

# Medidas

Dafne Dorantes Avila

2022-06-29

#\_\_\_\_\_ MEDIDAS \_\_\_\_\_

## Se trabajará con la matriz de datos “penguins.xlsx”

1.- Exportacion de matriz #Import dataset/from excel/Browser/ seleccionar # archivo/ aceptar/ (visualizar)/ import

```
library(readxl)
```

```
penguins<-read_excel("penguins.xlsx")
```

2.- Acortar el nombre de la matriz de datos

```
BD<-penguins
```

#\_\_\_\_\_ # Exploracion de la matriz #\_\_\_\_\_

```
library(readxl)
```

```
penguins<-read_excel("penguins.xlsx")
```

```
dim(BD)
```

```
## [1] 344 9
```

```
str(BD)
```

```
## tibble [344 x 9] (S3: tbl_df/tbl/data.frame)
## $ ID : chr [1:344] "i1" "i2" "i3" "i4" ...
## $ especie : chr [1:344] "Adelie" "Adelie" "Adelie" "Adelie" ...
## $ isla : chr [1:344] "Torgersen" "Torgersen" "Torgersen" "Torgersen" ...
## $ largo_pico_mm : num [1:344] 39.1 39.5 40.3 37.8 36.7 39.3 38.9 39.2 34.1 42 ...
## $ grosor_pico_mm : num [1:344] 18.7 17.4 18 18.1 19.3 20.6 17.8 19.6 18.1 20.2 ...
## $ largo_aleta_mm : num [1:344] 181 186 195 190 193 190 181 195 193 190 ...
## $ masa_corporal_g: num [1:344] 3750 3800 3250 3700 3450 ...
## $ genero : chr [1:344] "male" "female" "female" "female" ...
## $ año : num [1:344] 2007 2007 2007 2007 2007 ...
```

```
colnames(BD)
```

```
## [1] "ID" "especie" "isla" "largo_pico_mm"
## [5] "grosor_pico_mm" "largo_aleta_mm" "masa_corporal_g" "genero"
## [9] "año"
```

```
anyNA(BD)
```

```
## [1] FALSE
```

#----- # Tendencia central #-----

## 1.- Media y mediana

```
summary(BD)
```

```
##      ID          especie      isla      largo_pico_mm
## Length:344      Length:344      Length:344      Min.   :32.10
## Class :character Class :character Class :character 1st Qu.:39.20
## Mode  :character Mode  :character Mode  :character Median :44.45
##                                           Mean  :43.92
##                                           3rd Qu.:48.50
##                                           Max.   :59.60
## grosor_pico_mm largo_aleta_mm masa_corporal_g genero
## Min.   :13.10 Min.   :172.0 Min.   :2700 Length:344
## 1st Qu.:15.60 1st Qu.:190.0 1st Qu.:3550 Class :character
## Median :17.30 Median :197.0 Median :4050 Mode  :character
## Mean   :17.15 Mean   :200.9 Mean   :4202
## 3rd Qu.:18.70 3rd Qu.:213.2 3rd Qu.:4756
## Max.   :21.50 Max.   :231.0 Max.   :6300
##      año
## Min.   :2007
## 1st Qu.:2007
## Median :2008
## Mean   :2008
## 3rd Qu.:2009
## Max.   :2009
```

## 2.- Moda

### 2.1.- Se descarga el paquete “modeest”

```
install.packages("modeest")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.2'
## (as 'lib' is unspecified)
```

### 2.2.- Se abre la librería

```
library(modeest)
```

### 2.3.- Cálculo de la moda para la variable isla y largo del pico

```
mfv(BD$especie) # categorica
```

```
## [1] "Adelie"
```

```
mfv(BD$largo_pico_mm) # numerica
```

```
## [1] 41.1
```

#----- # Medidas de dispersión #-----

## 1.- Cálculo de la varianza (sólo para variables cuantitativas)

```
var(BD$grosor_pico_mm)
```

```
## [1] 3.884256
```

## 2.- Cálculo de la desviación estándar

```
sd(BD$grosor_pico_mm)
```

```
## [1] 1.970852
```

3.- Error

```
media_pico<-mean(BD$largo_pico_mm)
```

```
media_pico
```

```
## [1] 43.92413
```

```
error<-(BD$largo_pico_mm-(media_pico))
```

```
error
```

```
## [1] -4.82412791 -4.42412791 -3.62412791 -6.12412791 -7.22412791
## [6] -4.62412791 -5.02412791 -4.72412791 -9.82412791 -1.92412791
## [11] -6.12412791 -6.12412791 -2.82412791 -5.32412791 -9.32412791
## [16] -7.32412791 -5.22412791 -1.42412791 -9.52412791 2.07587209
## [21] -6.12412791 -6.22412791 -8.02412791 -5.72412791 -5.12412791
## [26] -8.62412791 -3.32412791 -3.42412791 -6.02412791 -3.42412791
## [31] -4.42412791 -6.72412791 -4.42412791 -3.02412791 -7.52412791
## [36] -4.72412791 -5.12412791 -1.72412791 -6.32412791 -4.12412791
## [41] -7.42412791 -3.12412791 -7.92412791 0.17587209 -6.92412791
## [46] -4.32412791 -2.82412791 -6.42412791 -7.92412791 -1.62412791
## [51] -4.32412791 -3.82412791 -8.92412791 -1.92412791 -9.42412791
## [56] -2.52412791 -4.92412791 -3.32412791 -7.42412791 -6.32412791
## [61] -8.22412791 -2.62412791 -6.32412791 -2.82412791 -7.52412791
## [66] -2.32412791 -8.42412791 -2.82412791 -8.02412791 -2.12412791
## [71] -10.42412791 -4.22412791 -4.32412791 1.87587209 -8.42412791
## [76] -1.12412791 -3.02412791 -6.72412791 -7.72412791 -1.82412791
## [81] -9.32412791 -1.02412791 -7.22412791 -8.82412791 -6.62412791
## [86] -2.62412791 -7.62412791 -7.02412791 -5.62412791 -5.02412791
## [91] -8.22412791 -2.82412791 -9.92412791 -4.32412791 -7.72412791
## [96] -3.12412791 -5.82412791 -3.62412791 -10.82412791 -0.72412791
## [101] -8.92412791 -2.92412791 -6.22412791 -6.12412791 -6.02412791
## [106] -4.22412791 -5.32412791 -5.72412791 -5.82412791 -0.72412791
## [111] -5.82412791 1.67587209 -4.22412791 -1.72412791 -4.32412791
## [116] -1.22412791 -5.32412791 -6.62412791 -8.22412791 -2.82412791
## [121] -7.72412791 -6.22412791 -3.72412791 -2.52412791 -8.72412791
## [126] -3.32412791 -5.12412791 -2.42412791 -4.92412791 0.17587209
## [131] -5.42412791 -0.82412791 -7.12412791 -6.42412791 -5.82412791
## [136] -2.82412791 -8.32412791 -3.72412791 -6.92412791 -4.22412791
## [141] -3.72412791 -3.32412791 -11.82412791 -3.22412791 -6.62412791
## [146] -4.92412791 -4.72412791 -7.32412791 -7.92412791 -6.12412791
## [151] -7.92412791 -2.42412791 2.17587209 6.07587209 4.77587209
## [156] 6.07587209 3.67587209 2.57587209 1.47587209 2.77587209
## [161] -0.62412791 2.87587209 -3.02412791 5.07587209 1.57587209
## [166] 4.47587209 1.87587209 5.37587209 -1.92412791 5.27587209
## [171] 2.27587209 4.77587209 6.27587209 1.17587209 2.57587209
## [176] 2.37587209 -1.02412791 2.17587209 0.57587209 3.87587209
## [181] 4.27587209 6.07587209 3.37587209 -1.12412791 1.17587209
## [186] 15.67587209 5.17587209 4.47587209 -1.32412791 0.47587209
## [191] 0.07587209 4.77587209 -1.22412791 5.67587209 1.37587209
## [196] 5.67587209 6.57587209 -0.32412791 1.57587209 6.57587209
## [201] 0.97587209 1.27587209 2.67587209 4.57587209 1.17587209
## [206] 6.17587209 2.57587209 1.07587209 -0.12412791 1.57587209
```

```
## [211] -0.72412791  6.47587209  1.37587209  2.27587209  1.77587209
## [216] 10.37587209   1.87587209  5.87587209  2.27587209  5.57587209
## [221] -0.42412791   6.77587209  3.77587209  2.47587209  4.27587209
## [226]  2.57587209  2.47587209  4.67587209  3.57587209  7.17587209
## [231]  1.27587209  1.27587209  5.17587209  8.57587209  3.47587209
## [236]  6.07587209  0.97587209  6.87587209 -0.52412791  7.37587209
## [241]  3.57587209  8.17587209  3.57587209  8.27587209  1.57587209
## [246]  5.57587209  0.57587209  6.87587209  5.47587209  2.97587209
## [251]  4.47587209  7.17587209  4.57587209 11.97587209  3.27587209
## [256]  5.17587209  3.37587209  2.87587209 -2.22412791  9.47587209
## [261] -0.62412791  4.17587209  6.57587209  5.87587209 -0.42412791
## [266]  7.57587209  2.27587209 11.17587209  0.57587209  4.87587209
## [271]  3.27587209  6.87587209  2.87587209  6.47587209  1.27587209
## [276]  5.97587209  2.57587209  6.07587209  7.37587209  1.47587209
## [281]  8.77587209  1.27587209  2.17587209  7.37587209  2.07587209
## [286]  7.37587209  2.67587209  7.77587209  3.07587209  8.07587209
## [291]  1.97587209  6.57587209  6.37587209 14.07587209  2.47587209
## [296]  5.27587209 -1.52412791  4.57587209 -0.72412791  6.67587209
## [301]  2.77587209  8.07587209  6.57587209  5.57587209  2.47587209
## [306]  8.87587209 -3.02412791 10.27587209 -1.42412791  7.07587209
## [311]  5.77587209  3.57587209  3.67587209  8.07587209  2.97587209
## [316]  9.57587209  5.07587209  2.27587209  6.97587209  1.57587209
## [321]  6.97587209  6.87587209  6.17587209  5.07587209  7.57587209
## [326]  5.87587209  4.17587209  7.47587209  1.77587209  6.77587209
## [331] -1.42412791  8.27587209  1.27587209  5.37587209  6.27587209
## [336]  1.67587209  7.97587209  2.87587209  1.77587209 11.87587209
## [341] -0.42412791  5.67587209  6.87587209  6.27587209
```

4.- Coeficiente de variacion

```
CV<- sd(BD$largo_pico_mm)/mean(BD$largo_pico_mm)*100
CV
```

```
## [1] 12.44487
```

5.- Rango intercuartilico (IQR)

```
IQR(BD$largo_pico_mm)
```

```
## [1] 9.3
```

6.- Rango

```
pico<-BD$largo_pico_mm
pico
```

```
## [1] 39.1 39.5 40.3 37.8 36.7 39.3 38.9 39.2 34.1 42.0 37.8 37.8 41.1 38.6 34.6
## [16] 36.6 38.7 42.5 34.4 46.0 37.8 37.7 35.9 38.2 38.8 35.3 40.6 40.5 37.9 40.5
## [31] 39.5 37.2 39.5 40.9 36.4 39.2 38.8 42.2 37.6 39.8 36.5 40.8 36.0 44.1 37.0
## [46] 39.6 41.1 37.5 36.0 42.3 39.6 40.1 35.0 42.0 34.5 41.4 39.0 40.6 36.5 37.6
## [61] 35.7 41.3 37.6 41.1 36.4 41.6 35.5 41.1 35.9 41.8 33.5 39.7 39.6 45.8 35.5
## [76] 42.8 40.9 37.2 36.2 42.1 34.6 42.9 36.7 35.1 37.3 41.3 36.3 36.9 38.3 38.9
## [91] 35.7 41.1 34.0 39.6 36.2 40.8 38.1 40.3 33.1 43.2 35.0 41.0 37.7 37.8 37.9
## [106] 39.7 38.6 38.2 38.1 43.2 38.1 45.6 39.7 42.2 39.6 42.7 38.6 37.3 35.7 41.1
## [121] 36.2 37.7 40.2 41.4 35.2 40.6 38.8 41.5 39.0 44.1 38.5 43.1 36.8 37.5 38.1
## [136] 41.1 35.6 40.2 37.0 39.7 40.2 40.6 32.1 40.7 37.3 39.0 39.2 36.6 36.0 37.8
## [151] 36.0 41.5 46.1 50.0 48.7 50.0 47.6 46.5 45.4 46.7 43.3 46.8 40.9 49.0 45.5
## [166] 48.4 45.8 49.3 42.0 49.2 46.2 48.7 50.2 45.1 46.5 46.3 42.9 46.1 44.5 47.8
```

```
## [181] 48.2 50.0 47.3 42.8 45.1 59.6 49.1 48.4 42.6 44.4 44.0 48.7 42.7 49.6 45.3
## [196] 49.6 50.5 43.6 45.5 50.5 44.9 45.2 46.6 48.5 45.1 50.1 46.5 45.0 43.8 45.5
## [211] 43.2 50.4 45.3 46.2 45.7 54.3 45.8 49.8 46.2 49.5 43.5 50.7 47.7 46.4 48.2
## [226] 46.5 46.4 48.6 47.5 51.1 45.2 45.2 49.1 52.5 47.4 50.0 44.9 50.8 43.4 51.3
## [241] 47.5 52.1 47.5 52.2 45.5 49.5 44.5 50.8 49.4 46.9 48.4 51.1 48.5 55.9 47.2
## [256] 49.1 47.3 46.8 41.7 53.4 43.3 48.1 50.5 49.8 43.5 51.5 46.2 55.1 44.5 48.8
## [271] 47.2 50.8 46.8 50.4 45.2 49.9 46.5 50.0 51.3 45.4 52.7 45.2 46.1 51.3 46.0
## [286] 51.3 46.6 51.7 47.0 52.0 45.9 50.5 50.3 58.0 46.4 49.2 42.4 48.5 43.2 50.6
## [301] 46.7 52.0 50.5 49.5 46.4 52.8 40.9 54.2 42.5 51.0 49.7 47.5 47.6 52.0 46.9
## [316] 53.5 49.0 46.2 50.9 45.5 50.9 50.8 50.1 49.0 51.5 49.8 48.1 51.4 45.7 50.7
## [331] 42.5 52.2 45.2 49.3 50.2 45.6 51.9 46.8 45.7 55.8 43.5 49.6 50.8 50.2
```

```
max(pico)
```

```
## [1] 59.6
```

```
min(pico)
```

```
## [1] 32.1
```

```
rango<-max(pico)-min(pico)
```

```
rango
```

```
## [1] 27.5
```

```
#----- # Medidas de posición #-----
```

1.- Cuartiles

```
summary(BD)
```

```
##      ID          especie      isla      largo_pico_mm
## Length:344      Length:344      Length:344      Min.   :32.10
## Class :character Class :character Class :character 1st Qu.:39.20
## Mode  :character Mode  :character Mode  :character Median :44.45
##                                           Mean  :43.92
##                                           3rd Qu.:48.50
##                                           Max.   :59.60
## grosor_pico_mm largo_aleta_mm masa_corporal_g  genero
## Min.   :13.10   Min.   :172.0   Min.   :2700   Length:344
## 1st Qu.:15.60   1st Qu.:190.0   1st Qu.:3550   Class :character
## Median :17.30   Median :197.0   Median :4050   Mode  :character
## Mean   :17.15   Mean   :200.9   Mean   :4202
## 3rd Qu.:18.70   3rd Qu.:213.2   3rd Qu.:4756
## Max.   :21.50   Max.   :231.0   Max.   :6300
##      año
## Min.   :2007
## 1st Qu.:2007
## Median :2008
## Mean   :2008
## 3rd Qu.:2009
## Max.   :2009
```

2.- Quintil

```
quintil<-quantile(BD[["largo_aleta_mm"]],
                  p=c(.20, .40, .60, .80))
```

```
quintil
```

```
## 20% 40% 60% 80%  
## 188 194 203 215
```

3.- Decil

```
decil<-quantile(BD[["largo_aleta_mm"]],  
                p=c(.10, .20, .30, .40, .50, .60,  
                    .70, .80, .90))
```

```
decil
```

```
## 10% 20% 30% 40% 50% 60% 70% 80% 90%  
## 185 188 191 194 197 203 210 215 221
```

4.- Percentil

```
percentil<-quantile(BD[["largo_aleta_mm"]],  
                    p=c(.33, .66, .99))
```

```
percentil
```

```
## 33% 66% 99%  
## 192 209 230
```

## Interpretacion:

**<192 = Bajo**

**192-209 = Intermedio**

**> 209 = Alto**

#----- # Ejercicio 1 #-----

#----- # Tendencia central #-----

1.- Media y mediana

```
summary(BD)
```

```
##      ID      especie      isla      largo_pico_mm  
## Length:344 Length:344 Length:344 Min. :32.10  
## Class :character Class :character Class :character 1st Qu.:39.20  
## Mode :character Mode :character Mode :character Median :44.45  
## Mean :43.92  
## 3rd Qu.:48.50  
## Max. :59.60  
## grosor_pico_mm largo_aleta_mm masa_corporal_g genero  
## Min. :13.10 Min. :172.0 Min. :2700 Length:344  
## 1st Qu.:15.60 1st Qu.:190.0 1st Qu.:3550 Class :character  
## Median :17.30 Median :197.0 Median :4050 Mode :character  
## Mean :17.15 Mean :200.9 Mean :4202  
## 3rd Qu.:18.70 3rd Qu.:213.2 3rd Qu.:4756  
## Max. :21.50 Max. :231.0 Max. :6300  
## año
```

```
## Min. :2007
## 1st Qu.:2007
## Median :2008
## Mean :2008
## 3rd Qu.:2009
## Max. :2009
```

2.- Moda

2.1.- Se descarga el paquete “modeest”

```
install.packages("modeest")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.2'
## (as 'lib' is unspecified)
```

2.2.- Se abre la librería

```
library(modeest)
```

2.3.- Cálculo de la moda para la variable isla y largo del pico

```
mfv(BD$especie) # categorica
```

```
## [1] "Adelie"
```

```
mfv(BD$largo_aleta_mm) # numerica
```

```
## [1] 190
```

```
#----- # Medidas de dispersión #-----
```

## 1.- Cálculo de la varianza (sólo para variables cuantitativas)

```
var(BD$largo_aleta_mm)
```

```
## [1] 198.2214
```

## 2.- Cálculo de la desviación estándar

```
sd(BD$largo_aleta_mm)
```

```
## [1] 14.07911
```

## 3.- Error

```
media_aleta<-mean(BD$largo_aleta_mm)
```

```
error<-(BD$largo_aleta_mm-(media_aleta))
error
```

```
## [1] -19.94476744 -14.94476744 -5.94476744 -10.94476744 -7.94476744
## [6] -10.94476744 -19.94476744 -5.94476744 -7.94476744 -10.94476744
## [11] -14.94476744 -20.94476744 -18.94476744 -9.94476744 -2.94476744
## [16] -15.94476744 -5.94476744 -3.94476744 -16.94476744 -6.94476744
## [21] -26.94476744 -20.94476744 -11.94476744 -15.94476744 -20.94476744
## [26] -13.94476744 -17.94476744 -13.94476744 -28.94476744 -20.94476744
```

```

## [31] -22.94476744 -22.94476744 -12.94476744 -16.94476744 -5.94476744
## [36] -4.94476744 -10.94476744 -20.94476744 -19.94476744 -16.94476744
## [41] -18.94476744 -5.94476744 -14.94476744 -4.94476744 -15.94476744
## [46] -10.94476744 -18.94476744 -21.94476744 -10.94476744 -9.94476744
## [51] -14.94476744 -12.94476744 -10.94476744 -0.94476744 -13.94476744
## [56] -9.94476744 -14.94476744 -7.94476744 -19.94476744 -6.94476744
## [61] -15.94476744 -5.94476744 -15.94476744 -8.94476744 -16.94476744
## [66] -8.94476744 -5.94476744 -12.94476744 -10.94476744 -2.94476744
## [71] -10.94476744 -10.94476744 -4.94476744 -3.94476744 -10.94476744
## [76] -5.94476744 -9.94476744 -16.94476744 -13.94476744 -5.94476744
## [81] -11.94476744 -4.94476744 -13.94476744 -7.94476744 -9.94476744
## [86] -6.94476744 -10.94476744 -11.94476744 -11.94476744 -10.94476744
## [91] 1.05523256 4.05523256 -15.94476744 -14.94476744 -13.94476744
## [96] 7.05523256 -10.94476744 -4.94476744 -22.94476744 -8.94476744
## [101] -8.94476744 2.05523256 -17.94476744 -10.94476744 -7.94476744
## [106] -16.94476744 -1.94476744 -10.94476744 -19.94476744 -3.94476744
## [111] -2.94476744 -9.94476744 -7.94476744 -3.94476744 -9.94476744
## [116] -4.94476744 -12.94476744 -1.94476744 -11.94476744 -11.94476744
## [121] -13.94476744 -2.94476744 -24.94476744 1.05523256 -14.94476744
## [126] -1.94476744 -9.94476744 -5.94476744 -9.94476744 9.05523256
## [131] -10.94476744 -3.94476744 -7.94476744 -1.94476744 -13.94476744
## [136] -10.94476744 -9.94476744 -0.94476744 -15.94476744 -7.94476744
## [141] -7.94476744 -13.94476744 -12.94476744 -10.94476744 -8.94476744
## [146] -15.94476744 -10.94476744 -16.94476744 -5.94476744 -7.94476744
## [151] -13.94476744 0.05523256 10.05523256 29.05523256 9.05523256
## [156] 17.05523256 14.05523256 9.05523256 10.05523256 18.05523256
## [161] 8.05523256 14.05523256 13.05523256 15.05523256 13.05523256
## [166] 12.05523256 9.05523256 16.05523256 9.05523256 20.05523256
## [171] 8.05523256 21.05523256 17.05523256 14.05523256 12.05523256
## [176] 14.05523256 14.05523256 14.05523256 15.05523256 14.05523256
## [181] 9.05523256 19.05523256 21.05523256 8.05523256 6.05523256
## [186] 29.05523256 19.05523256 19.05523256 12.05523256 18.05523256
## [191] 7.05523256 7.05523256 7.05523256 24.05523256 9.05523256
## [196] 15.05523256 21.05523256 16.05523256 9.05523256 24.05523256
## [201] 12.05523256 14.05523256 9.05523256 19.05523256 9.05523256
## [206] 24.05523256 16.05523256 19.05523256 7.05523256 19.05523256
## [211] 7.05523256 23.05523256 7.05523256 20.05523256 13.05523256
## [216] 30.05523256 18.05523256 29.05523256 13.05523256 28.05523256
## [221] 19.05523256 22.05523256 15.05523256 20.05523256 20.05523256
## [226] 16.05523256 15.05523256 29.05523256 8.05523256 19.05523256
## [231] 14.05523256 22.05523256 11.05523256 20.05523256 11.05523256
## [236] 23.05523256 11.05523256 27.05523256 17.05523256 17.05523256
## [241] 11.05523256 29.05523256 17.05523256 27.05523256 11.05523256
## [246] 23.05523256 13.05523256 25.05523256 15.05523256 21.05523256
## [251] 2.05523256 24.05523256 18.05523256 27.05523256 14.05523256
## [256] 27.05523256 15.05523256 14.05523256 9.05523256 18.05523256
## [261] 7.05523256 8.05523256 15.05523256 28.05523256 12.05523256
## [266] 29.05523256 16.05523256 29.05523256 16.05523256 21.05523256
## [271] 13.05523256 21.05523256 14.05523256 21.05523256 11.05523256
## [276] 12.05523256 -8.94476744 -4.94476744 -7.94476744 -12.94476744
## [281] -3.94476744 -2.94476744 -22.94476744 -3.94476744 -5.94476744
## [286] -2.94476744 -7.94476744 -6.94476744 -15.94476744 0.05523256
## [291] -10.94476744 0.05523256 -3.94476744 -19.94476744 -10.94476744
## [296] -5.94476744 -19.94476744 -9.94476744 -13.94476744 -7.94476744

```



```
## [301] -5.94476744 -3.94476744 -0.94476744 -0.94476744 -9.94476744
## [306] 4.05523256 -13.94476744 0.05523256 -13.94476744 2.05523256
## [311] -5.94476744 -1.94476744 -5.94476744 9.05523256 -8.94476744
## [316] 4.05523256 9.05523256 -13.94476744 -4.94476744 -4.94476744
## [321] -4.94476744 0.05523256 -10.94476744 11.05523256 -13.94476744
## [326] -2.94476744 -1.94476744 0.05523256 -7.94476744 2.05523256
## [331] -13.94476744 -3.94476744 -9.94476744 2.05523256 1.05523256
## [336] -6.94476744 5.05523256 -11.94476744 -5.94476744 6.05523256
## [341] 1.05523256 -7.94476744 9.05523256 -2.94476744
```

```
error<-(BD$largo_aleta_mm-(media_aleta))
error
```

```
## [1] -19.94476744 -14.94476744 -5.94476744 -10.94476744 -7.94476744
## [6] -10.94476744 -19.94476744 -5.94476744 -7.94476744 -10.94476744
## [11] -14.94476744 -20.94476744 -18.94476744 -9.94476744 -2.94476744
## [16] -15.94476744 -5.94476744 -3.94476744 -16.94476744 -6.94476744
## [21] -26.94476744 -20.94476744 -11.94476744 -15.94476744 -20.94476744
## [26] -13.94476744 -17.94476744 -13.94476744 -28.94476744 -20.94476744
## [31] -22.94476744 -22.94476744 -12.94476744 -16.94476744 -5.94476744
## [36] -4.94476744 -10.94476744 -20.94476744 -19.94476744 -16.94476744
## [41] -18.94476744 -5.94476744 -14.94476744 -4.94476744 -15.94476744
## [46] -10.94476744 -18.94476744 -21.94476744 -10.94476744 -9.94476744
## [51] -14.94476744 -12.94476744 -10.94476744 -0.94476744 -13.94476744
## [56] -9.94476744 -14.94476744 -7.94476744 -19.94476744 -6.94476744
## [61] -15.94476744 -5.94476744 -15.94476744 -8.94476744 -16.94476744
## [66] -8.94476744 -5.94476744 -12.94476744 -10.94476744 -2.94476744
## [71] -10.94476744 -10.94476744 -4.94476744 -3.94476744 -10.94476744
## [76] -5.94476744 -9.94476744 -16.94476744 -13.94476744 -5.94476744
## [81] -11.94476744 -4.94476744 -13.94476744 -7.94476744 -9.94476744
## [86] -6.94476744 -10.94476744 -11.94476744 -11.94476744 -10.94476744
## [91] 1.05523256 4.05523256 -15.94476744 -14.94476744 -13.94476744
## [96] 7.05523256 -10.94476744 -4.94476744 -22.94476744 -8.94476744
## [101] -8.94476744 2.05523256 -17.94476744 -10.94476744 -7.94476744
## [106] -16.94476744 -1.94476744 -10.94476744 -19.94476744 -3.94476744
## [111] -2.94476744 -9.94476744 -7.94476744 -3.94476744 -9.94476744
## [116] -4.94476744 -12.94476744 -1.94476744 -11.94476744 -11.94476744
## [121] -13.94476744 -2.94476744 -24.94476744 1.05523256 -14.94476744
## [126] -1.94476744 -9.94476744 -5.94476744 -9.94476744 9.05523256
## [131] -10.94476744 -3.94476744 -7.94476744 -1.94476744 -13.94476744
## [136] -10.94476744 -9.94476744 -0.94476744 -15.94476744 -7.94476744
## [141] -7.94476744 -13.94476744 -12.94476744 -10.94476744 -8.94476744
## [146] -15.94476744 -10.94476744 -16.94476744 -5.94476744 -7.94476744
## [151] -13.94476744 0.05523256 10.05523256 29.05523256 9.05523256
## [156] 17.05523256 14.05523256 9.05523256 10.05523256 18.05523256
## [161] 8.05523256 14.05523256 13.05523256 15.05523256 13.05523256
## [166] 12.05523256 9.05523256 16.05523256 9.05523256 20.05523256
## [171] 8.05523256 21.05523256 17.05523256 14.05523256 12.05523256
## [176] 14.05523256 14.05523256 14.05523256 15.05523256 14.05523256
## [181] 9.05523256 19.05523256 21.05523256 8.05523256 6.05523256
## [186] 29.05523256 19.05523256 19.05523256 12.05523256 18.05523256
## [191] 7.05523256 7.05523256 7.05523256 24.05523256 9.05523256
## [196] 15.05523256 21.05523256 16.05523256 9.05523256 24.05523256
## [201] 12.05523256 14.05523256 9.05523256 19.05523256 9.05523256
## [206] 24.05523256 16.05523256 19.05523256 7.05523256 19.05523256
```

```
## [211] 7.05523256 23.05523256 7.05523256 20.05523256 13.05523256
## [216] 30.05523256 18.05523256 29.05523256 13.05523256 28.05523256
## [221] 19.05523256 22.05523256 15.05523256 20.05523256 20.05523256
## [226] 16.05523256 15.05523256 29.05523256 8.05523256 19.05523256
## [231] 14.05523256 22.05523256 11.05523256 20.05523256 11.05523256
## [236] 23.05523256 11.05523256 27.05523256 17.05523256 17.05523256
## [241] 11.05523256 29.05523256 17.05523256 27.05523256 11.05523256
## [246] 23.05523256 13.05523256 25.05523256 15.05523256 21.05523256
## [251] 2.05523256 24.05523256 18.05523256 27.05523256 14.05523256
## [256] 27.05523256 15.05523256 14.05523256 9.05523256 18.05523256
## [261] 7.05523256 8.05523256 15.05523256 28.05523256 12.05523256
## [266] 29.05523256 16.05523256 29.05523256 16.05523256 21.05523256
## [271] 13.05523256 21.05523256 14.05523256 21.05523256 11.05523256
## [276] 12.05523256 -8.94476744 -4.94476744 -7.94476744 -12.94476744
## [281] -3.94476744 -2.94476744 -22.94476744 -3.94476744 -5.94476744
## [286] -2.94476744 -7.94476744 -6.94476744 -15.94476744 0.05523256
## [291] -10.94476744 0.05523256 -3.94476744 -19.94476744 -10.94476744
## [296] -5.94476744 -19.94476744 -9.94476744 -13.94476744 -7.94476744
## [301] -5.94476744 -3.94476744 -0.94476744 -0.94476744 -9.94476744
## [306] 4.05523256 -13.94476744 0.05523256 -13.94476744 2.05523256
## [311] -5.94476744 -1.94476744 -5.94476744 9.05523256 -8.94476744
## [316] 4.05523256 9.05523256 -13.94476744 -4.94476744 -4.94476744
## [321] -4.94476744 0.05523256 -10.94476744 11.05523256 -13.94476744
## [326] -2.94476744 -1.94476744 0.05523256 -7.94476744 2.05523256
## [331] -13.94476744 -3.94476744 -9.94476744 2.05523256 1.05523256
## [336] -6.94476744 5.05523256 -11.94476744 -5.94476744 6.05523256
## [341] 1.05523256 -7.94476744 9.05523256 -2.94476744
```

#4.- Coeficiente de variacion

```
CV<- sd(BD$largo_aleta_mm)/mean(BD$largo_aleta_mm)*100
CV
```

```
## [1] 7.006459
```

## 5.- Rango intercuartilico (IQR)

```
IQR(BD$largo_aleta_mm)
```

```
## [1] 23.25
```

## 6.- Rango

```
aleta<-BD$largo_aleta_mm
aleta
```

```
## [1] 181 186 195 190 193 190 181 195 193 190 186 180 182 191 198 185 195 197
## [19] 184 194 174 180 189 185 180 187 183 187 172 180 178 178 188 184 195 196
## [37] 190 180 181 184 182 195 186 196 185 190 182 179 190 191 186 188 190 200
## [55] 187 191 186 193 181 194 185 195 185 192 184 192 195 188 190 198 190 190
## [73] 196 197 190 195 191 184 187 195 189 196 187 193 191 194 190 189 189 190
## [91] 202 205 185 186 187 208 190 196 178 192 192 203 183 190 193 184 199 190
## [109] 181 197 198 191 193 197 191 196 188 199 189 189 187 198 176 202 186 199
## [127] 191 195 191 210 190 197 193 199 187 190 191 200 185 193 193 187 188 190
```

```
## [145] 192 185 190 184 195 193 187 201 211 230 210 218 215 210 211 219 209 215
## [163] 214 216 214 213 210 217 210 221 209 222 218 215 213 215 215 215 216 215
## [181] 210 220 222 209 207 230 220 220 213 219 208 208 208 225 210 216 222 217
## [199] 210 225 213 215 210 220 210 225 217 220 208 220 208 224 208 221 214 231
## [217] 219 230 214 229 220 223 216 221 221 217 216 230 209 220 215 223 212 221
## [235] 212 224 212 228 218 218 212 230 218 228 212 224 214 226 216 222 203 225
## [253] 219 228 215 228 216 215 210 219 208 209 216 229 213 230 217 230 217 222
## [271] 214 222 215 222 212 213 192 196 193 188 197 198 178 197 195 198 193 194
## [289] 185 201 190 201 197 181 190 195 181 191 187 193 195 197 200 200 191 205
## [307] 187 201 187 203 195 199 195 210 192 205 210 187 196 196 196 201 190 212
## [325] 187 198 199 201 193 203 187 197 191 203 202 194 206 189 195 207 202 193
## [343] 210 198
```

```
max(aleta)
```

```
## [1] 231
```

```
min(aleta)
```

```
## [1] 172
```

```
rango<-max(aleta)-min(aleta)
rango
```

```
## [1] 59
```

```
#----- # Medidas de posición #-----
```

## 1.- Cuartiles

```
summary(BD)
```

```
##      ID          especie          isla      largo_pico_mm
## Length:344      Length:344      Length:344      Min.   :32.10
## Class :character Class :character Class :character 1st Qu.:39.20
## Mode  :character Mode  :character Mode  :character Median :44.45
##                                           Mean  :43.92
##                                           3rd Qu.:48.50
##                                           Max.   :59.60
## grosor_pico_mm largo_aleta_mm masa_corporal_g  genero
## Min.   :13.10  Min.   :172.0  Min.   :2700  Length:344
## 1st Qu.:15.60  1st Qu.:190.0  1st Qu.:3550  Class :character
## Median :17.30  Median :197.0  Median :4050  Mode  :character
## Mean   :17.15  Mean   :200.9  Mean   :4202
## 3rd Qu.:18.70  3rd Qu.:213.2  3rd Qu.:4756
## Max.   :21.50  Max.   :231.0  Max.   :6300
## año
## Min.   :2007
## 1st Qu.:2007
## Median :2008
## Mean   :2008
## 3rd Qu.:2009
## Max.   :2009
```

## 2.- Quintil

```
quintil<-quantile(BD[["largo_aleta_mm"]],  
                  p=c(.20, .40, .60, .80))  
quintil
```

```
## 20% 40% 60% 80%  
## 188 194 203 215
```

## 3.- Decil

```
decil<-quantile(BD[["largo_aleta_mm"]],  
                p=c(.10, .20, .30, .40, .50, .60,  
                    .70, .80, .90))  
decil
```

```
## 10% 20% 30% 40% 50% 60% 70% 80% 90%  
## 185 188 191 194 197 203 210 215 221
```

## Percentil

```
percentil<-quantile(BD[["largo_aleta_mm"]],  
                    p=c(.33, .66, .99))  
percentil
```

```
## 33% 66% 99%  
## 192 209 230
```

## Interpretacion:

**<192 = Bajo**

**192-209 = Intermedio**

**> 209 = Alto**