**Lab Exam 23rd November 2021**

**Before starting attach dataset;**

attach(ToothGrowth)

**Q1**

**Part 1**

par(mfrow=c(1,1))

boxplot(len ~ supp, xlab='Supplement Type', ylab='Len', main='A comparison of tooth lengths by supplement type')

Chart, box and whisker chart

Description automatically generated

**Part 2**

Yes as we can see the min is lower and max is higher in guinea pigs that took VC.

**Q2**

**Part 1**

**Mean**

tapply(len, supp, mean)

Text

Description automatically generated with medium confidence

**Variance**

tapply(len, supp, var)

Text

Description automatically generated with low confidence

**Part 2**

Yes OJ (orange juice) as there is a less variance.

**Q3**

**Part 1**

total <- length(len)

Background pattern

Description automatically generated with low confidence

n\_lengths <- len[supp=='VC']

proportion <- length(n\_lengths[n\_lengths < 20]) / total

**proportion as a decimal**

A picture containing text

Description automatically generated

**proportion as a percentage**

**A picture containing text

Description automatically generated**

**Part 2**

n\_lengths <- len[supp=='VC' & dose==1.0]

proportion <- length(n\_lengths[n\_lengths < 20]) / total

**proportion as a decimal**

A picture containing icon

Description automatically generated

**proportion as a percentage**

A picture containing icon

Description automatically generated

**Q4**

hist(len[dose == 'VC'], len[dose == 'OJ'], breaks=seq(0, 100. 10))