

## 208hw4

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```
y <- c(6.4, 10, 12.6, 2, 17.8, 16.7, 12.9, 11.0, 11, 7.4)
x <- matrix(
  c( 1,1,1,
     1,4,0,
     1,3,2,
     1,1,0,
     1,6,1,
     1,6,2,
     1,1,3,
     1,5,0,
     1,3,1,
     1,3,0
  ), ncol = 3, byrow = TRUE
)

M1 <- lm(y ~ x[,2:3] )
summary(M1)
```

```
##
## Call:
## lm(formula = y ~ x[, 2:3])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.18650 -0.39809  0.07607  0.78186  1.77223
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.5073     0.9918   1.520 0.172371
## x[, 2:3]1     1.9436     0.2276   8.540 5.99e-05 ***
## x[, 2:3]2     2.8587     0.4203   6.802 0.000253 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.321 on 7 degrees of freedom
## Multiple R-squared:  0.9391, Adjusted R-squared:  0.9217
## F-statistic: 53.94 on 2 and 7 DF, p-value: 5.585e-05
```

```
beta <- solve(t(x) %*% x)%*%t(x)%*%y
```

```
qpcR::RSS(M1)
```

```
## [1] 12.21988
```

```
P <- x%*%solve(t(x)%*%x)%*%t(x)
I <- diag(1, nrow = length(y))
y %*% (I-P) %*% y
```

```
##           [,1]
## [1,] 12.21988
```