HW 4 Ishita Dutta

Ishita Dutta

10/28/2021

```r
cat("1a.")
```

```
## 1a.
```

```r
helicopter = read.table("helicopter.txt")
#separate X and Y
X = helicopter[,2]
Y = helicopter[,1]

# Subset based on shift
Y1 <- subset(helicopter, helicopter[,2] == 1)
Y2 <- subset(helicopter, helicopter[,2] == 2)
Y3 <- subset(helicopter, helicopter[,2] == 3)
Y4 <- subset(helicopter, helicopter[,2] == 4)

#Find fitted vals
Ybar1. = mean(Y1[,1])
Ybar2. = mean(Y2[,1])
Ybar3. = mean(Y3[,1])
Ybar4. = mean(Y4[,1])

cat("Ybar1. = ", Ybar1.,"\nYbar2. = ", Ybar2., "\nYbar3. = ", Ybar3.,"\nYbar4. = ", Ybar4.)
```

```
## Ybar1. =  3.9
## Ybar2. =  1.15
## Ybar3. =  2
## Ybar4. =  3.4
```

```r
#Find Residuals
Yr1 = (Y1[,1] - Ybar1.)
Yr2 = (Y2[,1] - Ybar2.)
Yr3 = (Y3[,1] - Ybar3.)
Yr4 = (Y4[,1] - Ybar4.)

cat("Residuals:")
```

```
## Residuals:
```

```r
cat("Y1 = ", Yr1)
```

```
## Y1 =  0.1 -0.9 1.1 0.1 2.1 -0.9 -1.9 1.1 3.1 -2.9 -1.9 1.1 0.1 3.1 0.1 1.1 -3.9 0.1 -2.9 2.1
```

```r
cat("Y2 = ", Yr2)
```

```
## Y2 =  -1.15 0.85 -1.15 1.85 0.85 -0.15 -1.15 1.85 -0.15 -1.15 -1.15 -0.15 -0.15 -1.15 -0.15 1.85 -0.1
```

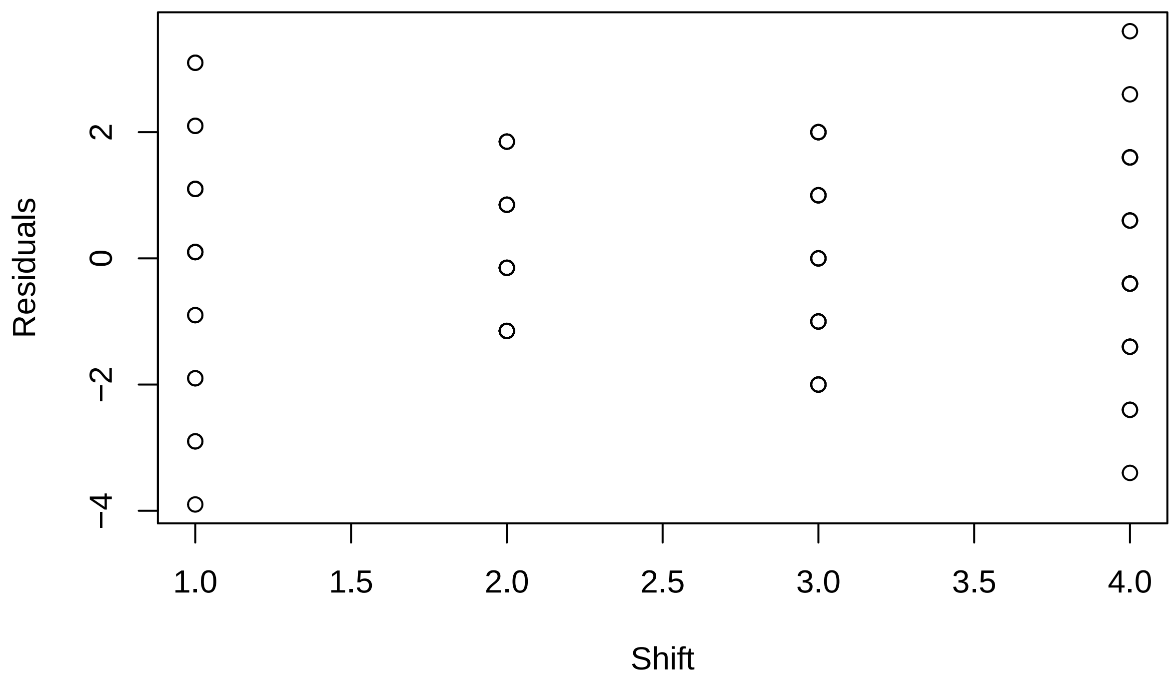
```r
cat("Y3 = ", Yr3)
```

```
## Y3 =  0 -1 -2 1 2 -1 1 2 0 -2 -1 1 0 2 -2 -1 1 -2 0 2
```

```r
cat("Y4 = ", Yr4)
```

```
## Y4 =  1.6 -1.4 0.6 0.6 2.6 1.6 -0.4 1.6 3.6 -0.4 -2.4 -3.4 -1.4 -0.4 -0.4 0.6 -2.4 1.6 -1.4 -0.4
```

```r
plot(X, c(Yr1, Yr2, Yr3, Yr4), xlab = "Shift", ylab = "Residuals")
```



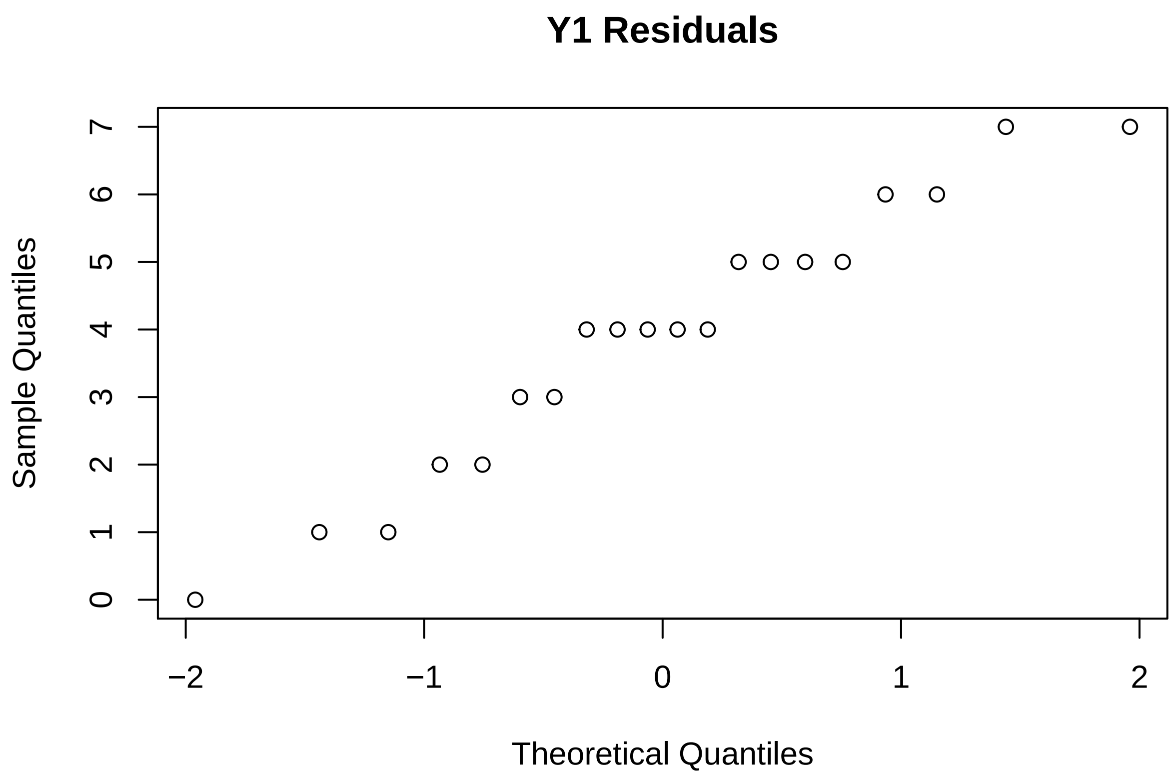

```r
cat("1b. \nThe error variances are not roughly equal, as the residuals for shifts 2 and 3 cover a visibl
```

```
## 1b.
## The error variances are not roughly equal, as the residuals for shifts 2 and 3 cover a visibly small
```

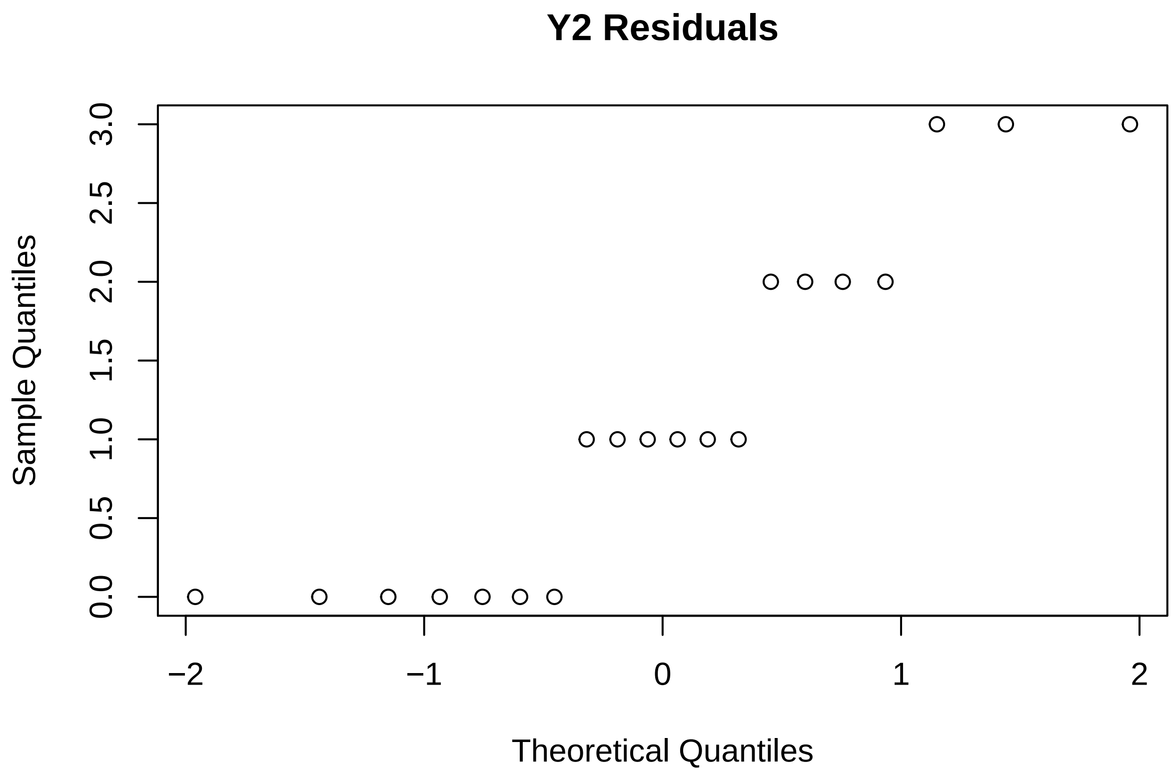
```r
cat("1c. \n ")
```

```
## 1c.
##
```

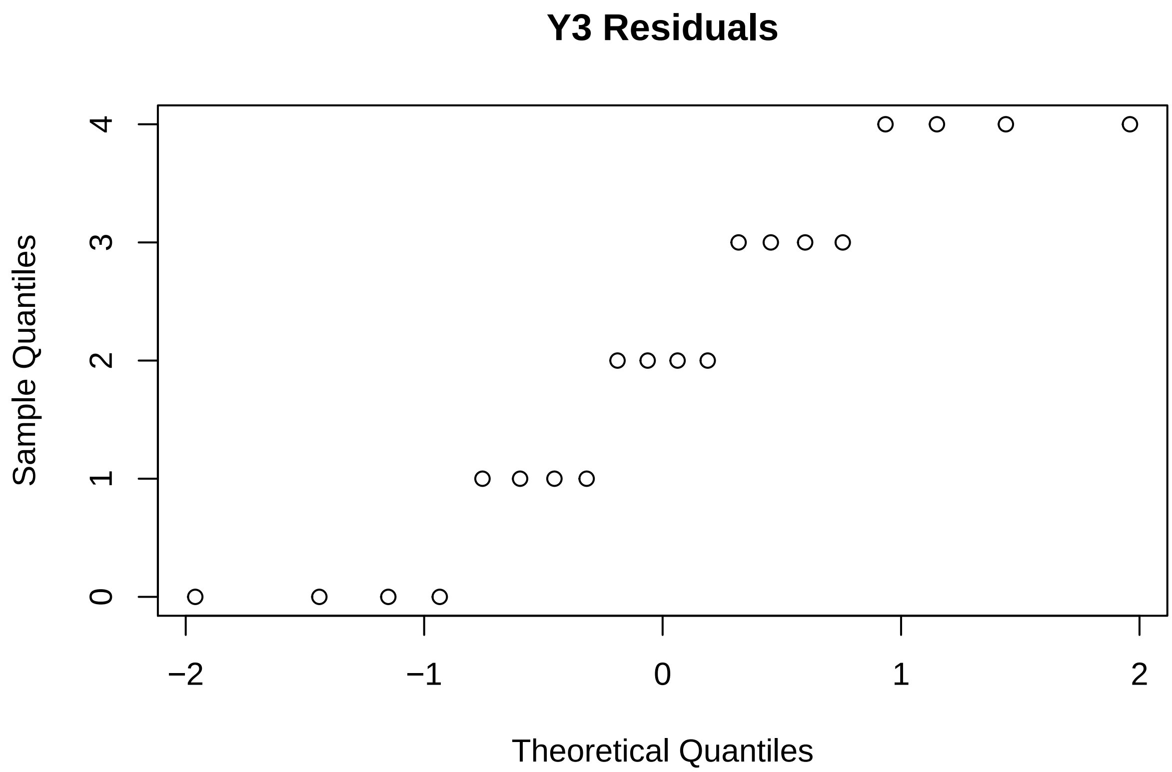
```r
qqnorm(Y1[,1], main = "Y1 Residuals")
```



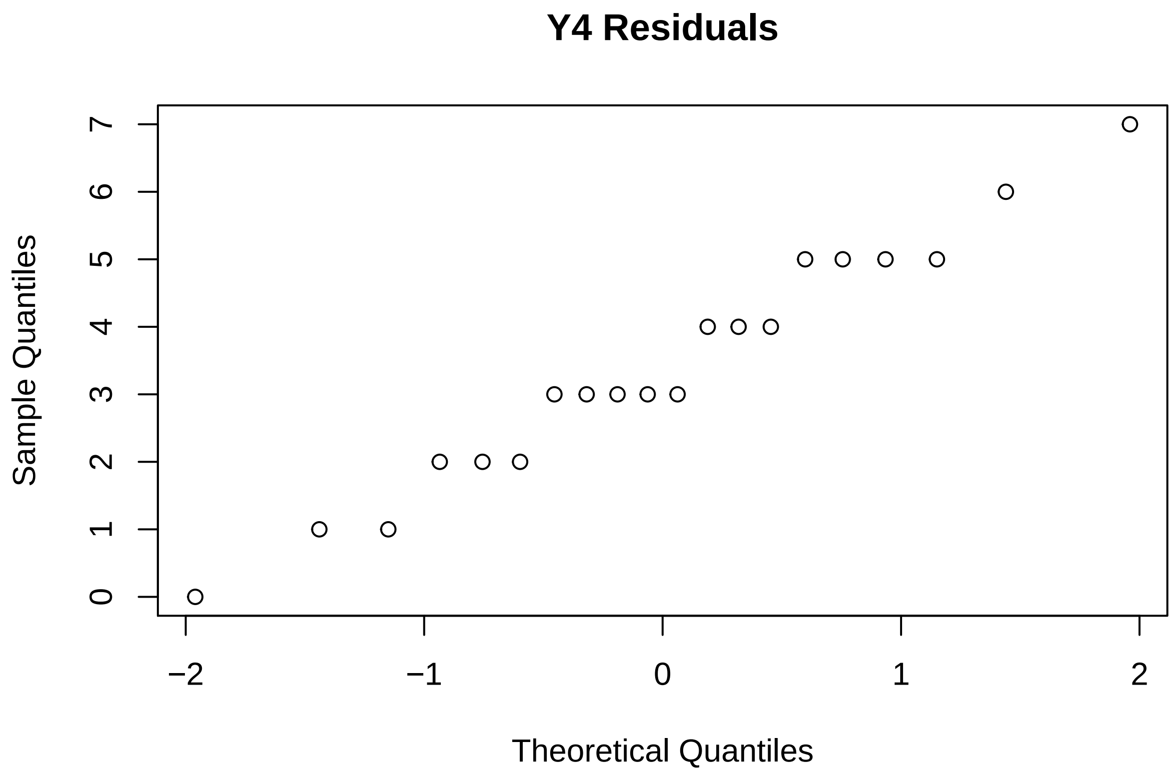

```r
qqnorm(Y2[,1], main = "Y2 Residuals")
```




```
qqnorm(Y3[,1], main = "Y3 Residuals")
```




```r
qqnorm(Y4[,1], main = "Y4 Residuals")
```




```
cat("None of the lines seem to be straight on this qqpnorm for the sets. This means that we must take s
```

```
## None of the lines seem to be straight on this qqpnorm for the sets. This means that we must take some
```

```
cat("1d. \n")
```

```
## 1d.
```

```
#Finding Si^2:
S1 = sqrt((1/19)*(sum((Y1[,1] - Ybar1.)^2)))
S2 = sqrt((1/19)*(sum((Y2[,1] - Ybar2.)^2)))
S3 = sqrt((1/19)*(sum((Y3[,1] - Ybar3.)^2)))
S4 = sqrt((1/19)*(sum((Y4[,1] - Ybar4.)^2)))

#Finding (Si^2)/Ybari.
S21Yb1. = (S1^2)/Ybar1.
S22Yb2. = (S2^2)/Ybar2.
S23Yb3. = (S3^2)/Ybar3.
S24Yb4. = (S4^2)/Ybar4.

#Finding Si/Yi
S1Yb1. = (S1)/Ybar1.
S2Yb2. = (S2)/Ybar2.
S3Yb3. = (S3)/Ybar3.
```

```r
S4Yb4. = (S4)/Ybar4.

#Finding Si/(Yi^2)
S1Yb21. = S1/(Ybar1. ^ 2)
S2Yb22. = S2/(Ybar2. ^ 2)
S3Yb23. = S3/(Ybar3. ^ 2)
S4Yb24. = S4/(Ybar4. ^ 2)

tab <- matrix(c(S1^1, S21Yb1., S1Yb1.,S1Yb21.,S2^1, S22Yb2., S2Yb2.,S2Yb22.,S1^3, S23Yb3., S3Yb3.,S3Yb2
colnames(tab) <- c('S^2','(Si^2)/Ybari.','Si/Yi', 'Si/(Yi^2)')
rownames(tab) <- c('Y1', 'Y2', 'Y3', 'Y4')
tab <- as.table(tab)
tab
```

```
##          S^2 (Si^2)/Ybari.     Si/Yi Si/(Yi^2)
## Y1 1.9708401     0.9959514 0.5053436 0.1295753
## Y2 1.0894228     1.0320366 0.9473242 0.8237602
## Y3 7.6551577     1.0526316 0.7254763 0.3627381
## Y4 1.7888544     0.9411765 0.5261336 0.1547452
```

```r
cat("The best values should come from using a square root transformation for this dataset, as it has the
```

```
## The best values should come from using a square root transformation for this dataset, as it has the s
##
##  Sorry, but this is all I was able to do for this homework assignment in regards to time... I'll mana
```