Homework 4 Saksham Goel

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Problem 1

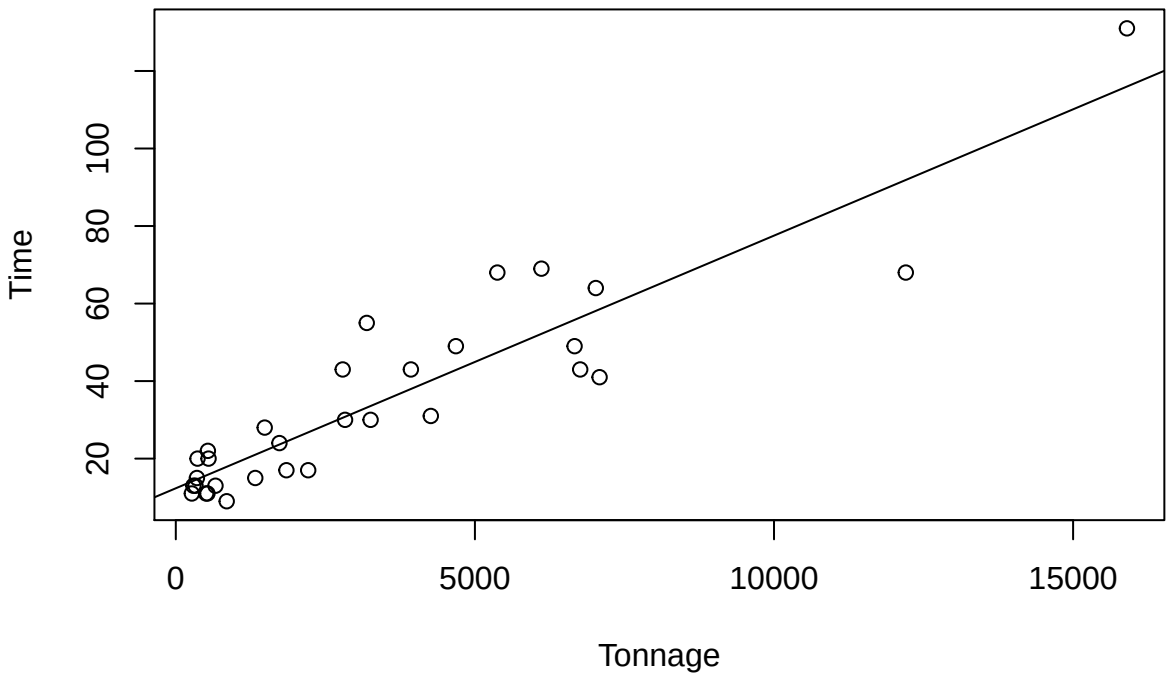
Part A

```
glakesData = read.table("glakes.txt", header = TRUE)
linearModelGlakes = lm(Time ~ Tonnage, data = glakesData)
summary(linearModelGlakes)
```

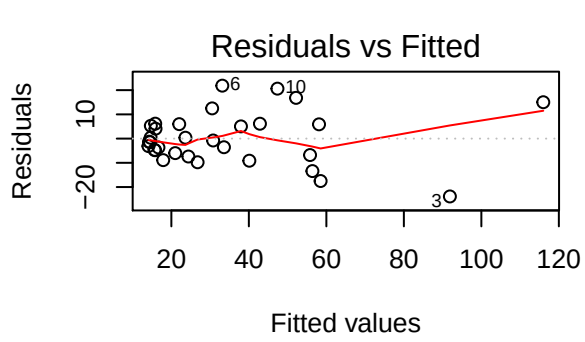
```
##
## Call:
## lm(formula = Time ~ Tonnage, data = glakesData)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -23.882  -6.397  -1.261   5.931  21.850
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 12.344707   2.642633   4.671 6.32e-05 ***
## Tonnage      0.006518   0.000531  12.275 5.22e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 10.7 on 29 degrees of freedom
## Multiple R-squared:  0.8386, Adjusted R-squared:  0.833
## F-statistic: 150.7 on 1 and 29 DF,  p-value: 5.218e-13
```

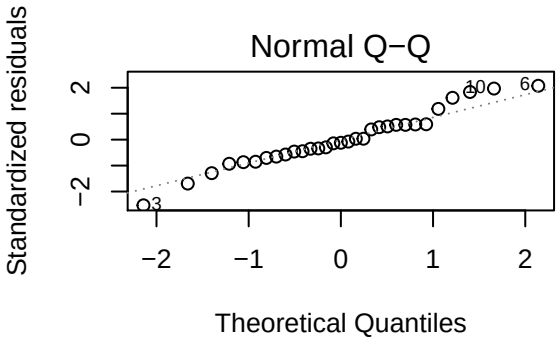
Part B

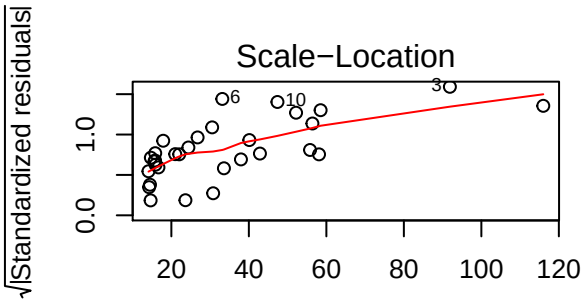
```
plot(Time ~ Tonnage, data = glakesData)
abline(linearModelGlakes)
```

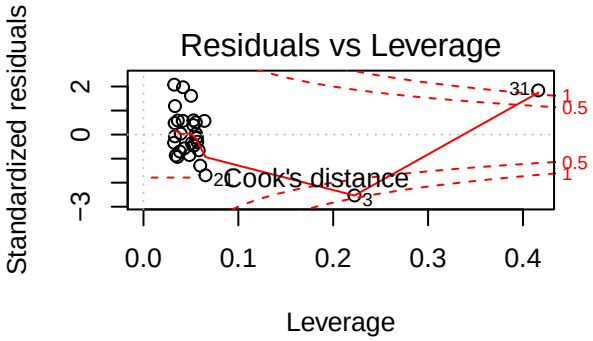



```
par(mfrow=c(2,2))
plot(linearModelGlakes)
```



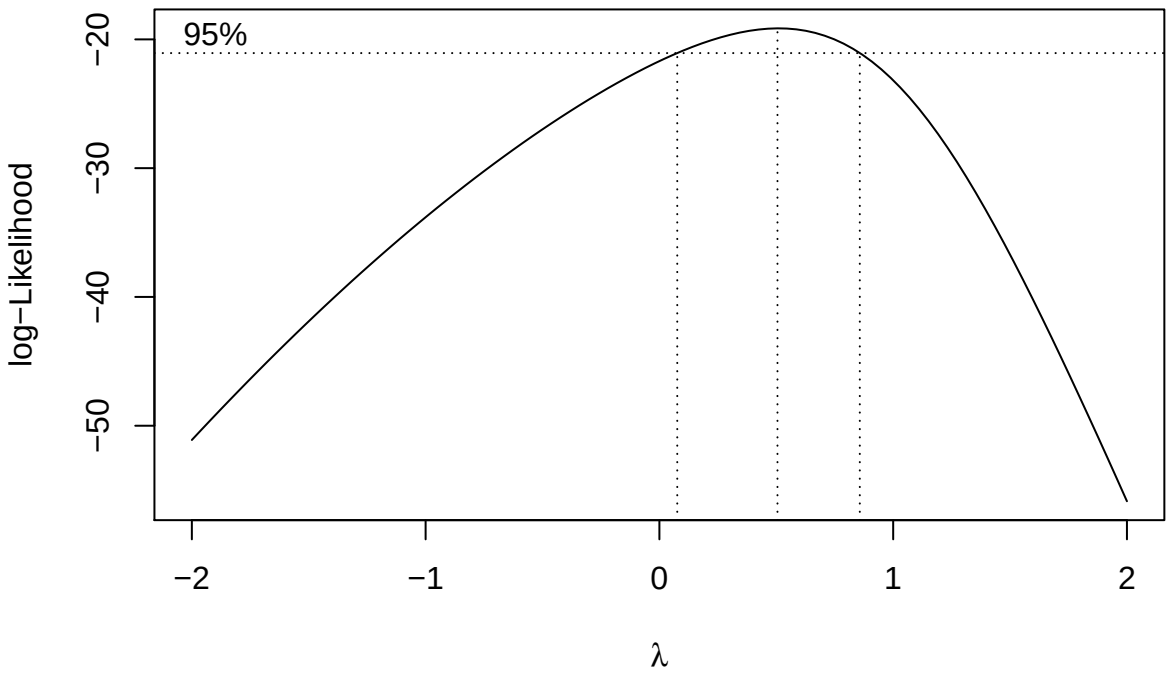




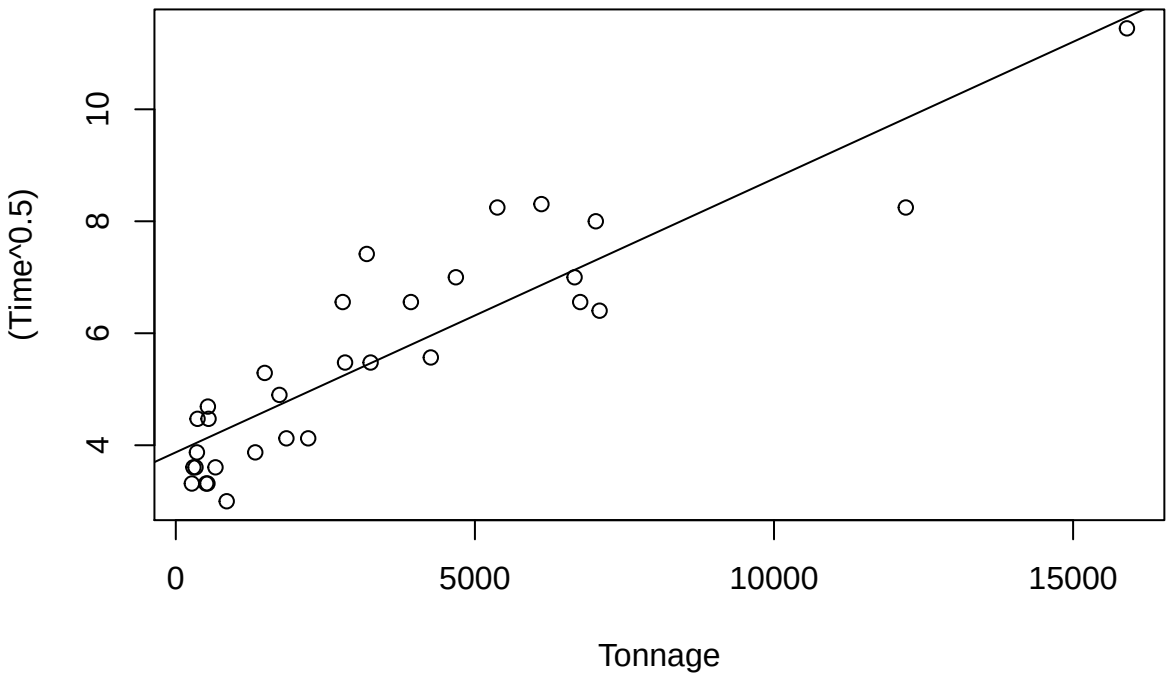


Part C

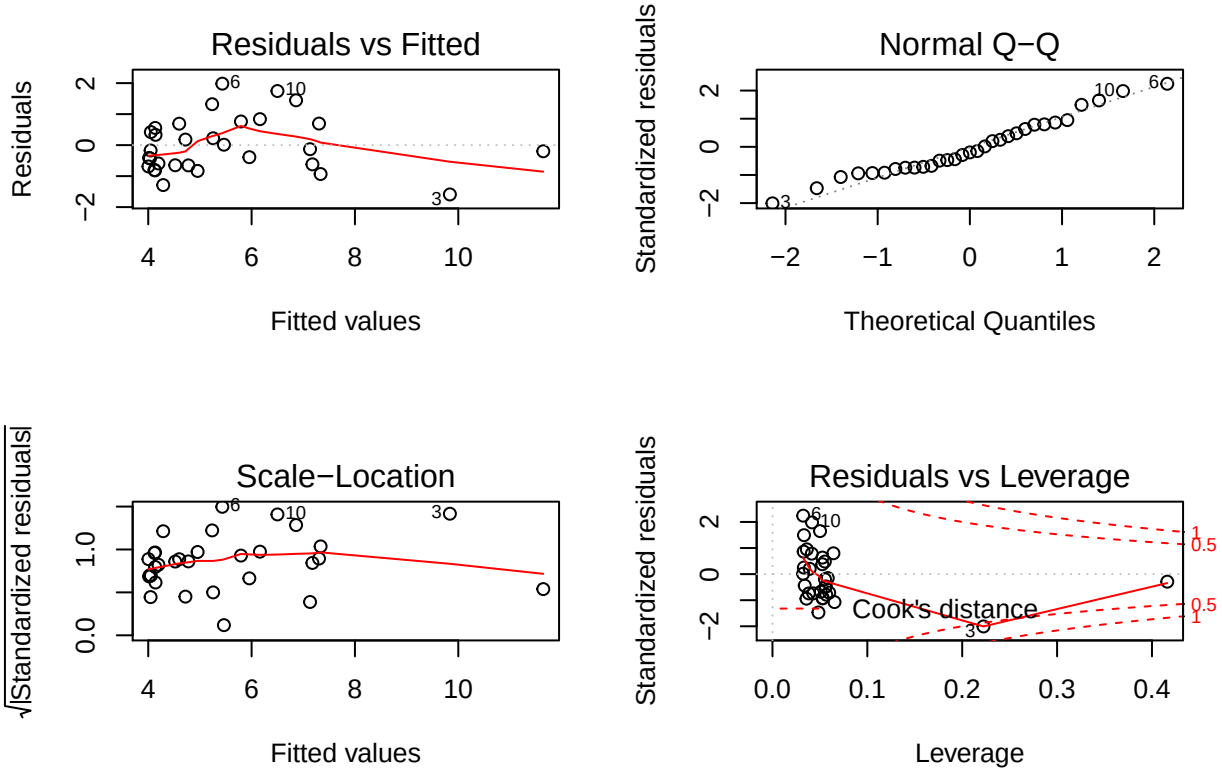
```
library(MASS)
boxcox(Time ~ Tonnage, data = glakesData)
```




```
boxCoxSuggestedModel = lm((Time^0.5) ~ Tonnage, data = glakesData)
plot((Time^0.5) ~ Tonnage, data = glakesData)
abline(boxCoxSuggestedModel)
```




```
par(mfrow=c(2,2))
plot(boxCoxSuggestedModel)
```

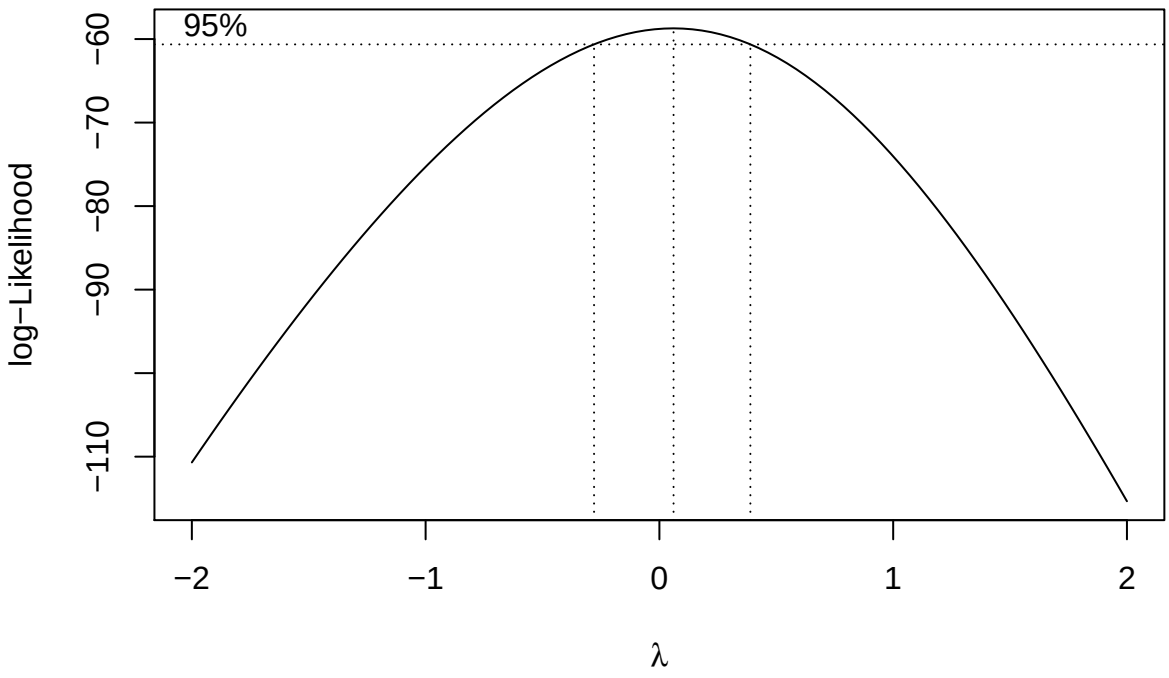


Part D

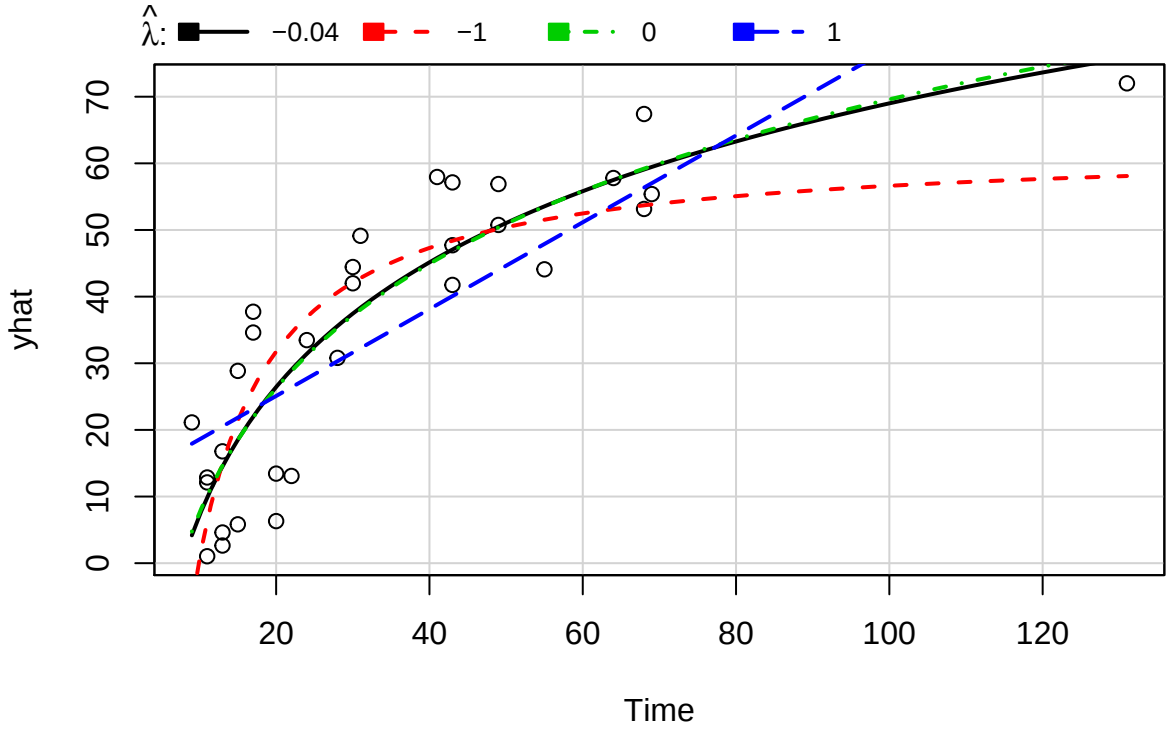
```
library(MASS)
library(car)
```

```
## Warning: package 'car' was built under R version 3.4.4
```

```
boxcox(Tonnage ~ 1, data = glakesData)
```



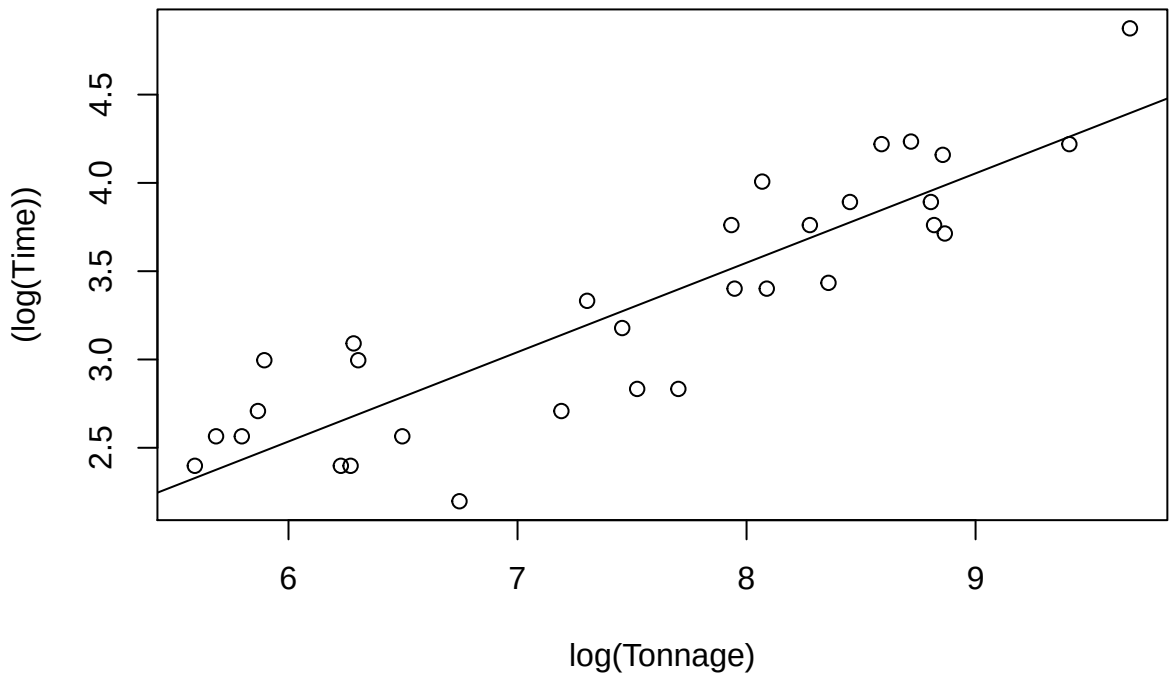

```
boxCoxSuggestedModel = lm(Time ~ (log(Tonnage)), data = glakesData)
invResPlot(boxCoxSuggestedModel)
```



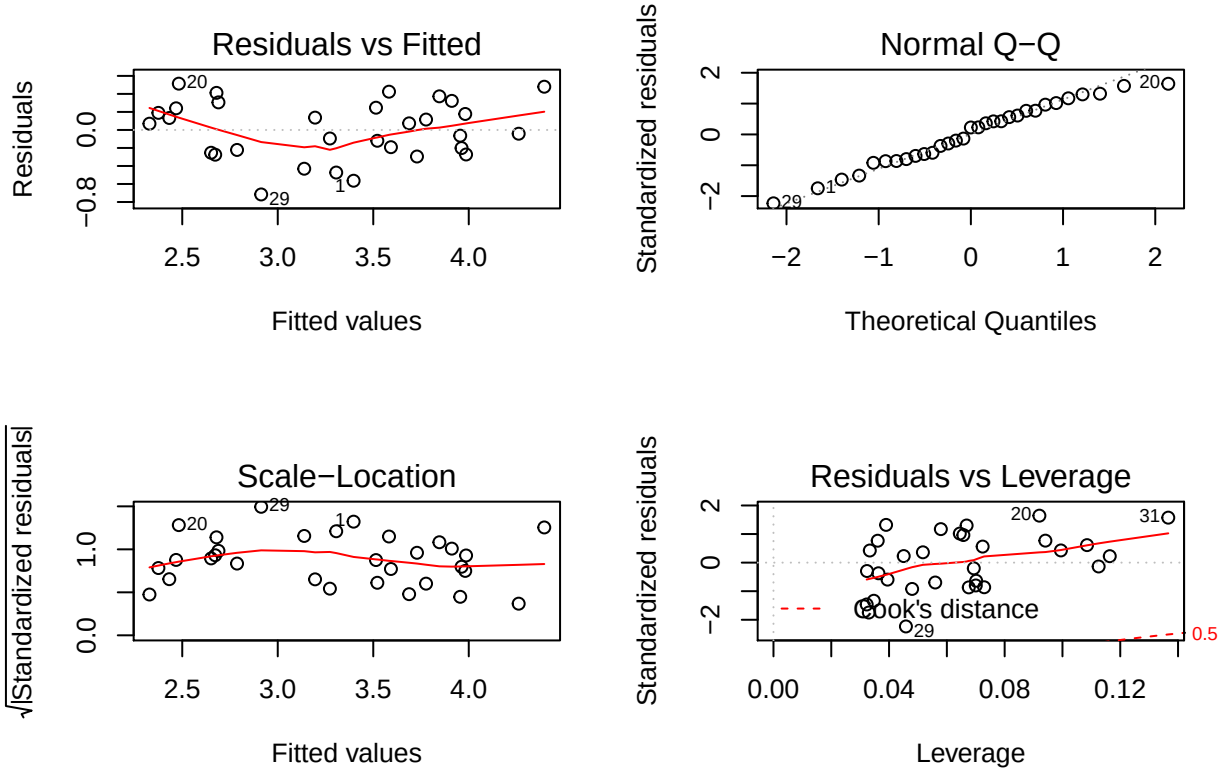

```
##        lambda      RSS
## 1 -0.04412807 2885.157
## 2 -1.00000000 3948.620
## 3  0.00000000 2888.143
## 4  1.00000000 4669.495
```

```
InverseResponseSuggestedModel = lm((log(Time)) ~ (log(Tonnage)), data = glakesData)

plot((log(Time)) ~ (log(Tonnage)), data = glakesData)
abline(InverseResponseSuggestedModel)
```




```
par(mfrow=c(2,2))
plot(InverseResponseSuggestedModel)
```



Part E

Part F

Part G

Part H

Problem 2

Part I