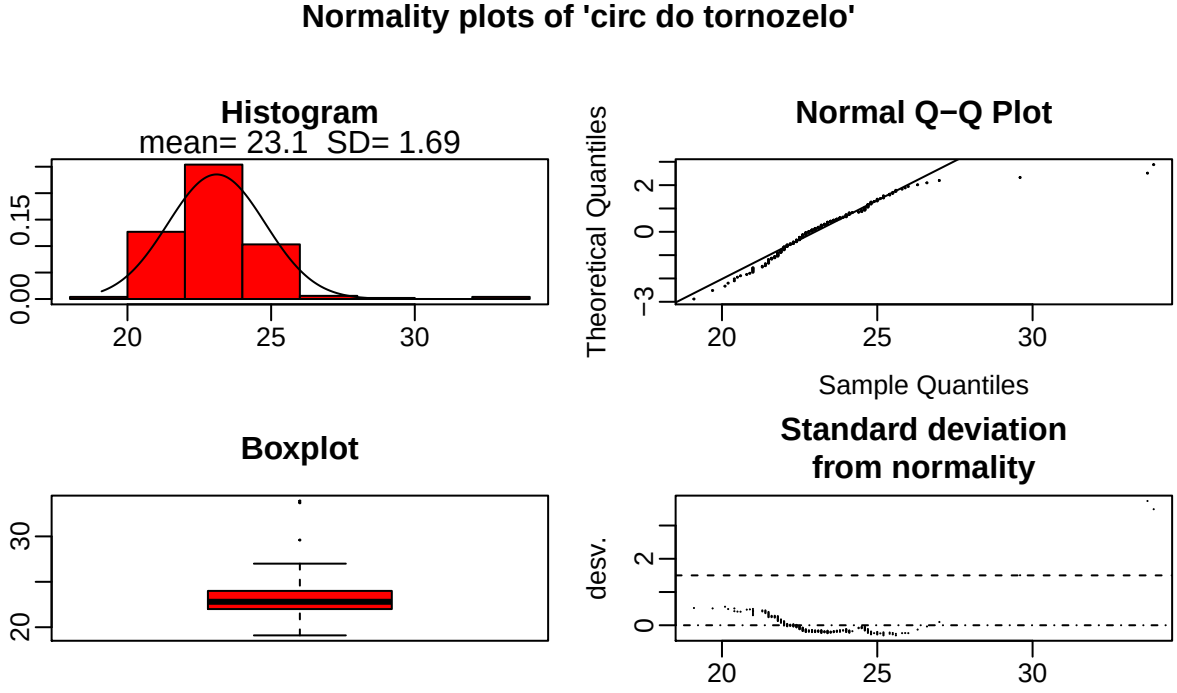
Shapiro−Wilks p−value: <0.001



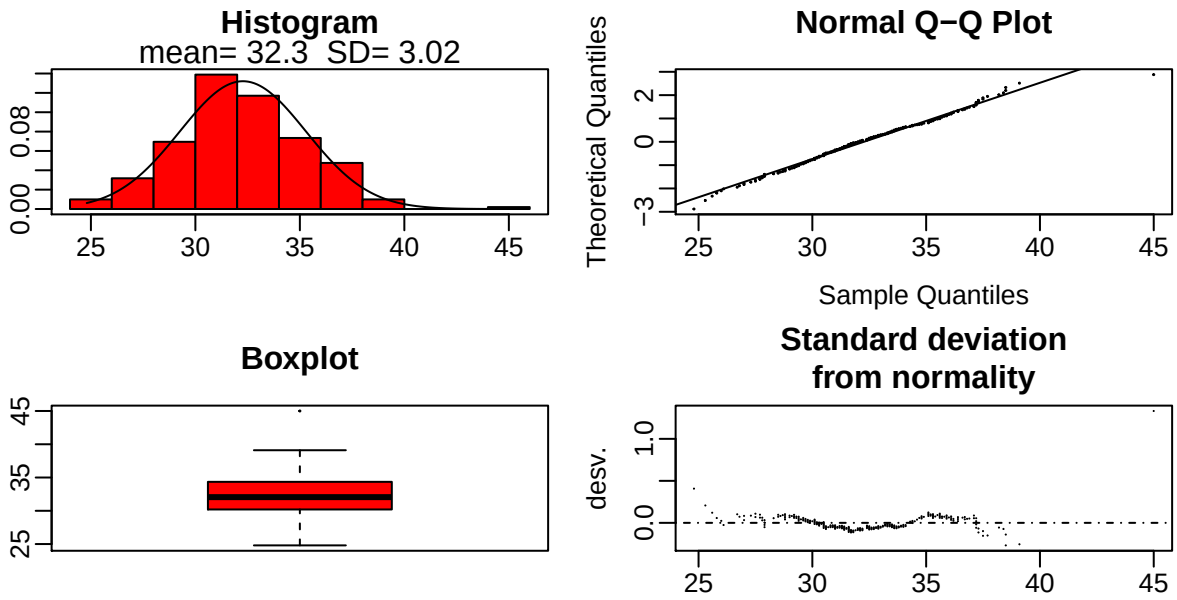
Shapiro−Wilks p−value: <0.001



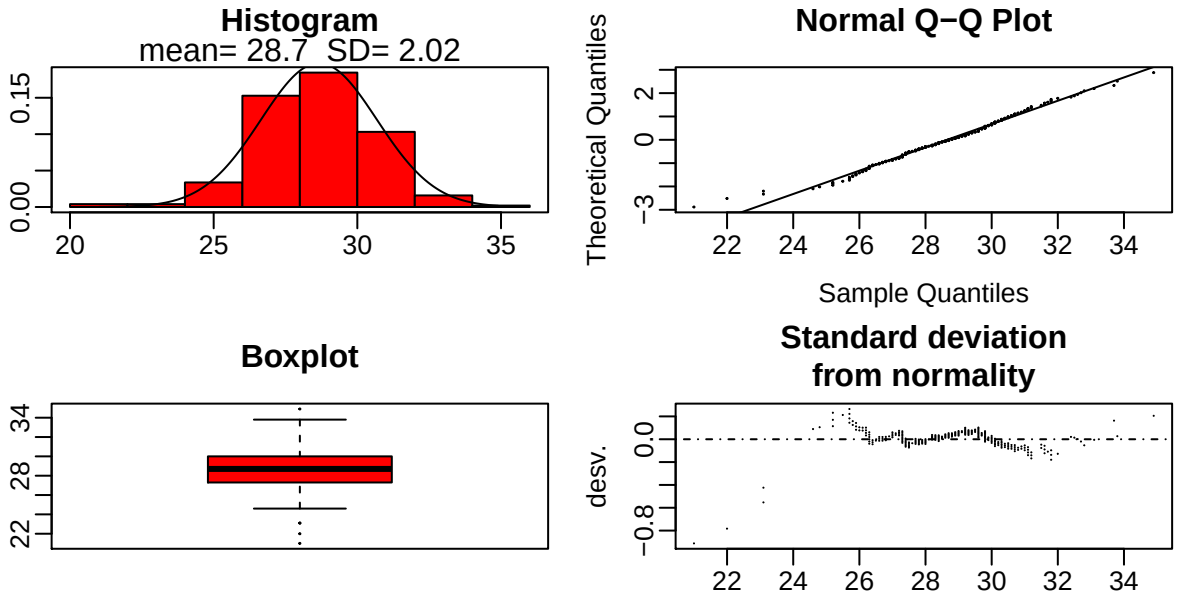
Shapiro−Wilks p−value: 0.003



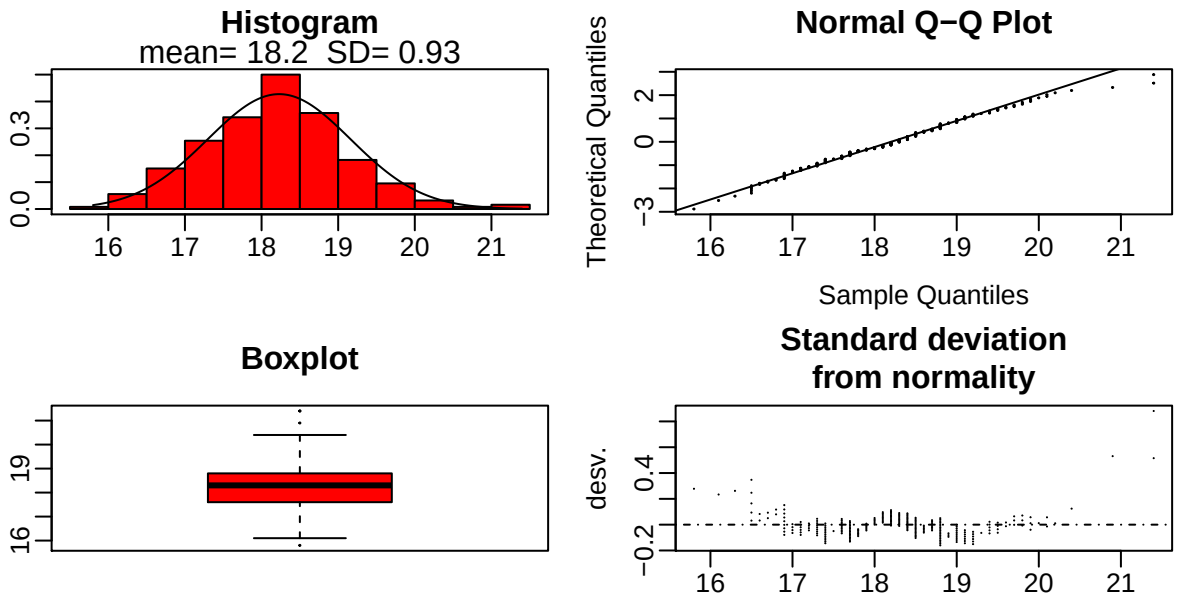
Shapiro−Wilks p−value: <0.001



Shapiro−Wilks p−value: 0.046

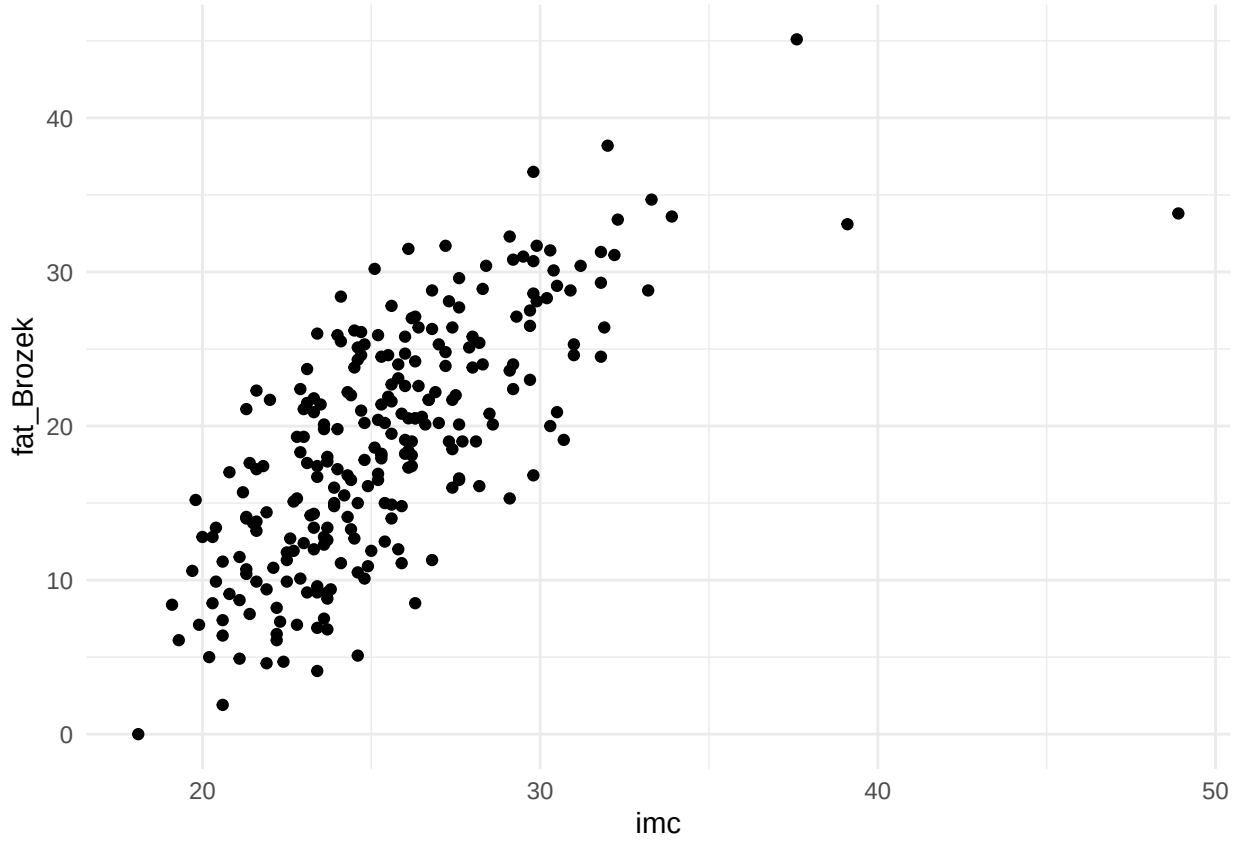


Shapiro−Wilks p−value: 0.048




```
disp_fat_dat <- ggplot(fat_dat, aes(x = imc, y = fat_Brozek))+
  geom_point() +
  theme_minimal()

disp_fat_dat
```




```
lm_imc_brozek <- lm(formula = fat_Brozek ~ imc,
                    data = fat_dat)

summary(lm_imc_brozek)
```

```
##
## Call:
## lm(formula = fat_Brozek ~ imc, data = fat_dat)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -21.4292  -3.4478   0.2113   3.8663  11.7826
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -20.40508    2.36723   -8.62 7.78e-16 ***
## imc           1.54671    0.09212   16.79  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 5.324 on 250 degrees of freedom
## Multiple R-squared:   0.53,  Adjusted R-squared:  0.5281
## F-statistic: 281.9 on 1 and 250 DF,  p-value: < 2.2e-16
```

```r
confint(lm_imc_brozek)
```

```
##                   2.5 %    97.5 %
## (Intercept) -25.067331 -15.74283
## imc           1.365275   1.72815
```

A cada aumento de 1 unidade no IMC ocorre aumento de 1.55% na gordura corporal. O intervalo de confiança é de 1.36 a 1.73.