MATH 4780 - Project

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#1 The quality of Point Noir wine is thought to be related to the properties of clarity, aroma, body, flavor, and oakiness. Data for 38 wines are given in Table B.11.

```
library(MPV)
wine <- table.b11
```

a. Fit a multiple linear regression model relating wine quality to these regressors.

```
lm_wine <- lm(Quality ~ Clarity + Aroma + Body + Flavor + Oakiness, data=wine)
summary(lm_wine)
```

```
##
## Call:
## lm(formula = Quality ~ Clarity + Aroma + Body + Flavor + Oakiness,
##     data = wine)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.85552 -0.57448 -0.07092  0.67275  1.68093
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   3.9969     2.2318   1.791 0.082775 .
## Clarity       2.3395     1.7348   1.349 0.186958
## Aroma         0.4826     0.2724   1.771 0.086058 .
## Body          0.2732     0.3326   0.821 0.417503
## Flavor        1.1683     0.3045   3.837 0.000552 ***
## Oakiness     -0.6840     0.2712  -2.522 0.016833 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.163 on 32 degrees of freedom
## Multiple R-squared:  0.7206, Adjusted R-squared:  0.6769
## F-statistic: 16.51 on 5 and 32 DF,  p-value: 4.703e-08
```

b. Test for significance of regression. What conclusions can you draw?

```
anova(lm_wine)
```

```
## Analysis of Variance Table
##
## Response: Quality
##           Df Sum Sq Mean Sq F value    Pr(>F)
## Clarity    1  0.125   0.125  0.0926 0.7628120
## Aroma      1 77.353  77.353 57.2351 1.286e-08 ***
## Body       1  6.414   6.414  4.7461 0.0368417 *
## Flavor     1 19.050  19.050 14.0953 0.0006946 ***
```

```
## Oakiness   1  8.598   8.598  6.3616 0.0168327 *
## Residuals 32 43.248   1.352
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

c. Use t-tests to assess the contribution of each regressor to the model. Discuss your findings.

d. Calculate R^2 and R_adj^2