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Analysis of Environmental Data

Lab 10 Report

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Worked with Juliana Berube

Question 1

rm(list = ls())

require(here)

read.csv(here("data", "rope.csv"))

rope = read.csv(here("data", "rope.csv"))

rope$rope.type = factor(x = rope$rope.type)

levels(rope$rope.type)

n\_obs = length(rope$rope.type)

n\_groups = length(levels(rope$rope.type))

mean\_cut= mean(rope$p.cut)

resids\_cut = rope$p.cut - mean\_cut

ss\_tot = sum(resids\_cut^2)

df\_tot = n\_obs - 1

agg\_resids = aggregate(

x = rope$p.cut,

by = list(rope$rope.type),

FUN = function(x){x-mean(x)})

str(agg\_resids)

agg\_sq\_resids = aggregate(

x = rope$p.cut,

by = list(rope$rope.type),

FUN = function(x){sum((x-mean(x))^2)})

str(agg\_sq\_resids)

ss\_within = sum(agg\_sq\_resids$x)

df\_within = 115

ss\_among = ss\_tot - ss\_within

df\_among = 5

ms\_within = ss\_within / (n\_obs - n\_groups)

ms\_among = ss\_among / (n\_groups - 1)

f\_ratio = ms\_among / ms\_within

f\_pval = pf(f\_ratio, df\_among, df\_within, lower.tail = FALSE)

Question 2

**No,** the boxes for each rope type are not the same shape.

Question 3

**0.00143**

Question 4

Both the box plots and the Bartlett test confirm that there is a difference in variance (because p-value is less than 0.5, we can reject the Bartlett null that all the variances are the same). The ANOVA test is **not** appropriate because it assumes equal variance. “In ANOVA, when homogeneity of variance is violated, there is a greater probability of falsely rejecting the null hypothesis” (Google).

Question 5

**BLAZE**

Question 6

**0.36714.** For the base case, the intercept estimate is the mean percent cut.

Question 7

**0.2655** = 0.36714 + (1 \* -0.10164)