Problem Set 4

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1 Question 1 part A

names(Prestige)[names(Prestige) == "type"] ¡- "professional"
Prestige ¡- Prestige (precentage¿percentage) mutate(Prestige, professional = ifelse(professional =="prof", 1, 0))
view(Prestige)

Percentage signs were used in code

2 Question 1 part B

Mod1 ¡- lm(prestige income + as.factor(professional) + as.factor(professional):income, data = Prestige)
summary(Mod1)

3 Question 1 part C

x1=income
x2= professional prof
x3= professional wc

1 if the person is a professional
0 if the person is anything other such as working class

Prediction equation is
$\hat{y} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3$
$\hat{y} = 21.1422589 + 0.0031709 x_1 + 37.7812800 x_2 + -0.0023257 x_3$

4 Question 1 part D

On average a 1 unit increase in dollar is a 0.0031709 increase in the expected value of y holding my other covariates constant at their empirical means

5 Question 1 part e

Professionals are predicted to have a prestige score 37.7812800 or 38 higher than than working class people controlling for all of the other independent variables.

6 Question 1 part f

$\hat{y} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3$
$\hat{y} = 21.1422589 + 0.0031709 x_1 + 37.7812800 x_2 + -0.0023257 x_3$

$effect1 < -21.1422589 + 0.0031709 * 0 + 37.7812800 * 1 + (-0.0023257 * 0 * 1)$
$effect1$

$effect2 < -21.1422589 + 0.0031709 * 1000 + 37.7812800 * 1 + (-0.0023257 * 1000 * 1)$
$effect2$

$effect3 < -effect2 - effect1$
$effect3$

$returnsavalueof 0.8452$

7 Question 1 part g

effect4 ¡- 21.1422589 + 0.0031709 * 6000 + 37.7812800*0 + (-0.0023257*0 *0)
effect4

effect5 ¡- 21.1422589 + 0.0031709 * 6000 + 37.7812800*1 + (-0.0023257* 6000*1)
effect5

effect6 ¡- effect5-effect4
effect6

returns a value of 23.82708

8 Question 2 part 1

0.042 divided into 0.016 = 2.625 t score is bigger than 1.96
131-3 = 128 degrees of freedom
p value of 0.005 x 2 = 0.01 it is less than 0.05
null hypothesis is that it makes no difference to voteshare having a yard sign
we reject the null hypothesis

9 Question 2 part 2

0.042 divided by 0.013 = 3.23076 t score is bigger than 1.96
degrees of freedom is 128
p value 0.000787 x 2 = 0.001574 this is again less than 0.05
null hypothesis is that it makes no difference to voteshare have a yard sign
we reject the null hypothesis

10 Question 2 part 3

The coefficient suggests even if there are no lawn signs
there is still a 30 percent voteshare for Ken Cuccinelli
the lawn signs increase voteshare by roughly 4 percent in both cases

11 Question 2 part 4

the r sqaured value offers us an insight into how much of the the model is being explained
it explains 9.4 percent of the voteshare
Therefore, there are a lot of other variables to be considered.
Other factors that would influence voteshare could be anything from political opinions and associations, current residential or county issues to political debate
this model would suggest there would be a lot of residuals