Data File Used in this Analysis:

```
# M3080 - 1         Tea Data           March 17    2010
#
# From Devore, "Probability and Statistics for Engineering and the
# Sciences 4th ed." Based on the article
# "Folacin Content of Tea," (J. American Dietetic Assoc., 1983)
# Folacin is the only significant B vitamin in tea. Recent methods
# allow its accurate determination in four leading brands of green tea
#
"y" "Brand"
7.9   1
5.7   2
6.8   3
6.4   4
6.2   1
7.5   2
7.5   3
7.1   4
6.6   1
9.8   2
5.0   3
7.9   4
8.6   1
6.1   2
7.4   3
4.5   4
8.9   1
8.4   2
5.3   3
5.0   4
10.1  1
6.1   3
9.6   1
4.0   4
```

R Session:

```
R version 2.10.1 (2009-12-14)
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  Natural language support but running in an English locale
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Type 'q()' to quit R.

[R.app GUI 1.31 (5538) powerpc-apple-darwin8.11.1]

[Workspace restored from /Users/andrejstreibergs/.RData]

> tt <- read.table("M3081DataTea.txt", header=TRUE)
> tt
      y Brand
1   7.9     1
2   5.7     2
3   6.8     3
4   6.4     4
5   6.2     1
6   7.5     2
7   7.5     3
8   7.1     4
9   6.6     1
10  9.8     2
11  5.0     3
12  7.9     4
13  8.6     1
14  6.1     2
15  7.4     3
16  4.5     4
17  8.9     1
18  8.4     2
19  5.3     3
20  5.0     4
21 10.1     1
22  6.1     3
23  9.6     1
24  4.0     4
> attach(tt)
> brand <- factor(Brand)
>#====================SUMMARY STATS FOR EACH BRAND=======
> tapply(y,brand,summary)
$`1`
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  6.200   7.250   8.600   8.271   9.250  10.100

$`2`
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
    5.7     6.1     7.5     7.5     8.4     9.8

$`3`
```
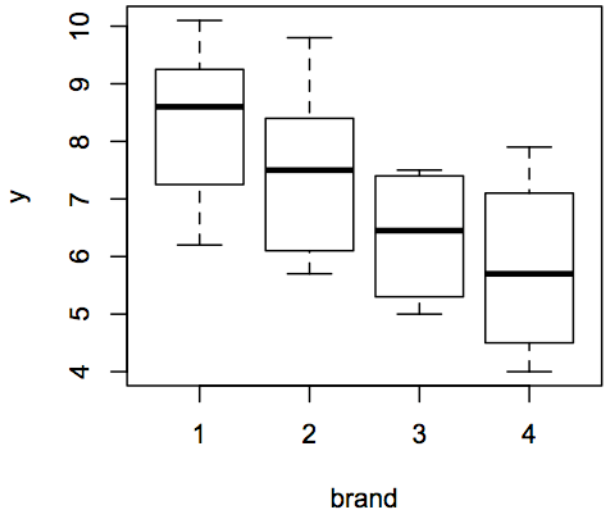
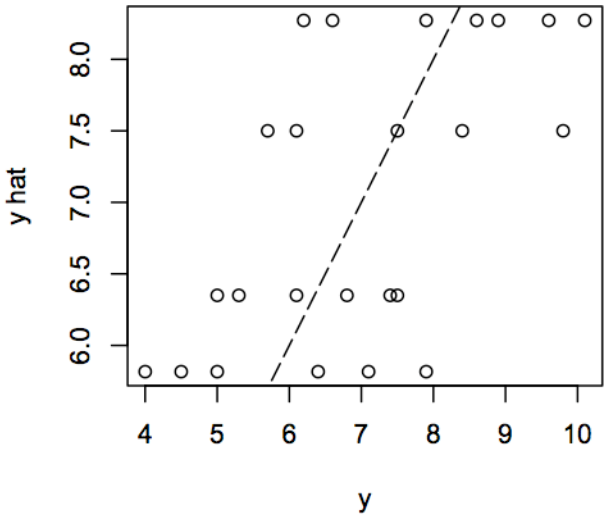
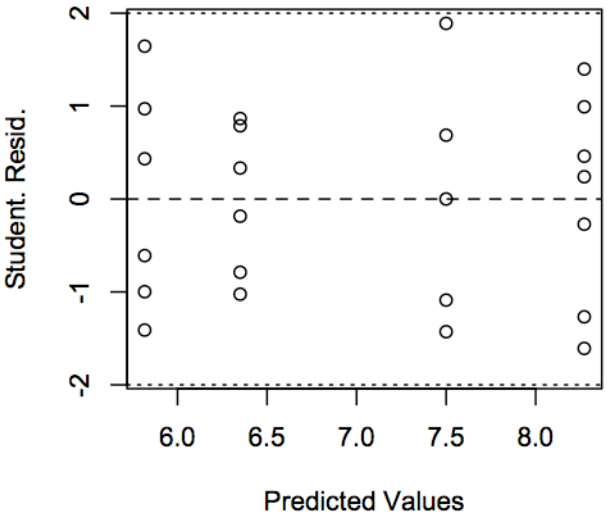
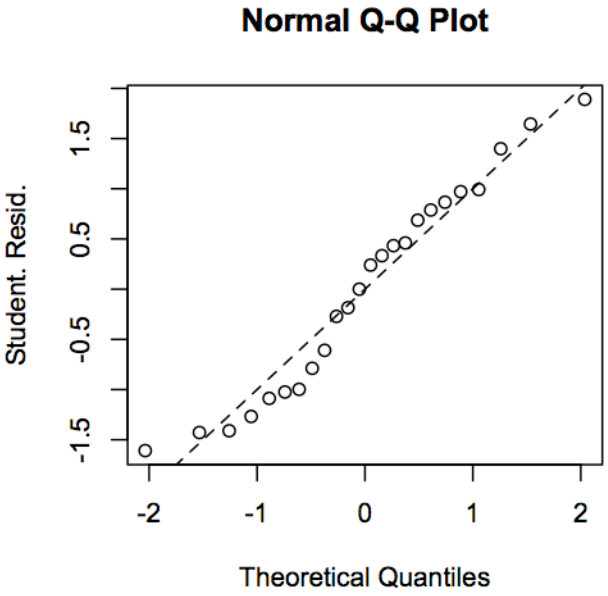

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   5.00    5.50    6.45    6.35    7.25    7.50

$`4`
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  4.000   4.625   5.700   5.817   6.925   7.900

>#============================ANALYSIS OF VARIANCE===========
> f1<-aov(y~brand);summary(f1)
            Df Sum Sq Mean Sq F value  Pr(>F)
brand        3 23.496  7.8319  3.7493 0.02755 *
Residuals   20 41.778  2.0889
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1   1

>#=============DISPLAY MEANS (MU, MU_i'S AND J_i'S)============
> model.tables(f1, type="means")
Tables of means
Grand mean

7.016667

 brand
        1   2    3     4
    8.271 7.5 6.35 5.817
rep 7.000 5.0 6.00 6.000

>#=========================DISPLAY EFFECTS (ALPHA_i'S)=========
> model.tables(f1, type="effects")
Tables of effects

 brand
        1      2       3    4
    1.255 0.4833 -0.6667 -1.2
rep 7.000 5.0000  6.0000  6.0

>#============================PLOT DIAGNOSTICS====================
> layout(matrix(1:4,ncol=2))
> plot(y~brand)
> plot(rstudent(f1)~fitted(f1),ylab="Student. Resid.",
 xlab="Predicted Values",ylim=max(abs(rstudent(f1)))*c(-1,1))
> abline(h=c(0,-2,2),lty=c(2,3,3))
> plot(fitted(f1)~y,ylab="y hat");abline(0,1,lty=5)
> qqnorm(rstudent(f1),ylab="Student. Resid.");abline(0,1,lty=2)

>#===RUN SHAPIRO-WILK TEST TO CHECK NORMALITY OF STUDENT. RESID.====
> shapiro.test(rstudent(f1))

Shapiro-Wilk normality test

data:  rstudent(f1)
W = 0.9533, p-value = 0.3192
```


y
brand


y hat
y


Student. Resid.
Predicted Values


Normal Q-Q Plot
Student. Resid.
Theoretical Quantiles