

Homework 2

PSTAT 120C

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Problem 3

```
data <- data.frame(
  y = c(1, 0, 0, 1, 2, 3, 3),
  x1 = c(-3, -2, -1, 0, 1, 2, 3),
  x2 = c(5, 0, -3, -4, -3, 0, 5),
  x3 = c(-1, 1, 1, 0, -1, -1, 1)
)

model <- lm(y ~ x1 + x2 + x3, data = data)
model
```

```
##
## Call:
## lm(formula = y ~ x1 + x2 + x3, data = data)
##
## Coefficients:
## (Intercept)          x1          x2          x3
##      1.429      0.500      0.119     -0.500
```

```
1.429 + (.5*1) + (.119*-3) + (-.5*-1)
```

```
## [1] 2.072
```

The values are not the same as in row 5 of the table because the model is just a prediction and it is

```
reduced_model <- lm(y ~ x1 + x2, data = data)
reduced_model
```

```
##
## Call:
## lm(formula = y ~ x1 + x2, data = data)
##
## Coefficients:
## (Intercept)          x1          x2
##      1.429      0.500      0.119
```

```
anova(reduced_model, model)
```

```
## Analysis of Variance Table
##
## Model 1: y ~ x1 + x2
## Model 2: y ~ x1 + x2 + x3
##   Res.Df    RSS Df Sum of Sq   F    Pr(>F)
## 1      4 1.52381
## 2      3 0.02381   1      1.5 189 0.0008329 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
qf(p=0.05, df1=1, df2=3, lower.tail = TRUE)
```

```
## [1] 0.004635911
```

```
# We fail to reject the hypothesis that x_3 contributes to the model.
```