Lab 13

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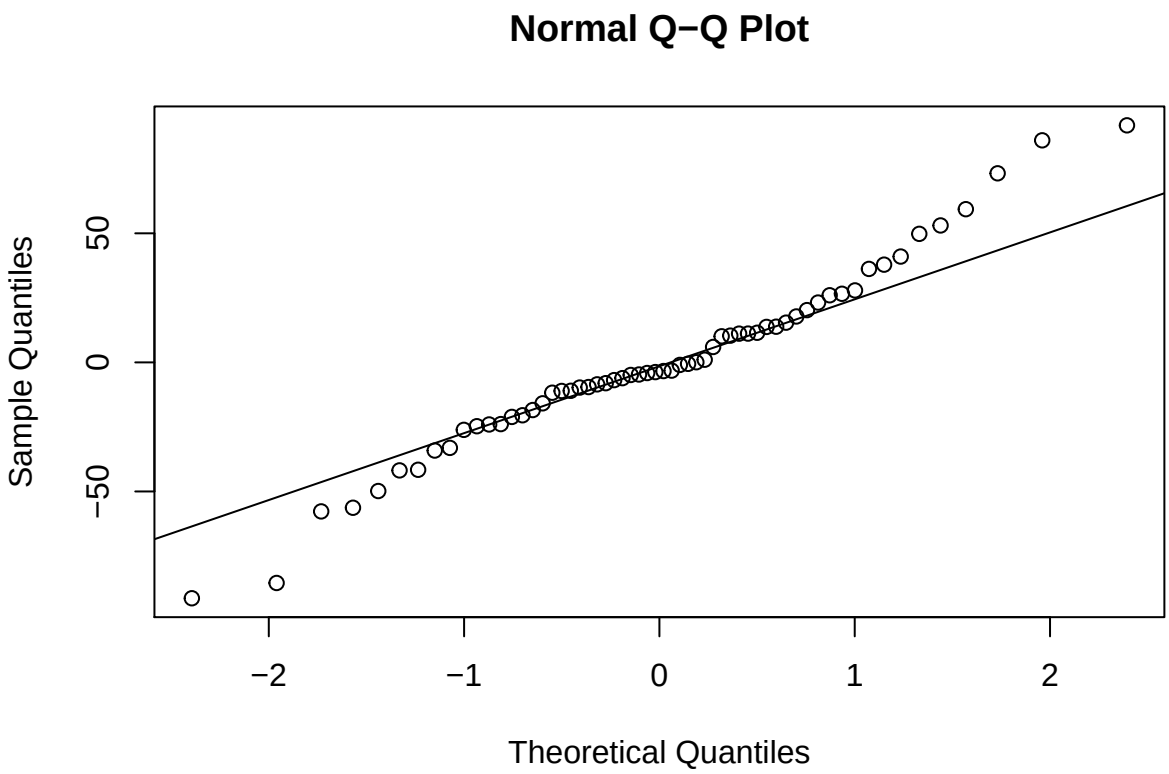
Reading in Data

```
# Reading in data
dat = read.csv("/home/david/Documents/2019 Spring/Applied Regression/Labs_HW/Data_Sets/Appendices/data-

fit = lm(MORT~., dat)

summary(fit)
```

```
##
## Call:
## lm(formula = MORT ~ ., data = dat)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -91.38 -18.97  -3.56  16.00  91.83
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 995.63646   91.64099  10.865 3.35e-15 ***
## PRECIP        1.40734    0.68914   2.042 0.046032 *
## EDUC        -14.80139    7.02747  -2.106 0.039849 *
## NONWHITE      3.19909    0.62231   5.141 3.89e-06 ***
## NOX          -0.10797    0.13502  -0.800 0.427426
## SO2           0.35518    0.09096   3.905 0.000264 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37.09 on 54 degrees of freedom
## Multiple R-squared:  0.6746, Adjusted R-squared:  0.6444
## F-statistic: 22.39 on 5 and 54 DF,  p-value: 4.407e-12
```

Plotting Normality of Residuals

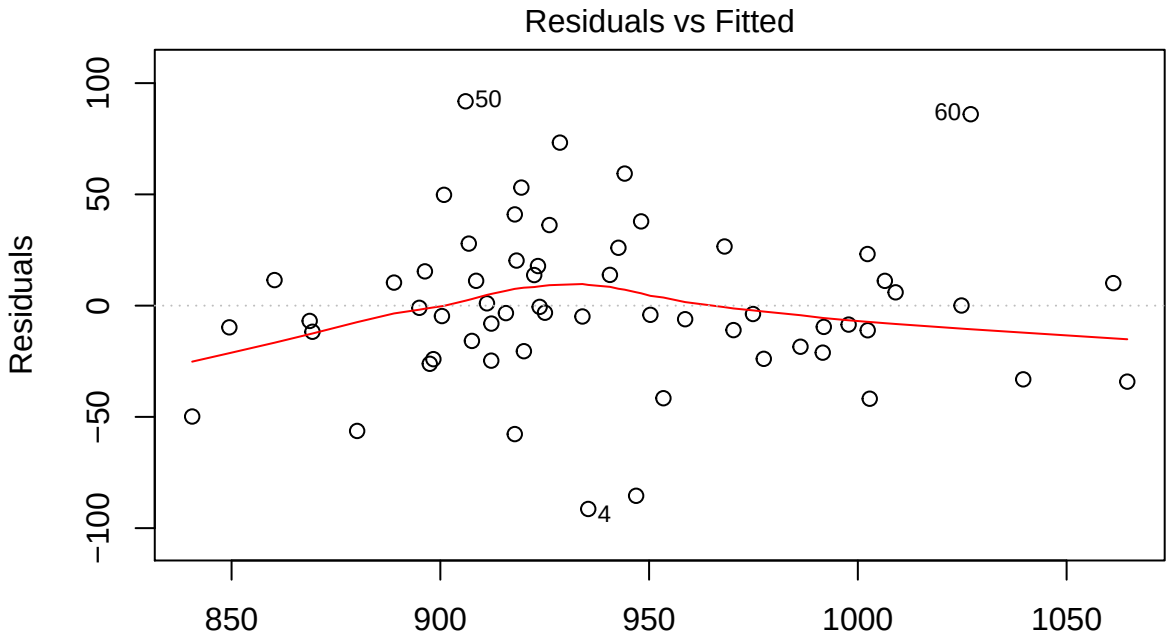
```
qqnorm(fit$residuals)
qqline(fit$residuals)
```

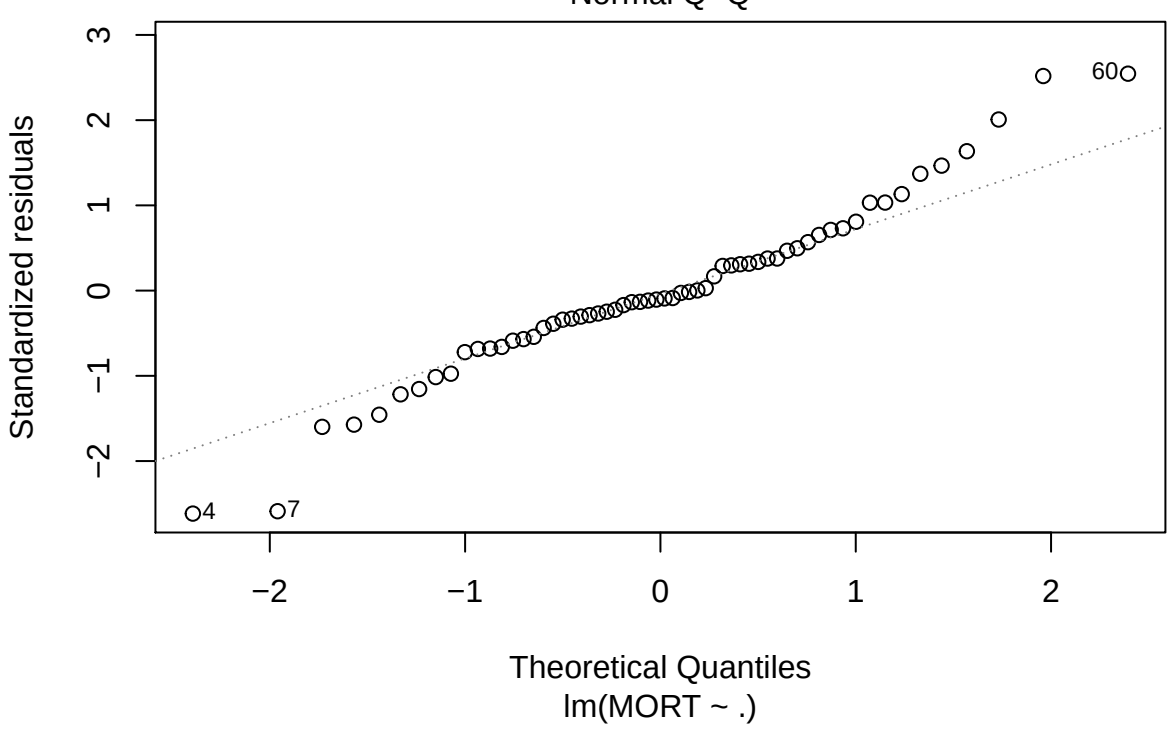


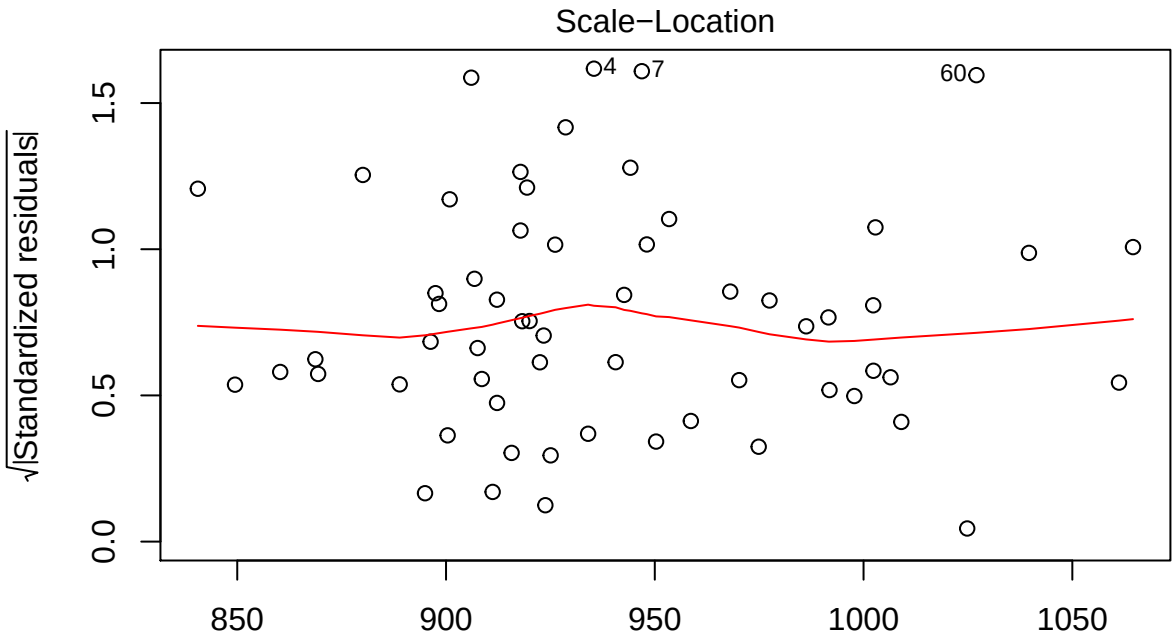
Looking at the plot, we can see there is some light-tailed distribution leading us to believe there may not be normality in the data.

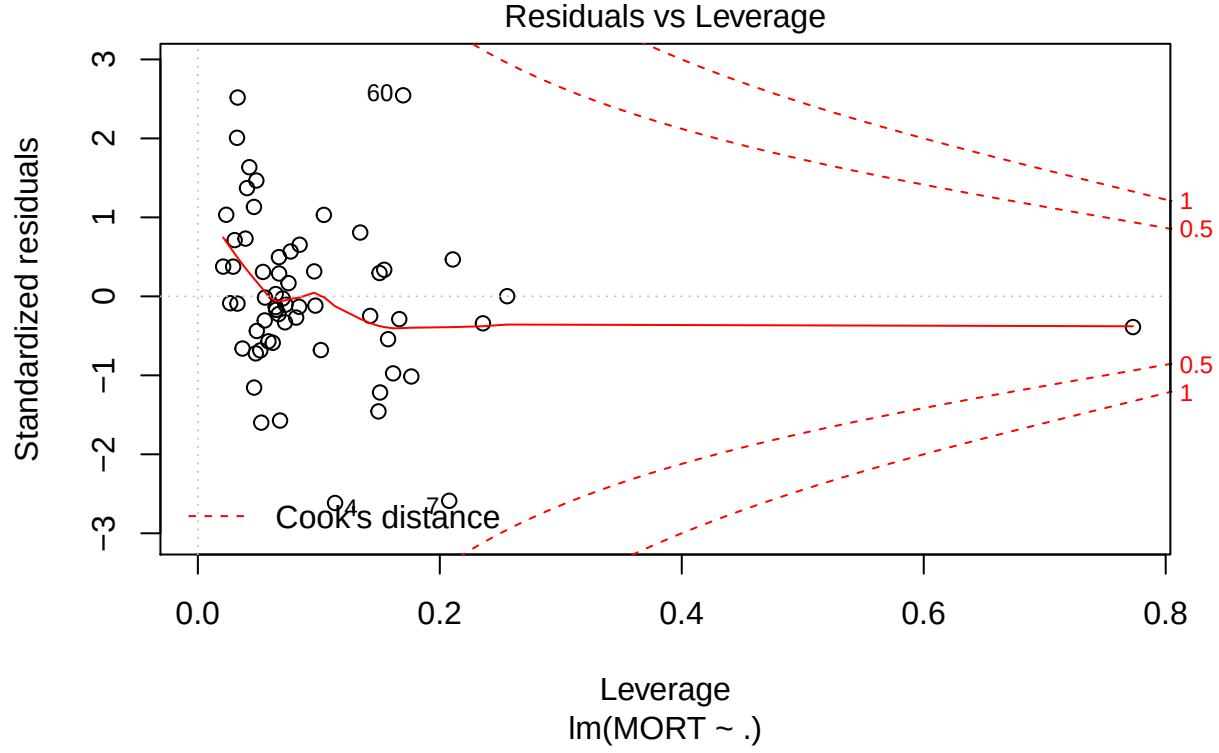
Plotting Residuals vs Fitted

```
plot(fit)
```


Residuals vs Fitted
Residuals
100
50
0
−50
−100
50
60
4
850
900
950
1000
1050
Fitted values
lm(MORT ~ .)


Normal Q−Q
Standardized residuals
3
2
1
0
−1
−2
60
4
7
−2
−1
0
1
2
Theoretical Quantiles
lm(MORT ~ .)





From observing that graph of Res vs Fit, we see there is a double bow happening. There means there is non-linearity in the data. This could be corrected by applying an appropriate transformation to the regressor or the response variable or use a method of weight least squares.