

Instituto Superior de Agronomia
Modelos Matemáticos e Aplicações – 2020/2021

Exam I

28 June 2021

APPENDIX I

```
> Bw.Vios<-Todos$Bw[Todos$Casta=="Viosinho"]
> Bw.Sy<-Todos$Bw[Todos$Casta=="Syrah"]
> Bw.Alva<-Todos$Bw[Todos$Casta=="Alvarinho"]
> hist(Bw_Vios,breaks<-c(0, 100,150,200,250,300,400),plot=FALSE)
$breaks
[1] 0 100 150 200 250 300 400

$countss
[1] 10 27 13 14 9 2

$density
[1] 0.00133333333 0.0072000000 0.0034666667 0.0037333333 0.0024000000
[6] 0.0002666667

$mids
[1] 50 125 175 225 275 350

$xname
[1] "Bw_Vios"

$equidist
[1] FALSE

attr("class")
[1] "histogram"
> summary(Bw.Vios)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  27.6  125.2   154.5   168.1  211.1   351.0
> summary(Bw.Sy)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  15.8   91.0   150.1   149.8  197.2   319.8
> summary(Bw.Alva)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  30.8   89.9   132.6   140.1  178.3   318.4
> sort(Bw.Vios)
 [1] 27.6  69.7  71.4  71.9  75.9  83.3  89.5  90.3  91.7  95.8 100.1 107.4
[13] 111.4 111.7 113.0 116.1 123.4 123.9 124.4 126.0 128.2 130.5 131.1 137.8
[25] 138.8 139.9 139.9 140.5 141.5 144.3 145.5 146.2 148.0 148.1 148.7 149.0
[37] 149.9 154.5 154.7 157.4 160.8 161.5 162.6 164.6 170.9 171.4 172.3 177.9
[49] 185.0 187.4 200.8 201.8 208.9 209.6 209.6 210.0 212.1 216.7 221.6 230.0
[61] 236.7 238.5 243.3 246.5 250.8 254.6 255.5 255.5 257.6 258.1 260.3 274.0
[73] 285.2 306.3 351.0
> shapiro.test(Bw.Vios);shapiro.test(Bw.Sy)

      Shapiro-Wilk normality test

data:  Bw.Vios
W = 0.9741, p-value = 0.127

      Shapiro-Wilk normality test

data:  Bw.Sy
W = 0.97627, p-value = 0.1711

> t.test(Bw.Sy,Bw.Vios)
```

Welch Two Sample t-test

```
data: Bw.Sy and Bw.Vios
t = -1.6716, df = 146.63, p-value = 0.09674
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -40.066402  3.346402
sample estimates:
mean of x mean of y
 149.752  168.112

> t.test(Bw.Sy,Bw.Vios, alternative="less")
```

Welch Two Sample t-test

```
data: Bw.Sy and Bw.Vios
t = -1.6716, df = 146.63, p-value = 0.04837
alternative hypothesis: true difference in means is less than 0
95 percent confidence interval:
 -Inf -0.178892
sample estimates:
mean of x mean of y
 149.752  168.112

> t.test(Bw.Sy,Bw.Vios, paired=TRUE)
```

Paired t-test

```
data: Bw.Sy and Bw.Vios
t = -1.6311, df = 74, p-value = 0.1071
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -40.787891  4.067891
sample estimates:
mean of the differences
      -18.36

> t.test(Bw.Sy,Bw.Vios, alternative="less",paired=TRUE)
```

Paired t-test

```
data: Bw.Sy and Bw.Vios
t = -1.6311, df = 74, p-value = 0.05355
alternative hypothesis: true difference in means is less than 0
95 percent confidence interval:
 -Inf 0.3890471
sample estimates:
mean of the differences
      -18.36
```